

# **Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations**

Final report

17 March 2021

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The Competition and Markets Authority has excluded from this published version of the report information which the Inquiry Group considers should be excluded having regard to the three considerations set out in section 244 of the Enterprise Act 2002 (specified information: considerations relevant to disclosure). The omissions are indicated by [✂].

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## Appendices

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B: List of enhancement categories, and Ofwat's FD assessment methodology

C: Base 2019/20 Costs Data

D: Gearing Outperformance Sharing Mechanism and the Modigliani and Miller theorem

## Glossary

# Summary

## Overview

1. This report contains the Competition and Markets Authority (CMA)'s price control determinations for four companies that appealed Ofwat's PR19 price control determinations:<sup>1</sup> Anglian Water Services Limited (Anglian); Bristol Water plc (Bristol); Northumbrian Water Limited (Northumbrian); and Yorkshire Water Services Limited (Yorkshire) (together defined here as the Disputing Companies).
2. Our role is to conduct a redetermination of the price controls for the four Disputing Companies. In doing so, we have taken account of extensive written and oral submissions from Ofwat, the Disputing Companies and Third Parties on the questions that we are required to decide. We have obtained additional facts and evidence where appropriate, including up-to-date data that was not available to Ofwat at the time it made its Final Determinations (Ofwat's FD). We have consulted widely as our thinking has developed, including through the publication of Provisional Findings and consultations on working papers.
3. While we have taken due account of the views we have heard, we are not, in this process, choosing between the positions put forward by the Disputing Companies and Ofwat. Rather, we are required to reach our own independent judgements as to the right outcome based on the facts and evidence before us and that is what we have done. In determining the price controls, our statutory duties require us to balance a range of factors. The legal framework requires us, among other things, to consider the interests of consumers through the lens not only of short-term bills but also in terms of long-term resilience (such as the ability of infrastructure to cope with increasing demand and a changing climate).
4. We are also required to ensure that Disputing Companies can finance their activities by providing a reasonable return on capital to investors. Companies issue debt or raise equity to allow them to undertake projects without relying entirely on upfront charges for customers, which limits fluctuations in customer bills and allows long-lived water assets to be paid for over time by more of the users that ultimately benefit. In return, investors require a return on finance, which customers also pay for over time.

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<sup>1</sup> Under the applicable legal regime, the mechanism by which Ofwat's determinations can be challenged is by way of a redetermination by the CMA.



5. Our task is limited to redetermining the price controls for the Disputing Companies alone. We are not empowered to review the regulatory system more broadly or to redetermine the price control for the water industry as a whole and nor have we done so. However, based on what we have learned during the redeterminations, we have made suggestions where we think it might be helpful about how the application of the price control mechanism might be refined in the future through, for example, the collection of additional data.
6. Our determinations follow the structure and methodology that Ofwat used in reaching its final determination and in many areas we reach the same or similar conclusions to Ofwat, including in areas of contention. However, in other areas, we conclude that the evidence requires us to modify the package that Ofwat imposed to achieve cost-effective improvements in service while at the same time securing that the Disputing Companies are financeable. In this context 'financeable' means that a water company that is operating efficiently is able to earn a reasonable return and therefore to cover the costs of financing both existing and new investment.
7. In arriving at our determinations, we have, consistent with Ofwat's approach, been demanding of the Disputing Companies, especially in terms of the quality of services provided to consumers. We have also placed weight on the consumers' interests not just in price levels but also in the stability and quality of future services which requires the Disputing Companies to be able to meet their financial obligations and to invest in water infrastructure. The key elements of our determinations are as follows:
  - a. We, like Ofwat, conclude that the Disputing Companies should be incentivised to achieve further gains in cost efficiency together with stretching service quality targets in order to improve outcomes and reduce bills for customers in the longer term.
  - b. We increase the Disputing Companies' allowed costs relative to Ofwat's FD by £400 million or 3% over the period of the price control. This change was principally the result of our use of more recent cost data from 2019/20 (not available at the time of Ofwat's FD, nor at the time of our Provisional Findings) which we use to forecast efficient costs. This compares with a request by the Disputing Companies, in aggregate, for an increase of £1.8 billion in their allowed costs.
  - c. We provide for additional cost allowances where the evidence warrants it to pay for improvements in priority areas for customers, like security of supply. In the area of leakage reduction, we recognise the important principle raised by the Disputing Companies that a commitment to

improve outcomes across the whole sector may require companies to spend more than in the past. Having concluded that Northumbrian had not demonstrated a need for additional leakage funding, we performed an in-depth review of the costs of achieving and maintaining lower levels of leakage for Anglian, Bristol and Yorkshire and adjusted the allowances accordingly.

- d. We decide that the package of service targets and related financial incentives imposed by Ofwat should remain in place with minor modifications.
- e. We broadly adopt Ofwat's approach to companies that outspend or under-spend their allowances over the price control period. This means that consumers and investors will share the benefit if the Disputing Companies are able to deliver services more efficiently than we expect and, conversely, share the risk when companies need to spend more than we have allowed. However, we impose sharing rates which are less severe towards the Disputing Companies than Ofwat's but which are better aligned with promoting lower whole-life cost solutions to longer-term problems.
- f. We set an allowed rate of return (or weighted average cost of capital (WACC)) for investors that is low by historic standards. Our WACC is set at 3.2% (in CPIH-real terms) compared to a WACC of 4.7% in the previous price control period (PR14).<sup>2</sup> This 32% reduction in the allowed rate of return reflects a combination of market movements and changes of methodology used to calculate the WACC. Our WACC is 0.2% above the WACC determined in Ofwat's FD and 0.4% to 0.6% below the WACC requested by the Disputing Companies. While our WACC is low in historic terms and significantly below the WACC requested by the Disputing Parties, we conclude that they will be able to finance their activities at this rate of return.
- g. The WACC consists of two components, cost of equity and cost of debt. Our cost of equity is necessarily an estimate as it cannot be directly observed. While our estimate is very low by historic standards, it exceeds that in Ofwat's FD. This is, in part, because we decide to rely on different sources of evidence and also because we have the benefit of more up-to-date data. Our cost of equity is 0.25% above the mid-point of our range of possible estimates. However, we conclude that a cost of equity of this level is needed to secure finance and to

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<sup>2</sup> PR14 figure is 3.74% Appointee WACC in RPI terms, inflated by current 0.9% RPI-CPIH wedge assumption and presented to 1 decimal place.

promote investment in the sector in the long-term, in circumstances where equity costs have fallen sharply.

- h. Our cost of debt largely reflects the actual costs of debt already incurred across the sector, with cross-checks designed to ensure that we are not asking consumers to pay for inefficiently incurred debt.
  - i. We do not include Ofwat's proposed Gearing Outperformance Sharing Mechanism (GOSM) in our determinations for the Disputing Companies. We found the mechanism was not well-designed to increase the financial resilience of the Disputing Companies and might even reduce it, in the absence of any evidence of any relevant benefits that could be shared with customers. Also, we considered there was insufficient evidence that an intervention of this nature was required for the Disputing Companies within this price control.
  - j. We conclude that the return we have allowed is sufficient for the Disputing Companies to finance their activities efficiently. Ofwat also concluded that its determinations were financeable but it did so by advancing cashflows from future periods through pay-as-you go (PAYG) adjustments for three out of the four Disputing Companies. We conclude that our determinations are financeable without these adjustments and note that reversing Ofwat's adjustment largely offsets the effect of our higher WACC on bills for these Disputing Companies. Our approach to assessing whether the Disputing Companies' determinations are financeable is more consistent with the approach taken by the rating agencies. We were concerned that Ofwat's approach would increase bills in the current price control without any confidence that it will in practice improve the credit-worthiness of the companies or, indeed, that on the contrary it might adversely affect financial resilience in the future which could result in higher costs for the companies and their customers.
8. The indicative impacts of our findings on average annual customer bills are provided in Table 1.<sup>3</sup> This table demonstrates that customers will benefit from an average £34 reduction (or 10%) in their annual bills from their level in 2019/20.
9. We have included in this table a comparison of the indicative impact of our determinations with Ofwat's FD and the Disputing Companies' business

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<sup>3</sup> The price control sets revenue allowances for the individual companies. This determines the average bill that the company can charge its customers. Individual bills will vary depending on the charging scheme adopted by the company, see Ofwat's [information on charging](#).

plans. This demonstrates that the outcome of our independent determinations is closer to the Disputing Companies' business plans than Ofwat's FD. This is largely because, on the basis of more up-to-date data, we have concluded that the Disputing Companies require additional allowances to operate their businesses. While we have also adopted a higher WACC than Ofwat, the impact of this on bills is, as explained in paragraph 7.j, offset to a significant degree by the reversal of Ofwat's cash-flow advancement.

**Table 1: Indicative impact of our determinations on annual customer bills\***

	<i>Historical bills (2019/20)</i>	<i>Average bill in April business plan†</i>	<i>Average bill under Ofwat's Final Determination (FD)</i>	<i>Average bill under CMA final determination</i>	£ per year
Anglian (water and sewerage)	422	418	386		400
Bristol (water only)	182	174	160		172
Northumbrian (water and sewerage)	429	343	323		335
Yorkshire (water and sewerage)	383	379	364		374

Source: CMA analysis

\* Footnote: The numbers in this table reflect the average amount per customer charged, expressed at constant (inflation adjusted) prices (2017-18 CPIH deflated). Individual customer bills will vary depending on a number of factors such as the whether the property is metered or not and, for metered customers, the amount of water consumed.

† Footnote: The April business plan figures here are taken from Ofwat's published documents and may not align with all of the implications of the company's submissions in their Statement of Case or subsequently.

## Background

10. Ofwat is the economic regulator for the monopoly water suppliers in England and Wales. Every five years, it carries out reviews of the price controls applying to these suppliers. These set the maximum revenues the companies can raise from customers. Ofwat's most recent PR19 price review, which governs the period 2020 to 2025, is the subject of these redeterminations.
11. Ofwat's themes for PR19 included long-term resilience in the round, affordable bills, innovation and great customer service. Ofwat said that from the initial development of the PR19 methodology it had been clear with companies that the price review was not going to preserve the status quo as the sector faced profound challenges, such as climate change, population growth and shifting customer expectations and so the sector needed to strengthen its operational performance. It said it was important to set a stretching but achievable level of overall challenge. Its concerns included that productivity growth had stagnated and that there was little overall leakage reduction, even though some companies had managed to achieve high performance on service measures and high cost efficiency. It noted though that companies, on average, had tended to outperform the cost allowances in past periods.

12. In its 'Putting the sector in balance' position statement in 2018,<sup>4</sup> Ofwat raised further concerns about high dividend payments; levels of executive pay; and complicated and potentially risky financial structures which it said call financial resilience into question. At PR19 it introduced the GOSM that it said would share the benefits of higher gearing with customers.
13. On 17 December 2019, Ofwat published its FD of the PR19 price controls applying to all the water and wastewater service suppliers in England and Wales for the asset management period 2020-2025 (also referred to as AMP7).
14. The Disputing Companies asked that Ofwat refer their price controls to the CMA for redetermination and Ofwat did so on 19 March 2020.
15. The reasons for rejecting the PR19 determinations identified by the Disputing Companies included that Ofwat had:
  - a. provided insufficient funding to deliver business plans including enhancement expenditure to improve resilience;
  - b. failed to recognise the link between costs incurred and delivering higher levels of service (the 'cost-service disconnect');
  - c. inappropriately set too low a cost of capital;
  - d. given insufficient weight to evidence on customer views; and
  - e. increased levels of risk for companies (notably from asymmetric outcome delivery incentives (ODIs)) and, together with the other elements of the determination, this had undermined their financeability.
16. In general terms, the Disputing Companies argued that Ofwat was overly concerned with short-term bill impact at the expense of other factors like resilience.
17. The Disputing Companies operate in different areas of the country and face, to some extent, different topographies, populations and climates which, in turn, impact the nature of the cost and service challenges they face. There are also differences in their activities: Anglian, Northumbrian and Yorkshire all

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<sup>4</sup> Ofwat (2018), [Putting the sector in balance: position statement on PR19 business plans](#), section 6

supply both water and wastewater (sewerage) services, while Bristol supplies only water.<sup>5</sup>

18. The price paid by each customer is not set directly by the price control. Rather, the companies' tariffs must be consistent with the revenue limits, which are derived from costs and levels of profit which the regulator identifies as allowable on the basis of its statutory duties. Ofwat also sets service quality targets, reinforced by a package of financial and reputational incentives. When reaching its determination, Ofwat is bound by a number of statutory duties, both primary and secondary, and, with respect to English water companies, it has to act in accordance with objectives set out in a Strategic Policy Statement (SPS) issued by the Department of Environment, Food and Rural Affairs (Defra).
19. As noted in paragraphs 2 and 3, in carrying out a redetermination, the CMA is not bound simply to accept or reject the position adopted by Ofwat or the Disputing Companies; rather we evaluate the evidence and adopt what we consider to be the best approach to the issues we are deciding on. In doing so we must take account of the same statutory duties as Ofwat (including the SPS).
20. The scope of our determinations extends to all aspects of the price control and not just the issues raised by the Disputing Companies. However, we have prioritised our consideration of what we regarded as the key elements of the price controls in light of the time and resources available and so have not carried out an in-depth consideration of all aspects of the price control.
21. Water and wastewater services are essential to customers. We have been mindful of the issue of vulnerable customers, both those who are financially vulnerable and so face difficulties meeting their water bills and those who are vulnerable for other reasons. There are a variety of measures in use by the water companies to address these concerns, for example, through running a Priority Services Register and offering social tariffs. While we consider these extremely important, most of these measures lie outside the scope of the price control. Where relevant to the price control, we have given these careful consideration.
22. We have used the same regulatory building blocks as Ofwat used in its determinations. In particular, we have maintained Ofwat's approach of:

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<sup>5</sup> Water companies are either water and sewerage companies (WASCs), or water-only companies (WOCs). Some WASCs also own WOCs; for example Northumbrian, in addition to its operations in the North East of England, owns Essex & Suffolk Water, a WOC.

- a. setting four wholesale price controls covering different activities, managing bioresources as an average revenue control and setting a retail price control; and
  - b. separating our assessment into its major component parts around costs, service and financial returns.
- 23. While we did not consider it would be practicable to adopt a wholly different regulatory framework within the context of our redeterminations, there are also a number of areas which have arisen in our assessment where we considered that Ofwat's approach was flawed and we have rejected or adapted that approach. We have also noted in our report where consideration should be given to refinements to aspects of the regime in the future.
- 24. This report sets out our decisions in relation to each of the major building blocks of the price control. In reaching our decisions we have taken account of the same statutory duties as applied to Ofwat, and we have had regard to the principles of best regulatory practice and the need to act in accordance with the SPS, but have exercised our own regulatory discretion in appropriately balancing these statutory duties.
- 25. In reaching our conclusions we have taken into account additional evidence that was not available at the time of Ofwat's FD. We have considered updated market data, submissions of the Main Parties and Third Parties, reviews of business plans and specific projects, and the advice of engineering advisers, to reach these conclusions.
- 26. We have used cost data from the last year of the previous price control (2019/20) that was not available at the time of Ofwat's FD (or when we published our Provisional Findings). We recognise that by including 2019/20 data we introduce a risk that the Disputing Companies' allowance could be overestimated due to the possibility that a limited amount of investment has been brought forward into 2019/20. However, we consider that the advantages of using the most up-to-date data (such as accounting for the most recent information and increasing the number of observations in the model) outweigh the risks of potential bias, noting that other sources of potential bias due to anticipated or deferred expenditure may work in the opposite direction, regardless of whether we make use of the most recent data.
- 27. In order to finally determine the price controls for each company for each activity, we have translated our decisions on each of the building blocks into a revenue allowance for each Disputing Company.

28. We have considered the extent to which we should take account of the impact of Coronavirus (COVID-19) on water companies' costs and performance in our determinations. However, there are significant difficulties in assessing these impacts within the framework of the redetermination given that the pandemic has not yet run its course. There remains significant uncertainty regarding the full impact of COVID-19 on the water sector as well as the timing, duration and scale of such impacts. For these reasons, we consider that the best mechanism for taking direct account of impacts of COVID-19 is for Ofwat to consider these as part of an industry-wide process; Ofwat has proposed it will consider the need for any ex-post adjustments at a time aligned to its normal PR19 reconciliation process.

## **Totex (total expenditure)**

29. We set a funding allowance (totex) to cover forecast necessary costs, covering both base expenditure, which covers routine costs that companies incur, and enhancement expenditure, which covers the costs of enhancing the capacity or quality of the services provided by the water companies. Base costs account for approximately 75% of totex across the industry.
30. Accordingly, totex covers both operating expenditure (opex) and capital expenditure (capex); this approach was introduced by Ofwat at the previous PR14 price control to incentivise overall efficiency and address concerns that previous approaches assessing capex and opex separately had led to a focus on capital solutions at the expense of possibly more efficient opex solutions.
31. In order to mitigate the risk that we set a totex allowance that turns out to be either too low or too high, and in line with Ofwat's approach, we include an overall totex cost-sharing mechanism which applies to the majority of totex. Under the cost-sharing mechanism, if a company underspends its allowance, customers share in the saving made. Conversely, if the company needs to overspend to deliver the necessary services, it can recover part of the costs from customers.
32. The proportions in which any cost difference is shared between customers and investors is known as the sharing rate. Ofwat applied a formula to determine the sharing rate for each company which was designed both to provide incentives for accurate information revelation in the business plans that companies submit as part of Ofwat's price control process and to provide incentives to be more efficient.
33. We agree with Ofwat that there is merit in providing incentives for companies to provide accurate business plan information during the price control process. However, we also considered that the cost-sharing mechanism



should avoid creating a significant risk of perverse incentives, particularly in relation to schemes that require investment over multiple periods. Such mechanisms should balance the need to set strong efficiency incentives with the need to appropriately mitigate the risks of over and under performance, some of which will likely relate to factors outside the companies' control. We therefore decide to depart from Ofwat's cost sharing rates and apply the same asymmetric rate to all of the Disputing Companies. Our approach results in the company bearing 55% of the cost of any overspend and receiving 45% of the benefit of any underspend.

## **Modelled base costs**

34. Water companies conduct many routine activities in order to run their businesses and provide a base level of service to customers.
35. We adopt an econometric modelling approach to assess most of the costs of this base level of service, using data from across the sector. Comparative benchmarking allows us to estimate the efficient costs for these day-to-day operations, rather than relying on individual company data or forecasts. Our modelling approach is similar to Ofwat's, although we adjust the econometric models and expand the dataset by including data from 2019/20 (which was not available at the time of Ofwat's FD). This results in some adjustments to the base costs allowances.
36. Our cost models estimate how much it would cost the averagely efficient water company to cover base operations. However, we want to set cost allowances for a water company that is more than merely averagely efficient, and so we apply a 'catch up' efficiency challenge. Our decision is to use the company at the upper quartile as the benchmark and reduce the Disputing Companies' allowances accordingly. We consider this sets a challenging benchmark whilst acknowledging the limitations of our econometric modelling (and the consequent risk that the company will have insufficient allowed revenue to ensure a base level of service). Our benchmark is set at a similar, although slightly less demanding, level to Ofwat's.
37. Future costs are likely to differ from the historical benchmarks because of changes to productivity levels and input costs. We therefore:
  - a. Apply a 'frontier shift' which reduces the modelled allowance by 1% per year to reflect expected productivity gains from improvements in technology and new ways of working. This adjustment, which reflects the evidence of productivity levels in other sectors, is slightly lower than the equivalent adjustment made by Ofwat.

- b. Provide a real price effect (RPE) adjustment for labour costs. We also include a reconciliation mechanism for these labour costs to protect both customers and the company if there are differences between forecasts and actual wage inflation. The evidence we reviewed did not support introducing RPEs for other cost categories.
- 38. Serving new properties involves additional costs for water companies: both the costs of installing new connections, and from the demand increase, necessitating reinforced or additional infrastructure. Like Ofwat, we:
  - a. reduce or increase the allowance depending on whether forecast growth is above or below the industry average; and
  - b. include a reconciliation mechanism to protect against differences between forecasts and actual growth.
- 39. However, we apply these differently than Ofwat. First, we decide to use symmetrical downward and upward adjustments for the impact of forecast growth, whereas Ofwat had applied a more limited downward adjustment in revenues in respect of lower than industry average growth. Second, we expand the scope of the reconciliation mechanism better to reflect the costs associated with growth.
- 40. Ofwat's historical data collection approach contained no distinction between base opex and enhancement opex. Therefore, Ofwat's modelled base costs could double-count enhancement opex if an adjustment was not applied. We decide to use the same approach as Ofwat used in its FD, which is to estimate an implicit allowance for enhancement opex and adjust the companies' allowance accordingly.
- 41. The approach described above is reliant on econometric models which are based on a limited set of explanatory variables and, like any econometric model, are subject to some limitations and a degree of uncertainty in their final estimates. This means that there could be company specific circumstances which are not reflected in our modelling. We have therefore, like Ofwat, assessed whether any cost adjustments should be made to reflect individual Disputing Companies' specific circumstances.
- 42. We assessed a small number of cost adjustment claims raised by Anglian, Bristol and Yorkshire. These included claims relating to capital maintenance and sludge transport, which we reject, and for Bristol, a claim for abstraction costs, which we partially accept. We also, as described in paragraph 79, accept requests for additional funding for leakage.

## Unmodelled base costs

43. In designing our base models discussed above, we have excluded certain costs that are unsuitable for modelling where, for example, there is insufficient data for modelling or where exceptional circumstances apply to particular companies. We refer to these as unmodelled base costs. These include costs associated with abstraction, business rates, and compliance with the Industrial Emissions Directive (IED) and Traffic Management Act (TMA).
44. Ofwat made an allowance for the companies' unmodelled costs, and we decide that these are largely appropriate. We also generally agree with Ofwat's approach to applying a cost-sharing mechanism to these costs which took account of the extent to which they lie within management control.
45. We make some company-specific decisions on certain unmodelled costs as follows:
  - a. Bristol: We allow most of the cost adjustment claim it made to reflect its costs of purchasing water from the Gloucester and Sharpness Canal (G&S Canal).
  - b. Northumbrian:
    - i. Northumbrian has atypical abstraction costs associated with the Kielder Reservoir, that have increased following an Environment Agency consultation which finished after Ofwat's FD was published. It has also experienced a cost increase since Ofwat's FD in relation to bulk supply costs from Thames Water. We reflect this new information by allowing Northumbrian additional allowances to cover these costs.
    - ii. Business rates: Ofwat was not aware of, and did not reflect in its FD, a revision of Northumbrian's rateable values which took place in 2018. This resulted in an over allowance, which we remove in our determination.
    - iii. IED compliance costs: We decide to make a relatively small allowance to cover some costs to ensure compliance with the IED due to changing interpretation of this legislation.
46. We also conclude that the cost-sharing rates for business rates costs should differ to some extent from those applied more generally to unmodelled costs, reflecting the relatively limited degree of management control over these costs.

47. We do not apply a frontier shift to business rates or abstraction charges as we conclude that these costs were in the most part outside of company control. However, we apply a frontier shift to other unmodelled costs of 1% together with a labour RPE (with a true-up mechanism where labour costs differ from forecasts). We consider our approach does not give rise to any double-counting necessitating an adjustment.
48. Our conclusions with respect to the base cost allowance for each Disputing Company are set out in Table 2.

**Table 2: Base cost allowances for each Disputing Company**

	£m (over 5 years)*			
	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
Raw base models	3,494	367	2,133	3,161
Catch-up	-66	-5	-37	-57
Frontier shift + RPEs	-56	-6	-34	-51
Growth	30	4	-39	-47
Enhancement Opex	-14	-3	-11	-14
Cost adjustment claims	43	10	5	16
<b>Total modelled base costs</b>	<b>3,430</b>	<b>367</b>	<b>2,016</b>	<b>3,008</b>
Abstraction charges	50	15	200	26
Traffic management	6	4	6	21
Business rates (Local authority and cumulo rates)	311	24	185	280
IED compliance costs	0	0	12	0
<b>Total unmodelled base costs</b>	<b>367</b>	<b>43</b>	<b>402</b>	<b>327</b>
<b>Total base costs</b>	<b>3,797</b>	<b>410</b>	<b>2,418</b>	<b>3,335</b>
<i>Change vs Ofwat FD (£m)</i>	<i>+71</i>	<i>+28</i>	<i>+87</i>	<i>+121</i>
<i>Change vs Ofwat FD (%)</i>	<i>+1.9%</i>	<i>+7.5%</i>	<i>+3.8%</i>	<i>+3.7%</i>

Source: CMA analysis

\* Footnote: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

## Enhancement costs

49. Within Ofwat's framework, the enhancement allowance is intended to cover the costs of the water companies undertaking investment to enhance the resilience, capacity or quality of service beyond a base level, such as building a new reservoir or treatment works, building strategic interconnectors to connect up parts of the network, and introducing new measures to protect wildlife.
50. Enhancement expenditure may be driven by a number of factors, including new statutory obligations and strategic priorities. The largest of these are generally:
- Environmental improvements: Water companies have proposed numerous environmental projects, whilst also facing increasing obligations to improve their environmental outcomes including from the increased scope of the water industry national environment programme

(WINEP) which is a set of statutory requirements overseen by the Environment Agency. In particular, Anglian, Northumbrian and Yorkshire face significant additional costs to remove phosphorus (which can cause excessive algal growth if discharged into rivers) from wastewater.

- b. Supply-demand balance: One of the responsibilities of a water company is to secure a balance of supply and demand including in the light of ongoing trends such as climate change and population growth. Water companies have a statutory requirement to develop a water resource management plan (WRMP) every five years, setting out how they intend to balance supply and demand over at least the next 25 years. Supply-demand balance can be influenced by investment in major new infrastructure (eg reservoirs) but also by measures to reduce leakage or reduce consumption.
- c. Resilience: Enhancement funding aims to provide improved operational resilience by funding schemes which address the risk of low-probability high-consequence events, such as ensuring properties are not reliant on a single source of supply or adding in additional support / back-up for critical infrastructure.

- 51. In Ofwat's FD, the four Disputing Companies were awarded enhancement allowances totalling £2.7 billion. This is substantially higher than their expenditure in previous periods and reflects (amongst other things) material new WINEP obligations.
- 52. Ofwat's preferred method of assessment for enhancement was a benchmarking analysis of forecast costs. For other categories, Ofwat followed a 'risk-based process' of having a lighter touch ('shallow dive') assessment for low materiality costs and a more thorough assessment of the evidence ('deep dive') for high materiality costs, each based on the company's business plans.
- 53. In our review of enhancement expenditure, we have generally focused on areas where Ofwat and the Disputing Companies have provided conflicting views and where we needed to resolve these in coming to our determination. These accounted for the majority of enhancement spend. For other enhancement expenditure, including some major schemes which met Ofwat's evidential threshold to receive additional enhancement funding, we adopt the same approach as Ofwat did in its FD.
- 54. We have adopted the same broad approach as Ofwat to assess enhancement allowances, including a combination of benchmarking, deep dives and shallow dives. We have applied these approaches to categories of spend for the

Disputing Companies, and, like Ofwat, consider any efficiency challenges which should be applied to these allowances. Our approach often involved an assessment of additional evidence or arguments which were not available at the time of Ofwat's FD.

55. We have made use of comparative data (including modelling, engineering comparisons and cost benchmarking comparisons) where available to develop our best estimate for efficient enhancement costs. Where a comparative approach is not appropriate, we are more reliant on evidence provided by the company proposing the enhancement. In these cases, we have, with the assistance of our engineering advisers, where necessary, reviewed the evidence provided by the Disputing Companies about the need for and costs of the more material schemes to assure ourselves that the proposed investment is both appropriate and efficiently delivered.
56. We apply efficiency challenges and reduce allowances where we are concerned about the robustness of the evidence provided for enhancement schemes. In doing so we are seeking to ensure that customers do not overpay for inefficient service whilst also ensuring sufficient allowance is available to achieve the enhanced level/quality of service. Consistent with our decision on base costs above, we apply a frontier shift on all enhancement costs (not just WINEP and metering as Ofwat did) together with a labour RPE. We do this in a way that avoids double-counting the efficiency challenges that we apply.
57. The most material enhancement area where both Ofwat and we decided to use benchmarking relates to phosphorus-removal and wastewater WINEP allowances more generally. These are large and broadly comparable programmes of work. Our decision is to make adjustments to Ofwat's phosphorus-removal allowances using a broader range of model specifications but to adopt the same overall approach. This results in relatively modest increased allowances for Northumbrian and Yorkshire of around £4 million and £9 million respectively.
58. The Disputing Companies raised a number of specific projects where they argued that Ofwat had not approved sufficient, or any, funding. Ofwat rejected applications for enhancement projects where it decided that the company in question had not demonstrated that key considerations had been met, such as sufficient need for the project, that the proposal was the best option for customers, and that it had been robustly and efficiently costed. We also needed to be satisfied on these issues but have undertaken our own appraisals of the proposed projects and have had the benefit of additional evidence where available.

59. For Anglian these projects are:

- a. Strategic Interconnector Programme: Anglian proposed to build a series of interconnectors to transport water around its region in order to provide for an improved supply-demand balance and increased resilience. We are supportive of this aim and the benefits it will bring customers. After careful review, we consider that Anglian has demonstrated its plans are prudent and costs are efficient. We provide Anglian with its full requested additional allowance for this scheme.
- b. Smart Metering Scheme: Anglian proposed to install smart meters in nearly all properties in its region by 2030, which would particularly assist with reducing leakage and water consumption in an area of the country which has relatively little rainfall. We are supportive of Anglian's proposal but concerned that certain elements of its requested allowance would result in customers paying twice for the same activities as metering forms an element of base activities. We therefore allow some but not all of Anglian's requested allowance to cover the incremental costs of installing smart meters.
- c. Water Resilience Scheme: Anglian included a request for additional funds for the replacement of certain assets within its water treatment works, and development of a new risk planning tool. Our decision is that these activities represent incremental improvements which the sector has delivered, and continues to deliver, as part of its day-to-day operational functions, and so we reject Anglian's request for an additional allowance for this scheme.
- d. Security-related activities: Anglian included a request for additional funds for the delivery of certain water security-related activities. We do not increase Anglian's allowances on Security and Emergency Direction (SEMD)<sup>6</sup> activities since these have been funded already in PR14. For non-SEMD activities we provide an additional allowance, but with an efficiency challenge on aspects where the evidence provided on cost efficiency was insufficiently robust.
- e. Bioresources Scheme: Anglian proposed to expand one of its sludge treatment centres to accommodate expected increases in the level of

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<sup>6</sup> [The Security and Emergency Measures \(Water and Sewerage Undertakers\) Direction 1998](#) directs undertakers to maintain plans to provide a supply of water at all times. [The Security and Emergency Measures \(Water Undertakers\) Direction 2006](#) places a qualified duty on undertakers to provide a water supply to a licensed water supplier where (i) there is an access agreement in place and (ii) the licensed water supplier requests the water undertaker to provide it with a supply of water in the event that the licensed water supplier is unable to provide a supply to its customers due to an emergency or security event.

sludge being produced in the future. We find that this proposal is reasonable given the limited availability of alternative capacity from other suppliers, and reflects an efficient whole-life approach to the issue identified. However, we challenge certain costs which were not directly associated with the scheme or would already have been funded through the rest of the determination.

60. In addition to the above schemes, we have considered Anglian's costs for removing metaldehyde from water, following the reintroduction of a ban on the use of this pesticide part way through the price control period. We consider that Anglian has atypically high costs due to metaldehyde's extensive use in its region. We allow £12.7 million to ensure Anglian is funded for the water treatment and product substitution activities necessary until metaldehyde is no longer in the environment.
61. We also considered Anglian's exposure to uncertainty in relation to its Elsham scheme (which will provide additional water transfer, storage and treatment capacity) and the potential to deliver this in-house. We decide that the arrangements which Ofwat has put in place provide an appropriate means to resolve this issue, and so make no associated changes to totex allowances, performance commitments (PCs), or outcome delivery incentives (ODIs) as part of our determination.
62. For Northumbrian, these projects are:
  - a. Essex Resilience Scheme: Northumbrian proposed to build a new interconnector for Essex & Suffolk Water to allow the transfer of raw water between its reservoir in Abberton and its reservoir in Hanningfield, to mitigate the risk of substantial supply loss to the local area (in the context of ongoing climate change, population growth, and other risk factors). We consider that, in light of the nature of the risk, the cost of addressing the issue is relatively modest particularly given the number of households affected and the long-life nature of the solution which would provide ongoing benefits for many years to come. We provide an allowance for this scheme. However, we have some concerns around the level of evidence provided on cost efficiency for the scheme, so apply a 10% challenge to Northumbrian's request; and
  - b. Sewer Flooding Resilience Scheme: Northumbrian proposed to undertake a 'proactive' scheme to reduce the risk of sewer flooding in properties which have not previously been flooded. We do not include any increased allowance for this scheme as we have not seen robust evidence that the scheme proposed by Northumbrian represents incremental benefits for customers which should attract additional



enhancement funding, rather than simply reflecting an alternative approach to carrying out its base activities (which are already funded).

63. For Yorkshire, these projects are:
- a. Living with Water Partnership in Hull and Haltemprice: We provide additional enhancement funding to help address the unique circumstances in this area which result in an increased risk of flooding. However, we apply an efficiency challenge to the estimate included in Yorkshire's business plan; and
  - b. Internal Sewer Flooding Scheme: Yorkshire submitted that its region has a higher prevalence of cellars and back-to-back properties which result in a higher number of internal sewer flooding incidents, and requested funding to address this issue. We do not provide any increased allowance for this scheme as we have not seen robust evidence to support Yorkshire's claims that this is a material, unique factor which justifies additional funding.
64. Bristol did not raise any specific enhancement schemes which required us to undertake a deep dive review.
65. When providing companies with specific funding to undertake additional activities, there is a risk that the company does not subsequently choose to proceed with the scheme while customers nonetheless bear the cost. In order to ensure that the higher level of service being funded by these schemes is delivered, we include a number of scheme-specific mechanisms to protect customers from non- or under-delivery of these schemes.
66. Our determinations of the Disputing Companies' wholesale totex allowances are shown in Table 3.

**Table 3: Enhancement cost allowances for each Disputing Company compared with Ofwat's FD**

	£ million†			
	Anglian	Bristol	Northumbrian	Yorkshire
<b>Ofwat FD allowance</b>	<b>1,425</b>	<b>30</b>	<b>352</b>	<b>906</b>
Water models	0	0	0	0
Wastewater models (incl WINEP)	0	N/A	+4	+9
Shallow dive challenges	0	0	0	0
Deep dive challenges	0	0	-7	-5
Deep dives	+50	0	+18	+7
Metaldehyde	+13	0	0	0
Frontier shift*	-14	-1	-5	-1
Net change in leakage	-7	0	0	+28
<b>Total enhancement allowance</b>	<b>1,466</b>	<b>30</b>	<b>363</b>	<b>943</b>
<i>Change vs Ofwat FD (£m)</i>	<i>+41</i>	<i>-0.3</i>	<i>+11</i>	<i>+38</i>
<i>Change vs Ofwat FD (%)</i>	<i>+2.9%</i>	<i>-1.0%</i>	<i>+3.1%</i>	<i>+4.2%</i>

Source: CMA analysis

\* Footnote: Figures reported in the table above this line do not include the effects of frontier shift – all of this challenge is included in the specified row; this row includes both changes to scope and scale of frontier shift as well as removal of double-counting with shallow dives

† Footnote: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

## Overall totex

67. Our determinations of the Disputing Companies' wholesale totex allowances are shown in Table 4.

**Table 4: Totex cost allowances for each Disputing Company**

	£ million†			
	Anglian	Bristol	Northumbrian	Yorkshire
Modelled base allowance (including CAC)	3,430	367	2,016	3,008
Unmodelled allowance	367	43	402	327
Enhancement allowance	1,466	30	363	943
Other totex allowances*	-90	-7	-40	-67
<b>Total</b>	<b>5,173</b>	<b>432</b>	<b>2,742</b>	<b>4,211</b>
<i>Change vs Ofwat FD (£m)</i>	<i>+108</i>	<i>+27</i>	<i>+112</i>	<i>+158</i>
<i>Change vs Ofwat FD (%)</i>	<i>+2.1%</i>	<i>+6.6%</i>	<i>+4.3%</i>	<i>+3.9%</i>

Source: CMA analysis

\* Footnote: Other totex allowances include operating lease adjustments; strategic regional water resources solutions and other cash items; third party costs; non-section 185 diversions; ex-ante cost sharing adjustment; grants and contributions (after adjustment for income offset, and updated for our determination); and pension deficit recovery costs. Prices are deflated for inflation (based on Consumer Prices Index Including Owner Occupiers' Housing Costs (CPIH) measure).

† Footnote: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

## Outcomes

68. Ofwat's FD included a large number of performance targets or commitments for each company, supported by a package of financial and reputational delivery incentives.
69. These PCs and ODIs were derived from proposals made by the companies, having conducted research into customers' priorities and willingness to fund

incentives. Ofwat intervened in the companies' proposals on PCs and ODI rates or structure where it considered appropriate having conducted a comparative evaluation of company proposals, and taking account of customer views, and performance in previous price control periods.

70. The resulting package included eleven Common PCs applying to all water companies and a further four Common PCs applying to all WASCs, as well as a number of Bespoke PCs for each company. The Common PCs covered areas such as:
  - a. performance level measures (for example, water supply interruptions and pollution incidents);
  - b. asset health measures (such as mains repairs and sewer collapses);
  - c. measures to reduce water demand (leakage and per capita consumption); and
  - d. measures to help vulnerable consumers (priority service register).
71. Most PCs were accompanied by financial incentives in the form of ODIs, either as designed by the companies based on customer research, or as amended by Ofwat. In some cases, Ofwat set symmetrical ODI rates with the same rates for out and under-performance, while in other cases asymmetrical rates were used. Ofwat also made use of so-called penalty-only ODIs, which carry a penalty for under-performance but no reward for out-performance. Ofwat also made use of so-called 'enhanced ODI rates', which provide a higher rate of reward (or penalty) for performance beyond (or below) a given threshold.
72. The ODIs included caps on the level of outperformance rewards (both at standard and enhanced rates) in some circumstances to limit these and the consequent impact on customer bills. Likewise, the ODIs included penalty collars to limit the company risk of incurring substantial under-performance penalties. In some cases, the ODIs also included 'deadbands', which allow for a degree of under-performance before a penalty is triggered.
73. Ofwat's approach to outcomes and PCs at PR19 included:
  - a. Setting three Common PCs on the basis of upper quartile forecast performance, with the remainder set with reference to the ranges of anticipated performance included in companies' business plans.
  - b. Seeking a minimum reduction of 15% for leakage.

- c. Having a 3% gross RoRE (return on regulatory equity) limit on the overall size of any outperformance rewards earned and a 3% gross limit on the overall size of any under-performance penalties incurred by a company.
- 74. Overall, we decide that the package of PCs and ODIs imposed by Ofwat should largely remain in place. In doing so, we conclude that:
  - a. Ofwat was right to intervene in company business plans to take account of comparisons between companies and that doing so did not inappropriately ignore differences between topographies or weather conditions;
  - b. There is no simple cost-service relationship whereby more demanding PCs should always be accompanied by higher costs. Moreover, for the PCs other than leakage, we have not found that the improvements in performance required by the Common PCs are sufficiently large as to justify an increase in cost allowances across the companies.
  - c. The extensive engagement and research undertaken by companies in PR19 has gone a long way to encourage company business plans and regulatory decisions to reflect the specific priorities and values of customers and the outcomes framework is an area where customers and key stakeholders properly play a role in determining the standards of performance that companies should be held to account against. That said, we consider there are limits to the weight that can or should be placed on customer research evidence in this area, for example reflecting that customers have less information about comparator companies than the regulator.
- 75. We also conclude that the use of asymmetric or penalty-only incentives may be appropriate in certain circumstances, for example, where there is evidence that customers would not be willing to pay for out-performance or there are diminishing economic benefits to out-performance. Where this results in residual financial risks for investors, this should be taken into account as part of the assessment of the appropriate cost of capital and whether the company is financeable.
- 76. Other than in a very limited number of cases, we generally have not identified a need to intervene on Bespoke PCs or their associated ODIs. Our analysis therefore focuses on Common PCs.

## Common PCs

77. We focused our assessment on the Common PCs and the related ODIs and conclude that:
- a. the PC levels for the three common performance measures set at the forecast upper quartile level are appropriate. These cover water supply interruptions, pollution incidents and internal sewer flooding. It is normal regulatory practice to make assessments using comparative regulation, and upper quartile is a common measure used when promoting improvements in efficiency;
  - b. we make some adjustments to the ODI rates, caps and collars, and deadbands for the Common PCs. For example, for the PCs relating to unplanned outages and mains repairs we introduce deadbands which would mitigate the risk of penalties that might arise in respect of these PCs due to factors outside the companies' control;
  - c. we welcome the Common PC linked to vulnerable customers that encourages companies to identify those customers most likely to need additional support. A thorough and up-to-date Priority Services Register may also prompt companies to identify further innovations that will allow the sector better to help vulnerable customers; and
  - d. we have considered the leakage PC separately due to the interaction of the funding and outcome incentives in relation to leakage and because of the attention it has been given in the SPS and in Ofwat's FD.

## Leakage

78. Each of the Disputing Companies has a PC which requires them to achieve a step change in the level of leakage reduction compared to previous periods. We decide to retain these PCs at the level set by Ofwat.
79. However, we decide that some of the Disputing Companies may require an additional allowance to achieve the required level of performance. In particular:
- a. We have concluded that there is a link between maintaining higher performance on leakage and costs such that the base cost model we used will not adequately compensate all companies that are maintaining performance above the upper quartile. This could justify additional allowances for Anglian and Bristol, which are two of the

highest performing companies in the sector. We decide to adjust the base cost allowance for Anglian, according to its stated base expenditure requirements in proportion to its outperformance on leakage. While Bristol is also a higher performer on leakage, we conclude that the costs which it said it needs to maintain low levels of leakage are funded through the overall base cost allowances, once the base cost modelling has been updated to include the most recent data.

- b. We conclude that the Disputing Companies which demonstrated that further enhancement allowances were needed to meet the ambitious leakage PCs should be allocated an allowance for the efficient costs of these enhancements. Ofwat only allowed these costs for the highest performing companies, including Anglian and Bristol. We did not agree with Ofwat's view that there was evidence that the Disputing Companies which were not high performers might have profited in the past by underperforming their leakage targets or by obtaining excessively generous funding for those targets. We therefore provide allowances for Yorkshire as well as for Anglian and Bristol but conclude Northumbrian does not need additional funding to meet its leakage target.

- 80. We have also considered the ODI rates relating to the leakage PC and we reject the use of enhanced ODI rates to reward substantial outperformance in this area. As explained above, we conclude that leakage improvements will require additional funding and so will impose costs on customers. In the circumstances, and in the absence of evidence for the cost-benefit trade off of further leakage reductions, we do not consider it would be appropriate to use Enhanced ODIs to shift the frontier in this area. We also make adjustments to increase the companies' penalty rates for underperformance ODIs, as we conclude that this would make the calibration of the ODIs more consistent with our determinations on enhancement costs.

## **Overall Changes to PC and ODIs**

- 81. The summary of changes we have made to PCs and ODIs in Ofwat's FD including leakage (excluding scheme-specific PCs) are set out in Table 5.

**Table 5: Decisions on the revisions to the PC arrangements set at PR19**

<i>Category</i>	<i>PC</i>	<i>Change compared to Ofwat's FD</i>
Common performance measures	<b>Water supply interruptions</b> <b>Pollution incidents</b> <b>Internal sewer flooding</b>	no change Anglian: increase collar to 41.6 Yorkshire: increase collars in years 2,3,4 and 5
Reducing demand	<b>Leakage</b>  <b>Per capita consumption</b>	All four companies: remove enhanced ODI rates. For three companies: adjust funding and amend Tier 1 penalty rates Bristol: reduce ODI rates to £-0.03m and £0.025m
Statutory measures	<b>Compliance risk index</b> <b>Treatment works compliance</b>	Revert to Ofwat's DD deadband levels for all four companies no change
Asset health measures	<b>Mains repairs</b> <b>Unplanned outage</b> <b>Sewer collapses</b>	Deadband of 10 for all four companies Deadband of 1.2 x PCL for all four companies no change
Vulnerability measures	<b>Priority services register</b>	no change
Bespoke ODIs	<b>Low pressure</b> <b>Water quality contacts</b> <b>Bathing water quality</b> <b>Visible leaks</b>	Yorkshire: remove outperformance incentive no change no change Northumbrian: clarify definition to exclude customer-side leaks
Other	<b>Overall reward cap</b>	no change

Source: CMA analysis

## Cost of Capital

### Weighted Average Cost of Capital (WACC)

82. The cost of capital is an input to the calculation of the companies' allowed revenue and is used to calculate the return that the companies need to earn to remunerate their investors within the price control.
83. Ofwat and the Disputing Companies had very different views on the right level of the cost of capital. As a result, the assumption on allowed profit was a large source of difference between them. Ofwat chose a 2.96% appointee level cost of capital allowance, significantly below the cost of capital suggested by the Disputing Companies, which are set out in Table 6.

**Table 6: Parties positions on the appointee WACC**

<i>Inflation adjusted CPIH-real point estimate or midpoint of range</i>	<i>Anglian</i>	<i>Bristol (industry level)</i>	<i>Bristol (inc. CSA)</i>	<i>Northumbrian</i>	<i>Yorkshire</i>	<i>Ofwat PR19</i>
Appointee WACC	3.62%	3.32%	4.04%	3.54%	3.78%	2.96%

Source: Anglian SoC, 1221 (based on midpoint of an RPI-real range of 2.5% to 2.9%), Bristol SoC, para 150 (industry estimate based on nominal point estimate of 5.35%, Bristol SoC, para 24 (inc SCA estimate based on a nominal point estimate of 6.08%), Northumbrian estimated figure relates to KPMG expert report for Northumbrian, section 8.1 and an RPI-real range of 2.49% to 2.75%), Yorkshire estimate is based on KPMG's metrics other than Yorkshire's specific requests on cost and proportion of debt.

Notes:

1. The companies did not use the same WACC submissions to the CMA as were used in the business plans, and in some cases did not provide a single point estimate for the WACC in their submissions to the CMA.
2. Where no overall point estimate or range was explicitly presented, we have estimated the company's view from either component metrics or other sources such as commissioned expert analysis. This table should be read as indicative only.
3. The appointee WACC is the term used in Ofwat's determination for the WACC allowance for the relevant water or water and sewerage companies considered within our price control determination.

84. There are two components of the WACC: the cost of equity and the cost of debt. We have used the Capital Asset Pricing Model (CAPM) to determine the cost of equity. The CAPM is an established methodology with well-understood theoretical foundations and which makes use of observable market data as far as possible. The CAPM is used by all UK regulators when calculating the cost of capital, and was the framework used in Ofwat's FD. We perform our own assessment of each of the parameters of this model, using up-to-date market data.
85. The main components of the cost of equity on which we decide are (in inflation adjusted CPIH-real terms):
- a. The total market return (TMR) (6.2% to 7.5%): To calculate the TMR, we place the most weight on historical ex-post returns (from 1900 to the present day), as well as on the historic ex-ante approach when selecting our range. We place less weight on the forward-looking evidence;
  - b. The Risk-Free Rate (RFR) (-1.6% to -1.0%): We calculate an RFR by placing weight on both long-tenor index-linked gilts and AAA-rated non-government bonds (the highest quality commercial debt) and taking into account up-to-date market data;
  - c. The equity beta (0.69 to 0.74): We calculate an equity beta based on a range of approaches of analysing the observable market data of WASC comparators, including a potential debt beta.
86. Based on the above, we calculate a range for the cost of equity over the period of the price control of 3.76% to 5.21%. We pick a point estimate 0.25% above the mid-point of this range. Our judgement of the point estimate of the cost of equity is based on the following considerations:
- a. promoting investment, and specifically addressing the risk of an exit of capital from the sector if the cost of capital were set too low;
  - b. the asymmetry of risk in the package of ODIs;
  - c. the scale of parameter uncertainty in estimating the cost of equity, particularly in the context of a sharp decline in equity returns since PR14; and
  - d. cross-checks, including the need for the WACC to be sufficiently high to support financeability, which, for the reasons described at paragraph 7.j, we conclude is a more appropriate mechanism than Ofwat's decision to increase bills by advancing cash-flows from future periods.



87. We also consider other cross-checks against market data, although we conclude that these were insufficiently robust to change the choice of point estimate which we assessed based on the factors above.
88. We set an allowance for the total cost of debt at 2.18% in CPIH-real terms, marginally higher than Ofwat's 2.14%. We reach this figure by considering the costs of debt already incurred by the industry (embedded debt), the new debt costs that companies will face during the price control, the appropriate ratio of new and embedded debt and the costs of fees in relation to issuance and liquidity costs.
89. Evidence submitted by the Main Parties following Provisional Findings and our subsequent consultation on the cost of debt, as well as our own analysis, has allowed us to base our cost of embedded debt allowance on actual costs. In this process, we have made suitable adjustments to account for unusual levels of cash (as a result of COVID-19) and floating rate debt, and have considered these costs in relation to the notional structure used throughout this determination. We have then cross checked our estimates against the iBoxx A/BBB benchmark over 15- and 20-year trailing averages. In conducting this extensive exercise in analysis and cross-checking, we are able to set an allowance for the cost of embedded debt that ensures that customers do not pay any more than is reasonably required to allow us to secure that water companies can finance the proper carrying out of their statutory functions.
90. In relation to new debt costs, we set an allowance relative to an iBoxx A/BBB 10+ benchmark, measured over the first 6-months of the price control. Unlike Ofwat, we consider there to be insufficient evidence to apply an outperformance wedge in order to reduce this allowance. However, our allowance of 0.19% (in CPIH terms) is lower than Ofwat's 0.53% on the basis of lower market yields at the time of measurement.
91. We agree with the use of a true-up mechanism for the cost of new debt in the next price control process and would expect this to be conducted on a like-for-like basis (with no performance wedge applied when calculating the true-up).
92. We apply a ratio of 17% new debt to 83% embedded debt in our calculations, slightly lower than the 20% of new debt used by Ofwat. We set the issuance and liquidity cost allowance at 0.1%, in line with Ofwat.
93. We also decide on levels for related metrics, particularly inflation (CPIH of 2%, with a 0.9% RPI-CPI wedge) and notional gearing (60%).
94. We consider our cost of capital allowance achieves the right balance for customers, who benefit not only from lower bills but also from continued investment in the water and sewerage networks.

95. Ofwat's FD included a 0.04% reduction in WACC in order to avoid water companies receiving compensation for systematic risks that were already covered by the margin in the retail price control. Our own assessment suggests that the potential for overcompensation is higher than initially calculated by Ofwat, but that this should be incorporated as a reduction in each Disputing Companies' allowed revenues rather than as an adjustment to the cost of capital.

**Table 7: CMA's WACC decisions in Nominal, CPIH-real and RPI-real terms**

<i>WACC Metrics</i>	<i>Nominal</i>	<i>CPIH-Real</i>	<i>RPI-Real</i>
TMR	8.94%	6.81%	5.85%
RFR	0.63%	-1.34%	-2.22%
ERP	8.31%	8.15%	8.07%
Unlevered beta	0.29	0.29	0.29
Debt beta	0.075	0.075	0.075
Equity beta	0.71	0.71	0.71
Cost of new debt	2.19%	0.19%	-0.70%
Cost of embedded debt	4.52%	2.47%	1.56%
Proportion of new debt	17%	17%	17%
Issuance and Liquidity costs	0.10%	0.10%	0.10%
Impact of picking a point estimate above the midpoint	0.25%	0.25%	0.25%
<b>Pre-tax cost of debt</b>	<b>4.22%</b>	<b>2.18%</b>	<b>1.27%</b>
<b>Post-tax cost of equity</b>	<b>6.82%</b>	<b>4.73%</b>	<b>3.79%</b>
Notional Gearing	60%	60%	60%
<b>Appointee Allowed Return on Capital (Vanilla)</b>	<b>5.26%</b>	<b>3.20%</b>	<b>2.28%</b>
Retail margin adjustment	0.08%	0.08%	0.08%
Wholesale Allowed Return on Capital (Vanilla)	<b>5.18%</b>	<b>3.12%</b>	<b>2.20%</b>

Source: CMA analysis and Ofwat PR19 FD

## Bristol Company Specific Adjustment

96. Ofwat has made specific adjustments within some water-only companies' cost of capital to reflect structurally higher costs faced by smaller companies within the industry. Bristol claimed a Company Specific Adjustment (CSA) as part of the redetermination, in the form of an uplift to the cost of debt allowance and the cost of equity allowance.
97. Ofwat's FD rejected Bristol's claim for a CSA uplift to the cost of debt allowance on the basis that customers did not benefit sufficiently from being served by Bristol to compensate for the increased costs of financing a small company.
98. We decide to award Bristol an uplift in its embedded debt allowance of 0.30% reflecting the higher historical financing costs of a small company relative to our cost of embedded debt allowance which is based on the actual costs of the larger companies in the sector. In doing so, we are conscious of the importance of regulatory consistency in this area and the fact that the CMA has previously rejected the application of a customer benefits test. We have not applied a customer benefits test to Bristol's costs of capital allowance and it remains our view that the key consideration in this regard is the return on

capital that allows a notional company of the size of the appointee to finance its activities.

99. We reject Bristol's request for an uplift to its cost of new debt, considering recent evidence that indicates that Bristol can now access debt markets in a flexible and competitive manner. However, we award a 0.05% increase to Bristol's issuance and liquidity cost allowance, reflecting that average fees may be larger as a result of smaller companies having fewer interactions with financial markets.
100. We reject Bristol's request for a cost of equity uplift, taking into account the latest evidence on the market pricing of debt and equity for small companies, as well as taking into consideration our overall cost of equity allowance and our assessment of Bristol's financeability

## **Gearing Outperformance Sharing Mechanism**

101. Ofwat introduced a GOSM for the first time in PR19. Ofwat stated that equity investors benefit from higher equity returns that are associated with their increased risk, but there is no substantive benefit passed to customers. In addition, Ofwat stated where companies adopt high levels of gearing, they may reduce financial resilience and transfer some risk to customers and / or potentially taxpayers in the event that a company fails. To address this, Ofwat introduced a mechanism that it said would share the benefits of higher gearing with customers.
102. We consider that the GOSM as designed was ineffective either as a benefit-sharing mechanism or as a tool to improve financial resilience. First, we consider that Ofwat had not adequately evidenced the existence of the benefits from high gearing that it said would be available to share. Second, to the extent that high gearing reduces financial resilience, the GOSM works only to encourage a reduction in gearing rather than to require a reduction in gearing. Moreover, we note that there are already multiple licence conditions which, together with a large and stable asset base, provide protection to consumers from excessive gearing. While we do not rule out that Ofwat may need to intervene at some time in the sector to reinforce its financial resilience and that this may or may not involve some constraint on gearing, for the purposes of this price control, we were not presented with evidence that an intervention on gearing is currently required in respect of the Disputing Companies or that the GOSM is the appropriate mechanism for such an intervention.

## Financeability

103. We are required to secure that companies can continue to finance the proper performance of their functions. We therefore completed an in-the-round assessment of the financeability of the Disputing Companies, including a financial ratio analysis similar to that which would be undertaken by the credit rating agencies. We find that the Disputing Companies should be able to achieve strong investment-grade credit ratings based on the notional capital structure, and this is consistent with our assumptions in the WACC for the cost of debt. We also find that under a reasonable downside scenario, the Disputing Companies' ratios are worse than in the baseline model but still investment-grade. We also consider the overall risk and return package and take note that, compared to Ofwat's FD, our determinations have resulted in lower risk exposure in a number of areas.
104. We consider that companies facing a financeability constraint, such as to address a downside scenario, may adopt a range of mitigating actions to address impact, such as absorbing headroom in credit ratios or increasing the contribution of equity either by foregoing dividends or injecting fresh capital. We conclude that this supports the view that our determination for each of the Disputing Companies is financeable.
105. Companies earn revenues through the PAYG share of allowed totex, which is comparable to operating expenditure or current expenses, and RCV run-off (a form of depreciation of regulated assets). When developing their business plans, companies proposed PAYG rates and RCV run-off rates for each of the four price controls (water network, wastewater network, bioresources and water resources). The use of these measures is intended to mirror the standard accounting concepts of operating expenditure, recovered from current customers, and capital expenditure, recovered over the life of the assets. The use of the regulatory measures of PAYG and RCV run-off as an alternative to accounting measures should allow the companies and Ofwat to set the recovery of costs over a suitable period and to address any timing issues.
106. We conclude that our determinations would be financeable on the basis of these measures being set at a rate which is consistent with the underlying totex in this period. In particular, as noted above, we consider that our determinations would be financeable without Ofwat's adjustment to bring forward more revenues to this period than implied by the Disputing Companies' business plans. We therefore decide that PAYG rates should be set at our best estimate of the 'natural rate'. For three of the Disputing Companies, this is the same as set in Ofwat's FD. For Anglian, we accept its

submission that the decision that both we and Ofwat made to allow less capital expenditure than in its business plan implied a higher ‘natural rate’ than it had requested and had been allowed by Ofwat.

## Disputing Companies’ Costs of the Determination

107. We have to decide to what extent it is reasonable to take account in our determinations the costs incurred by the Disputing Companies in connection with our redeterminations. In so doing, we have had regard to the extent to which our determinations support the Disputing Companies’ claims. We have also taken account of the CMA’s costs, which the Disputing Companies are required to pay as a CMA fee set by Ofwat. Our overall, in the round judgement is that it is reasonable to take into account 25% of the external costs incurred by (or, in the case of the CMA’s costs attributed to) Anglian, Northumbrian and Yorkshire. We have allowed 50% of Bristol’s costs, reflecting the narrower range of issues it raised and that we awarded it a CSA. We therefore decide to include the following costs of the determinations as allowances: Anglian £2.1 million; Bristol £2.0 million; Northumbrian £1.8 million; and Yorkshire £2.3 million.

## Conclusion

108. For the purposes of these determinations, we calculate a revenue allowance for each of the Disputing Companies for AMP7, which is reflected in Table 8.

**Table 8: Calculation of wholesale allowed revenue for each Disputing Company**

	£m*			
	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
PAYG	2,722	325	1,490	2,511
RCV Run-off	1,896	128	1,022	1,327
Return on Capital (incl RMA)	1,082	75	561	943
Reconciliation	5	-5	-1	83
Tax	5	15	81	11
Grants and contributions	241	16	112	92
Deduct non-Price control income	-64	-10	-50	-18
Innovation competition	21	2	12	18
Revenue reprofiling	8	1	3	4
<b>Wholesale revenue</b>	<b>5,916</b>	<b>547</b>	<b>3,230</b>	<b>4,971</b>
<i>Change vs Ofwat FD (£m)</i>	<i>+208</i>	<i>+45</i>	<i>+115</i>	<i>+148</i>
<i>Change vs Ofwat FD (%)</i>	<i>+3.5%</i>	<i>+8.2%</i>	<i>+3.7%</i>	<i>+3.0%</i>

Source: CMA analysis

\* Footnote: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

109. Having determined the revenue allowances over the whole AMP, we have profiled it between individual years in order to provide customers with a better view of the potential impact, and to allow for an annual calculation of the price control. In doing so, we have chosen to implement a consistent annual

increase in nominal bills over the course of the remaining three years in the AMP. This defers some of the bill increases until later years, which is likely to be particularly beneficial to customers affected by the COVID-19 pandemic, whilst also avoiding any specific 'spike' in customer bills in a single year.

110. We emphasise that while we have looked at individual components in detail, and necessarily made decisions on each of these, we have also considered any cross-cutting or interconnected issues when making such decisions. In particular, the inter-relationship between cost and service, as well as risk, return and financeability have influenced our decisions in each of the major areas of the determinations (totex, outcomes and WACC). These are determinations of a whole package for each Disputing Company 'in the round', and we consider that these determinations secure compliance with all our duties and ensure that customers pay the lowest charge consistent with the companies being able to finance their operations and invest appropriately for the future.

# 1. Introduction

- 1.1 Under the Water Industry Act 1991 the Secretary of State appoints water companies and sets licence conditions governing their appointment.<sup>7</sup> Water companies have the power to charge for any of the services provided in the course of carrying out their statutory functions.<sup>8</sup> Under the terms of their licences, the charges that water companies can make for their retail and wholesale activities are controlled by the Water Services Regulation Authority (Ofwat). The licence conditions allow Ofwat to carry out periodic reviews and to make price control determinations that are designed to limit the revenue allowed to the relevant company and as a result the charges levied by it. Ofwat is required to carry out 5-yearly 'periodic reviews' (or 'price reviews') for this purpose.
- 1.2 On 15 December 2019, Ofwat gave notice to each of the water companies in England and Wales of its price control determinations in relation to them for the 5-year period from 1 April 2020 (PR19).
- 1.3 On 19 March 2020, Ofwat informed the Competition and Markets Authority (CMA) that the four companies – Anglian Water Services Limited (Anglian), Bristol Water plc (Bristol), Northumbrian Water Limited (Northumbrian) and Yorkshire Water Services Limited (Yorkshire) (together defined here as the Disputing Companies) – had not accepted Ofwat's Final Determination (Ofwat's FD) and had required Ofwat to refer the Disputed Determination to the CMA. Ofwat, as required by section 12(3)(a) of the Water Industry Act 1991 (WIA91) and the Appointments, referred the Disputed Determinations to the CMA (the references).<sup>9</sup>
- 1.4 The CMA was required to report on and redetermine the Disputed Determinations within a period of six months from 19 March 2020. However, on 24 March 2020, following a request from the CMA, Ofwat decided that given the nature and scale of work involved in four water industry price control references and the possible disruption from the Coronavirus (COVID-19) pandemic, that there were special reasons why the reports cannot be made within the period specified in the references, and so extended the period specified in the references by an additional six months. The CMA is therefore required to report on and determine the Disputed Determinations by 18 March 2021.

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<sup>7</sup> The Water Industry Act 1991, [section 6](#)

<sup>8</sup> The Water Industry Act 1991, [section 142](#)

<sup>9</sup> Ofwat's notices of reference are published on our [webpage](#).

- 1.5 The functions of the CMA with respect to this reference were carried out on behalf of the CMA by a special reference group constituted for the purpose by the Chair of the CMA.<sup>10</sup> The reference was conducted in accordance with the usual CMA rules of procedure.<sup>11</sup> Details of the conduct of the reference are set out in paragraphs 3.2 to 3.20.
- 1.6 This report presents our determinations for the four Disputing Companies. It covers our determination of the revenue allowances and our reasoning for these.

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<sup>10</sup> [Our webpage](#)

<sup>11</sup> [CMA Rules of procedure for merger, market and special reference groups \(CMA17\)](#)



## **2. Background**

### **Introduction**

2.1 We set out below:

- some background to the water industry and the process of regulation;
- some background information on water customers including vulnerable customers and schemes that exist to assist to help them;
- details of the four Disputing Companies;
- a summary of the statutory framework for the water sector and its regulation;
- details of the statutory duties and strategic priorities applicable to Ofwat;
- a summary of the PR19 price review and how it developed from PR14;
- the context of PR19 from Ofwat's and the Disputing Companies perspective;
- observations from the Disputing Companies about how Ofwat had balanced its duties; and
- the reasons why the four Disputing Companies rejected the determinations.

2.2 Our approach to the redetermination process is set out in Section 3.

### **Background to the water industry and regulation**

2.3 The water industry in England has been operated by privately owned companies since privatisation in 1991.<sup>12, 13</sup> There has been consolidation of ownership of water companies over time. The number of water-only companies (WOCs) has reduced substantially following merger with each other or with larger WASCs. Only two water companies remain as listed companies.

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<sup>12</sup> At the time of privatisation, there already existed a significant number of private WOCs, see paragraph 2.35.

<sup>13</sup> In Wales, since 2001 Dŵr Cymru (Welsh Water) has been a not-for-profit company.

- 2.4 Different structures apply in Scotland, where Scottish Water is publicly owned. There is a separate Scottish Regulator, the Water Industry Commission for Scotland.
- 2.5 Since privatisation, water company services in England and Wales have been largely funded by customer bills and with private investment being used to finance capital projects. Water infrastructure networks require substantial capital investment and maintenance, and the need for investment is sometimes large and unforeseeable.<sup>14</sup> Companies issue debt or raise additional equity to allow them to undertake projects without relying entirely on upfront charges to customers. This limits fluctuations in customer bills and allows long-lived water assets to be paid for over time by more of the users who ultimately benefit. In return, investors require a return on finance, which customers also pay for over time.
- 2.6 Following privatisation, the water industry has made substantial investment into the enhancement of infrastructure. There is evidence that there were significant improvements in the industries' efficiency and effectiveness after privatisation.<sup>15</sup>
- 2.7 On privatisation of the water sector, three regulatory bodies were created for the sector – the Director General of Water Service supported by the Office of Water Services Regulation (Ofwat), which became the Water Services Regulation Authority as the economic regulator; the Drinking Water Inspectorate (DWI) which provides independent assurance on the quality of drinking water; and the National Rivers Authority (now the Environment Agency and Natural Resources Wales) as the environmental regulator.<sup>16</sup>
- 2.8 Water companies are licenced to operate in particular geographic areas. They are monopoly suppliers for wholesale provision of water and sewerage services, and associated retail, except the supply of water supply to business customers. Water undertakers and sewerage undertakers have the power to charge for any services provided in the course of carrying out their statutory functions in relation to water and wastewater services. These charges are ultimately borne by customers of water and wastewater companies.

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<sup>14</sup> National Audit Office (2015), [The economic regulation of the water sector](#), paragraph 1.5

<sup>15</sup> For example see Ofwat (2015), [The form of the price control for monopoly water and sewerage services in England and Wales – a discussion paper](#), p3

<sup>16</sup> Defra sets the overall policy framework in England, including standard setting and drafting of legislation, and set SPS for Ofwat (the Welsh Government does this for Wales). Other relevant bodies include CC Water, which represents consumers within the water and wastewater sector and investigates consumer complaints not satisfactorily resolved by water companies, and Natural England which is the Government's adviser on the natural environment.

- 2.9 As the economic regulator in England and Wales, Ofwat is responsible for regulating the monopoly companies. It has roles in protecting customer interests and encouraging competition and adequate investment within the industry. It does this principally through administering and enforcing the licensing regime for water companies. Under the licences, Ofwat conducts five-yearly price reviews which are intended to protect customer interests and permit water companies to make an adequate return on capital (permitting investment into the water infrastructure), while encouraging efficiency. The most recent PR19 price review is the seventh since privatisation and is the subject of our redeterminations.<sup>17</sup>
- 2.10 At privatisation, it was anticipated that regulation would follow an approach whereby allowed revenues would be increased for inflation but adjusted to account for cost changes not otherwise captured by the inflation measure and productivity improvements. With periodic 5-year price reviews, companies would be incentivised to outperform their revenue allowances by retaining any underspend as profits. They would thus be incentivised to adopt improvements in efficiencies and reveal these, with the consequence that allowed revenues would be driven down in subsequent review periods to the benefit of customers.
- 2.11 Regulation has evolved over time. The level of detail of company operations which is examined and controlled, together with the process of developing price controls has become a much more extensive activity for the sector and regulator over successive price reviews.
- 2.12 All of the price controls set by Ofwat are in the form of revenue controls. These do not specify the individual prices or tariffs that companies charge for water services (such as unit charges, standing charges, or business tariffs). Final tariffs that are charged to customers are constrained so as to recover only the allowed revenues for both wholesale activities and retail activities. There are separate regulatory processes that apply to companies' decisions concerning the structure of tariffs and how they may vary across consumer groups subject to the overall revenue constraint.<sup>18</sup>
- 2.13 Ofwat's price control framework for wholesale price controls is based around the RCV. The RCV comprises the value of investment by a water company in its licensed activities that is recognised as such by Ofwat. This investment is returned over time to investors through an RCV run-off that makes up a component of allowed revenues. At the price control review, Ofwat includes in

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<sup>17</sup> Ofwat's price reviews are known by reference to the year preceding their implementation. The predecessor to the current PR19 review was the PR14 determination.

<sup>18</sup> These tariffs tend to be set annually, subject to the overall constraints from the aggregate revenue control.

its calculations an allowance for what it considers to be a reasonable level of return on the RCV, based on the cost of capital over the price control period. This allowed rate of return is estimated to reflect likely returns that investors would otherwise be able to earn on their investments in competitive markets appropriately adjusted for risk and is designed to attract appropriate investment to the sector at a fair price.

- 2.14 Under the RCV-based approach, estimates or assumptions of each company's expenditure requirements, over the five-year price control period, are also an input to calculation of the wholesale price control. Ofwat seeks to assess what each company's expenditure requirements would be if its spending was in line with that of an efficient company. Ofwat's cost assessment feeds into the calculation of the total allowed wholesale revenue, along with other elements including, as described above, allowances for regulatory depreciation and returns on investment.
- 2.15 Ofwat uses a comparative regulation approach. It uses comparative analysis of all the water companies to inform its assessment of the efficient expenditure requirements of each individual company (along with target performance and incentive rates); by looking at all the different water companies and making allowances for differences between them, it seeks to estimate what revenues an efficient company performing its functions would require, given the geographic area in which it operates. For example, it may use econometric models to estimate an efficient benchmark based on costs and characteristics of different companies' actual operations.
- 2.16 However, there are limits in relying purely on comparative regulation. For example, the approach may not be able to fully determine and measure efficiencies; this could arise due to the many and varied differences between companies, the many factors that can contribute to efficiencies, the limited number of comparators, and possible information asymmetries between companies and the regulator.
- 2.17 Of the other sector regulators, the DWI checks that the water companies in England and Wales supply water that is safe to drink and meets the standards set in the Water Quality Regulations. DWI's roles include agreeing and managing water company programmes for improving drinking water quality including the DWI's input into Ofwat's periodic review of water prices.<sup>19</sup>
- 2.18 The Environment Agency is the principal adviser to the government on the environment, and the leading public body protecting and improving the

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<sup>19</sup> [Drinking Water Inspectorate, 'about us' webpage](#)

environment in England.<sup>20</sup> It is engaged in flood management, regulates discharges to water, and has a role in conservation and ecology. The Environment Agency has a duty to maintain and improve the quality of surface waters and ground-waters and, as part of the duty, it monitors the quality of rivers, lakes, the sea and groundwater. The Environment Agency manages the use and conservation of water through the issue of water abstraction licences for activities such as drinking water supply, artificial irrigation and hydro-electricity generation.

- 2.19 The consequence is that the DWI and the Environment Agency have important roles in determining how water companies operate and how they invest to manage water supplies, avoid pollution and assure water quality.
- 2.20 Overall, the average combined household water and sewerage bill is around £400 per year (see Table 2-1). Of this, around 40% relates to current costs, and 30% relates to RCV run-off which is similar to depreciation and relates to expenditure recovered over time (in other words, the return of capital investment in assets). Around 20% relates to the return on capital, in other words financing debt and providing a return to shareholders, and the remaining 10% relates to tax, the cost of retail activities and other less material items.
- 2.21 There is considerable variation in household bills between water companies, reflecting the challenges faced by different service areas in England and Wales, for example the state of existing infrastructure, the availability of raw water and how it is abstracted, stored and transported, the scale of treatment required, as well as population density and the pace of investment programmes. For example: there can be markedly different costs in treating water to make it suitable for drinking depending on whether it is drawn from a chalk aquifer or a river, which may be subject to industrial or agricultural pollution; similarly, pumping water or sewage over long distances and hilly terrain costs more than where it is treated close to centres of demand; and the need to enhance capacity and provide alternative sources may be highest where water supplies are under greater demand due to relatively limited rainfall and high population.

## **Customers**

- 2.22 The Disputing Companies serve a population of around 17.5 million and have both residential and commercial customers. Recent average annual

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<sup>20</sup> Natural Resources Wales undertakes the equivalent role in Wales.

household water and sewerage bills are set out in Table 2-1: Average household water and sewerage bills £ annual.

**Table 2-1: Average household water and sewerage bills £ annual**

	£ per year			
	Water		Sewerage	
	2018-19	2019-20	2018-19	2019-20
Average for England and Wales	191	192	214	222
Anglian	187	191	242	247
Bristol	184	187		
Northumbrian	182	184	220	226
Northumbrian (Essex and Suffolk)	258	257		
Yorkshire	172	172	215	220

Source: DiscoverWater.co.uk

- 2.23 At PR19 Ofwat set out its expectations for water companies as part of the business planning stage of the process. Ofwat told the water companies it expected them to carry out local engagement with their customers to understand their ‘priorities, needs and requirements’ to inform their business planning. All water companies have Customer Challenge Groups (CCGs), although these may be known by different names. Ofwat stated that at PR19 the CCGs should provide independent challenge to companies and assurance to Ofwat on the quality of a company’s customer engagement and the degree to which it is reflected in the business plans.<sup>21</sup> The Disputing Companies told us that they also consulted with customers on development of their business plans through a variety of measures including surveys and consultation events. Further details are set out below in the company descriptions (see paragraphs 2.46, 2.52, 2.59 and 2.64).
- 2.24 Water supply and wastewater services are essential to customers. But some struggle to pay their water bills due to their financial circumstances – this is often referred to as ‘water poverty’.
- 2.25 Citizens Advice estimated that 3 million UK adults had fallen behind on their water bills during the COVID-19 pandemic.<sup>22</sup> In July 2020 Citizens Advice reported that in the previous twelve months it had advised over 74,000 people about water supply and sewerage debts.<sup>23</sup>
- 2.26 Customers are not at risk of their water supply being disconnected if they fall behind their bill payments, but they may face civil legal recovery actions and/or damage to their credit rating.<sup>24</sup>

<sup>21</sup> Ofwat (2016), [Ofwat’s customer engagement policy statement and expectations for PR19](#), p3

<sup>22</sup> Citizens Advice (2020), [Lockdown debts](#), p2

<sup>23</sup> Citizens Advice (2020), [Redetermining Water](#), p20

<sup>24</sup> CCW, (2020) [Call for evidence Independent review of affordability support for water customers](#), p4

- 2.27 The Consumer Council for Water (CCW) is the statutory consumer organisation representing water and sewerage consumers in England and Wales. In October 2020 CCW issued a call for evidence as part of a review of affordability support for financially vulnerable customers. In that call for evidence CCW noted that water companies have 'given increased focus to meeting the needs of financially vulnerable households'.<sup>25</sup>
- 2.28 Water UK is the representative body and policy organisation for water and wastewater services providers across the UK. In its response to the call for evidence from CCW, Water UK noted that significant progress had been made to ensuring water is affordable to all customers, but it argued more needed to be done. Water UK noted in its response that this was all the more urgent given the impact of the COVID-19 pandemic.<sup>26</sup>
- 2.29 CCW's Water for All report 2019/20 reports that 'at the end of 2019/20 almost 900,000 financial vulnerable households in England and Wales were receiving help through reduced water bills'.<sup>27</sup>
- 2.30 Water companies offer various measures to address water poverty and provide assistance to customers who may otherwise struggle with water bills. For example, companies offer their own social tariff schemes that have the effect of limiting or reducing bills to some lower-income customers. In most cases the schemes are fully funded through other customers' bills. Companies must consult with their customers and CCW in developing these tariffs but are otherwise free to determine the nature they will take. That has resulted in considerable variation in terms of the eligibility criteria of the schemes and the level and nature of the support which they provide. By April 2020 almost three quarters of a million customers in England and Wales were receiving help through the social tariff schemes.<sup>28</sup>
- 2.31 Other arrangements that have been in put place to assist customers financially by water companies include payment breaks and payment matching schemes to clear arrears. All water and wastewater companies offer the WaterSure scheme that limits metered bills for low income, high water users to (at most) the average for the region. Customers can qualify for the scheme if they meet criteria such as receiving certain welfare benefits or if someone living at the property has a medical condition that requires high water use.

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<sup>25</sup> CCW, (2020) *Call for evidence Independent review of affordability support for water customers*, p4

<sup>26</sup> Water UK (2020), *Response to call for evidence for the independent review of affordability support for financially vulnerable water customers in England and Wales*, p2

<sup>27</sup> CCW (2020), *Water for All Water Affordability and Vulnerability Report 2019-20*, p4

<sup>28</sup> CCW (2020), *Water for All Water Affordability and Vulnerability Report 2019-20*, p11

- 2.32 The number of registered customers for WaterSure for the Disputing Companies is shown in Table 2-2. CCW commented that customer awareness of this scheme is limited and so not all eligible households may be registered.<sup>29</sup>

**Table 2-2 : Number of registered customers for WaterSure**

<i>Company</i>	<i>2019-20</i>
Anglian	34,853
Bristol	2,974
Northumbrian	3,247
Yorkshire	7,205

Source: CCW (2020), [Water for All Water Affordability and Vulnerability Report 2019-20](#)

- 2.33 Other schemes operated by the Disputing Companies include: benefit entitlement checks; water efficiency home audits; and charitable trust or in-house crisis funds to assist customers with their bills. Not all the Disputing Companies operate all of those schemes.
- 2.34 Some customers are at a higher risk should their water supply be interrupted, or they may find it more difficult to engage with water companies, to represent themselves and ensure they are receiving appropriate service. Examples of such vulnerability might include age, infirmity, illness, caring for dependents, communications challenges and similar matters. These factors may affect the quantity of water customers need to use. Other customers may need other types of support, for example in understanding billing or communicating with the water company. In order to provide appropriate support, water companies record on a Priority Services Register the additional support that customers require. CCW reported that the number of customers registered across England and Wales increased in 2019/20 by 41%. In total 595,839 customers were registered for priority services.<sup>30</sup>

## The Disputing Companies

- 2.35 There are 11 WASCs and 6 WOCs in England and Wales. In areas where WOCs operate, the WOC provides drinking water, while wastewater services are provided by a WASC.
- 2.36 Figure 2-1 shows the operating areas of the various water companies in England and Wales. The operations of the four Disputing Companies are shown in colours other than blue. Bristol is a WOC. Yorkshire supplies fresh water and wastewater services in its area. Anglian and Northumbrian are also

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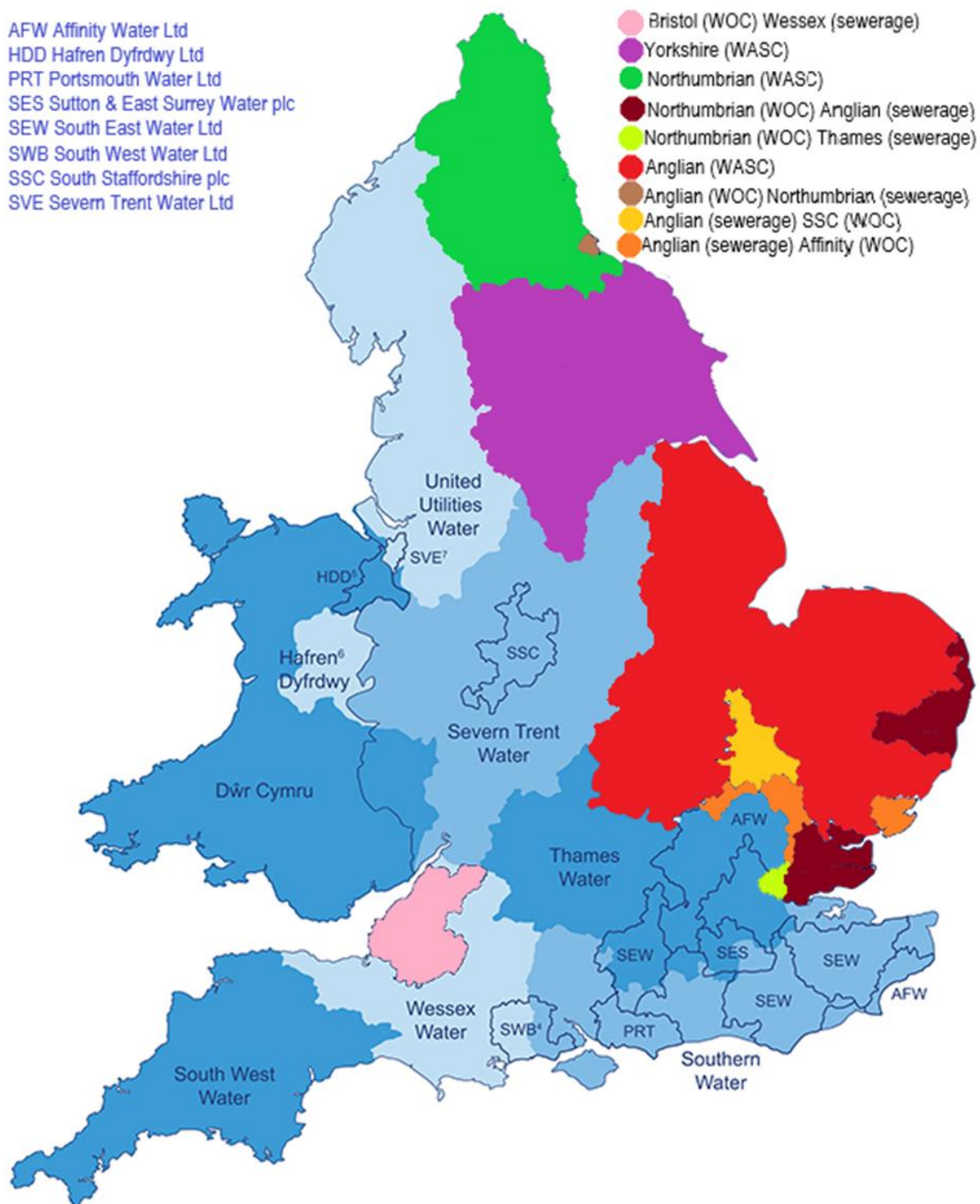
<sup>29</sup> CCW (2020), [Water for All Water Affordability and Vulnerability Report 2019-20](#), p10

<sup>30</sup> For the disputing companies, these were: Anglian 82,383; Bristol 7,583; Northumbrian 16,897; and Yorkshire 65,661. CCW (2020), [Water for All Water Affordability and Vulnerability Report 2019-20](#), p29



WASCs, but in parts of their areas of operation, other WOCs are responsible for water supply. Both have some water-only operations. Anglian owns Hartlepool Water, which is a WOC where sewerage is provided by Northumbrian. Northumbrian owns Essex and Suffolk Water, which is a WOC where sewerage is provided partly by Anglian and partly by Thames Water. For price determination purposes, Ofwat includes Hartlepool Water, and Essex and Suffolk Water with their parent WASCs although they have different allowed revenues from their parent and so different customer tariffs.

**Figure 2-1: Map of the operating areas of water companies in England and Wales**



2.37 Table 2-3 sets out some indicators of the size of each of the Disputing Companies. Bristol is relatively small as a WOC serving just over half a million properties. The other three Disputing Companies each serve over two million properties with both water and sewerage services and hence have markedly higher revenues and RCVs.

**Table 2-3: Indicators of the size of the Disputing Companies**

	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
RCV (2019/20)	£8,242m	£563m	£4,316m	£6,951m
Ofwat's PR19 determination allowed revenues over 5 years	£5,600m	£462m	£2,900m	£4,400m
Number of connected properties	3,153,478	545,956	2,128,892	2,466,857
km of water mains	38,709	6,875	26,200	31,891
km of sewer	76,857	n/a	30,106	52,315
Population served	6.7m	1.2m	4.5m	5.1m
Annual revenue (2019/20)	£1,309m	£125m	£837m	£1,063m
Number of employees (FTE, directly employed)	4,834	560	2,911	3,525

Source: CMA, from company information. Allowed PR19 revenues from Ofwat (2020), [Reference of the PR19 determinations: Overview](#)

Note: All values are as at 31 March 2020, unless otherwise stated

## **Anglian**

2.38 Anglian is the largest WASC in England and Wales by geographic area and the fourth largest in terms of its RCV. It supplies services to more than three million connected properties in the east of England. In several areas such as Cambridge, Chelmsford and Basildon, Anglian provides wastewater services only (for historical reasons). In Hartlepool (trading as Hartlepool Water), Anglian provides water-only services. At 31 March 2020, Anglian directly employed 4,834 full time equivalent staff.

2.39 Anglian was one of the WASCs floated as public limited companies on the London Stock Exchange on privatisation in 1989 but was de-listed in 2006. The ultimate holding company is Anglian Water Group Limited (AWGL). AWGL is in turn owned by a number of pension funds and private equity funds.<sup>31</sup>

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<sup>31</sup> AWGL is a Jersey registered company which was incorporated on 14 September 2006. AWGL is owned by a consortium of investors comprising: (i) The Canada Pension Plan Investment Board (Hong Kong) Limited (32.9%); (ii) First Sentier Investors (Australia) RE Ltd and First State Investments Fund Management S.á.r.l. (15.6%); (iii) Global InfraCo (HK) E. Limited, which is controlled by IFM Investors (19.8%), a global asset manager owned by 27 Australian pension funds; (iv) Camulodunum Investments Ltd (15%), a joint investment vehicle for Dalmore Capital and GLIL Infrastructure LLP; and (v) Infinity Investments S.A. (16.7%). AWGL's wholly-owned subsidiary, Osprey Acquisitions Limited, acquired Anglian Water Group Plc (now known as AWG Parent Co Ltd) and its subsidiaries, including Anglian, on 23 November 2006.

- 2.40 In 1997, it acquired Hartlepool Water and, on 1 April 2000, Anglian was appointed, through a merger of the businesses, as a water undertaker for the Hartlepool area and its 90,000 customers.
- 2.41 Anglian told us that the most acute issues in its region were climate change, population and housing growth and the need to protect and enhance the natural environment. Anglian said it had enshrined public interest in its constitutional documents (including a commitment to ensuring long-term resilience, addressing affordability and delivering wider public interest outcomes for society and the environment) by amending its articles of association in July 2019.<sup>32</sup>
- 2.42 It said that the Anglian region is one of the driest in England and Wales with 71% of the UK national average rainfall. Anglian obtains water from a variety of sources; the main sources of water are groundwater (48.6%) and pumped storage reservoirs (42.3%). Water is taken from river intakes, groundwater sources, reservoirs, storage points and pipeline routes across the operating region, but the company described these sources as highly disparate and subject to limited connectivity.<sup>33</sup>
- 2.43 The Environment Agency classifies 59 out of the 129 catchments in Anglian's region as already over-abstracted or 'over-licensed', meaning more water is being taken from river and groundwater systems than is considered environmentally sustainable to meet 'good' ecological status under the Water Framework Directive (WFD).<sup>34</sup> The principal land use of Anglian's region is arable farming and Anglian said its area has one of the highest usages of arable pesticides such as metaldehyde, which is difficult to remove from water.<sup>35</sup>
- 2.44 Anglian also said it has a high proportion of flat and low-lying areas, including The Fens in Cambridgeshire and the Norfolk Broads, where it faces a risk of flooding and where more energy is required to pump water from place to place.
- 2.45 It told us its predominantly residential customer base is growing at higher than average rates and this high growth is projected to continue.
- 2.46 Anglian told us that it developed and tested its business plan in close collaboration with its customers through an extensive programme of events, research and face to face contact, as well as the development of an online

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<sup>32</sup> [Anglian SoC](#), paragraphs 5 & 188

<sup>33</sup> [Anglian SoC](#), paragraph 349

<sup>34</sup> [Anglian SoC](#), p23

<sup>35</sup> Anglian, [Help and advice working with farmers webpage](#)

community of customers.<sup>36</sup> Anglian was given an 'A' rating by Ofwat for customer engagement.<sup>37</sup>

## **Bristol**

- 2.47 Bristol is a WOC based in the South West, sourcing, treating and distributing water for a population of 1.2 million people across more than half a million connected properties in Bristol and the surrounding area. At 31 March 2020, Bristol directly employed 560 full time equivalent staff.
- 2.48 Following privatisation in 1991, the Bristol Waterworks Company became Bristol Water plc, a subsidiary of Bristol Water Holdings plc. In April 2016, iCON Infrastructure Partners acquired a 50% stake in Bristol, which was subsequently increased to 80% in December 2016.
- 2.49 Bristol obtains water from a variety of sources. Its main sources of water are: rivers, principally the River Severn via the Gloucester & Sharpness Canal (approximately 47% of the supply); shallow surface water reservoirs in the Mendips (around 37%); and some small springs and boreholes.
- 2.50 Bristol told us that as a small WOC, it faced higher costs of financing than larger companies.
- 2.51 Bristol told us that it has changed significantly since its PR14 determination was referred to the CMA: it has new ownership; a new Board structure; a new management team; and has established a social contract with customers and stakeholders which it feels gives it a clear social purpose. It said it had undertaken a transformation programme to deliver increased cost efficiency, a stronger focus on operational management, and improved service for customers.
- 2.52 Bristol said that as part of its customer engagement strategy it defined the customer base and created customer segments to understand the impact of its operations and activities on customers of differing ages, income and other characteristics as well as engaging with its Water Forum (CCG).<sup>38</sup> It told us that it used a wide range of customer engagement techniques including a mixture of traditional and innovative approaches.<sup>39</sup> Bristol was given a 'B' rating by Ofwat for customer engagement.<sup>40</sup>

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<sup>36</sup> [Anglian SoC](#), paragraphs 50 & 248

<sup>37</sup> Ofwat (2019), [PR19 initial assessment of plans Summary of test area assessment](#), p29

<sup>38</sup> [Bristol SoC](#), paragraph 30

<sup>39</sup> [Bristol SoC](#), paragraph 608

<sup>40</sup> Ofwat, (2019) [PR19 initial assessment of plans Summary of test area assessment](#), pp29 to 30

## **Northumbrian**

- 2.53 Northumbrian is a large WASC providing services in the North East of England (trading as Northumbrian Water) and water-only services in Essex and Suffolk (trading as Essex & Suffolk Water).<sup>41</sup> It serves more than 2.1 million connected properties in total and directly employed 2,911 full time equivalent staff at 31 March 2020.<sup>42</sup>
- 2.54 CK Hutchison Holdings Limited, listed on the Stock Exchange of Hong Kong Limited, is the ultimate legal owner of Northumbrian.<sup>43,44</sup>
- 2.55 Northumbrian obtains water from a variety of sources. Northumbrian's main sources of water are from river abstractions (43%), pumped storage reservoirs (29%) and impounding reservoirs (22%), but there are significant differences between its two regions.<sup>45</sup>
- 2.56 Northumbrian said that the key challenge in the North East is increased storm intensity increasing the risk of flooding. It said its water supply system in the area is characterised by predominantly upland raw water reservoirs (including Kielder Water) and water treatment works (WTW) in the west of the region. This allows it to take advantage of natural topology to enable treated water to be fed by gravity to the main population centres in the east.<sup>46</sup> However, it said the east of the region is prone to severe storms. The resulting surface water flows, when combined with the main population centres, present a challenge regarding sewer flooding risk.
- 2.57 Northumbrian told us that water resources in the Essex area are primarily surface water-based complemented by a small amount of groundwater, along with water transferred into the Essex supply area from two sources.<sup>47</sup> Its Suffolk area has three separate supply zones, fed by a combination of ground water (from boreholes) and surface water.<sup>48</sup>
- 2.58 It said that the Essex and Suffolk supply area is located within some of the driest areas of the country and faces growing demand. We were told that

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<sup>41</sup> [Northumbrian SoC](#), section 2, paragraph 46

<sup>42</sup> [Northumbrian SoC](#), section 2, paragraph 49

<sup>43</sup> Northumbrian is a wholly-owned subsidiary of Northumbrian Water Group Limited (NWGL), and is a member of Northumbrian Water Group (NWG). The legal owners of NWGL (via intermediate holding companies) are CK Hutchison Holdings Limited, CK Infrastructure Holdings Limited (CKI) and Li Ka Shing Foundation Limited (LKSF).

<sup>44</sup> Northumbrian has three directly and indirectly owned financing subsidiaries: Northumbrian Water Finance plc, Reiver Holdings Limited and Reiver Finance Limited.

<sup>45</sup> [Northumbrian SoC](#), section 2, paragraph 46

<sup>46</sup> [Northumbrian SoC](#), section 2, paragraphs 52–53

<sup>47</sup> Namely the Chigwell raw water bulk supply from Thames Water Utilities and the Ely Ouse to Essex Transfer Scheme, owned by the Environment Agency, which brings water from Denver in Norfolk; [Northumbrian SoC](#), section 2, paragraph 60

<sup>48</sup> [Northumbrian SoC](#), section 2, paragraph 62

climate change created increased risks as it could make rainfall less reliable, while in this supply area Northumbrian faced a lack of new intrinsic water resource; hence a key challenge related to maintaining resilient supplies.<sup>49</sup>

- 2.59 Northumbrian told us that throughout the development of its business plan it undertook a robust programme of customer research and engagement which included: large-scale, statistically representative quantitative surveys and deliberative events to seek opinions from customers.<sup>50</sup> Northumbrian said that when sharing the results of the customer engagement with members of its Water Forums (CCGs) they commented that the company had ‘struck a good balance...between the level of detail and the cost of undertaking the activities involved’.<sup>51</sup> Northumbrian was given a ‘B’ rating by Ofwat for customer engagement.<sup>52</sup>

## **Yorkshire**

- 2.60 Yorkshire is a WASC providing services to around 2.5 million connected properties in the Yorkshire and Humberside region.<sup>53</sup> At 31 March 2020, Yorkshire directly employed 3,525 full time equivalent employees. Yorkshire manages over 600 water and wastewater treatment works across the area.
- 2.61 Yorkshire is owned by Kelda Group plc, previously named Yorkshire Water plc and was originally formed following water company privatisations in 1989. The Kelda Group was de-listed from the London Stock Exchange on 12 February 2008, following its acquisition by the global infrastructure fund, Saltaire Water.<sup>54</sup>
- 2.62 It is one of the largest landowners in Yorkshire managing 28,000 hectares of land.<sup>55</sup> Yorkshire obtains water from a variety of sources including reservoirs (around 74% of its requirements), water abstractions and boreholes. Yorkshire collects around 1 billion litres of wastewater daily for treatment.<sup>56</sup>
- 2.63 Yorkshire told us that it faces specific regional challenges, including a higher than average proportion of cellared properties in the county which present an increased risk of internal sewer flooding, and the problems of reducing the

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<sup>49</sup> Northumbrian SoC, section 2, paragraph 51

<sup>50</sup> Northumbrian SoC, section 4, paragraphs 177–178

<sup>51</sup> Northumbrian SoC, section 4, paragraph 184

<sup>52</sup> Ofwat (2019), *PR19 initial assessment of plans Summary of test area assessment*

<sup>53</sup> Yorkshire (2020), *Yorkshire Annual Performance Report 2019-20*, Table Q4, line 8

<sup>54</sup> Kelda Group, *Kelda Group's History* webpage

<sup>55</sup> Yorkshire (2020), *Yorkshire Annual Performance Report 2019-2020*, p90

<sup>56</sup> Yorkshire (2020), *Yorkshire Annual Performance Report 2019-2020*, p19



flood risk in Hull, which it said constitutes the biggest flood risk outside of London.<sup>57</sup>

- 2.64 Yorkshire said that its customer engagement process for PR19 met all the standards set by Ofwat and told us that Ofwat had acknowledged the high quality of its customer engagement work. Yorkshire also told us that its engagement with customers included surveys together with ‘innovative’ techniques and that the quantitative results were checked against more qualitative surveys. Yorkshire said that it ensured the groups responding to the surveys reflected the demographic make up of its customer base and noted that its Water Forum (CCG) commented the extent and reach of the customer research programme was to be commended.<sup>58</sup> Yorkshire was given a ‘B’ rating by Ofwat for customer engagement.<sup>59</sup>

## The statutory framework and regulation

- 2.65 The post-privatisation provisions for the water industry in England and Wales are consolidated in the WIA91. The WIA91 has been amended over time including new primary statutory duties. The Water Act 2003 amended the WIA91 to include new regulatory arrangements for the water industry and the consumer objective as a primary duty. The Water Act 2014 amended some of the procedural arrangements relevant to these references and added the resilience objective as a new primary duty. New provisions in the Water Act 2014 also allow Ofwat to set charging rules with which all water companies must comply.<sup>60</sup> This Act also created a market for the retail of non-household supply.
- 2.66 Water companies have the power to charge for services provided in the course of carrying out their statutory functions.<sup>61</sup> The licence conditions include Condition B (Charges), which allows Ofwat to carry out periodic reviews and to make price control determinations that are designed to limit the revenue allowed to each water company. In charging customers, water companies need to levy charges in a way which complies with the price controls set by Ofwat.<sup>62</sup>

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<sup>57</sup> Yorkshire SoC, paragraphs 11(d) & 8

<sup>58</sup> Yorkshire SoC, paragraphs 80–83

<sup>59</sup> Ofwat (2019), *PR19 initial assessment of plans Summary of test area assessment*, pp 29–30

<sup>60</sup> The Water Industry Act 1991, [section 143B](#)

<sup>61</sup> The Water Industry Act 1991, [section 142](#)

<sup>62</sup> Condition B clause 9.1/8.1

2.67 Through the licence conditions, Ofwat sets the following price controls<sup>63</sup> for WASCs in England and Wales:

- (a) Water Resource Activities;<sup>64</sup>
- (b) Network Plus Water Activities (wholesale water activities covering raw water distribution, water treatment and treated water distribution);<sup>65</sup>
- (c) Network Plus Wastewater Activities (wholesale wastewater activities covering sewage collection and treatment);<sup>66</sup>
- (d) Bioresource Activities (ie sludge treatment and disposal);<sup>67</sup> and
- (e) Household Retail Activities.<sup>68</sup>

2.68 Ofwat sets a sixth control for Business Retail Activities for Dŵr Cymru only, and limits revenue to different customer groups depending on usage. It does not set such a price control in England as the business retail market is already open to competition. Companies can also undertake unregulated activities.

2.69 For WOCs in England and Wales, Ofwat sets the following price controls:

- (a) Water Resources Activities;
- (b) Network Plus Water Activities;<sup>69</sup> and
- (c) Household Retail Activities.

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<sup>63</sup> See Licence Condition B clause 9.4 and Ofwat (2020), [Reference of the PR19 final determinations: Overview](#) paragraphs 3.25 to 3.35 for an overview of the price controls. Ofwat also sets a sixth price control for Thames in respect of the Thames Tideway tunnel: see Ofwat (2019), [Notification of the PR19 final determination of Price Controls for Thames Water](#), p5. Thames has a bespoke licence condition that allows this.

<sup>64</sup> Defined as activities carried out by the water company in performance of its functions as a water company in connection with abstraction licences, raw water abstraction, raw water transport and raw water storage, and such ancillary activities, as may be so designated from time to time by Ofwat.

<sup>65</sup> Defined as all activities carried out by the water company in performance of its functions as a water company other than Water Resources Activities and Retail Activities.

<sup>66</sup> Defined as all activities carried out by the water company in performance of its functions as a sewerage company other than Bioresources Activities and Retail Activities.

<sup>67</sup> Defined as activities carried out by the water company in performance of its functions as a sewerage company in connection with sludge transport, sludge treatment, sludge disposal and Network Plus – Sludge liquor treatment, and such ancillary activities, as may be so designated from time to time by Ofwat but excluding sewage collection, sewage treatment and sewage disposal.

<sup>68</sup> See Condition B clause 8.3/9.3 The retail price control covers household-related services that the companies provide – such as sending customers' bills and responding to customer enquiries and non-household water supply but excluding water treatment and treated water distribution.

<sup>69</sup> Condition B clause 8.4/9.4



- 2.70 For Network Plus Water and Wastewater Activities, the price controls consist of a measure of inflation<sup>70</sup> plus 'K', which is a percentage figure determined at each price review which limits allowed revenues.<sup>71</sup>
- 2.71 For Water Resource Activities, Bioresource Activities and Retail Activities, the licence conditions require Ofwat to set the price control by reference to what is the appropriate nature, form and level of price controls in respect of these activities, how the company can demonstrate that it levies charges in compliance with the revenue allowances as well as the duration of these controls.<sup>72</sup> This takes slightly differing forms.<sup>73</sup>

### **The statutory duties and strategic priorities and objectives statement**

- 2.72 Ofwat's general statutory duties are split into primary and secondary duties.<sup>74</sup>
- 2.73 The primary duties set out in section 2(2A) WIA91 (see Appendix A Section 2 General duties with respect to water industry) require Ofwat to perform its powers and duties in the manner which it considers is best calculated:

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<sup>70</sup> From April 2020 the licence conditions use CPIH as the relevant index rather than RPI. RPI and CPIH are Office for National Statistics inflation measures.

<sup>71</sup> Formally, these price controls are expressed as:

(a) the percentage change (positive, negative or none) in CPIH between that published for the month of November between November in the year prior to the relevant charging year and November in the preceding year; and

(b) a number, 'K', which may be a positive number or a negative number or zero. (Condition B clause 8.4/9.4) which together shall be expressed as a percentage, and which shall limit the change in the revenue allowed to the relevant water company in each year of the price control.

<sup>72</sup> Licence, Condition B, paragraph 8.3/9.3 and 8.4/9.4

<sup>73</sup> Ofwat has set the price controls for Water Resource Activities, Bioresource Activities and Retail Activities in the formats set out below.

For Water Resources Activities, the price control set by Ofwat consists of:

(a) the percentage change (positive, negative or none) in CPIH (or RPI pre-April 2020) between that published for the month of November between November in the year prior to the relevant charging year and November in the preceding year; and

(b) a number, 'K', which may be a positive number or a negative number or zero; which together shall be expressed as a percentage, and which shall limit the change in the revenue allowed for the relevant water company in each year of the price control. (Condition B, clause 8.4/9.4)

For Bioresource Activities, the price control set by Ofwat consist of:

(a) a total amount of revenue which is modified to reflect differences between outturn sludge production and forecast sludge production;

(b) an adjustment to reflect any over- or under-recovery of revenue in previous charging years in the price control period; and

(c) an adjustment to reflect any profit made by the relevant water company where assets belonging to the relevant water company are used by any other person (Or by any business or activity of the relevant water company other than its appointed business activities);

and shall limit the revenue allowed to the relevant water company in each charging year of the price control.

For Retail Activities, the price control consists of a limit on the total revenue allowed to the relevant water company in each charging year of the price control in respect of the Retail Activities concerned (Condition B clause 8.3/9.3).

<sup>74</sup> The language of primary and secondary duties was utilised by the CMA in the Bristol Water PR14 Determination (Bristol Water PR14 Final Report paragraph 3.4), and is also found in Defra policy documentation (Defra – Updating the General Duties with respect to the water industry to reflect the UK Government's resilience priorities - April 2013 para 6.4).

- (a) to further the consumer objective, which is to protect the interests of consumers, wherever appropriate by promoting effective competition between persons engaged in, or in commercial activities connected with, the provision of water and sewerage services (consumer objective);
- (b) to secure that the company's functions under the WIA91 are properly carried out in respect of every area of England and Wales (functions duty);
- (c) to secure that the company is able (in particular, by securing reasonable returns on its capital) to finance the proper carrying out of those functions (financing duty);
- (d) to secure that the activities authorised by the company's licence and any statutory functions are properly carried out (licence duty); and
- (e) to further the 'resilience objective'.<sup>75</sup>

2.74 The secondary duties (set out in Appendix A Section 2 General Duties with respect to water industry) require Ofwat to exercise these primary duties in the manner which it considers is best calculated to:

- (a) promote economy and efficiency on the part of companies holding licences (efficiency duty);
- (b) secure that no undue preference (including for the relevant body itself) or undue discrimination is shown in the fixing of water or drainage charges;
- (c) secure that no undue preference (including for itself) is shown and that there is no undue discrimination in the doing by a water company of things which relate to the provision of services by itself or another company or things as relate to the provision of services by a water supply or sewerage licensee;
- (d) secure that consumers are protected as regards benefits that could be secured for them from the proceeds of any disposal of a company's protected land;

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<sup>75</sup> The resilience objective is defined for these purposes in section 2(2DA) WIA91 as: (a) to secure the long-term resilience of water undertakers' supply systems and sewerage undertakers' sewerage systems as regards environmental pressures, population growth and changes in consumer behaviour; and (b) to secure that undertakers take steps for the purpose of enabling them to meet, in the long term, the need for the supply of water and the provision of sewerage services to consumers, including by promoting: (i) appropriate long-term planning and investment by relevant undertakers; and (ii) the taking by them of a range of measures to manage water resources in sustainable ways, and to increase efficiency in the use of water and reduce demand for water so as to reduce pressure on water resources.

- (e) ensure that consumers are protected as regards any activities of a company which are not attributable to the exercise of its functions under the WIA91, in particular by ensuring that any transactions are carried out at arms-length and that in the exercise of its functions companies maintain and present themselves in a suitable form and manner; and
  - (f) contribute to the achievement of sustainable development (sustainability duty).
- 2.75 In exercising its powers and performing all of its duties, Ofwat is required to have regard to the principles of best regulatory practice, including the principles under which regulatory activities should be transparent, accountable, proportionate, consistent and targeted only at cases in which action is needed.<sup>76</sup>
- 2.76 In addition to these statutory duties, the Secretary of State may publish from time to time a SPS which sets out strategic priorities and objectives which Ofwat must act in accordance with when it is carrying out its functions in England (see Appendix A under ‘Section 2A strategic priorities and objectives: England’). The SPS must take account of Ofwat’s statutory duties, social and environmental matters and other matters that the Secretary of State thinks fit.<sup>77</sup> The SPS is not just relevant for price controls but for all the functions that Ofwat carries out. A separate SPS is published for Wales by the Welsh Ministers, but our discussion in this redetermination relates to England given the operating areas of the Disputing Companies.
- 2.77 The most recent SPS was published in 2017.<sup>78</sup> It contains three areas where it sets priorities and objectives for Ofwat. These are in relation to (i) securing long term resilience,<sup>79</sup> (ii) protecting customers,<sup>80</sup> and (iii) making markets work.<sup>81</sup>
- 2.78 Securing long term resilience includes protection from service failures. This requires Ofwat to challenge the water sector to plan, invest and operate to meet the need of current and future customers.<sup>82</sup> As part of securing this priority the government expected companies to take account of the full range of pressure on water and wastewater services and consider a broad and innovative range of options to tackle these issues with a view to delivering the best value for money over the long term considering the wider costs and

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<sup>76</sup> The Water Industry Act 1991, [section 2\(4\)](#)

<sup>77</sup> The Water Industry Act 1991, [section 2A\(3\)](#)

<sup>78</sup> Defra (2017), [The government’s strategic priorities and objectives for Ofwat \(SPS\)](#)

<sup>79</sup> [SPS](#), paragraph 4

<sup>80</sup> [SPS](#), paragraph 4

<sup>81</sup> [SPS](#), paragraph 36

<sup>82</sup> [SPS](#), paragraph 8

benefits to the economy, society and the environment.<sup>83</sup> There was also an expectation that companies carry out meaningful and effective engagement with consumers and demonstrate that their plans are acceptable to consumers. The government said Ofwat should intervene if it does not have assurance that companies are planning in a resilient long-term manner.<sup>84</sup>

- 2.79 In respect of ‘protecting customers’<sup>85</sup> Ofwat must require water companies to go further in identifying and meeting the needs of customers who are struggling to afford their charges.<sup>86</sup>
- 2.80 The third area in the SPS, making markets work, required Ofwat to promote markets to drive innovation and achieve efficiencies in a way that takes account of the need to further (i) the long term resilience of water and waste water systems and services; and /or (ii) the protection of vulnerable customers.<sup>87</sup> Under this priority the SPS set out an expectation that Ofwat explore the full range of ways in which it can bring competitive pressures to bear in the water market focusing on areas where the industry has significant potential to improve.<sup>88</sup> It also said Ofwat should seek to sustain long-term investor confidence in the sector in line with its duty including protecting current and future consumer interests.<sup>89</sup>
- 2.81 Ofwat set out how it considered it had fulfilled the priorities and objectives of the SPS in PR19.<sup>90</sup>
- 2.82 When a reference is made to the CMA by Ofwat (on request of a water company) for a redetermination of Ofwat’s price control, the CMA is to decide the matter on its own merits in accordance with the statutory duties that apply to Ofwat.<sup>91</sup> The CMA has received four separate references and has a duty to make four determinations of the price control - one for each company’s reference.
- 2.83 In carrying out these redeterminations, the CMA will be exercising its own regulatory discretion as to how to appropriately balance these statutory duties. As the CMA is making a fresh determination, the CMA considers that it

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<sup>83</sup> [SPS](#), paragraph 9

<sup>84</sup> [SPS](#) paragraph 10

<sup>85</sup> [SPS](#) paragraph 4

<sup>86</sup> [SPS](#) paragraph 28

<sup>87</sup> [SPS](#) paragraph 36

<sup>88</sup> [SPS](#) paragraph 37

<sup>89</sup> [SPS](#) paragraph 38

<sup>90</sup> Ofwat (2019), [UK Government priorities and our 2019 price review final determinations](#)

<sup>91</sup> The Water Industry Act 1991, [section 12\(3\)\(b\)](#)

should, in principle, consider any further issues that have arisen since Ofwat made the Disputed Determinations.<sup>92</sup>

- 2.84 The legislation does not set out any hierarchy of the primary duties.<sup>93</sup> The CMA has previously set out (in the CMA's Bristol PR14 Determination) that the primary duties are equally important and are intended to complement one another. They should not be applied in isolation. The secondary duties are subordinate to, or subject to, the primary duties but are still legal requirements that must be taken account of.<sup>94</sup>
- 2.85 The CMA has had regard to previous decisions of the CMA and the Competition Commission (CC) to the extent relevant. There may be precedent value in these previous decisions, but previous approaches can be departed from where justified.<sup>95</sup> Previous decisions will not, however, have taken account of updates to the legislation, such as the introduction of the resilience objective (see paragraph 2.73(e) or the SPS, and will have applied the duties in different circumstances.
- 2.86 The SPS does not require extra weight to be given to one statutory duty over another. Ofwat's statutory duty is to carry out its functions in accordance with the SPS and to that extent it may prioritise certain work areas over others, but this does not affect the weight given to each primary duty. The expectation is that the regulated water industry will reflect the priorities and objectives in its strategic direction. Accordingly, there should not be a conflict between the SPS and the primary and secondary duties.

## The Ofwat PR19 price review

- 2.87 In this section we summarise some key aspects of Ofwat's approach to PR19 that are relevant to our determinations. We do not seek here to cover all elements of Ofwat's PR19 price control framework and final determination. We describe more detailed aspects of Ofwat's approach as they arise in subsequent sections of our provisional determinations report.

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<sup>92</sup> Also see consideration in CMA (2015), *Bristol Water plc. A reference under section 12(3)(a) of the Water Industry Act 1991 (Bristol PR14 Determination)*, paragraph 2.15

<sup>93</sup> Case law has also set out that the order in which duties are listed does not create a hierarchy. See *R v Director General of Telecommunications, ex p. Cellcom* [1999] ECC 314 and Competition Commission SES PR04 Interim Decision at paragraph 4.52.

<sup>94</sup> *Bristol PR14 Determination*, paragraph 3.4

<sup>95</sup> Competition Commission (2010), *Bristol Water plc. A reference under section 12(3)(a) of the Water Industry Act 1991 (Bristol PR09 Determination)*, paragraphs 9.21–9.22

## ***Setting the PR19 price controls***

2.88 In PR19, Ofwat set five separate price controls relevant to our determinations (see paragraph 2.67). All the price controls run for the five-year period from 1 April 2020.

2.89 Ofwat said that the PR19 methodology built on PR14 and earlier price controls. Significant developments at PR14 included:

- (a) Ofwat introduced separate price controls for wholesale and retail activities.
- (b) Ofwat required each company to focus on customer priorities and establish an independent CCG (formed from local groups of customer representatives and other stakeholders), to review and challenge the way companies engaged customers and took customer views into account and to provide assurance to Ofwat about the quality and effectiveness of companies' direct engagement with their customers.
- (c) Ofwat went through a process to incentivise outcome performance. Ofwat set certain PCs under which a target level of outcome was set for a number of defined measures of performance (see paragraph 2.114). Companies were encouraged to set financial incentives (ODIs, both reward and penalty) directly linked to performance above and below their committed performance level for each outcome and relative to allowed total expenditure. The intention behind the design of ODIs was that these should be based on customer research and agreed with the CCGs.<sup>96</sup> Companies were asked to come up with their own list of metrics and targets, based on the customer research. Ofwat chose to intervene in a number of these areas, particularly regarding the target levels of service required.
- (d) In PR14 Ofwat introduced an approach to incentivise overall efficiency where it set a single wholesale expenditure allowance, or total expenditure (known as totex), covering both operational expenditure (opex) and capital expenditure (capex). This was to address the concern that differences in the way Ofwat assessed remunerated and incentivised opex compared to capex encouraged a focus on capital solutions. Ofwat's

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<sup>96</sup> There were different views expressed to us on whether the CCGs would agree the ODIs or whether their role was to report on the ODIs.

totex approach applied across cost assessment, cost recovery and the RCV.<sup>97</sup>

- (e) Companies were required to submit business plans to Ofwat which were then assessed. Different targeted approaches were followed to further develop these depending on Ofwat's assessment of the quality of the plans and the need for detailed analysis. Where a company's actual expenditure varies from the wholesale expenditure allowance, a cost sharing incentive applies by setting a proportion of any over- or under-spend to be retained by the company, rather than being passed through to consumers. For PR14, Ofwat applied the cost sharing rate to totex with no distinction between opex and capex.
  - (f) Ofwat applied a 'menu regulation' scheme for PR14 (this was not carried over, see paragraphs 2.97 to 2.100 for PR19). This was a complex regulatory mechanism that determines the cost sharing incentive rate that each company faces and the allocation of a company's allowed wholesale revenues between the coming price control period and subsequent price control periods. Ofwat's assessment of each company's efficient wholesale expenditure requirements is an input to the scheme, alongside a forecast from each company of its expenditure requirements over the price control period.
- 2.90 Ofwat started to develop the PR19 methodology in 2015 when it published the PR14 lessons learnt, followed by a consultation on its proposals for changes to the regulatory framework. It consulted on the PR19 methodology in July 2017 and published its final PR19 methodology in December 2017. The price review process continued until final determinations were published in December 2019.<sup>98</sup>
- 2.91 Ofwat told us the process of setting the price control went through four stages:
- (a) first, Ofwat set the framework and methodology;
  - (b) second, companies then submitted business plans based on this methodology, setting out a range of matters including: what companies propose to invest, what they propose to charge customers, how they will support vulnerable customers and how they will ensure the long-term resilience of their infrastructure and operations;<sup>99</sup>

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<sup>97</sup> A fixed proportion of the wholesale totex allowance (reflecting Ofwat's cost assessment) was remunerated directly through revenues collected during the price control period. This proportion is given by the PAYG rate. The remainder was added to the RCV and remunerated over a longer time period.

<sup>98</sup> Ofwat (2019), [PR19 final determinations: Policy summary](#), section 1.5.3

<sup>99</sup> Ofwat (2018), [Water companies set out plans for 2020-2025](#)

(c) third, Ofwat checked and challenged these business plans, making its initial assessment and intervening where it considered that it was required; and

(d) fourth, Ofwat then consulted on its proposed interventions before making its draft determinations and final determinations.

2.92 The process described above can result in companies making successive developments and submissions of their business plans as a result of this interaction with Ofwat and seeing what good evidence looks like in other company plans. Ofwat said that while extensive, this process is partly intended to address concerns of information asymmetry between Ofwat and the water companies.

2.93 The key changes from PR14 were that separate price controls were introduced for water resources and bioresources (as well as wholesale water network plus, wholesale wastewater network plus, and residential retail, and business retail in Wales). In each of the wholesale controls, allowed revenue is indexed for inflation by CPIH rather than the Retail Price Index (RPI) from April 2020, with RCV transitioning from RPI to CPIH.<sup>100</sup> Ofwat said the move to disaggregate price controls since 2009 (when there was a single control) was to facilitate the development of new markets (eg in providing for vertical separation between wholesale and retail activities) and provide greater focus.

2.94 Ofwat retained its broad approach to PCs and ODIs from PR14 but sought to make PCs more 'stretching' in PR19 requiring a higher level of outcome relative to cost allowances.<sup>101</sup> Common PCs were introduced for all companies and companies were encouraged to offer additional Bespoke PCs based on individual circumstances and customer preferences. ODIs were also further developed with the intention of aligning shareholder and management interest with those of customers by rewarding effort and risk-taking to deliver performance improvements and by penalising non-delivery of PCs.

2.95 In order to respond to concerns that companies were not always acting in a way that promoted trust and confidence in the sector, Ofwat published 'Putting the sector in balance' in 2018.<sup>102</sup> This referred to concerns that had been raised about: high dividend payments undermining the long term capacity of companies to perform; levels of executive pay being out of step with what has

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<sup>100</sup> Revenue is indexed by CPIH from 1 April 2020. RCV transitions to CPIH from 1 April 2020 with 50% of the RCV at 1 April 2020 indexed by RPI, the remainder, including any RCV additions is indexed by CPIH.

<sup>101</sup> Ofwat explained that by 'stretching', it meant stretching performance by reference to each company's business plan, see Ofwat (2018), [Putting the sector in balance: position statement on PR19 business plans](#), p7

<sup>102</sup> Ofwat (2018), [Putting the sector in balance: position statement on PR19 business plans](#), section 6



been delivered for customers; and complicated and potentially risky financial structures which call financial resilience into question.

- 2.96 To address these views, it therefore proposed measures that required highly geared companies to share what it considered to be financing gains with customers. Ofwat introduced the GOSM into the price control regime for the first time in PR19. Ofwat stated that equity investors benefit from higher equity returns that are associated with their increased risk, but that there is no substantive benefit passed to customers. In addition, Ofwat stated where companies adopt high levels of gearing, they may reduce financial resilience and transfer some risk to customers and / or potentially taxpayers in the event that a company fails. To address this, Ofwat introduced a mechanism that it said would share what it claimed were the benefits of higher gearing with customers. Under the PR19 GOSM, companies are required to share the difference between the allowed cost of equity and their actual cost of debt for gearing levels starting at 74% for the year 2020/21, reducing by 1% each year to 70% for the year 2024/25.<sup>103</sup> 'Putting the sector in balance' also set out expectations that companies should demonstrate how dividend and related pay policies reflected performance delivery for customers, and that they should demonstrate how they will maintain long-term financial resilience.<sup>104</sup>

#### *Assessment of business plans, fast tracking and cost sharing*

- 2.97 Ofwat sought to push companies to further improve efficiency, customer service and resilience. It looked to provide companies with incentives to take on the responsibility for preparing efficient business plans, which it would then review. At the stage of its initial assessment of business plans, Ofwat applied a categorisation process (between fast-track, slow-track and significant scrutiny)<sup>105</sup> which helped it to give prominence to companies that had satisfied its expectations, and to prioritise further review of company business plans where necessary. Ofwat said that fast-track status companies received early draft determinations and financial and reputational benefits. The financial incentives included an uplift to the allowed return and a symmetrical cost-sharing rate for companies.
- 2.98 The initial assessment (stage c, see paragraph 2.91(c)) tested the water company business plans against three overarching criteria: quality, ambition and innovation. Fast-track status was given to plans that were considered to be of high quality and where limited, minor or no intervention was required to protect customers' interests. Slow-track status was given to plans where

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<sup>103</sup> Ofwat (2019), [PR19 final determination: Aligning risk and return technical appendix](#), section 9.3

<sup>104</sup> These are not matters covered in the price controls.

<sup>105</sup> There was also an 'exceptional' category potentially available.

Ofwat considered a material level of intervention was required to protect the interests of customers. Slow-track companies were required to resubmit their business plans and provide additional evidence. 'Significant scrutiny' status was given to plans that Ofwat considered fell well short of the required quality and where Ofwat considered an extensive material intervention was required to protect the interests of customers.

- 2.99 Ofwat's approach to the treatment of business plans included a consequential impact on the cost sharing incentive rate (see paragraph 6.73-6.77) that it determined for each company.<sup>106</sup> Ofwat's approach was to bundle symmetrical cost sharing rates with other incentives awarded to fast-track companies, and to set asymmetrical cost sharing rates in favour of customers for slow-track companies. This scheme was intended to incentivise companies to submit more accurate forecasts of their future expenditure requirements within their price control business plans and to incentivise performance. Ofwat's assessment of each company's efficient wholesale expenditure requirements was an input to the scheme, alongside a forecast from each company of its expenditure requirements over the price control period.
- 2.100 For slow-track companies, the cost sharing rates were set by reference to the difference between Ofwat's assessment of totex and two iterations of the company's business plan submitted during the business plan assessment process. The asymmetrical cost sharing rates for under and outperformance were determined by a formula that moved further in favour of customers (away from companies), in proportion to the excess of totex estimates prepared by a company over Ofwat's estimates. However, if a company submitted a business plan with totex estimates below Ofwat's assessment, then the formula was not applied in relation to underperformance and the company would receive a symmetrical cost sharing rate.

### *Customer engagement*

- 2.101 Building on PR14, Ofwat encouraged significant customer engagement in the preparation of business plans. It said companies needed to understand customers' preferences and priorities, in particular in relation to the bespoke, company specific PCs that they put forward and into financial ODIs. It found there was a marked improvement in companies' engagement with their customers in this price review, helping the development of their business plans.

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<sup>106</sup> There were other benefits, including an uplift of 10 basis points on the return on regulatory equity.

## ***Building blocks of the PR19 determination***

2.102 There were three main building blocks of the PR19 price determination:

- (a) Costs assessment: Ofwat reviewed the expenditure forecasts that companies submitted in their business plans to set an efficient cost allowance for each of base and enhancement expenditure. Base costs are routine costs that companies incur to provide a base level of service while enhancement costs are those required to enhance the capacity or quality of the service beyond the base level.
- (b) Outcomes: Ofwat set the level of the outcome targets for certain PCs, together with a package of financial and reputational incentives or penalties (ODIs) relating to whether it fails to meet or surpasses these targets.
- (c) Risk and return: Ofwat set a WACC with the intention of ensuring that water companies can finance their activities and sets other financial penalties and incentives. It also developed risk protection mechanisms to allow for unforeseen cost developments and other situations.

2.103 Ofwat said that while these building blocks were assessed separately, it also examined the overall package in the round to ensure that in its judgement it was achievable and appropriately funded.

2.104 Overall revenue allowances were derived from these building blocks in the following way:

- (a) Under wholesale controls, 2020-25 totex expenditure is either recovered in period PAYG expenditure, or it is added to the RCV. The WACC is applied to the RCV to give the allowed return on capital. The RCV at the start of the period is also subject to run off (or depreciation). Additionally, these factors are adjusted for any revenue reconciliation adjustments<sup>107</sup> and an allowance for tax. Taken together, these provide the total wholesale allowance revenue.
- (b) For retail controls, the retail allowed revenue is based only on the cost to serve, any reconciliation adjustments<sup>108</sup> with PR14 outturns, and a net margin to cover returns and tax. There is no RCV for retail and depreciation of any associated assets is included in the cost to serve.

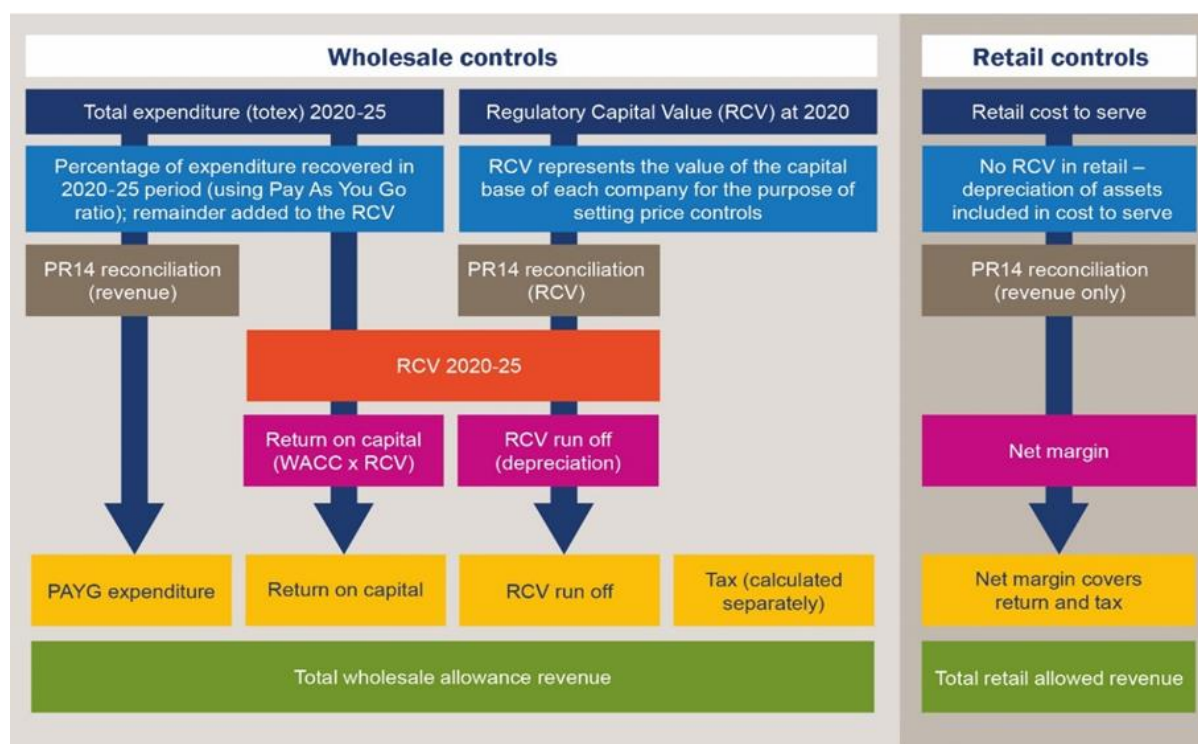
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<sup>107</sup> Revenue reconciliation adjustments include adjustments for the WFRIM, totex sharing and ODIs.

<sup>108</sup> For both revenue forecasting and ODIs.

2.105 This is illustrated in Figure 2-2.

**Figure 2-2: Determination of overall revenues from the building blocks**



Source: Ofwat

### Cost assessment

- 2.106 In order to set cost allowances, Ofwat reviewed the company business plans. Where possible, it did this by comparing costs across companies using cost models such as econometric or unit costs models in order to help identify benchmarks of efficient cost.
- 2.107 Ofwat used econometric models to estimate a relationship between a set of explanatory variables (such as number of customers or treatment complexity) and the cost of an overall service. This relationship is given by the estimated coefficients. The coefficients were then used to set a benchmark for required expenditure for the period 2020-25 based on a forecast of the explanatory variables for this period. Ofwat's models are based on eight years of historical data on 17 companies in wholesale water and retail activities, and 10 companies in wastewater activities. Companies were also able to submit 'cost adjustment claims' to request an adjustment to Ofwat's modelling results for exceptional company circumstances.
- 2.108 Some non-routine costs, such as some large bespoke enhancement projects, were not suitable for benchmarking of some or all of their costs. These projects were reviewed through a 'deep dive' assessment of the need for and

efficiency of the investment. This covered whether there was good evidence of a need for the investment and whether customers supported it, whether the proposal was the best solution, whether the cost estimates were robust and efficient, and whether customers were protected if there were delays or reductions in the investment. Smaller costs were subject to a 'shallow dive' where the efficiency of the expenditure was challenged on the basis of the efficiency of the wider business plan.

- 2.109 Ofwat subjected costs to an efficiency challenge, reducing allowed costs to allow for productivity growth and eliminate inefficiencies. The approach adopted varied depending on the category of costs. For example, in the case of econometrically modelled base costs, estimates of a catch-up challenge were applied to reflect where companies were operating less efficiently than other companies. This resulted in an efficiency challenge of between 2-4% across the sector. For wholesale water services Ofwat used the 4th most efficient company (out of 17 water companies) to set the catch-up efficiency challenge. For wholesale wastewater services it used the 3rd most efficient company (out of 10 wastewater companies). Second, there was a dynamic frontier shift challenge to reflect general improvements in productivity and technological improvements, which would not be reflected in historical spend. There was also an adjustment for real changes in input prices, where the level of input prices increases or decreases faster than the inflation indexation mechanism.
- 2.110 In addition, there were some base costs which are not suitable for modelling and have a bespoke assessment (including for example costs for business rates (see paragraph 4.1054) and Traffic Management Act measures (see paragraph 4.1047). Those 'unmodelled' costs that were considered within the cost sharing incentive were worth around £4 billion out of a total industry requested base and growth cost of £41.5 billion.
- 2.111 Companies requested enhancement expenditure in addition to growth for a total of around £11 billion (Ofwat finally approved industry-wide enhancement expenditure of around £13 billion, including growth allowances).<sup>109</sup> Such costs may be driven by, for example new statutory obligations such as expenditure on environmental outcomes as set by the environment regulators (such as reducing phosphorous or nitrogen in wastewater discharge).

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<sup>109</sup> This was more than the £11 billion total requested enhancement expenditure. See 'New infrastructure for increased resilience: Our package includes £13 billion for new and improved services that go above and beyond water companies' day-to-day operations'. Ofwat (2019), [PR19 final determinations: Overview of companies' final determinations](#), p3.

2.112 Costs also included an allowance for PR14 reconciliation – this reflects the true-up of incentive payments, such as outcome delivery incentives, incurred in the PR14 price control period (2015-20).

2.113 Ofwat also determined that for schemes forecast to cost at least £100 million, companies should assess whether direct procurement for customers would be an efficient mechanism for delivering the investment.<sup>110</sup>

### *Outcomes*

2.114 Ofwat sets certain PCs which for each measure set the target level for these measures. There are 15 Common PCs applying to all WASCs, and 10 applying to WOCs, although the target levels may vary between companies. These cover:

- Common performance level measures: water supply interruptions, pollution incidents and internal sewer flooding.
- Reducing water demand: leakage and per capita consumption.
- Statutory measures: compliance risk index and treatment works compliance.
- Asset health measures: mains repairs, unplanned outages and sewer collapses.
- Resilience measures: risk of sewer flooding in a storm and risk of severe restrictions in a drought.
- Vulnerability measures: the Priority Services Register.
- Customer experience: customer experience measure and developer services experience measure.

2.115 In addition, there are a large number of PCs bespoke to individual companies. These reflect other areas of importance to customers and wider stakeholders. Companies propose these commitments.

2.116 Ofwat said that in setting PC levels, the baseline level of performance against which companies' proposed PC levels were assessed was based on

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<sup>110</sup> Ofwat said this is a process for water companies to competitively tender for a third-party competitively appointed provider to design, build, finance, operate and maintain infrastructure. Ofwat said this initiative has the potential to provide significant benefits for customers through promoting innovation and enabling capital and operational cost savings as well as a reduction in financing costs (Ofwat (2019), [Consultation on proposed PR19 uncertainty mechanisms in respect of Direct Procurement for Customers](#), p2).

companies' 2019/20 forecasts. These forecast levels were scrutinised against PR14 levels and actual performance, where applicable, to ensure they represented realistic performance baselines. There was also customer engagement in setting appropriate performance levels. The level of 'stretch' was tested using a range of approaches, including cost-benefit analysis, comparative and/or historical information.

- 2.117 All PCs are accompanied by ODIs. In addition to the reputational incentives associated with failing PCs, Ofwat said it was aiming to sharpen incentives by linking a higher proportion of revenues to service performance through financial ODIs than at PR14. There are also enhanced ODI payments for performance that shifts the frontier of outcomes.

### *Risk and return*

- 2.118 Ofwat said that its approach was intended to align the interests of companies and investors with those of customers by aligning risk and return. It said that its totex cost sharing and ODIs provided significant scope to earn outperformance returns as well as lower returns from underperformance. There are risk protection mechanisms for companies in Ofwat's determinations such as inflation indexation, totex sharing, reconciliation adjustments for revenue, cost of new debt and tax, and differences in growth rates, and additional cost protection mechanisms for other aspects including labour costs, business rates and Environment Agency abstraction licence charges. In extreme cases of revenue fluctuations Ofwat can also reopen the determinations.
- 2.119 Ofwat assessed an allowed real return on capital of 2.96% adjusted for CPIH inflation (2.92% for wholesale), 5.02% nominal (unadjusted for inflation). This is the lowest allowed return since privatisation. Ofwat said that while a number of independent reviews of previous determinations have identified that Ofwat and other regulators have tended to allow an over-generous return on capital, its reasons for determining this low rate reflect benign capital market conditions and changes to the approach for estimating the appropriate return on capital rather than being an additional reduction in allowed returns. The allowed return is based on a notional capital structure, rather than any allowance being made for companies' choice of financing. Ofwat said that in the light of the lower allowed returns at PR19, some companies may need to take action to strengthen their balance sheets.

- 2.120 Company Specific Adjustments were made to the allowed return on debt for Portsmouth Water and South Staffordshire Water which as small companies were deemed to be facing higher debt costs than other larger companies.<sup>111</sup>
- 2.121 Ofwat then assessed financeability (see paragraph 2.73(c)) to check that an efficient company could generate cash flows sufficient to meet its financing needs, on the basis of the notional capital structure assuming no out/underperformance.
- 2.122 Ofwat noted that companies may suffer cashflow constraints primarily due to the imbalance between real returns on capital and the nominal cost of debt. For 12 companies, including Anglian, Northumbrian and Yorkshire, Ofwat advanced revenue that would otherwise be capitalised in the RCV (for recovery at a later period) in order to improve financeability.

### ***The final determination***

- 2.123 Ofwat told us that its goal at PR19 was to achieve a regulatory package that aligned the interests of customers, companies and investors – providing companies with the revenues they needed to invest for a resilient and sustainable future, while ensuring customers did not pay more than necessary.<sup>112</sup> It said that in coming to its final determination it took full account of and acted consistently with its duties and in accordance with the statements of strategic priorities and objectives from the UK and Welsh governments.
- 2.124 It said that it considered the overall ‘stretch’ across costs, outcomes and the allowed return on capital and where appropriate made adjustments to its approach at draft determination which reduced the level of revenue challenge to companies. These adjustments included reducing the frontier shift estimate from 1.5% to 1.1% per year, refining its approach to base cost modelling by including 2018/19 data, amending the way that catch-up and frontier shift efficiency were applied, providing additional funding to reduce leakage for better performing companies and reviewing the ‘stretch’ on water supply interruptions and other PCs and adjusting collars to limit penalties in early periods on specific outcomes. It concluded that the overall challenge across costs, outcomes and the allowed return on capital in the final determination was stretching but achievable, and that the final determinations were financeable.

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<sup>111</sup> Ofwat said it applied a three stage appraisal of such company specific claims for cost of capital adjustments, that (i) there was evidence the level requested was appropriate, (ii) customers were adequately compensated from the increased cost and (iii) there was evidence of customer support for the increased cost.

<sup>112</sup> [Ofwat's final submission](#), p2



- 2.125 In presenting the PR19 determinations,<sup>113</sup> Ofwat stated that it was a £51 billion package over 5 years, which included £13 billion for new and improved services that go above and beyond water companies' day-to-day operations. It said this includes more than £1 billion to reduce the impact of flooding across England and Wales, and measures to ensure companies work together to solve long-term drought resilience challenges. It pointed to almost £500 million allowed to support 17 major resilience schemes, including developing new water resources and the transfer of water across the country. It said there would be reduced pollution (reducing pollution incidents by 30%); stretching targets on customer service, supply interruptions, bursts, leakage (cut by 16%); and increasing help for vulnerable customers. It also introduced a £200 million innovation fund. It said these measures would take place alongside an average 12%, or about £50 in each year, fall in customer bills, before inflation, achieved as a result of a £6 billion efficiency challenge and lower financing costs.
- 2.126 In its final submission, it said that it had been at least as concerned about resilience as the companies, but the difference between it and the Disputing Companies was around the importance it placed on efficiency and avoiding unearned returns.<sup>114</sup> It said that listed companies' results (South West Water, Severn Trent and United Utilities) after the first six months of PR19 showed that companies expect to perform in line with or outperform its efficient totex allowance, even despite the impacts of COVID-19 on water sector costs, growing evidence of companies expecting significant outperformance over the AMP and in year 1. It also said the allowed return is sufficient and potentially generous in light of falling returns since late 2019.<sup>115</sup>
- 2.127 Ofwat reported that the relative materiality of its allowed totex costs across the whole of PR19 were: 68% modelled base costs; 7% unmodelled base costs; 17% enhancement costs and 8% retail costs.<sup>116</sup>

## **Main Parties' views on the context and themes of PR19**

### ***Ofwat's view on the context of the PR19 determination***

- 2.128 We first set out some of Ofwat's views on the context of the PR19 determination and the Disputing Companies' responses to this.

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<sup>113</sup> See Ofwat (2019), *PR19 final determinations: Overview of companies' final determinations*, p3

<sup>114</sup> Ofwat's final submission, p2

<sup>115</sup> Ofwat's final submission, p3

<sup>116</sup> Ofwat, *PR19 final determinations: Securing cost efficiency technical appendix*, Figure 3, p11

2.129 Ofwat said that based on its duties and the SPS from the UK and Welsh governments, it set four key themes for PR19:<sup>117</sup>

- Great customer service – It challenged companies to do much more to understand customers' needs and reflect them in their business plans.
- Long-term resilience in the round – It encouraged companies to consider all aspects of resilience, including operational, corporate and financial resilience, in line with its resilience planning principles.
- Affordable bills – Recognising that water is an essential service, it said it expected companies to understand and address affordability concerns for both current and future customers.
- Innovation – In order to deliver on the above themes, it said companies needed to innovate to deliver more of what matters to customers and the environment, including developing new ways of working and building on best practice from within and outside the water sector.

2.130 Ofwat said that from the initial development of the PR19 methodology Ofwat had been clear with companies that the price review was not going to preserve the status quo.<sup>118</sup> It said the sector faces profound challenges, such as climate change, population growth and shifting customer expectations and the sector as a whole needed to strengthen its operational performance to provide reliable and affordable services against these challenges. It said it was important to set a stretching but achievable level of overall challenge, so customers pay no more than efficient costs and receive high quality services from their water company.

2.131 Ofwat said that since privatisation, the water sector has made significant improvements in service delivery. However, it said in recent years company performance has stagnated and even deteriorated on a number of measures:

- (a) since 2011, productivity growth in the sector has effectively been zero, even after allowing for quality improvements;
- (b) at PR14, more than half of companies achieved the historical upper quartile on the upper quartile Common PCs by the first year of the price control – then improvements stagnated in 2017/18 and 2018/19; and

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<sup>117</sup> Ofwat (2020), [Reference of the PR19 final determinations: Overview](#), paragraph 3.14

<sup>118</sup> [Ofwat's Response to common issues in companies' SoCs: Introduction and overall stretch on costs and outcomes](#), paragraph 1.1

(c) over the past two decades, despite material technological progress, the sector has achieved little overall reduction in leakage. Ofwat said that overall leakage level declined following privatisation by 37% between 1994-95 and 2000-01. However, since then it has shown little change. Between 2012-13 and 2018-19 overall leakage has increased by 2.3% (although it fell by 7% in 2019-20).

2.132 It said in a number of areas, some companies have performed relatively well in recent years, while others have lagged behind. Hence overall sector performance tends to mask significant gaps in the relative performance of individual companies. On leakage, some individual companies have made large improvements, including Portsmouth Water reducing leakage by 17% and Dŵr Cymru by 8% since 2012/13 whereas there had been increases by 25% for Southern Water and by nearly 10% for Yorkshire.

2.133 It said some companies demonstrated at PR14 that delivering high quality and high efficiency at the same time is achievable. For example, Portsmouth Water and Wessex Water have achieved upper quartile performance on a number of service measures whilst also achieving high cost efficiency.

2.134 It noted though that companies, on average, have tended to outperform the cost allowances set in past determinations. It was concerned that some companies have continued to pay high dividends to investors throughout the PR14 period (see paragraphs 2.95-2.96). Ofwat expressed concern about the adoption of complex highly geared financial structures, payment of high dividends and loans from the regulated companies to shareholders, and service failures and misreporting.

2.135 Ofwat pointed to sections of certain reviews of water and other regulated sectors which, among other issues, have criticised regulators for repeatedly setting over-generous controls, resulting in investors earning excess returns and customers paying higher bills than necessary. For example:

(a) The EFRA Select Committee (2018) Regulation of the water industry report stated – ‘In the absence of real competition in the sector, Ofwat must strike a difficult balance between consumer interests and making it financially worthwhile for water companies to satisfy their investors. That balance has been skewed in favour of the latter. The regulator’s proposals to ‘balance the sector’ are now heading in the right direction but we are sceptical about whether they go far enough.’<sup>119</sup>

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<sup>119</sup> Environment, Food and Rural Affairs Select Committee (2018), [Regulation of the water industry](#), paragraph 56

(b) The National Infrastructure Commission (2019) Strategic investment and public confidence report stated 'In future price controls, regulators should take direct account of information asymmetries in assessing the WACC and total expenditure allowances, 'aiming off' to ensure a fair outcome for consumers and investors'.<sup>120</sup>

(c) Citizens Advice (2019) – Missing billions report said 'Regulators have allowed water, energy, broadband and telephone networks to overcharge customers by £24.1 billion over the past fifteen years'. 'These overpayments partly occurred because regulators made forecasting errors. They predicted that costs, such as debt, would be higher than they in fact were. Regulators also over-estimated how risky these businesses were for investors'.<sup>121</sup>

2.136 Ofwat said this stagnation in sector performance, despite significant improvements since privatisation, led it to conclude that there needed to be a step change.

2.137 The Disputing Companies, while acknowledging that it was appropriate for an economic regulator to seek to push for improvements in productivity, efficiency and service, disagreed with elements of Ofwat's views on these issues. For example:<sup>122</sup>

(a) The companies disputed that there had been excessive returns to shareholders or that such an observation applied to them. Yorkshire said during AMP6, it had reinvested all outperformance in better service levels for customers and that when considering only dividends that are not immediately returned to Yorkshire as interest, it paid among the lowest amount in dividends of the WASCs during that period.<sup>123</sup> Bristol denied that the characterisation of 'companies outperforming their base returns and returning high dividends to shareholders' applied to it.<sup>124</sup> Anglian said its shareholders had shown their long-term commitment to the sector, through conservative dividend policies in AMP6, and in AMP7 planned to pay no dividends to shareholders outside AWGL.<sup>125</sup>

(b) The Disputing Companies noted that the regulatory system deliberately provided incentives to companies to outperform against allowances in order to drive efficiencies which were then built into subsequent price

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<sup>120</sup> The National Infrastructure Commission (2019), [Strategic investment and public confidence report](#), p16

<sup>121</sup> Citizens Advice (2019), [Missing Billions](#)

<sup>122</sup> These are a few illustrative examples, specific arguments against Ofwat's implementation in PR19 are addressed throughout this provisional determination report.

<sup>123</sup> [Yorkshire's reply to Ofwat's Response](#), paragraph 1.1.20d

<sup>124</sup> [Bristol's reply to Ofwat's Response](#), p8

<sup>125</sup> [Anglian SoC](#), paragraph 159

controls. Anglian said its track record showed it had paid dividends to shareholders when it has delivered strong performance, and submitted that this is precisely the outcome that the incentive-based regulation system aims to deliver.<sup>126</sup> Similarly, Northumbrian said that Ofwat had previously recognised the benefits for customers of outperformance but was now characterising outperformance as simply ‘underspending’ and failing to identify whether it considers each instance of underspend to be efficient or inefficient.<sup>127</sup>

- (c) The Disputing Companies disagreed with Ofwat’s characterisation of low productivity growth in the sector, arguing that Ofwat was using inappropriate time periods for the comparisons (in particular that the comparison was heavily weighted towards pre-financial crisis performance disregarding industrial performance over the last 13 years) or based the comparisons on a selective range of best performing sectors.<sup>128</sup>
- (d) On leakage, Yorkshire said in previous price reviews, water companies were required to set leakage targets by reference to the ‘sustainable economic level of leakage’ (SELL, see paragraph 8.11 to 8.13). Therefore, sector performance had reflected this regulation, whereas Ofwat had moved away from this only in PR19 in favour of target levels of leakage reduction.<sup>129</sup>

### ***The Main Parties’ views on interpretation of duties***

2.138 As is evident from the Disputing Companies’ reasons for rejection of Ofwat’s determinations (see paragraphs 2.150 to 2.180(f)), there were some broad disagreements with how, in their perception, Ofwat had discharged its duties in the determinations.

2.139 A key theme in the case of most of the Disputing Companies was that Ofwat had chosen to implement a step-change in regulation, to stretch the performance of the companies as a result of its perception that previous regulation had been overly generous.<sup>130</sup> The consequence was that they believed the consumer objective had been prioritised at the expense of other objectives, and an emphasis on limiting customer bills had led to an

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<sup>126</sup> [Anglian’s reply to Ofwat’s Response](#), paragraph 5

<sup>127</sup> [Northumbrian’s reply to Ofwat’s Response](#), paragraph 655

<sup>128</sup> For example, [Yorkshire SoC](#), paragraph 199

<sup>129</sup> [Yorkshire SoC](#), paragraph 32

<sup>130</sup> Bristol did not run this balance of objectives arguments although it did draw attention to the step-change in performance metrics, a much lower WACC, an asymmetric cost sharing rate and a GOSM moving the balance of risk of the package towards the downside. [Bristol SoC](#) paragraph 717.

overly-narrow interpretation of the consumer objective. In particular they claimed that insufficient priority had been given to the resilience objective, and that the determinations did not allow the companies to properly finance their activities.

2.140 For example, Yorkshire told us:

...one of [Yorkshire's] key concerns with the FD is that in an effort to address the perceived shortcomings in previous price controls by focusing on reduction in customer bills, Ofwat has not found the right balance between short-term price cuts on the one hand and the capital expenditure needed to ensure long-term resilience and sustainability on the other. In other words, Ofwat appears to have elevated its secondary duty to promote economy and efficiency above its primary duty to customers, to the maintenance of the resilience of [Yorkshire]'s infrastructure and to the financeability of [Yorkshire]'s operations.<sup>131</sup>

2.141 Anglian told us:

Almost every aspect of Ofwat's FD falls short of providing Anglian with the means to carry out the work necessary to meet the stated preferences of its customers and the requirements set by the quality regulators – the Environment Agency and the DWI – in terms of water quality and environment.<sup>132</sup>

Anglian does not consider this represents a proper balancing of Ofwat's regulatory duties, particularly regarding financeability and resilience.<sup>133</sup> Ofwat's FD appears heavily weighted towards a narrow and short-term interpretation of the consumer duty in the form of low bills for this price control period.<sup>134</sup> This approach is at the expense of wider consumer and environmental interests both now and in the future, long-term operational resilience to growth and climate change, and the ability of companies to finance the proper performance of their functions.<sup>135</sup> Ofwat's approach is also incompatible with the Government's SPS as the focus on low bills prevents Anglian from delivering best value solutions in the long-term, taking into account wider environmental and social impacts and customers' stated priorities.<sup>136</sup>

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<sup>131</sup> Yorkshire SoC, paragraph 55

<sup>132</sup> Anglian SoC, paragraph 20

<sup>133</sup> Anglian SoC, paragraph 38

<sup>134</sup> Anglian SoC, paragraph 39

<sup>135</sup> Anglian SoC, paragraph 40

<sup>136</sup> Anglian SoC, paragraph 43

2.142 Northumbrian said:

We consider that Ofwat has failed to discharge its statutory duties by creating an unequal balance between the primary duties ...Ofwat has erred in prioritisation of short-term customer bill reduction over the promotion of longer-term investment and Resilience Objectives.<sup>137</sup>

2.143 The Disputing Companies also told us that Ofwat had ignored evidence from customers that they assigned great importance to resilience and environmental objectives and that bill reductions were somewhat less of a priority. They said that this was in conflict with Ofwat's proposed methodology for PR19 which had required companies to undertake extensive customer research to shape and inform their business plans. For example, Northumbrian said:

Customer engagement was a key building block for Ofwat's PR19 methodology and we carried out extensive customer engagement alongside robust challenge and scrutiny from the independent Water Forums in developing our [business plan] BP19. That engagement demonstrated that our customers were not singularly focused on short-term bill reductions...[Ofwat's] FD19 reflects an unduly narrow view of the Consumer Objective, with bill reduction prioritised at the expense of other customer concerns...FD19's emphasis on short-term bill reductions ignores other, equally relevant, customer priorities...FD19 risks promoting inter-generational unfairness.<sup>138</sup>

2.144 The Disputing Companies said that in general Ofwat had not taken account of customer evidence. Bristol told us 'Based on the final determination, we do not believe there is a single example of Ofwat diverting from its calculated range [of ODI rates] for customer evidence'.<sup>139</sup>

2.145 Ofwat told us that it had been clear to companies throughout the PR19 process that the price review was not going to preserve the status quo.<sup>140</sup> Rather, it had concluded that there needed to be a step change.<sup>141</sup>

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<sup>137</sup> [Northumbrian SoC](#), paragraph 134

<sup>138</sup> [Northumbrian SoC](#), paragraphs 137–138

<sup>139</sup> [Bristol SoC](#), annex 4, paragraph 25

<sup>140</sup> [Ofwat's Response to common issues in companies' SoCs: Introduction and overall stretch on costs and outcomes](#), paragraph 1.1

<sup>141</sup> [Ofwat's Response to common issues in companies' SoCs: Introduction and overall stretch on costs and outcomes](#), paragraph 2.11



- 2.146 Ofwat disagreed with the Disputing Companies' contention that it had not met its statutory duties, arguing that the companies' points were disagreements as to the merits of its decisions. It said this was an exercise of regulatory judgement, in which the regulator strikes a balance between the objectives set out in the Act read in the light of the SPS, the evidence and its own experience and expertise.<sup>142</sup> It said it had been motivated by all of its statutory duties, protecting customer interests and finding the right outcome in light of the duties in the round, including looking to the long term, and making sure companies can earn a reasonable return and can finance their functions.<sup>143</sup>
- 2.147 It said it had taken account of challenges to the sector such as climate change, population growth and shifting customer expectations. To address this, it needed the sector to strengthen its operational performance. It said PR19 had challenged the companies to achieve this, without asking customers to pay extra for inefficiency or to accept lagging performance, or indeed to pay out inflated returns to investors.<sup>144</sup>
- 2.148 It said that by challenging inefficiency, it had saved customers £6 billion across England and Wales without compromising services.<sup>145</sup> But it said it did not aim for a particular level of customer bills as part of the price review, rather the level of bills is a product of the different elements of the price review, which in turn contribute towards the company's revenue allowance.<sup>146</sup> It said its final determinations would significantly increase the resilience of the water sector, allowing £13 billion of investment for new and improved services and to tackle environment challenges, above and beyond what companies need to do as part of their day-to-day operations, funding solutions to long-term drought resilience challenges in the south and south east, provide protection from flooding and investment in major new infrastructure across England and Wales.<sup>147</sup>
- 2.149 Ofwat said that some companies had suggested that Ofwat had failed to satisfy its duty in relation to the consumer objective because it had not adopted preferences indicated by their customers through the customer

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<sup>142</sup> [Ofwat's Response to common issues in companies' SoCs: Introduction and overall stretch on costs and outcomes](#), paragraph 3.12

<sup>143</sup> [Ofwat's Response to common issues in companies' SoCs: Introduction and overall stretch on costs and outcomes](#), paragraph 1.6

<sup>144</sup> [Ofwat's Response to common issues in companies' SoCs: Introduction and overall stretch on costs and outcomes](#), paragraph 1.1

<sup>145</sup> Ofwat (2019), *PR19 final determinations: Overview of companies' final determinations*, p16

<sup>146</sup> [Ofwat's Response to common issues in companies' SoCs: Introduction and overall stretch on costs and outcomes](#), paragraph 2.17

<sup>147</sup> Ofwat (2019), *PR19 final determinations: Overview of companies' final determinations*, p6



engagement process.<sup>148</sup> Ofwat said this was a misrepresentation,<sup>149</sup> as the customer research provided by companies is just one input it asked companies to consider in setting PC levels alongside for example cost benefit analysis, comparative performance, historical information, minimum improvement possible, maximum level attainable and expert knowledge. It said it had applied a wider set of tests than just evidence of customer support,<sup>150</sup> and that customer engagement was not intended to replace either the role or judgement of Ofwat.<sup>151</sup> It said that there are areas where customers are not best placed to determine whether a company's business plan is appropriate, for example, in determining whether companies' proposed PCs are stretching but achievable in relation to PC levels.<sup>152</sup> It said companies' customer research varies in quality and so it needed to scrutinise and, where appropriate, challenge the results of companies' customer research, based on the wider set of information available to it.<sup>153</sup>

## Reasons for the rejection by the Disputing Companies

- 2.150 Under their licence conditions, where a water company disputes Ofwat's determination following a periodic review, it can give notice, within two months of the determination, requiring Ofwat to refer the matter to the CMA for a further determination.<sup>154,155</sup>
- 2.151 The Disputing Companies did not accept the PR19 determinations. We now summarise their reasons for not accepting them as initially put to the CMA. The issues and reasoning presented by the Disputing Companies (and Ofwat's response) evolved over the course of our investigation, as reflected in the discussions of issues in the following analysis sections.
- 2.152 Apart from their view on how Ofwat had applied its interpretation of the balance of duties (see paragraphs 2.138 to 2.149), the main themes identified by the Disputing Companies included that Ofwat had:

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<sup>148</sup> Ofwat [Reference of the PR19 final determinations: Introduction and overall stretch on costs and outcomes – response to cross-cutting issues in companies' statements of case](#), paragraph 3.109

<sup>149</sup> Ofwat [Reference of the PR19 final determinations: Introduction and overall stretch on costs and outcomes – response to cross-cutting issues in companies' statements of case](#), paragraph 3.110

<sup>150</sup> [Ofwat's Response to common issues in companies' SoCs: Introduction and overall stretch on costs and outcomes](#), paragraph 3.113

<sup>151</sup> [Ofwat's Response to common issues in companies' SoCs: Introduction and overall stretch on costs and outcomes](#), paragraph 3.114

<sup>152</sup> [Ofwat's Response to common issues in companies' SoCs: Introduction and overall stretch on costs and outcomes](#), paragraph 3.115

<sup>153</sup> [Ofwat's Response to common issues in companies' SoCs: Introduction and overall stretch on costs and outcomes](#), paragraph 3.116

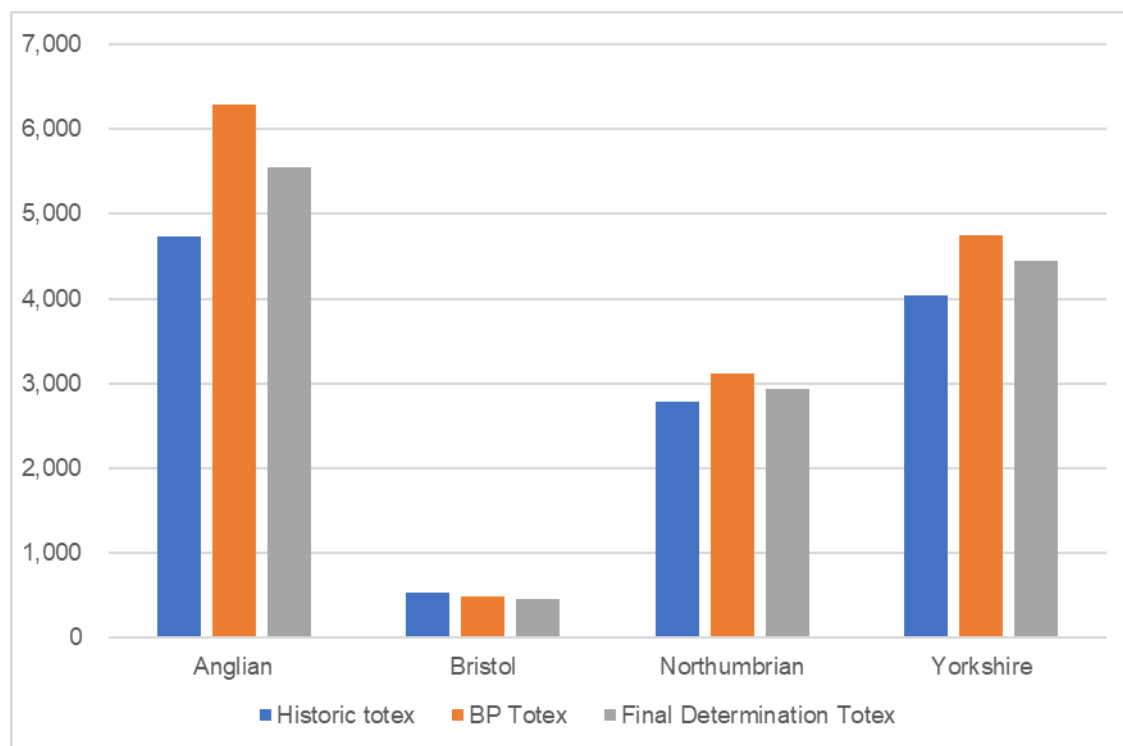
<sup>154</sup> Condition B Part V; [section 12\(2\)\(b\)](#) WIA 91.

<sup>155</sup> Under [section 12\(3\)](#) WIA91, it is the duty of Ofwat on request by the water company to make the reference to the CMA.

- (a) provided insufficient funding to deliver business plans (see Figure 2-3) including enhancement expenditure to improve resilience;
- (b) failed to recognise the link between costs incurred and delivering higher levels of service (the 'cost-service disconnect');
- (c) inappropriately settled on too low a cost of capital;
- (d) given insufficient weight to evidence on the views of customers; and
- (e) increased levels of risk for companies (notably from asymmetric ODIs) and together with the other elements of the determination this had undermined financeability.

2.153 Figure 2-3 shows for the four Disputing Companies their historic (PR14) totex allowances, the companies' final business plan funding requirements, and the PR19 allowance set by Ofwat, based on Ofwat's figures.

**Figure 2-3: Disputing companies' totex allowances relative to final business plans and historic (PR14) totex, £million over 5 years**



Source: CMA, based on Ofwat figures

2.154 The percentage differences between the business plan requirement and allowed totex were: Anglian 11.7%, Bristol 6.5%, Northumbrian 5.8% and Yorkshire 6.4%.

2.155 Each company also raised a variety of issues as described below. Further details and supporting evidence are referenced throughout the report in relation to specific issues.

### **Anglian**

2.156 Anglian told us that it had submitted an ambitious business plan which enjoyed wide customer support gained through an extensive customer engagement process.<sup>156</sup> Its plan proposed what it considered to be stretching targets for outputs and cost reductions, with a claimed step change in investment and service level improvements relative to the previous AMP.<sup>157</sup>

2.157 Anglian told us that its plan had been co-created with customers through a detailed and extensive customer engagement process. It submitted that its Customer Engagement Forum believed that the plan reflected the preferences expressed by customers. When offered the choice between investing now for better and more resilient services and improved environmental outcomes rather than postponing investment and focussing on reduced bills, Anglian submitted that customers overwhelmingly favoured the former approach.<sup>158</sup>

2.158 Anglian said it believed its plan had been tested for efficiency and exposed the company to a fair balance of downside risks should it underperform, alongside upside opportunities should it deliver.<sup>159</sup>

2.159 Anglian told us that the Ofwat FD failed to deliver a fair balance and did not provide best value for customers.<sup>160</sup> Its main disputes with the final determination were:

(a) Cost allowance errors: it failed to recognise the higher costs the company faces which result from its high performance relative to the sector, new service obligations and higher capital maintenance needs, consequently underfunding Anglian's base expenditure requirements by £265 million;<sup>161</sup>

(b) Enhancement errors: it underfunded Anglian's enhancement plan, which the company felt was largely driven by statutory obligations, by £161 million;<sup>162</sup>

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<sup>156</sup> Anglian SoC, p3

<sup>157</sup> Anglian SoC, p3

<sup>158</sup> Anglian SoC, p3

<sup>159</sup> Anglian SoC, p3

<sup>160</sup> Anglian SoC, p4

<sup>161</sup> Anglian SoC, p4

<sup>162</sup> Anglian SoC, p4

- (c) Growth errors: it provided a major shortfall on growth allowance (valued by the company as £318 million), both by ignoring what the company felt were important categories of cost in relation to new connections, as well as by providing a reconciliation mechanism which the company felt would not fully compensate them in the event growth was higher than Ofwat estimated;<sup>163</sup>
- (d) That these three elements summed to a total claimed shortfall of £744 million (around a 12% difference). Anglian also highlighted the importance of the distinction between capital and operating expenditure and said there had been a misallocation. It observed that whilst the final determination provided an uplift of £678 million in capital expenditure allowance since AMP6, this was insufficient and came with a simultaneous reduction of operating expenditure allowance of £91 million compared to AMP6;<sup>164</sup>
- (e) Elsham scheme and metaldehyde programme: The company further took issue with the final determination on the basis that it left the company exposed to significant contingent costs of £190 million in relation to the Elsham scheme and metaldehyde programme by offering a reconciliation mechanism the company claimed had no practical effect; and
- (f) ODIs: Anglian said that the ODIs in Ofwat's FD were significantly skewed toward penalties over rewards. It told us that the ODI package was incoherent because it was based on an inconsistent view of an upper quartile notional company, ignored customer views and would penalise Anglian even if it delivered significant improvements.

2.160 As a consequence of these perceived flaws in the final determination, Anglian argued that the overall final determination package would create the 'near-certain' prospect of it making a financial return for investors which was below Ofwat's view of the WACC. It also said that Ofwat's assessment of WACC was significantly less than Anglian's actual cost of capital. In particular, it felt this had occurred due to Ofwat ignoring its actual cost of embedded debt.<sup>165</sup>

2.161 The consequential challenges to financeability it highlighted were, Anglian argued, evidenced by the fact at least one of the rating agencies had subsequently downgraded their ratings for nine of the Ofwat regulated water companies and placed a further company (Northumbrian) on negative

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<sup>163</sup> [Anglian SoC](#), p4

<sup>164</sup> Ofwat told us that the gap between Anglian's final requested cost and the allowance in PR19 was £732 million.

<sup>165</sup> [Anglian SoC](#), p5

watch.<sup>166</sup> In its view, Ofwat's advancement of PAYG revenues to assist with financing had brought them above natural levels, above what companies requested or customers supported, and did not change rating agency views.

- 2.162 Anglian stated that Ofwat had missed an opportunity to set stretching targets to meet what Anglian considered was the need for a step change in resilience and performance, whilst still allowing some bill reduction, because it had instead prioritised large short-term bill reductions. The consequence of this, it argued, was that Anglian would be forced to cut back on asset maintenance activity, undertake short term fixes, and delay service, resilience and environmental improvements. It stated that this would mean investment costs being deferred so that future customers would have to bear them, resulting in intergenerational inequity and poor value for money compared to the proposed business plan, and could undermine the reputation of the industry and regulators.<sup>167</sup>
- 2.163 Anglian also stressed the urgency of addressing risks to the security of water supply in its region, stating that these had increased (even during the Redetermination process). It said that supply-side options will only bring benefits from AMP8 so it needed to reduce demand in AMP7, which required funding for leakage reduction and investment in smart metering.<sup>168</sup>
- 2.164 Anglian referred to a cost-service disconnect in Ofwat's price control,<sup>169</sup> whereby Ofwat had rejected the existence of a trade-off between cost reduction and quality but had not evidenced reasons for doing this. Instead, it argued, Ofwat's approach unduly benchmarked high-quality networks against the costs of low-quality networks, treating the additional costs for the former as inefficiency. It told us Ofwat undervalued quality and as a consequence both failed to provide sufficient funding for high performers like Anglian, and also created a long run incentive for mediocre performance. Anglian argued it was particularly exposed on leakage, where it is the frontier performer.<sup>170</sup>
- 2.165 Finally, Anglian raised concerns about the GOSM. The company disagreed that gearing above the threshold levels poses an inherent risk to customers, and it stated the approach also ignored countervailing benefits higher gearing provides to customers. It argued that Anglian's equity investors have repeatedly demonstrated a commitment to invest in the business on a

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<sup>166</sup> [Anglian SoC](#), p5

<sup>167</sup> [Anglian SoC](#), p6

<sup>168</sup> [Anglian's final submission: cover letter](#), p2

<sup>169</sup> [Anglian SoC](#), p218

<sup>170</sup> [Anglian SoC](#), p218

long-term basis and argued that they were entitled to earn a reasonable return on the basis of that investment and risk exposure.<sup>171</sup>

## **Bristol**

- 2.166 Bristol described the 2020-25 business plan it submitted to Ofwat as innovative and ambitious. It said the plan was built upon extensive customer engagement, upper quartile cost efficiency and stretching service performance targets to meet customers' needs, balanced with the investment needed to meet current and future requirements. It reported that Ofwat had recognised the strength of the engagement and of customer support for ambitious service levels on areas such as leakage and supply interruptions.<sup>172</sup>
- 2.167 Bristol said it was supportive of Ofwat aims and objectives for PR19 and agreed with Ofwat's overall vision for the water sector. It felt that there was agreement or close alignment on many aspects of its plan, including on PCs, ODIs and resilience investment. There was no dispute over retail controls, nor over 'significant elements'<sup>173</sup> of the wholesale controls. Bristol reported that its Board was reluctant to make a third consecutive reference to the CMA, but did so after careful consideration 'on the grounds that Ofwat's FD was not financeable for a small WOC like Bristol Water'.<sup>174</sup>
- 2.168 It described Ofwat as having made a series of specific decision-making errors which mean it cannot efficiently finance delivery of its plan for customers.<sup>175</sup> These errors, in Bristol's view, were:
- (a) Cost of capital errors:
- (i) It said the 'most concerning and by far the most fundamental issue' was its belief Ofwat had set the cost of capital too low. It argued that Ofwat had failed to apply a Company Specific Adjustment uplift on their cost of debt for its small size and that this, alongside other errors, meant it could not earn a reasonable rate of return on efficient costs in the 2020-25 period. This, it observed, had occurred despite what it described as 'significant regulatory precedent'<sup>176</sup> established by references to the CMA in 2015 and the CC in 2010, and despite having provided robust evidence that it faced higher financing costs than the notional company.

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<sup>171</sup> Anglian SoC, p6

<sup>172</sup> Bristol SoC, p1

<sup>173</sup> Bristol SoC, p1

<sup>174</sup> Bristol SoC, p1

<sup>175</sup> Bristol SoC, p1

<sup>176</sup> Bristol SoC, p1

- (ii) Bristol argued that Ofwat had also not considered precedent from previous references on the cost of equity, where it felt it had evidenced that higher operational gearing circumstances for smaller WOCs meant an uplift was required.<sup>177</sup>
  - (iii) Bristol also observed that Ofwat had cut industry cost of capital parameters for the PR19 period to levels not supported by the evidence, whilst also making errors in the setting of TMR, RFR, asset beta, debt beta and the ratio of new to embedded debt.<sup>178</sup>
- (b) Cost allowance errors: Bristol objected to the £30 million cost challenge Ofwat imposed on its base costs, arguing that this challenge goes beyond upper quartile benchmarks and is inconsistent with the high-quality service Bristol proposed for customers. It believed Ofwat made unjustified assumptions on industry wide productivity improvements and also made incorrect cost adjustments to some items, for example on the costs of abstraction from the Gloucester and Sharpness canal (G&S canal).<sup>179</sup>
- (c) Balance of risk errors: Bristol believed that Ofwat had imposed a series of financial incentives which expose the company to downside risk, thus compromising the financeability of the business and its ability to deliver a reasonable return for shareholders. Specifically, it took issue with:
- (i) the penalty rate for ODIs, which it stated was set too high;
  - (ii) the asymmetric totex risk sharing mechanism, which meant Bristol must bear 60% of any cost overruns, but can retain only 40% of underspend; and
  - (iii) the imposition of the GOSM in circumstances where gearing is not expected to increase as part of the business plan.<sup>180</sup>

2.169 Bristol argued that the combined impact of these balance of risk decisions was that it could not reasonably be expected to maintain an investment grade credit rating, deliver reasonable return for shareholders, or retain sufficient financial resilience to weather even minor shocks. Given these observations, Bristol felt that a financeability error had also been made, whereby the Ofwat's FD was 'not financeable for a relevant notional (small water only) financial structure for a company like Bristol water'.<sup>181</sup>

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<sup>177</sup> Bristol SoC, p1

<sup>178</sup> Bristol SoC, p2

<sup>179</sup> Bristol SoC, p2

<sup>180</sup> Bristol SoC, p2

<sup>181</sup> Bristol SoC, p2

## **Northumbrian**

2.170 Northumbrian summarised its reasons for referring the price control to the CMA as being:

- (a) the overall package was unbalanced with a short-term focus on bill reductions;
- (b) the cost allowances and service level targets did not represent a sensible or reasonable level of challenge;
- (c) the package was unfinanceable;
- (d) it moved Northumbrian a long way from its business plan that it had set out and which had received widespread customer and stakeholder support.<sup>182</sup>

2.171 Northumbrian told us that its business plan offered the largest bill reduction of any company in the water and wastewater sector alongside improving and delivering above average levels of service and investment in resilience and sustainability and that it had strong support from customers.

2.172 Northumbrian submitted that PR19 failed to achieve the right balance in the round, in both the short and long-term, and that Ofwat had failed to discharge its duties under the WIA91.

2.173 Northumbrian also said that Ofwat had failed to meet its statutory duty to further the resilience objective. Northumbrian said that, overall, Ofwat's approach had misrepresented the consumer objective and not given enough weight to the resilience objective by prioritising short-term bill reductions over the need for these schemes.

2.174 Northumbrian told us that PR19 failed to provide the efficient costs that the company needs to fulfil its functions. It said that the efficiency challenges set by Ofwat fail to reflect the reasonable cost pressures faced by Northumbrian and the degree to which those costs are within management control.

2.175 Northumbrian said that its customers have said they do not want a reduction in bills at the expense of long-term resilience and the risk of increased bills for future generations. Northumbrian also said Ofwat's interventions create inter-generational unfairness by prioritising short-term bill reductions and

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<sup>182</sup> [Northumbrian's final submission: cover letter](#), pp 1–2



deferring major investments that it argued are necessary to improve resilience in both areas it operates.

2.176 Northumbrian's main issues with Ofwat's FD were:

- (a) Cost of capital errors: Northumbrian said that Ofwat had made errors in setting the WACC. Northumbrian told us that while it accepted some reduction from PR14 was supported by evidence, it did not agree that such a substantial reduction was justified.<sup>183</sup>
- (b) Financeability: Northumbrian told us that Ofwat's approach to financeability was not sustainable and created unacceptable levels of risk for the company. Northumbrian argued that in this instance Ofwat had not discharged its duty to require that companies can finance their functions, including by reference to securing reasonable returns on their investments. Northumbrian said that the combination in PR19 of, in its view, unrealistically low-cost allowances, challenging and stretching performance measures and asymmetrically and downwardly skewed ODIs has materially increased risk exposure for the company.
- (c) Northumbrian raised specific points about a number of issues in PR19 including:
  - (i) Business Rates: Northumbrian said that Ofwat's proposed funding for business rates did not reflect the degree of management control and variability and would likely result in a funding shortfall.
  - (ii) Abstraction Charges: relating to abstraction charges charged by the Environment Agency for the Kielder Transfer Scheme (KTS), which Northumbrian said had not been appropriately funded.<sup>184</sup>
  - (iii) Resilience: Northumbrian referred to two specific resilience schemes: a scheme to reduce the risk of internal sewer flooding in the North East of England; and the Abberton to Hanningfield transfer main designed to tackle water demand issues in Essex and Suffolk.
  - (iv) Phosphorus removal: Northumbrian submitted that Ofwat was inconsistent in its approach towards setting allowances for Phosphorus removal (P-removal).

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<sup>183</sup> [Northumbrian SoC](#), paragraph 1.34

<sup>184</sup> A regional water grid constructed in the late 1970's which transfers water across Tyneside, Wearside, and Teesside. Northumbrian told us this could leave it exposed to a windfall loss of £8.25m in the first year of AMP7 under PR19.

- (d) Grants and Contributions: Northumbrian said that in the Grants and Contributions model, Ofwat made an adjustment to add a one-off contribution of £14.4 million to the Grants and Contributions component of the projected water network plus control. Northumbrian told us that this was an error as it double counted a contribution that was already included in the infrastructure charge receipts.<sup>185</sup>
- (e) IED: Northumbrian told us that compliance with the IED, an EU instrument regulating pollutant emissions from industrial installations, will require it to make one-off structural changes to many of its facilities. Northumbrian said that PR19 does not allow sufficiently for the potential costs it is likely to incur in complying with the IED.<sup>186</sup>

2.177 At the time of its closing submission, Northumbrian said that the outturn information for the 2015-20 period, the most recent cost data for the 2019/20 year and the early information from the listed companies operating under Ofwat's FD in comparison to the previous period, all suggest that the settlement was too challenging even for the best performers, and that this showed that the PR19 approach to assessing financeability was incorrect.<sup>187</sup>

## **Yorkshire**

2.178 Yorkshire told us that its business plan was arguably one of the most ambitious in the sector and met Ofwat's objectives of driving improvements in service to customers alongside a step change in efficiency. Yorkshire also told us that its business plan and long-term strategy received high levels of customer support.<sup>188</sup>

2.179 Yorkshire said it considered that Ofwat had failed to determine an 'in the round', balanced package, that achieved the right balance between the long-term challenges facing the water sector and setting fair customer bills for the five-year price review period.<sup>189</sup>

2.180 Yorkshire's main issues with Ofwat's FD were:

- (a) Cost of capital errors: Yorkshire submitted that Ofwat had set the WACC too low. The company told us that Ofwat had failed to ensure that the notionally efficient firm can raise finance on reasonable terms and failed to ensure the notionally efficient firm was investable. Yorkshire also told

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<sup>185</sup> [Northumbrian SoC](#), paragraph 964 & 966

<sup>186</sup> [Northumbrian SoC](#), paragraph 918 & 923

<sup>187</sup> [Northumbrian's final submission: cover letter](#), p3

<sup>188</sup> [Yorkshire SoC](#), paragraphs 1 & 5.128

<sup>189</sup> [Yorkshire final submission](#), paragraph 2.2.1

us that Ofwat had failed to correctly calibrate key incentives and introduced an inappropriate GOSM.<sup>190</sup>

- (b) Cost modelling errors: Yorkshire submitted that flaws in Ofwat's cost modelling has meant that it allowed the company insufficient funding to deliver its business plan.<sup>191</sup> Yorkshire told us those flaws included: unevidenced efficiency benchmarks, flawed and incorrectly applied frontier shift and a failure to account for all relevant RPEs.
- (c) Enhancement errors: Yorkshire also told us that Ofwat's enhancement models were simple and as such were likely to have omitted important cost drivers.<sup>192</sup> The company gave an example that only the third of Ofwat's models for the costs of P-removal accounts for the impact of the Urban Wastewater Treatment Directive (UWWTD). Specifically in relation to P-removal, Yorkshire told us that when Ofwat introduced the third model it averaged the outcomes with the two original models, lowering the impact of the UWWTD on Yorkshire's estimated efficient cost by £29 million.<sup>193</sup>
- (d) Performance assessment errors: Yorkshire said that Ofwat assumed in PR19 that service improvements could be achieved by making efficiency savings.<sup>194</sup> Yorkshire argued that Ofwat's position in PR19 was indefensible because it relied upon a 'backward looking' assessment of performance at PR14 and relied upon econometric models using an 'implausibly' low estimate for the additional cost to an efficient company of meeting Ofwat's stretching leakage PC. Overall, Yorkshire said that Ofwat had failed to properly account for the interaction between costs and performance.
- (e) PCs and ODIs: Yorkshire told us that in respect of PCs and ODIs, Ofwat had made arbitrary and unjustified changes and, in doing so, replaced the views of customers with the view of the regulator. Yorkshire said that these changes do not reflect genuine differences between Yorkshire and the rest of the industry.<sup>195</sup>
- (f) Yorkshire also raised specific points about a number of areas in PR19 including:

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<sup>190</sup> Yorkshire SoC, paragraphs 16

<sup>191</sup> Yorkshire SoC, paragraphs 188 & 203

<sup>192</sup> Yorkshire SoC, paragraph 195

<sup>193</sup> Yorkshire SoC, paragraph 197

<sup>194</sup> Yorkshire SoC, paragraphs 134, 142 & 148

<sup>195</sup> Yorkshire SoC, paragraph 153d

- (i) Internal Sewer Flooding: Yorkshire specifically raised this as a concern referring to the higher proportion of properties with cellars in Yorkshire than the industry average. Yorkshire told us that this was a particular challenge for the company as over 70% of its sewer flooding instances occur in cellared properties.<sup>196</sup>
- (ii) Leakage: Yorkshire told us that Ofwat had substantially changed its approach to leakage in PR19 and required companies to achieve at least a 15% reduction in leakage during AMP7. Yorkshire said that it supports Ofwat's desire to reduce leakage but that additional costs (outside of base costs) must be allowed.<sup>197</sup>
- (iii) Drinking water quality: Yorkshire highlighted the target set in relation to the quality and appearance of drinking water. The company told us this was another area where regional differences impact its ability to meet a more stretching target, due to the high proportion of upland water sources and the type of water pipes (cast iron) in the area.<sup>198</sup>
- (iv) Resilience: Yorkshire told us that Ofwat's decision in relation to the company's 'Living with Water' project in Hull and Haltemprice has materially underfunded an innovative programme to strengthen the resilience of the area against extreme flooding events.<sup>199</sup>
- (v) Data input in PR14: Yorkshire said that in PR14 it made a data input error in its submission to Ofwat that incorrectly reduced the amount of revenue that it was entitled to recover from its customers.<sup>200</sup> Yorkshire said it uncovered this error when preparing its Annual Performance Report (APR) for 2015-16 and told us that it had immediately notified Ofwat. Yorkshire told us that Ofwat acknowledged the company had made an error and agreed that this would be reflected within PR19, however, Ofwat subsequently disallowed the adjustment on the basis that it was not an unambiguous error.

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<sup>196</sup> Yorkshire SoC, paragraphs 160 & 37

<sup>197</sup> Yorkshire SoC, paragraphs 32 & 162–165

<sup>198</sup> Yorkshire SoC, paragraph 172

<sup>199</sup> Yorkshire SoC, paragraphs 8, 120g & 318

<sup>200</sup> Yorkshire SoC, paragraphs 205 & 207–208

### 3. Our approach

#### Introduction

3.1 In this section we set out our approach to the Disputed Determinations.

#### Our approach to the redetermination

3.2 The CMA has received four separate references and so we are making four new price control determinations. The CMA is required to produce a report on each reference made to it, which it must provide to Ofwat, and which sets out definite conclusions on the questions or matters in the reference and reasons for those conclusions.<sup>201</sup> Ofwat has referred the whole determination for each of the Disputing Companies. Our determinations for all of the Disputing Companies are included in this report but we separately identify our conclusions in respect of each of the Disputing Companies (see sections 12 to 15).

3.3 In carrying out the redetermination of the price controls, the CMA is required to determine the reference in accordance with the principles which apply to Ofwat under Part I WIA91,<sup>202</sup> ie the CMA is required to make its determinations in accordance with the primary and secondary statutory duties set out in section 2 WIA91 (see paragraphs 2.72 – 2.74) and subject to the same principles of best regulatory practice (see paragraph 2.75) and the need to act in accordance with the SPS (see paragraph 2.76 – 2.77) as applied to Ofwat when it made the Disputed Determinations.

3.4 As noted at paragraphs 2.82 – 2.83, the CMA exercises its own regulatory discretion as to how to appropriately balance these statutory duties. As we have explained in a previous redetermination,<sup>203</sup> we consider that each of the primary duties is equally important. They are intended to complement one another and should not be applied in isolation. The secondary duties are subordinate, or subject to, the primary duties but are still legal requirements of which account must be taken.<sup>204</sup>

3.5 Our approach to these redeterminations has been to reconsider the constituent blocks of the determinations following the structure used by Ofwat,

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<sup>201</sup> The Water Industry Act 1991, [section 12\(3\) \(c\)](#)

<sup>202</sup> The Water Industry Act 1991, [section 12\(3\)](#)

<sup>203</sup> [Bristol PR14 Determination](#), paragraph 3.4

<sup>204</sup> [Bristol PR14 Determination](#), paragraph 3.4

and to reach balanced, evidence-based conclusions on each of these separately on their merits. In particular, we have maintained:

- (a) Ofwat's approach of setting four wholesale price controls (water resources, water network plus, wastewater network plus, and bioresources);
- (b) separating our assessment into its major component parts around costs, service, and financial returns;
- (c) managing bioresources as an average revenue control; and
- (d) setting a separate retail control.

3.6 We have then reviewed the overall balance of the redeterminations in the round to check whether they are consistent with all our duties, including the financeability duty.

3.7 We did not consider it would be sensible or practicable to adopt a wholly different regulatory framework within the context of our redetermination. Some Parties have suggested that the CMA would be well placed to make recommendations in this report about the approach Ofwat should adopt to future price controls. Bearing in mind our limited statutory role in redetermining the price controls of only four companies, we have not generally considered future regulatory approaches for the purposes of these determinations, although we have in some places made suggestions of where consideration should be given to refinements to aspects of the regime in the future, through, for example, the collection of additional data. There are also a number of areas which have arisen in our assessment where we considered that Ofwat's approach was flawed and have rejected <sup>205</sup> or adapted its proposals. We set out these instances as appropriate in our analytical chapters.

3.8 As the CMA is making a fresh determination in response to each reference, we consider that we should examine issues that have arisen since Ofwat made the Disputed Determination, as it has done in previous cases.<sup>206</sup> We are also able to take account of current circumstances and information which is now available, which may not have been available at the time of the original determinations. The CMA can also seek further evidence.<sup>207</sup> Where there is relevant additional and updated information available, produced since Ofwat's

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<sup>205</sup> For example in relation to the GOSM, see paragraphs 9.1150–9.1225.

<sup>206</sup> [Bristol PR14 Determination](#), paragraph 2.15

<sup>207</sup> [Bristol PR14 Determination](#), paragraphs 4.58, 5.157, 6.92 & 6.182 and [Bristol PR09 Determination](#), paragraph 3.95

determination (including information, views and evidence produced and provided to us by the Main Parties in the course of the redeterminations), we have generally taken appropriate account of this to inform our determinations.

- 3.9 We have considered any revisions of case, arguments and allowance claims made by the Main Parties during the course of our investigations. Ofwat told us that each of the Disputing Companies had, after we published our Provisional Findings, advanced claims for allowances that were new or presented in ways that had not previously been seen.<sup>208</sup> Where new claims have been made, these have been assessed in the same way as others, but we have also considered the timing of the claim as part of our overall analysis of the merits of the claim, including whether it may be speculative or opportunistic.
- 3.10 We consulted on one specific issue relating to the use of new data, this being the use of additional data from 2019/20 in the estimation of our base cost models.<sup>209</sup> The advantages of using the most up-to-date data included accounting for the most recent information and increasing the number of observations in the model, but the consultation was to address a possible concern that the data from this additional year (which became available during the course of our considerations) could have been distorted by companies exceptionally bringing forward expenditure from AMP7 into the last year of AMP6 (particularly to reduce leakage). However, as discussed in paragraphs 4.39 to 4.44 and Appendix C paragraph 96 we found that the scale of any potential bias was not sufficiently material to justify excluding 2019/20 data from our models.
- 3.11 In general, we have considered updated market data, submissions and hearings of the Main Parties and Third Parties, reviews of business plans and specific projects, and the advice of engineering consultants, to reach these conclusions.
- 3.12 The scope of our determinations extends to all aspects of the price control and not just the issues raised by the Main Parties. We were also conscious that the redeterminations should not be construed as processes that would necessarily lead to an outcome for the Disputing Companies which is better than the Ofwat determination. We did not limit our assessment to the specific issues raised by the companies in their statements of case (SoC) and considered whether the allowances set by Ofwat were too generous. We also

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<sup>208</sup> [Ofwat Introduction to the reply to the responses to provisional findings](#), paragraph 1.9

<sup>209</sup> See the consultation document on the CMA webpage [2019/20 data for base cost models](#)



invited Third Parties to tell us if there were any other areas they thought we should consider.<sup>210</sup>

- 3.13 We have adopted a proportionate approach given the time available to us and have considered the extent to which issues are in dispute and/or are most likely to impact significantly on the achievement of statutory duties. Thus, some areas have been deprioritised (see paragraphs 3.37 to 3.50). In some areas, where we have not identified superior alternative approaches to those used by Ofwat, we came to a similar decision to those in Ofwat's PR19 determinations. In places, our findings on the redetermination may be expressed in terms of revisions to or replacements of aspects of Ofwat's determinations.
- 3.14 For the same reasons of proportionality, except where we set out otherwise in our report, we have broadly taken the same approach as Ofwat to materiality where issues warranted in-depth analysis (for example the use of deep dives on enhancement expenditure).
- 3.15 Following our Provisional Findings, Citizens Advice were critical of our proposed approach to the cost of capital. It said that it was likely that some or all of the CMA's decisions (relating to the cost of capital) would set a precedent that could result in unnecessarily higher bills for consumers in other sectors. It referred to the similarity of issues in Ofgem's RIIO-2 price control.<sup>211</sup> While we are aware our decisions may be considered by regulatory decision makers in other regulatory determinations, our duties are set with regard to the impact on the water sector alone (see paragraphs 2.72 to 2.86).
- 3.16 Citizen's Advice told us that we should in our decisions afford Ofwat an appropriate level of discretion in its approach. It said that the CMA's predecessor (the Competition Commission, CC) had attached significant value to the discretion of specialist regulators.<sup>212</sup> It referred to a 2010 ruling of *The Carphone Warehouse Group plc vs Ofcom* by the CC which said:

We have however borne in mind that Ofcom is a specialist regulator whose judgement should not be readily dismissed. Where a ground of appeal relates to a claim that Ofcom has made a factual error or an error of calculation, it may be relatively straightforward to determine whether it is well founded. Where, on the other hand, a ground of appeal relates to the broader principles adopted or to an alleged error in the exercise of a

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<sup>210</sup> [CMA approach to water redeterminations](#), paragraph 9

<sup>211</sup> [Citizens Advice Response to Provisional Findings](#), pp 11–12

<sup>212</sup> [Citizens Advice Response to Provisional Findings](#), pp 9–10



discretion, the matter may not be so clear. In a case where there are several alternative solutions to a regulatory problem with little to choose between them, we do not think it would be right for us to determine that Ofcom erred simply because it took a course other than the one that we would have taken. On the other hand, if, out of the alternative options, some clearly had more merit than others, it may more easily be said that Ofcom erred if it chose an inferior solution.<sup>213</sup>

- 3.17 Citizen's Advice said that the selection of assumptions in the cost of capital calculation was an area where there are a number of plausible assumptions, and therefore is an area where Ofwat should be given some degree of regulatory discretion to arrive at an overall balanced outcome, and where, before the CMA selects an alternative option, it should explain why it 'clearly [has] more merit' than Ofwat's approach.
- 3.18 We do not agree that the Carphone Warehouse/Ofcom approach is directly relevant. The approach adopted by the CC reflected that it was an appeals regime where the CC was required to identify whether Ofcom had made an error in its approach<sup>214</sup>. In this case, we are required to make a redetermination, where the task is instead to make a new determination rather than simply to decide whether we consider Ofwat's determination to have been reasonable.
- 3.19 Nor do we consider it appropriate automatically to assign Ofwat's views and evidence a higher value than that of other Parties. Rather, we assess Ofwat's evidence on its own merits. In so doing, we acknowledge that Ofwat's extensive knowledge and experience is likely to have a bearing on the weight that can be attributed to its views, but we have undertaken a critical assessment of these and its evidence in each case.
- 3.20 In reaching our determinations, we have given due weight to previous CMA decisions (although in many cases the issues and approaches in these determinations have differed substantially from previous decisions, or regulatory approaches have evolved substantially since those previous cases). However, we are not bound by the decisions of other Groups in past redeterminations and appeals, where facts, issues and arguments are likely to

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<sup>213</sup> CC, *The Carphone Warehouse Group plc v Office of Communications*, 2010, paragraph 1.32

<sup>214</sup> Communications Act 2003, [section 193\(2\)](#) and [section 194A\(2\)](#) set out the CMA's role is to answer the questions referred to it by the CAT, applying a judicial review standard in doing so. It is not the CMA's function in to conduct its own investigation into the price control matters referred. This limited role is set out in the CMA's guidance [Price control appeals under section 193 of the Communications Act 2003: Competition and Markets Authority guidance \(CMA72\)](#), paragraphs 2.3–2.7.

have differed. We have made our decisions in light of the breadth of relevant evidence.

### ***Treatment of customer evidence***

- 3.21 As part of its final methodology for PR19, Ofwat set expectations that the companies should engage with customers on areas such as affordability, improvements to customer service, resilience and the setting of PCs. All four Disputing Companies told us there had been substantial engagement with customers. The Disputing Companies all said that they had undertaken significant customer research including (but not limited to) detailed surveys and face to face events.
- 3.22 The Disputing Companies told us that many of the decisions in Ofwat's FD did not take account of the customer research that Ofwat had asked them to undertake. As a result, they said, the views of their customers were not fully reflected in Ofwat's FD.
- 3.23 As part of its methodology for PR19 Ofwat told all water companies to work closely with the CCGs. The role of the CCGs is to provide independent challenge to companies regarding the level of customer engagement and how customer views were reflected in companies' business plans. The CCGs were also expected to provide independent assurance to Ofwat on the quality of a company's customer engagement and how that engagement was reflected in the business plans.<sup>215</sup> The Disputing Companies told us that they took seriously the role of the CCGs in their business planning, in ensuring that the customer views the Disputing Companies had received were taken into account when finalising the business plans.
- 3.24 We invited the CCGs for the Disputing Companies to participate in a hearing prior to the publication of the Provisional Findings. At that hearing the CCGs strongly argued that Ofwat had not fully taken into account the views of customers that had been obtained by the Disputing Companies and in particular the preference of many customers for stable bills and more investment in issues that deal with climate change, resilience and growth.
- 3.25 Citizens Advice also made representations on this issue, stating that it was concerned that some of the Disputing Companies were misrepresenting consumer evidence 'to claim that consumer interests would be best served by setting higher prices for a better level of service'.<sup>216</sup>

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<sup>215</sup> Ofwat (2016), [Ofwat's customer engagement policy statement and expectations for PR19](#)

<sup>216</sup> [Citizens Advice first submission](#), p2

- 3.26 Ofwat told us that customer preferences are an important input, for example in setting PCs and ODIs, and had shaped its final determinations to a very significant extent. However it also pointed out that companies' customer research can 'only ever imperfectly capture customers' actual preferences and that even good customer research is at best an estimate of the underlying customer preferences'.<sup>217</sup> As such, Ofwat said it did override the customer research presented by companies in some cases in order to better align with what it felt was the best expression of customers' interests and preferences.
- 3.27 Following the publication of our Provisional Findings, we held a hearing with Citizens Advice, The Consumer Council for Water (CCWater) and the four CCGs for each of the Disputing Companies focused specifically on consumers. At the hearing Citizens Advice told us that there was scope for sharing best practice and innovation across the sector and to take a more coordinated approach to consumer evidence.
- 3.28 We consider that research into customer views can play an important element in informing the price review process, including gaining an understanding of ability and willingness to pay, and views on the balance of priorities. There are also likely to be substantial broader benefits from customer engagement in influencing company behaviour, regardless of its use in price review processes. Having examined examples of the customer research undertaken by the Disputing Companies, we consider that there are some areas where customers may not reasonably be expected to reach an informed opinion on the information, such as complex technical matters. Nor would customers necessarily be able to evaluate the differences between alternative plans. In some cases, customers may not have comparative information on other companies and in others the differences in the methods used by the various companies could also affect the ability to make comparisons.
- 3.29 We have considered the submissions put forward by Ofwat and the companies. In particular, we have looked at the extent to which we should give weight to customer evidence on the basis of submissions put to us, notably those in relation to certain enhancement allowance bids, and to PCs and ODIs more generally. Their pertinence will depend on the particular context and issues involved as well as the type and quality of research conducted.
- 3.30 We have listened carefully to customer evidence presented at hearings and in written submissions and taken account of evidence from customer research. For example, we have given careful consideration of views on resilience,

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<sup>217</sup> [Ofwat's response to common issues in companies' SoCs](#), paragraph 5.7

leakage and sewer flooding issues when considering enhancement projects reflecting customers' expressed preferences, but we have reached an overall view consistent with all our duties and interpretation of all available evidence.

- 3.31 We note that there are difficulties with developing research methodologies to increase the reliability of survey results, particularly on willingness to pay studies. We also note that Ofwat has recently published a consultation paper inviting views on how customer preferences might inform future price reviews and setting out some initial ideas.<sup>218</sup>

### ***Vulnerable customers***

- 3.32 We have been mindful of the issue of vulnerable customers, both those who are financially vulnerable, and so may face difficulties affording their water bills, and those who are vulnerable for other reasons. Examples of such vulnerability might include age, infirmity, illness, caring for dependents, communications challenges and similar matters, which may affect the quantity of water they need to use and/or could all make it more difficult for such customers to engage with water companies, to represent themselves and ensure they are receiving appropriate service.
- 3.33 There are a variety of measures in use by all water companies to address these concerns, for example in running a Priority Services Register, offering help and advice, and offering social tariffs (see paragraphs 2.30—2.34). Water companies also have a variety of bespoke performance commitments relevant to their own support schemes for vulnerable customers (see paragraphs 7.244—7.258).
- 3.34 Following the publication of the Provisional Findings, we explored some of the measures that are currently in place at the hearing held with Citizens Advice, CCWater and each of the four CCGs for each of the Disputing Companies. We also discussed what more could potentially be done to assist vulnerable consumers and those customers struggling financially particularly given the COVID-19 pandemic.
- 3.35 CCWater told us that awareness of the schemes in place, such as Priority Services Registers, should be higher. Citizens Advice also stated that awareness of the Priority Services Registers in the water sector was not very good compared to similar schemes in the energy sector. It considered that there was limited coordination of the schemes across the sector.

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<sup>218</sup> Ofwat (2021), [PR24 and beyond: Reflecting customer preferences in future price reviews](#)

3.36 While we consider these important issues, most of these measures offered by companies and supervised by Ofwat lie outside the scope of the PR19 price control and, therefore, our determinations. For example social tariffs are funded as cross-subsidies within the overall revenue controls). Where relevant to the price control (eg PCs and ODIs in relation to the Priority Services Register), we have given these measures careful attention.

## **Prioritisation and deprioritisation of issues**

3.37 The references to the CMA are references for the determination of new price controls for each of the four water companies, not an appeal on specific elements of Ofwat's decision. Accordingly, we are not limited in our consideration to arbitrating disputes between Ofwat and the Disputing Companies.

3.38 While the CMA is able to address any aspect of the price controls in the redeterminations, we have needed to prioritise our work given the limited time available. We consider it important to adopt a proportionate approach and to scrutinise most closely the areas in the determinations that would have the largest effect on customer prices and other outcomes, and on the Disputing Companies.

3.39 We have therefore been mindful of whether in respect to specific issues:

- any concerns have been raised by any Main or Third Party;
- we have identified any potential concerns;
- there is any precedent value or read across to other parts of the redeterminations; and/or
- there is a significant scale of impact on current and future customer bills and other outcomes such as service quality and resilience.

3.40 In our 'Approaches document' published on our webpage,<sup>219</sup> we invited comments on our proposal for areas to deprioritise. We did not receive any responses that challenged our proposed approach. The areas we deprioritised are set out below. In these deprioritised areas, we have decided that our redeterminations will follow Ofwat's approach. Where we consider it

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<sup>219</sup> [CMA approach to water redeterminations](#)

would aid understanding of our redeterminations, we have included information about that approach.<sup>220</sup>

### ***Household retail***

- 3.41 Ofwat introduced separate household retail price controls in PR14 and took a comparable approach in PR19. The decisions on retail are largely distinct from the wholesale decisions and Ofwat presented its assessment of charges for household retail charges as being a separate price control in its PR19 decisions. We have not made changes to these retail price controls (including the associated residential retail reconciliation mechanism, and experience measures (C-MeX and D-MeX)).<sup>221</sup>

### ***Business retail***

- 3.42 The Disputing Companies no longer carry out any non-household retail business and so we have not addressed this matter.

### ***Bioresources reconciliation mechanism***

- 3.43 Bioresources allowances are based on an allocation from the overall wastewater allowance, which we have considered as part of the base expenditure assessment. Ofwat's methodology included a step to split this allowance into a fixed and variable component. The variable component will then be (ex-post, in 2024) scaled to reconcile with actual volumes of sludge. This acts as a symmetrical risk mitigation mechanism around the uncertainty of actual outturn volumes. However, the effects of this reconciliation mechanism appear relatively modest. No stakeholders have raised concerns about this reconciliation mechanism. As an ex-ante control being set in PR19, we consider that this reconciliation mechanism falls within the scope of the redeterminations. However, for the reasons stated above, we have chosen not to review it.

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<sup>220</sup> However, there are in some cases consequential changes which need to be reflected, for example, certain retail allowances flow from wholesale cost figures, and so if we revised these wholesale allowances we would also need to update the consequential retail figures.

<sup>221</sup> Citizens Advice submitted that it was inappropriate for Ofwat to make a retail margin adjustment to the WACC as this is based on an assumption that debtors are the only relevant working capital item whereas many retail customers pay in advance for water services, see [Citizens Advice second submission](#). We have taken a different approach to Ofwat's retail margin adjustment, which affects wholesale revenue, rather than retail revenue. This matter is considered in paragraphs 9.534–9.563.

## **PR14 reconciliation**

- 3.44 The PR14 reconciliation adjusts the revenue allowances calculated during PR19 for various mechanisms specified during PR14. Other than one point raised by Yorkshire (see paragraphs 11.12 to 11.80), we have not reviewed the PR14 reconciliation adjustments.

## **Grants and contributions (other than one aspect of potential double-counting)**

- 3.45 A process is in place that allows water companies to receive funding income other than normal customer bills, for example, developers paying for services such as laying infrastructure to serve new developments. These are generally not amended by Ofwat and we have not addressed them, other than the one specific issue raised by Northumbrian (see paragraphs 11.81 to 11.113).
- 3.46 WA Consultancy and TDS asked the CMA to investigate charging arrangements for new connection services.<sup>222</sup> It questioned the cost reflectivity (across companies and over time) and transparency of charging arrangements.<sup>223</sup>
- 3.47 We recognise the importance of these issues for developers and house builders, however, we decided to continue to deprioritise the area of charging arrangements in our determination mainly due to the lack of substantial impact on Disputing Companies and end-user customers and the limited read-across to other parts of our determination. First, charging arrangements do not have substantial impact on companies' totex as grants and contributions are included within the price control. Second, the DSRA partially offsets end-user customer revenue changes due to changes in the number of connections. Third, charging arrangements have no or limited read across to growth estimation, the potential grants and contributions error (Northumbrian only),<sup>224</sup> or cost assessment and financeability. We note that Ofwat is carrying out a separate, industry-wide review into charging arrangements covering also cost reflectivity and transparency of charges.<sup>225</sup>

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<sup>222</sup> WA Consultancy Ltd, & TDS Ltd. [submission 18.5.20](#), p3; See also WA Consultancy Ltd, & TDS Ltd. (2020), [Why the water and sewerage sector reforms will cost house builders significantly more](#), pp4–10

<sup>223</sup> WA Consultancy Ltd, & TDS Ltd. [submission 18.5.20](#), pp10–11; WA Consultancy Ltd, & TDS Ltd. (2020), [Why the water and sewerage sector reforms will cost house builders significantly more](#), pp4–10

<sup>224</sup> See paragraphs 11.81–11.113.

<sup>225</sup> Ofwat (2020), [Charging arrangements for new connection services for English companies – comparative analysis and consultation – Conclusion](#), p2

### ***Issues already consulted on***

3.48 There are two areas on which Ofwat widely consulted prior to PR19, and where no concerns were raised by the Disputing Companies or other parties:

- Switch from RPI to CPIH: a phased switch from RPI to CPIH for the indexation of allowed revenue and RCV was implemented for the first time during PR19.
- Pension deficit recovery costs: At PR19 Ofwat adopted the policy of allowing companies to recover 50% from customers of any remaining pension deficit costs that need to be recovered into the period 2020 to 2025, while shareholders/equity owners take the risk for the other 50%.

### ***Other small impact issues***

3.49 There are a number of other issues and adjustments whose impact is small, and where no concerns were raised by the Disputing Companies or Third Parties:

- Non-price control income which is deducted from allowances: These are technical adjustments relating to forecasted income generated by the water companies from certain charges which are excluded from the price controls. The impact of these adjustments is small, and we have received no evidence to suggest we could improve on Ofwat's review of company forecasts of this income.
- Innovation competition funding: Ofwat established a collectively-funded innovation competition for 2020 to 2025, where funding is collected in proportion to a company's revenue. The amounts available are modest and no stakeholders raised concerns.
- Certain other adjustments to totex: Ofwat makes various other adjustments when calculating totex, for example relating to operating leases; strategic regional water resources solutions and other cash items; third party costs; and non-section 185 diversions. These adjustments are also relatively modest – and no concerns were raised with us by the Disputing Companies or Third Parties.

3.50 More broadly there have been public concerns around the transparency of dividends/performance-related executive pay. However, we do not consider that this is a price control matter.



## Conduct of the investigation

- 3.51 Our determinations have been informed by extensive submissions from the Main Parties.
- 3.52 We reviewed Ofwat's PR19 determinations documentation and supporting consultation documents, provisional decisions and methodology papers and the Disputing Companies' submissions on these points.
- 3.53 Ofwat also provided us with a number of teach-in sessions to explain the regulatory process and the background to PR19 ahead of the referrals.
- 3.54 Ofwat's references were published on our website on 20 March 2020.<sup>226</sup> We received and published the companies' statements of case (SoC),<sup>227</sup> Ofwat's Response to these SoCs,<sup>228</sup> another response submission from the companies<sup>229</sup> and an exchange of reply submissions from Ofwat and the companies.<sup>230</sup>
- 3.55 The Disputing Companies also made opening presentations to us and hosted virtual site visits, and Ofwat held a number of technical teach-ins with CMA staff on detailed analytical approaches and its financial models. We also held a round table session with the technical advisors to the Main Parties to discuss cost of capital issues.
- 3.56 We received responses from Ofwat and the Disputing Companies to detailed requests for information. Additionally, the Main Parties have at times sent us further letters and evidence.
- 3.57 In June we published our approaches document on our webpage, setting out our proposed approach to the determinations.<sup>231</sup>
- 3.58 We held hearings with all the Main Parties during July and early August to discuss the issues.
- 3.59 We also received submissions from Third Parties (see paragraphs 3.88 to 3.95), these were published on our website.<sup>232</sup> We held a number of Third Party hearings.

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<sup>226</sup> [References from Ofwat](#)

<sup>227</sup> [Statements of case](#)

<sup>228</sup> [Ofwat responses to Statement of Case](#)

<sup>229</sup> [Replies to Ofwat's Response to Statements of Case](#)

<sup>230</sup> [Ofwat's Further Submissions & Replies to Ofwat's Further Submissions](#)

<sup>231</sup> [CMA approach to water redeterminations](#)

<sup>232</sup> [Submissions from third parties](#)

- 3.60 Our Provisional Findings were published on 29 September 2020. We invited comments and received responses from the Main Parties. These were published on our website,<sup>233</sup> as were their replies to the responses to the Provisional Findings.<sup>234</sup> The Main Parties also made submissions after the post-Provisional Findings main party hearings,<sup>235</sup> and closing submissions.<sup>236</sup> We also published responses to the Provisional Findings received from third parties.<sup>237</sup>
- 3.61 We held further hearings with the Main Parties in late November and December 2020.
- 3.62 We also held a number of further third-party hearings.
- 3.63 As noted at paragraph 3.27 we also held a hearing focused on consumers including customer engagement and vulnerability with Citizens Advice, CCWater and the four CCGs for each of the Disputing Companies.
- 3.64 In January 2021 we published several consultation papers and invited comments.<sup>238</sup> These consultations referred to areas where we were reconsidering our approach and provisional conclusions in light of the evidence and arguments put to us in the responses we received to our Provisional Findings, and where it was appropriate for us to seek further views, or areas where we had signalled at Provisional Findings that further analysis needed to be undertaken. These were:
- (a) Cost of capital (covering choosing a [Point estimate for the cost of capital](#); and [cost of debt](#));
  - (b) [2019/20 data for base cost models](#);
  - (c) [The Elsham scheme](#) and DPC; and
  - (d) [Leakage enhancement totex allowance](#).
- 3.65 The responses to these consultations have also been published on our website.<sup>239</sup> We also held a round table session with the Main Parties to further discuss cost of capital issues.

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<sup>233</sup> [Main party responses to provisional findings](#)

<sup>234</sup> [Main party replies to the responses to the provisional findings](#)

<sup>235</sup> [Main party post-hearing submissions](#)

<sup>236</sup> [Main party final submissions](#)

<sup>237</sup> [Third party responses to provisional findings](#)

<sup>238</sup> [Consultation papers](#)

<sup>239</sup> [Responses to consultations](#)

- 3.66 Throughout the inquiry we have maintained an [administrative timetable](#) on our web pages showing our expected timing for the stages of our process. This has been subject to a number of revisions, including extending the timetable after the publication of Provisional Findings to allow for further consultation and as a consequence of COVID-19 illness and restrictions.
- 3.67 We have followed a policy of openness and transparency with the Main Parties in respect of the evidence we are considering, with the exception of a few minor points which were considered commercially confidential. We asked the Main Parties to copy each other into submissions and responses to the CMA's requests for information. In all cases, transcripts or recordings of meetings (including with Third Parties), round tables and teach-ins were shared with the Main Parties.
- 3.68 We have employed a firm of engineering consultants, WRc, to assist us on technical engineering matters in relation to the Determination. WRc has provided technical input to the CMA on issues including ODIs, issues relating to Anglian's Interconnector, WINEP, the IED, the bottom-up assessment of leakage enhancement proposals, econometric modelling, and internal sewer flooding. We have treated WRc's advice as further evidence to aid the Group's decision making.

## **COVID-19**

### *Background*

- 3.69 The COVID-19 crisis presents short and long-term challenges for the water sector, both on the operations of suppliers and on the levels and types of demand for services. The full impacts of this are not clear and will remain uncertain for some time, including:
- (a) the full economic impact of the crisis;
  - (b) the length of time that restrictive social distancing or lockdown measures are in place;
  - (c) the impact on the economy and water sector once the furlough scheme has ended;
  - (d) the duration of the pandemic; and
  - (e) the longer-term impact of increased home working.
- 3.70 In general, the Main Parties represented that the impact of COVID-19 has led to significant disruption in the operation of the water companies as well as

changes in the behaviour and finances of household and non-household customers. In particular there has, and will continue to be, an impact in the following areas:

- (a) Customer Usage
- (b) Affordability/Bad debt
- (c) Costs
- (d) Capital programme
- (e) PCs.

3.71 We consider each of these areas in more detail below.

#### *Customer Usage*

3.72 COVID-19 measures have meant the closure of offices and increased home-working. The Main Parties have told us that this has meant that household demand for water has increased significantly while non-household demand has decreased. The decrease in non-household demand will have a significant impact on the liquidity of retailers and bad debt issues in the non-household-market. To combat this, Ofwat introduced various changes to the market code in March 2020.<sup>240</sup>

#### *Affordability and bad debt*

3.73 COVID-19 is expected to have a significant effect on bad debt. It is likely that the full effects of this have not yet been felt. The costs of increased bad debt will fall to the water companies. In addition, we note that more customers will need financial assistance and other support.

#### *Totex*

3.74 Northumbrian, Anglian and Yorkshire submitted that there has been an increase in totex costs due to requirements for additional equipment and activity to undertake routine tasks. These additional costs are in maintaining essential services and complying with government requirements. These include increased residential demand, additional IT equipment to facilitate

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<sup>240</sup> These included an ability for retailers to use the market vacancy flag to prevent settlement of wholesale charges for premises that may be affected by COVID-19 closures. These changes were intended to remove financial liabilities from retailers. The second required wholesalers to provide liquidity to retailers through an immediate 50% reduction of liability in relation to the payment of wholesale charges for March 2020. This required the water companies to provide liquidity very quickly.

home working, purchase of PPE (personal protective equipment), higher staff absences and the impact of social distancing on construction and office work. For example, Yorkshire identified an increment to opex costs for additional vehicle fleet, PPE, and deferral of capital activity on clean water network of around £12m.<sup>241</sup>

- 3.75 However, some of the companies and Ofwat note that there have been some cost savings, although these do not offset the cost increases. These include a reduction in non-fleet mileage and travel and subsistence, decreased travel time from home working and increased ease of contacting customers as a result of home working.

### *Capital Programme*

- 3.76 We were told that COVID-19 has had a significant impact on some of the water companies' capital programmes. For example:

- (a) Yorkshire told us that it suspended its capital programme for two weeks to enable the impact of lockdown to be assessed. When the Yorkshire sites remobilised, the operating constraints caused further time delays and increases in project costs owing to having to find alternative suppliers; provide additional welfare facilities on site; additional fleet costs; sourcing limited supplies of PPE; and sourcing alternative materials and parts.
- (b) Northumbrian told us that it has seen some increased costs and delays in relation to the delivery of its capital programme.
- (c) Anglian told us that its capital programme was delayed by three months to focus on the delivery of key services.
- (d) Ofwat told us that companies have taken very different approaches to their capital programmes during COVID-19 with some companies noting significant delays and other companies pressing on with their programmes.

### *Performance commitments*

- 3.77 COVID-19 has also had an impact on companies' likely achievement of PCs and associated payments or penalties under ODIs. While Yorkshire and Anglian told us that the impact of COVID-19 including bad debt and changes to totex and capital programmes and prioritisation of core services will have negative impacts on PCs, Ofwat and Northumbrian noted that the crisis will

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<sup>241</sup> [Yorkshire's Post PF hearing submission](#), pp42–44

impact individual measures differently with some negative impacts and some positive impacts. Anglian submitted evidence on the effect of COVID-19 on per capita consumption and low pressure, and said that this should be taken account of when the CMA is setting the levels for PCs/ODIs at final determination.<sup>242</sup> Yorkshire told us that COVID-19 had impacted on its ability to raise awareness on water matters (for example at schools), on its repair of customer owned pipes to support leakage reduction, on per capita consumption, and on monitoring bathing water quality as the EA cannot carry out its sampling programme.<sup>243</sup>

### *CMA's assessment*

- 3.78 We must consider the extent to which we take account of the impacts of COVID-19 on the water industry in setting the price controls for the four Disputing Companies.
- 3.79 We received a letter from Anglian, Yorkshire and Northumbrian which stated that the CMA should consider the wider economic and market evidence as it makes its determinations. It also stated that there should be a sector-wide approach with a reconciliation mechanism for those direct impacts that remain uncertain. It noted that this matter is for Ofwat to address.
- 3.80 Following that, Yorkshire reiterated what it had said in the joint letter and noted that the CMA should use any emerging evidence as part of its redetermination process. Northumbrian noted that it expects that, where the information on the impacts of COVID-19 is sufficiently clear by the time of its publication of its determinations, the CMA should reflect this where appropriate in line with its general approach of making decisions based on the best information available. It stated that in particular the CMA should take account of the impact on the cost of capital, productivity challenges, frontier shift and financeability. Where the uncertainty cannot be resolved in time, it considered that there will need to be a form of regulatory reconciliation mechanism.
- 3.81 Bristol submitted in May that it supported Ofwat's preference to take account of the impacts of COVID-19 across the sector as part of the PR19 reconciliation process.<sup>244</sup>
- 3.82 Ofwat submitted that, given the continued uncertainty around the impacts of COVID-19, any regulatory adjustments should be implemented outside the

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<sup>242</sup> [Anglian post hearing submission: Annex 2](#), pp5–8

<sup>243</sup> [Yorkshire's Post PF hearing submission](#), pp42–44

<sup>244</sup> [Bristol's reply to Ofwat's Response](#), paragraph 33

redetermination process. Ofwat said it would consider the need for any ex-post adjustments following an in-the-round assessment, the timing of which will be aligned with its normal reconciliation processes.

- 3.83 In its post-Provisional Findings submission,<sup>245</sup> Ofwat said it had been jointly undertaking work (with Water UK) to understand the potential scale of the impact of COVID-19, but the scale of the impacts remains highly uncertain and dependent on company circumstances. It set out in a 19 March 2020 letter<sup>246</sup> to all companies regarding COVID-19, that ‘we will consider the need for any ex-post adjustments to our regulatory system following an in-the-round assessment as part of our normal reconciliation process’. In a 14 July 2020 letter<sup>247</sup> it said ‘we have yet to be persuaded that there is a need to act immediately’ and that ‘we would align the timing of our assessments with our normal reconciliation processes for PR19, once performance for the first year of the AMP has been reported’. It said that its preliminary work showed that at present the quality of information is variable and trends are highly uncertain. It said it considered that these impacts are best addressed when it can identify impacts across the sector as a whole and is able to benchmark company performance and apply a rounded judgement across all 17 companies and to do this as part of its normal reconciliation process. It said it expected to start this process when it receives the first year of data from AMP7 in July 2022.
- 3.84 In its post-Provisional Findings submission, Northumbrian pointed to the impact of COVID -19 as further showing the importance of resilience.<sup>248</sup>

### *Our view*

- 3.85 In our view, there are significant difficulties in assessing the impacts of COVID-19 within the framework of the redetermination at this stage. There is significant uncertainty regarding the full impact of COVID-19 on the water sector, as well as uncertainty on the timing, duration and scale of any impacts, and on the duration of the COVID-19 crisis. Although further evidence became available during the course of our investigation (for example the companies providing some estimates of the impact on their business), these were inevitably partial while the impact of COVID-19 is ongoing and the path that the impacts may continue to take is unknown (as we are preparing our final determination document, the UK is still largely in lockdown). It is therefore impossible for us to make any reasonable estimates at this stage of

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<sup>245</sup> [Ofwat post PFs costs and outcomes](#), paragraph 4.2

<sup>246</sup> Ofwat (2020), [Letter to all CEOs from Rachel Fletcher on Covid-19 water industry response](#), p2

<sup>247</sup> Ofwat (2020) [Letter to all CEOs from Rachel Fletcher on AMP7 company performance during the Covid-19 pandemic](#)

<sup>248</sup> [Northumbrian's response to PFs](#), section 2.4

what adjustments to the price controls would be appropriate. We have considered the possibility of making specific adjustments in this report where we have received substantive submissions (for example for the effect of COVID-19 on productivity and its impact on frontier shift in base cost modelling, see paragraphs 4.572-4.595). However, we have not found it appropriate at this time to attempt to make adjustments at this early stage in understanding the impacts of the pandemic.

- 3.86 For these reasons, we consider that the best mechanism for taking direct account of the impacts of COVID-19 is for Ofwat to consider these as part of an industry-wide process. Ofwat has proposed it will consider the need for any ex-post adjustments at a time aligned to its normal PR19 reconciliation process;<sup>249</sup> it has been suggested to us that we should provide views and principles to Ofwat on how it should approach this. However, for the same reason that the position and impacts of COVID-19 will be unknown, we do not consider that this would be appropriate.
- 3.87 Therefore, our modelling, proposals for PCs and ODIs, and our determination of allowances have not been adjusted for the expected impact of COVID-19 on the sector. We have, however, updated our determinations for new information (see paragraph 3.8) that is not directly about the impact of COVID-19, for example market information relevant to the calculation of the WACC (where our calculation of the RFR, beta and the cost of new debt includes data extending beyond the start of 2020).

## Third Party submissions

- 3.88 Ahead of publishing our Provisional Findings, we received 70 Third Party submissions from 61 interested Third Parties including environmental, conservation, business and consumer organisations, local government, academics, advisors, water companies and other regulated businesses. These submissions were published on our [webpage](#). The points raised in these submissions can be broadly grouped into four areas.
- 3.89 Many Third Parties told us that Ofwat's final determination underfunded investment in environmental and resilience schemes, with the risk that these would be scaled back. These arguments were made by local and regional Third Parties in particular. These parties often also expressed concern for the future of local partnerships or collaborations with one of the Disputing

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<sup>249</sup> Although we have needed to consider arguments on the impacts of COVID-19 in relation to growth, see for example paragraph 4.797.



Companies, or fears that local organisations would be unable to meet their goals as a result of the water companies scaling back schemes.

- 3.90 Many Third Parties also told us that Ofwat ignored customer views. They said that customers were in favour of environmental and resilience schemes and tended to favour these over bill reductions when offered the choice. In particular, the CCGs for all four Disputing Companies made this point, as did some non-disputing water companies. However, CCWater told us that it had found very high levels of acceptability among customers for Ofwat's Draft Determinations.
- 3.91 A few Third Parties told us that Ofwat was right to adopt a 'stretching' final determination given historical performance, past corporate behaviour and the very low levels of risk associated with providing a monopoly essential service. In particular, Citizens Advice told us there was a need for Ofwat to get tougher; consumers should not be paying over the odds for a reasonable level of performance and shareholders should face downsides for under-performance. It said challenge was important and that consumers should not be expected to overpay for a reasonable and efficient level of performance. CCWater also told us it welcomed Ofwat's challenge on efficiency.
- 3.92 Finally, some Third Parties provided comments on technical aspects of the calculation of the cost of capital. These comments did not tend to be made by local or regional Third Parties but were common in submissions from non-disputing water companies, other regulated businesses, other regulators and academics, some of whom have an interest in forthcoming regulated sector price controls which could be influenced by the CMA's conclusions here. In contrast to the representations of customer groups in paragraph 3.91, these submissions generally proposed (often on behalf of regulated companies) that Ofwat had set the cost of capital too low for various reasons. For example, the Energy Networks Association (ENA) told us that the RFR and the allowed cost of equity had been set too low, and Heathrow Airport Limited told us that the TMR had also been set too low.<sup>250</sup>
- 3.93 We also received 45 submissions from Third Parties in response to our Provisional Findings, and 31 submissions from 25 Third Parties in response to our consultation papers, and two closing submissions. The points raised were largely similar to and built on the areas identified above.
- 3.94 In some responses to our Provisional Findings, concerns were raised about whether sufficient attention and weight was afforded to representatives of the

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<sup>250</sup> See our webpage, [Submissions from third parties](#).

customer interest. Citizens Advice said that there was an information asymmetry in the price control process and so fairness required the CMA to take proper account of the counterbalancing views to industry put forward by Citizens Advice and other consumer organisations. It said that the CMA appeared to have failed to take proper account of its views in the Provisional Findings.<sup>251</sup> We are satisfied that we have had regard to and given appropriate weight to all representations we have received including those from Citizens Advice, CCWater and the Disputing Companies' CCGs in reaching our determinations.

- 3.95 We have not listed every relevant submission in relation to every point throughout our report, but we have been mindful of the submissions from groups representing customers in exercising our role of balancing the various duties that apply to us.

## **Structure of the redeterminations report**

- 3.96 This document is our report in respect of the four redeterminations. For simplicity and clarity, rather than producing four separate reports, we have addressed issues and then drawn out our conclusions and reasoning, and set out how these apply to each of the four Disputing Companies. Sections 12 to 15 provide details of the provisional determination for each company.

- 3.97 The remainder of these findings are set out as follows:

- (a) In Sections 4 to 6, we consider a range of evidence to assess wholesale costs for the determination:
  - (i) In Section 4, we consider approaches to assessing base expenditure allowances, including evaluation of Ofwat's base assessment and our approach. We also consider various specific unmodelled costs.
  - (ii) In Section 5, we review enhancement allowances.
  - (iii) In Section 6, we consider our overall conclusions on approaches to totex allowances.
- (b) In Section 7, we address outcomes including PCs and ODIs.
- (c) In Section 8, we consider funding and PCs and ODIs for the issue of leakage.

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<sup>251</sup> [Citizens Advice response to PFs](#), page 3

- (d) In Section 9, we set out our findings on rates of return derived from our calculation of the appropriate cost of capital. We also consider Bristol's request for a CSA and Ofwat's GOSM.
- (e) Section 10 sets out our assessment of financeability.
- (f) Section 11 covers a range of other issues not otherwise addressed, including taxation, matters relating to PR14 reconciliation and remedying previous possible errors. We also discuss the treatment of the costs of the redeterminations.
- (g) In Sections 12 to 15, we set out our findings on the determinations for each of the four Disputing Companies. This includes translating our decisions on each of the building blocks into a calculation on the effect on the licence, including as relevant a value of K.

## 4. Base costs

### Introduction

4.1 In this section we set out our approach to determining the Disputing Companies' base cost allowances and cover the following topics:

- (a) base cost modelling;
- (b) catch-up efficiency challenge;
- (c) frontier shift;
- (d) RPEs
- (e) growth;
- (f) adjustment for enhancement opex;
- (g) cost adjustment claims; and
- (h) unmodelled costs.

### Base cost modelling

#### *Introduction and summary*

- 4.2 In this section, we discuss our consideration of base cost modelling. This was the first building block of Ofwat's methodology to reach a view on each company's totex allowance. Ofwat used econometric models with the companies' historical costs as the dependent variables and cost drivers, such as the size of the network, as independent variables. Ofwat used this modelling to identify how efficient companies were and to estimate future cost allowances.<sup>252</sup>
- 4.3 In this sub-section, we provide a detailed assessment of each of the issues that have been raised by the Main Parties and Third Parties concerning base cost modelling, and the additional issues we have assessed.

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<sup>252</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p10

4.4 Ofwat's models were developed following a consultative and development process involving stakeholders and drawing on lessons from PR14.

- (a) Cambridge Economic Policy Associates (CEPA) supported the development of econometric models for the wholesale water and wholesale wastewater controls. CEPA developed econometric models that Ofwat could use as part of the assessment of costs for wholesale activities during PR19. We understand CEPA tested over 1,500 potential models and used robustness checks to select the models that were presented in its report.<sup>253</sup>
- (b) Vivid Economics further developed the wholesale wastewater models.
- (c) Professor Andrew Smith and Dr Thijs Dekker of the University of Leeds provided review and challenge throughout the process.
- (d) 13 water companies submitted their preferred models for the consultation, including the Disputing Companies. Overall, the companies submitted over 220 models in wholesale water and wastewater activities.<sup>254</sup>

4.5 Ofwat used five models for wholesale water:

- (a) two models for Water Resource Plus (water resource, raw water distribution and water treatment) (WRP1 and WRP2);
- (b) one model for Treated Water Distribution (TWD1); and
- (c) two models for aggregated Wholesale Water (WW1 and WW2).

4.6 Ofwat used eight models for wholesale wastewater:

- (a) two models for Sewage Collection (SWC1 and SWC2);
- (b) two models for Sewage Treatment (SWT1 and SWT2);
- (c) two models for Bioresource (BR1 and BR2); and
- (d) two models for Bioresources Plus (bioresources and sewage treatment) (BRP1 and BRP2).

4.7 In our review of the econometric models, we consider the following points.

- What is the correct estimation technique?

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<sup>253</sup> CEPA (2018), [PR19 Econometric Benchmarking Models](#), p51

<sup>254</sup> [Ofwat's Response to common issues in companies' SoCs: Cost efficiency](#), paragraph 3.37

- What is the correct functional form?
- Should we include 2019/20 data in our models?
- Which explanatory variables should be used?
- Should we adopt aggregate wholesale water and treated water distribution specifications?
- Should the alternative model specifications be used?
- Is capital maintenance addressed appropriately?
- Is there a log-transformation bias?
- Which forecast data should be used?
- What is the appropriate aggregation and triangulation approach?
- Should we estimate our models over five years?

4.8 We then summarise our decision on the assessment of the base cost models and conclude on the overall statistical performance of our models.

### ***What is the correct estimation technique?***

4.9 Econometric models can use different estimation techniques to calculate the estimated coefficients from the data supplied. The estimation techniques we considered were:

- (a) Pooled Ordinary Least Squares (OLS) models. This is a standard OLS regression which includes data for a cross-section of companies and across time. The pooled OLS model treats each data point as if it were a unique firm.
- (b) Random effects models. The random effects approach assumes each company has an unobserved unique time constant factor (such as the company's senior management) that affects costs. This unique factor is assumed to be uncorrelated with other cost drivers.
- (c) Fixed effects models. The fixed effects approach, like random effects models, assumes each company has an unobserved unique time constant factor that affects costs but that this unique factor may be correlated with other cost drivers.

(d) Stochastic frontier analysis (SFA). This is a modelling technique used to estimate production or cost functions that explicitly accounts for the existence of firm inefficiency. SFA allows the residual term from the econometric modelling to be split between inefficiency and error. For example, the model may predict that a company's costs should have been £200 million, but the company actually spent £225 million. With SFA, the difference of £25 million can be split down further, with an estimate of the actual inefficiency (for example, £15 million) and the underlying error term (for example, £10 million). The error term could be the result of measurement error (for example, data entry errors).

4.10 In the remainder of this sub-section, we discuss the Parties' arguments related to the correct estimation technique and we present our decision on these topics.

#### *Parties' arguments*

4.11 Ofwat used a random effects model to estimate all its models for three reasons.

(a) It reflected the panel structure of the data (including variation over time and companies).

(b) The coefficients were more statistically significant compared to using OLS.

(c) The standard statistical tests (Breusch-Pagan tests) consistently provided results supporting the use of the random effects model over OLS.<sup>255</sup>

4.12 CEPA said that:

While the way in which 'noise' is separated from inefficiency in SFA models is appealing, SFA models require large amounts of data. The reduction in the size of the panel for most of the models in PR19 (due to developing more granular models) makes the implementation of this methodology even less appealing/feasible. In addition, these models are more complex and less transparent and, as a result, they should only be used when other, simpler, models do not provide robust enough estimates. Furthermore, since SFA is not a statistical technique, it is not possible to implement tests to evaluate the accuracy of the results.

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<sup>255</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), pp7–8

It is also worth noticing that SFA models were developed in PR14 and both Ofwat and the CMA found that they provided limited additional value. As a result, this modelling approach was not considered as part of the modelling suite for PR19.<sup>256</sup>

- 4.13 Ofwat said that while SFA was appealing for efficiency analysis, in practice, it had limited use in regulatory applications. SFA models were complex and non-transparent for stakeholders, required large amounts of data and were sensitive to assumptions regarding the distribution of inefficiency.<sup>257</sup> CEPA had recommended to Ofwat that SFA models should only be used when other, simpler, models did not provide sufficiently robust estimates and Ofwat followed CEPA's advice.<sup>258</sup>
- 4.14 Anglian said that Ofwat should have used a wider range of estimation techniques.<sup>259</sup> Saal and Nieswand, in a report for Anglian, said that the Ofwat modelling labelled as inefficiency what could be legitimate cost differences resulting from different operating environments.<sup>260</sup>
- 4.15 Yorkshire said that Ofwat's assertion that SFA was 'complex and non-transparent' for stakeholders was an Ofwat value judgement which was not supported by evidence.<sup>261</sup>
- 4.16 Oxera, in a report for Yorkshire, commented on SFA.
- (a) SFA was a superior approach to regression analysis, since company-specific noise was separated from company-specific inefficiency. SFA was extensively used in regulation across Europe.
  - (b) Oxera had carried out SFA using the data for Ofwat's wholesale water and wholesale wastewater models. In the five wholesale water models, the SFA results showed no statistically significant inefficiency in all five models. In four of the eight wastewater models, the SFA results showed no statistically significant inefficiency.
  - (c) Ofwat's statement that SFA required large amounts of data was not a valid justification for not conducting SFA.

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<sup>256</sup> CEPA (2018), *PR19 Econometric Benchmarking Models*, p38

<sup>257</sup> Ofwat's response to Yorkshire's SoC, paragraph 3.50

<sup>258</sup> Ofwat's Response to common issues in companies' statements of case: Cost efficiency, paragraphs 6.40–6.43

<sup>259</sup> Anglian SoC, paragraph 592

<sup>260</sup> Saal and Nieswand submission, p5, Saal and Nieswand (March 2019), *A review of Ofwat's January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19*, p5 (comment 4) & p30 and Saal (2019), *A Comment on Misspecification and Systematic Bias in Ofwat's PR19 Draft Determination Integrated Wholesale Water and Wastewater Models*, p3 (comment 2) & p11

<sup>261</sup> Yorkshire's reply to Ofwat's response, paragraph 3.22.2



- (d) Ofwat's statement that SFA was sensitive to assumptions about the distribution of inefficiency was correct to some extent, but Ofwat itself made strong and unsupported assumptions about the distribution of inefficiency by applying an ad hoc adjustment to companies' efficiency scores.
- 4.17 Vivid Economics, in a report for United Utilities, considered using SFA, but found that it was not sufficiently robust to enable a decomposition of the results into an error term and efficiency. This was mainly due to serial correlation between the explanatory variables.<sup>262</sup>
- 4.18 Ofwat said that Oxera's analysis did not account for the panel data structure of the data.<sup>263</sup> Once this was accounted for, Ofwat found statistically significant inefficiency across the econometric models. Ofwat also tested the distribution of the SFA model error. This test indicated that its distribution was skewed the opposite way from the one suggested by theory, which suggested model specification problems.
- 4.19 In response to the Provisional Findings, Oxera, in a report for Yorkshire, said that when using SFA it was possible to test several inefficiency distributions and select the preferred model based on statistical diagnostics. SFA could also provide information to help determine an appropriate benchmark.
- 4.20 In response to the Provisional Findings, Northumbrian said it agreed with the CMA's provisional decision to use random effects as the correct estimation technique.<sup>264</sup>

### *Decision*

- 4.21 Fixed effects – We tested whether it was appropriate to use a fixed effects approach. The theoretical advantage would be that this approach could address omitted variable bias due to time-constant firm-specific factors, such as geographic factors and management.
- 4.22 We ran models using the fixed effects approach, but the results were unsatisfactory. Most of the variables considered were not significant and the R-squared (a measurement of goodness of fit) dropped for most of the

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<sup>262</sup> Vivid Economics/ARUP, [Use of econometric models for cost assessment at PR19](#), p38

<sup>263</sup> [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), paragraph 3.28

<sup>264</sup> [Northumbrian's response to the provisional findings](#), paragraph 34

models, indicating a relatively poor performance modelling base costs.<sup>265</sup> We therefore decide not to use fixed effects.

- 4.23 Pooled OLS – We confirmed Ofwat’s finding that Breusch-Pagan tests suggested that random effects models performed better statistically than pooled OLS models for both wholesale water and wastewater.<sup>266</sup> We therefore decide not to use pooled OLS.
- 4.24 SFA – We recognised that SFA is a potentially advantageous alternative estimation technique for estimating inefficiency compared to the random effects approach used by Ofwat. This was because the SFA technique is designed to separate the companies’ inefficiency from the random noise in the model.
- 4.25 We assessed Oxera’s SFA analysis and found that Oxera had not accounted for the panel nature of the dataset, hence ignoring data changes over time. Consequently, we placed little weight on Oxera’s results which showed little evidence of inefficiency.
- 4.26 In the SFA model, the inefficiency estimates will be affected by the distributional assumption made. Hence, SFA essentially involved replacing an ex-post judgement about the appropriate catch-up challenge based on an assessment of the quality of the modelling and the need for ‘stretch’, with an ex-ante technical judgement on the appropriate way to model the distribution of inefficiency. The academic literature discusses several ways to model inefficiency in an SFA approach, but it is unable to point to an ex-ante assumption that would be appropriate for our modelling purposes. We therefore considered that the SFA model introduced additional uncertainty relating to the appropriate way of modelling the inefficiency. Our approach did not require this ex-ante assumption. Therefore, we decide not to use SFA.
- 4.27 We therefore decide that a random effects model is the most appropriate estimation technique.

### ***What is the correct functional form?***

- 4.28 The functional form describes the assumed relationship between the dependent and explanatory variables. We considered two types of functional form: the translog and Cobb-Douglas.

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<sup>265</sup> The R-squared is a measure of how well the model can explain the data. Generally, a higher R-squared is preferable. However, this can be misleading because a too high R-squared may mean that the model loses its predictive power (this is known as overfitting).

<sup>266</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p170

- 4.29 The translog functional form allows more flexibility with respect to the relationship between cost drivers and base costs because fewer assumptions are required about the form of these relationships. For example, it allows the degree of economies of scale to vary with firm size – for example, a 1% increase in the number of connected properties leads to a 0.5% increase in costs for a small firm but leads to a 0.9% increase in costs for a large firm.
- 4.30 One advantage of translog is that simpler (more restrictive) functional forms are nested within this functional form so if, for example, the economies of scale do not vary across firms, then this will be reflected in the results. One disadvantage is that this functional form is more data intensive. This is because fewer restrictions are imposed on the modelled relationships, and the data and model must reveal the underlying relationship. If the sample size is small, the results may not be robust or statistically significant.
- 4.31 The Cobb-Douglas functional form is a relatively easy to interpret model specification which, in its simplest form, excludes interaction terms among variables.<sup>267</sup> This functional form imposes a more restrictive relationship between cost drivers and costs. In particular, the degree of economies of scale is restricted to be constant and does not vary with other cost drivers.<sup>268</sup>

#### *Parties' arguments*

- 4.32 CEPA in their work for Ofwat considered but rejected translog functions for two reasons.<sup>269</sup> First, the use of translog models made it more difficult to identify the specific effect of each variable on costs. Second, translog models required the introduction of a larger number of explanatory variables and CEPA was concerned about having too many explanatory variables due to the small sample size.
- 4.33 In PR19, Ofwat used a Cobb-Douglas functional form.<sup>270</sup> There were four reasons why Ofwat did not use a translog functional form.<sup>271</sup>
- (a) The translog coefficients often had a counter-intuitive sign. For example, the effect of the number of connected properties might be expected to show that water companies experience economies of scale, but instead the results implied diseconomies of scale.

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<sup>267</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p7

<sup>268</sup> Our interpretation of Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), Table 1 (WW1 column)

<sup>269</sup> CEPA (2018), [PR19 Econometric Benchmarking Models](#), p39

<sup>270</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p7

<sup>271</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p7

- (b) Some translog explanatory variables (such as length of mains multiplied by density) were statistically insignificant. This meant that they did not have a material effect on cost.
  - (c) Some translog terms were unstable. For example, during sensitivity analysis (including removing years, removing companies and including different cost drivers/measures) some coefficients changed from positive to negative.
  - (d) The specification took up more degrees of freedom compared to Cobb-Douglas and a better approach was to use more relevant cost drivers.
- 4.34 Saal and Nieswand, in a report for Anglian, supported the use of a translog functional form and said that water supply systems involved complex cost interactions between the volume of output, transportation, water resource availability, topography and other factors. They said that the substantial academic literature and consulting work done for both Ofwat and some companies (Anglian, Severn Trent Water and United Utilities) had found considerable evidence of important cost interactions between the upstream and downstream components. They said that the model should include interactions between cost drivers.<sup>272</sup>
- 4.35 Thames Water said that it supported Ofwat's use of more flexible functional forms, such as squared terms, in the econometric model.<sup>273</sup> Thames Water repeated this view in its response to our Provisional Findings.<sup>274</sup>
- 4.36 In response to the Provisional Findings, Northumbrian said it agreed with our provisional decision to use a Cobb-Douglas functional form.<sup>275</sup>

## Decision

- 4.37 Based on our review of the evidence, we decide to rely on Cobb-Douglas models.<sup>276</sup>
- 4.38 We decide against using the translog functional form for the following reasons.

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<sup>272</sup> Saal, David (2018), *Comments on CEPA's Methodological Approach in its PR19 Econometric Benchmarking Models for Ofwat*, p5-6, *Saal and Nieswand (2019), A Review of Ofwat's January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19*, p20 & p23, *Saal (2019), A Comment on Misspecification and Systematic Bias in Ofwat's PR19 Draft Determination Integrated Wholesale Water and Wastewater Models*, p7

<sup>273</sup> *Thames Water submission*, paragraph 2.11

<sup>274</sup> *Thames Water's response to the provisional findings*, paragraph 19

<sup>275</sup> *Northumbrian's response to the provisional findings*, paragraph 34

<sup>276</sup> We note that there is some flexibility in the application of the Cobb-Douglas form, eg including a squared term.

- Translog required the addition of several explanatory variables. We found that our dataset has a relatively small sample size of at most 158 observations. As we add additional variables to a regression model, we may find that the model explains more of the variation in cost (in other words, the cost for each company-year combination); however, the additional explanatory variables may not reflect the true underlying relationship between the cost drivers and cost. This means the estimated model would not be reliable for estimating the cost allowance for the 2020/21-2024/25 period.
- Additional explanatory variables, combined with the small sample size, also reduced the degrees of freedom in the model, leading to less precise estimates.
- Translog models made it more difficult to identify and interpret the specific effect of an explanatory variable on costs. As translog models had interaction terms and squared terms, the relationships were more complex. We opted, where possible, to have a parsimonious and easy-to-interpret model as this facilitates the application of our framework.

### ***Should we include 2019/20 data in our models?***

- 4.39 The base cost models published at Provisional Findings were based on data from 2011/12 up to 2018/19, the most up to date data available at the time. In July 2020, Ofwat completed its quality assurance process on 2019/20 data. This, and the extension of our timetable for the redeterminations, made it possible for us to consider including 2019/20 data in our base cost models.
- 4.40 In Appendix C, we present the Parties' arguments and our assessment of whether to include 2019/20 data in our base cost models. We have weighed the advantages and risks of including 2019/20 data and, on balance, we found that the benefits of including the data outweighed the risks of excluding it. We identified the following benefits of including 2019/20 data:
- (a) increasing the number of observations in our models, which would possibly increase the precision of our estimates;
  - (b) allowing our models to cover the entire AMP6;
  - (c) softening the impact of the variation of lumpy cost items, such as capital maintenance;
  - (d) accounting for the most recent information available; and
  - (e) avoiding a source of potential downward bias.

- 4.41 We recognise that by including 2019/20 data we introduce a risk which could lead to overestimation of the companies' allowances due to the possibility that some AMP7 investment had been brought forward into 2019/20. However, we found that the scale of any potential upward bias was too limited to justify excluding 2019/20 data from our models. Moreover, other sources of potential bias may work in the opposite direction and offset any potential upward bias. Therefore, we decide to include 2019/20 data in our base cost models.
- 4.42 As we explain in Appendix C, we have reached this conclusion after having reviewed evidence on:
- the impact of 2019/20 data on our models' statistical performance;
  - expenditure analysis,
  - companies' and Ofwat's commentary on investment brought forward from AMP7, and
  - the likelihood of downward bias.
- 4.43 We considered a variety of methods that could correct our models' estimates for any potential upward bias. Some of these methods were also assessed by the Main Parties.<sup>277</sup> We considered the following approaches.
- Imposing an ex-post adjustment to directly correct for the bias. While attractive from a theoretical perspective, this method relied on the quantification of any bias effect from including 2019/20 data in our models. Neither we nor the Parties were able to quantify this bias with any reasonable degree of accuracy.
  - Imposing an ex-ante company-specific adjustment to companies' 2019/20 costs to reflect any investment brought forward from AMP7. However, we could not identify a reliable methodology to quantify the amount of investment brought forward and consequently the adjustments we should apply to companies' costs in 2019/20. This was also supported by the companies' comments reported in Appendix C.

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<sup>277</sup> [Anglian's response to the 2019/20 data for base cost models working paper](#) paragraph 53, [Northumbrian's response to the 2019/20 data for base cost models working paper](#), paragraphs 48-50. [Yorkshire's response to the 2019/20 data for base cost models working paper](#) paragraphs 1.17-1.18 and [Ofwat's final submission](#), paragraph 2.102

- Limiting the base cost allowances to a maximum equal to the companies' business plans. Ofwat said that doing this would undermine the incentive for companies to seek efficiencies and submit stretching cost forecasts.<sup>278</sup>
- Adjusting the efficiency challenge and/or frontier shift. However, we did not think the evidence base for our decisions on either of these areas had changed with the inclusion of 2019/20 data.
- Using a dummy variable for the year 2019/20. However, as explained in Appendix C, paragraph 54, we were wary of using dummy variables to identify 'atypical' years. Moreover, a 2019/20-specific dummy variable would not be able to isolate the effect of the investment brought forward from other increases in expenditure.
- Triangulating models with and without 2019/20 data. However, this method did not directly correct for bias and relied on the arbitrary choice of the weight given to different models.
- Including 2019/20 data and use business plans for cost items where there was evidence of bias. However, we found it was not possible to accurately identify such cost items.
- Including 2019/20 data and using business plans for cost items that could be brought forward (renewal, maintenance, growth enhancement). We did not rely on this method because it assumed that 100% of 2019/20 renewal, maintenance, and growth enhancement were affected by bias and that, as a result, business plans were more accurate than outturn data. We did not have sufficient evidence to convince us that this was the case.
- Replacing 2019/20 data with either 2018/19 data (in part or in its entirety), or the average expenditure of AMP6. We found these methods would arbitrarily modify the data without reflecting the operational reality of the industry.

4.44 Based on our assessment, we were not satisfied by any of these methods. Northumbrian and Ofwat arrived at a similar conclusion.<sup>279</sup> Therefore, we decide not to apply any correction to our base cost models. We reflected our decision to include 2019/20 data in other decisions of this redetermination.

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<sup>278</sup> [Ofwat's final submission](#), paragraph 2.104

<sup>279</sup> [Northumbrian's response to the 2019/20 data for base cost models working paper](#), paragraphs 48-50 and [Ofwat's final submission](#), paragraph 2.102

### ***Which explanatory variables should be used?***

- 4.45 The companies' production process comprises the combination of several inputs. When estimating cost functions, it is therefore important to understand and model the relationships between costs and the cost drivers. In this section, we review the relationship between costs and its key drivers and decide on the explanatory variables that should be used.

#### ***Parties' arguments***

- 4.46 Ofwat's FD was based on a report by CEPA. The process followed by Ofwat was described in paragraph 4.4.
- 4.47 In Ofwat's FD, Ofwat produced models for wholesale water and wholesale wastewater base costs. For these base cost models, Ofwat decided that there were four key categories of cost drivers.<sup>280</sup>
- (a) Scale – 'Scale is a key driver of costs. Larger operations deliver more output and incur greater costs.'<sup>281</sup>
  - (b) Density – 'The density of an area could have two opposing effects on costs. On the one hand, the density variable captures the potential for a water treatment business to treat water using larger and fewer treatment works incurring lower unit costs. On the other hand, dense areas may be associated with higher property, rental and access costs.'<sup>282</sup>
  - (c) Treatment complexity – 'The complexity of treatment reflects both the quality of the raw water source supplying the treatment process and the treated output quality requirements.'<sup>283</sup>
  - (d) Topography – 'Topography and the distribution of demand centres across the region can influence a company's distribution costs through greater requirements to pump and transport water to customers.'<sup>284</sup>
- 4.48 Ofwat selected explanatory variables for each of the different cost models. The variables in each model differed to account for differences in the cost function. For example, the wholesale wastewater model included a variable for sludge, which the wholesale water model did not account for because sludge was not a factor for wholesale water.

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<sup>287</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), section 3.4

<sup>281</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), section 3.4, p12

<sup>282</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), section 3.4, p14

<sup>283</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), section 3.4, p12

<sup>284</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), section 3.4, p13



4.49 Ofwat used the following explanatory variables across the wholesale water and wastewater models.<sup>285</sup>

**Table 4-1: Ofwat's econometric models for wholesale water activities – variables included in each model**

Model name	WRP1	WRP2	TWD1	WW1	WW2
Dependent variable (log)	Water resources + Raw water distribution + Water treatment		Treated water distribution	Wholesale water total	
Connected properties (log)	✓	✓		✓	✓
Lengths of main (log)			✓		
Water treated at works of complexity levels 3 to 6 (%)	✓			✓	
Weighted average treatment complexity (log)		✓			✓
Number of booster pumping stations per lengths of main (log)			✓	✓	✓
Weighted average density (log)	✓	✓	✓	✓	✓
Squared term of log of weighted average density	✓	✓	✓	✓	✓
Constant term	✓	✓	✓	✓	✓

Source: Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), table A2.1.

**Table 4-2: Ofwat's econometric models for wholesale wastewater activities – variables included in each model**

Model name	SWC1	SWC2	SWT1	SWT2	BR1	BR2	BRP1	BRP2
Dependent variable (log)	Sewage collection		Sewage treatment		Bioresources		Bioresources + Sewage treatment	
Sewer length (log)	✓	✓						
Load (log)			✓	✓			✓	✓
Sludge produced (log)					✓	✓		
Load treated in size bands 1 to 3 (%)			✓		✓		✓	
Load treated in size band 6 (%)				✓				✓
Pumping capacity per sewer length (log)	✓	✓						
Load with ammonia consent below 3mg/l (%)			✓	✓			✓	✓
Number of properties per sewer length (log)	✓							
Weighted average density (log)		✓			✓			
Sewage treatment works per number of properties (log)						✓		
Constant term	✓	✓	✓	✓	✓	✓	✓	✓

Source: Ofwat (2019) [PR19 final determinations: Securing cost efficiency technical appendix](#), table A2.2

4.50 Anglian said that Ofwat's modelling was excessively simplistic to account for Anglian's atypical characteristics (in particular in terms of topography,

<sup>285</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p9

complexity, growth and quality of service) and these characteristics were not appropriately captured in Ofwat's models.<sup>286</sup>

- 4.51 Anglian also referred to a paper by Saal and Nieswand, its advisers, which concluded that Ofwat's models did not appear to have controlled sufficiently for the complexity of water supply.<sup>287, 288</sup>
- 4.52 Bristol said that the Ofwat models should include service level variables.<sup>289</sup>
- 4.53 Northumbrian did not have any criticisms of the explanatory variables. Northumbrian stated that 'the PR19 models have been simplified to ensure that the key drivers are modelled effectively.'<sup>290</sup>
- 4.54 In response to the Provisional Findings, Northumbrian said it agreed with the CMA's framework for assessing which explanatory variables should be used.<sup>291</sup>
- 4.55 Yorkshire was concerned that Ofwat's models were not able to distinguish inefficiency from omitted cost drivers, which might lead to an unrealistic efficiency challenge. It provided specific examples of cost drivers which it considered important, but which were not included in the base cost model.<sup>292</sup>
- 4.56 United Utilities said that additional explanatory variables should be added when there was engineering evidence of a relationship between these variables and costs.<sup>293</sup>

#### *CMA framework*

- 4.57 In this section, we describe the criteria we adopted to decide whether to include an explanatory variable.
- Does the variable make sense from an engineering and economic perspective? When considering whether to include explanatory variables, we include variables which are consistent with the underlying engineering tasks and economics of supplying water. For example, the costs of supplying water are likely to be related to the number of properties

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<sup>286</sup> [Anglian SoC](#), section 4.1

<sup>287</sup> [Anglian SoC](#), section 4.1, paragraph 562

<sup>288</sup> Saal and Nieswand (2019), *A Review of Ofwat's January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19*, p34

<sup>289</sup> [Bristol SoC](#), Chapter 10

<sup>290</sup> [Northumbrian SoC](#), paragraph 286

<sup>291</sup> [Northumbrian's response to the provisional findings](#), paragraph 34

<sup>292</sup> [Yorkshire SoC](#), paragraph 197

<sup>293</sup> Vivid Economics/ARUP (2017), *Understanding the exogenous drivers of wholesale wastewater costs in England and Wales*, p9

supplied and therefore including variables which represent the scale of the network makes sense from an engineering and economic perspective.

- Are the variables substantially under management control? Including variables which are substantially under management control is likely to cause statistical problems, including biased estimates, and could lead to unintended incentive issues. Service variables, such as leakage levels and the number of water supply interruptions, are under the substantial control of the water companies.
- Are the coefficients of the expected value and significance? We want to include variables where the coefficient is consistent with our understanding of how the variable should influence costs. For example, larger networks are likely to be more expensive to operate, so an explanatory variable related to scale, such as length of mains, should have a positive coefficient.<sup>294</sup>
- Is the variable highly correlated with other variables? We are concerned where there is the potential for high correlation between explanatory variables. The concern is that a high correlation between variables leads to model instability. The common approach in econometrics, which we follow, is to exclude variables that are highly correlated.
- Are there too many variables compared to the sample size? In the sample used by Ofwat, the number of observations is not large, which means that we may be able to only include a limited number of explanatory variables.

4.58 In the rest of this sub-section, we assess in turn each of the disputed explanatory variables and a selection of other variables.

#### *Average pumping head (APH)*

4.59 Pumping water is energy intensive and APH is considered a proxy for the energy requirement of companies.<sup>295</sup> We would therefore expect a positive relationship between costs and APH. APH is, among other things, related to topography because the topography determines how high water must be pumped. In the remainder of this section we first present the Parties' arguments on this topic. We then present our decision.

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<sup>294</sup> For non-linear terms we may conduct a check for joint statistical significance.

<sup>295</sup> This average is calculated by averaging over pumping stations and over time. For a reference see Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p36

### *Parties' arguments*

- 4.60 In some wholesale water models, Ofwat measured topography using the number of booster pumping stations per length of mains.<sup>296</sup>
- 4.61 Anglian said that in the wholesale water models APH should replace booster pumping stations per length of main as an explanatory variable.<sup>297</sup> This was for three reasons:
- (a) APH was more clearly defined relative to pumping stations, which was a variable being used for the first time. In the absence of a detailed definition of a pumping station, companies had interpreted differently what constituted a pumping station.<sup>298</sup>
  - (b) APH was a better measure for topography especially for a water and sewage company serving a flat rural area.<sup>299</sup> In particular, borehole pumps and on-site high lift pumps, of which Anglian had many, were excluded from the pumping station measure.<sup>300</sup>
  - (c) The number of booster pumping stations per length of mains did not cover the entire value chain (only the distribution part).<sup>301</sup>
- 4.62 Northumbrian said it had checked the robustness of Ofwat's findings. One of its analyses included replacing the number of booster stations with APH. Northumbrian said that APH passed the engineering and economic rationale test because it was a good proxy for the energy intensity of companies. However, APH was not statistically significant in its specifications, which implied that APH had a low predictive power.
- 4.63 Ofwat responded to the companies' arguments and said that APH had some advantages compared to other explanatory variables.<sup>302</sup> However, Ofwat had two concerns with respect to APH. First, Ofwat had tested APH in its specifications and found that it was not robust in some specifications.<sup>303</sup> Second, it was concerned about the quality of the APH data because the water companies rated the quality of the data as low. This could be responsible for the lack of robustness in the econometric model.<sup>304</sup> Ofwat said

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<sup>296</sup> Ofwat (2019), *Supplementary technical appendix: Econometric Approach*, p13

<sup>297</sup> [Anglian SoC](#), paragraph 563 (i)

<sup>298</sup> [Anglian SoC](#), paragraph 563 (i)

<sup>299</sup> [Anglian SoC](#), paragraph 563 (i)

<sup>300</sup> [Anglian SoC](#), paragraph 563 (i)

<sup>301</sup> [Anglian SoC](#), paragraph 563 (i)

<sup>302</sup> [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), paragraph 3.16

<sup>303</sup> Northumbrian's SoC shows that the APH variable is statistically insignificant. [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), paragraph 3.16

<sup>304</sup> [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), paragraph 3.16, table 3.2 and paragraph 3.17

that Anglian itself had expressed concerns about the consistency in reporting of the APH variable.<sup>305</sup> Anglian said that its confidence in the reported APH variable was higher than that presented by Ofwat.

- 4.64 Ofwat had decided not to use APH in the base costs model despite using it in previous determinations. Ofwat said it had tested alternatives to booster pumping stations to capture differences in network complexity and energy requirements, including APH and pumping capacity, but it did not find a more robust cost driver.<sup>306</sup> However, it recognised the points related to Anglian's topography and had addressed this through cost adjustments and alternative model specifications.<sup>307</sup>
- 4.65 Oxera, in a submission for Anglian, said that Ofwat's argument for attaching a low confidence level to the APH variable was weak. First, Ofwat's comparison of confidence grades was partial, as it included booster pumping stations per mains in its cost models. Second, much of the uncertainty around distribution APH related to how APH was allocated between the different areas of the value chain, rather than the absolute level. Third, comparing confidence grades for booster pumping stations with APH was misleading as it was not compared to other variables too. Fourth, there was substantial regulatory precedent for using APH. Fifth, there was uncertainty around the extent to which the number of stations would capture costs from topography and pumping. Sixth, the risk of bias resulting from using a pumping variable unrelated to activity in 39% of the cost base outweighed a small difference in reported confidence grades.
- 4.66 Severn Trent Water welcomed the use of the number of booster stations to capture how energy costs for water companies varied across the country.<sup>308</sup> United Utilities said that where there were doubts about the consistency of the data underlying a cost driver, and a valid alternative should be used.<sup>309</sup>
- 4.67 Professor Saal, and advisor to Anglian, presented evidence which supported the view that APH could be used instead of booster stations.
- 4.68 Following Provisional Findings, Anglian re-stated its position in favour of the use of APH in the base cost models.

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<sup>305</sup> [Ofwat's submission following the main party hearings](#), pp19–20

<sup>306</sup> [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), p26

<sup>307</sup> [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), paragraph 3.17

<sup>308</sup> [Severn Trent submission](#), p13

<sup>309</sup> [United Utilities submission](#), paragraph 1.2.4

- The region Anglian served was uniquely flat, large and sparsely populated, and Anglian employed a high proportion of groundwater.<sup>310</sup>
- The lack of statistical significance was not a compelling nor proportionate reason to exclude variables of obvious economic significance, particularly in a small sample, and doing so could bias the model.<sup>311</sup>
- The APH data was at least as reliable as booster pumping station data and better explained power costs. This was important because Ofwat used booster pumping stations to proxy for power costs.<sup>312</sup>
- There were concerns about the booster pumping station data. For example, the figures for Anglian, Portsmouth Water, South East Water and Southern Water had varied between reporting submissions.<sup>313</sup>
- There was no correlation between booster pumping station numbers and power costs while there was correlation between APH and power costs.<sup>314</sup> Furthermore, when booster pumping stations was replaced by APH, the model results showed Portsmouth Water's efficiency changed to a more credible level.<sup>315</sup>
- Anglian's correlation analysis multiplied APH by distribution input (DI) to normalise for company scale as it represented total work done by a company.<sup>316</sup> Booster pumping stations per length of main was not multiplied by DI because booster pumping stations was already proportionate to company scale.<sup>317</sup> Anglian found that power costs had a higher correlation with APH times DI than DI alone. Anglian also showed that power costs had a worse correlation with booster pumping stations per length of main times DI than DI alone.<sup>318</sup>
- APH had been used both by Ofwat in PR14 and in the CMA's Bristol PR14 Determination.<sup>319</sup>
- Water companies reported four separate numbers for APH, relating to the head associated with each part of the value chain: raw water abstraction,

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<sup>310</sup> [Anglian's response to the provisional findings](#), paragraph 80

<sup>311</sup> [Anglian's response to the provisional findings](#), paragraph 80

<sup>312</sup> [Anglian's response to the provisional findings](#), paragraph 80

<sup>313</sup> [Anglian's response to the provisional findings](#), paragraphs 85-87

<sup>314</sup> [Anglian's response to the provisional findings](#), paragraphs 88-89

<sup>315</sup> [Anglian's response to the provisional findings](#), paragraph 90

<sup>316</sup> [Anglian's response to the provisional findings](#), paragraphs 88-89, [Anglian's submission following the second main party hearings: Annex 2](#), paragraph 45

<sup>317</sup> [Anglian's submission following the second main party hearings: Annex 2](#), paragraph 47

<sup>318</sup> [Anglian's submission following the second main party hearings: Annex 2](#), paragraphs 49-50

<sup>319</sup> [Anglian's response to the provisional findings](#), paragraph 80

raw water transport, water treatment and treated water distribution. APH could therefore be used across the full range of Ofwat's disaggregated models.

- APH could be incorporated into all the CMA wholesale water base cost models. The results were consistent and made sense from both an economic and engineering perspective.<sup>320</sup> APH performed satisfactorily in both the disaggregated and aggregated models.<sup>321</sup>
- If the CMA did not include APH in its base modelling, the CMA should consider Anglian's cost adjustment claim for £31.7m.<sup>322</sup> This cost adjustment claim is considered in paragraphs 4.933 to 4.951.

4.69 Anglian's advisor, Professor Kumbhakar, said that the CMA's concerns regarding measurement error did not warrant excluding APH from the models. This was because:

- while statistical significance was important, operational and economic insights were more important with such a small dataset;
- statistical insignificance was not a valid reason for rejecting APH;
- the measurement error in APH appeared similar to the measurement errors associated with other variables used by Ofwat;
- measurement error would attenuate the estimated coefficient and lower its statistical significance, which would increase the likelihood of omitting a variable based on its statistical insignificance; and
- the exclusion of a relevant variable was never a good strategy.<sup>323</sup>

4.70 Professor Kumbhakar said that non-statistically significant variables had been included in Ofwat's models including coefficients on: (a) the squared term of log of weighted average density in the WRP2 model; and (b) the weighted average density in the SWC2 model.

4.71 Anglian's advisors, Oxera, said that:

- The CMA's data quality concerns were not a valid reason for excluding APH, as APH was no more affected by measurement error than other

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<sup>320</sup> [Anglian's response to the provisional findings](#), Table 2

<sup>321</sup> [Anglian's response to the provisional findings](#), paragraph 80

<sup>322</sup> [Anglian's response to the provisional findings](#), paragraphs 95-97

<sup>323</sup> [Anglian's response to the provisional findings](#), paragraphs 82-84



variables. The booster pumping station data also suffered from reporting inconsistencies.

- The CMA's concerns over statistical significance were unwarranted. APH was statistically significant at the 1% level in the TWD1 model and was statistically significant at the 1% level in all power cost models (models developed by Oxera that replaced base costs with power costs as the dependent variables). Given the sample size and operational reasoning, this was strong evidence for the inclusion of APH. In contrast, the number of booster pumping stations per length of mains, while significant in base cost models, had the wrong sign in a TWD power model and was only significant at the 50% level in an aggregate water power model. This was particularly concerning as Ofwat and the CMA said that the number of pumping stations per length of mains was used to capture pumping related power costs. While in wholesale water models average pumping head was not highly statistically significant, it was still statistically significant at around the 20% level.
- Excluding APH would lead to omitted variable bias. The CMA had used other cost drivers with data quality far less accurate than APH. For example, several companies reported confidence grades for the volume of water treated at specific complexity bands with an accuracy grade of X—described as 'Accuracy outside +/-100 %'.
- When considering data quality, it was more valid to compare the confidence grades of the aggregate measure of APH. This was because: much of the uncertainty in the data was related to the allocation between parts of the value chain, and data from 2010 showed that companies typically reported higher confidence intervals for aggregate APH.
- Booster pumping stations was, compared to APH, a much worse proxy for energy intensity requirements.
- When 2019/20 booster pumping data was added to the CMA models (without adjusting to match the previous values), the booster pumping stations per length of main was not statistically significant.

#### 4.72 Following Provisional Findings, Northumbrian said that:

- It agreed with our provisional decision not to use APH as an explanatory variable.<sup>324</sup>

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<sup>324</sup> [Northumbrian's response to the provisional findings](#), paragraph 34



- It did not think that APH had higher data quality than booster pumping stations and it was unable to reconcile Anglian's assessment of confidence grades.<sup>325</sup>
- It saw the revisions of the APH data as a strengthening of the data to improve its comparability between companies, rather than an area for concern.<sup>326</sup>
- Anglian's correlation analysis of power costs and the different variables was not a fair comparison because the comparison was not on a like for like basis: APH was multiplied by DI per property whereas the booster pumping stations per mains length variable used in the model was not. If the booster stations per main length variable was multiplied by DI per property, Anglian's negative correlations turned into positive relationships.<sup>327</sup>
- Rather than adjusting the models to deal with Anglian's unique circumstances, a company specific adjustment was more appropriate.<sup>328</sup>

#### 4.73 Following Provisional Findings, Ofwat said that:

- The APH data was substantially less reliable than the booster pumping stations data.<sup>329</sup>
- It was inappropriate to use data from 2010 as evidence that APH at the wholesale water level was as reliable as booster pumping stations for two reasons. First, a direct read-across could not be made because the data was ten years old. Second, the data was collected at the wholesale water level, whereas the APH data used by Oxera was the sum of APH variables across the value chain. This could be affected by unreliability at the value chain level. Furthermore, meaningful comparisons of APH between companies could not be made as the June 2010 data did not use a consistent denominator with some companies using flow through each stage of the value chain and others using DI.<sup>330</sup>
- Capturing APH was complex and required real time data on volumes, lift, and pressure to be captured across company assets at all locations.<sup>331</sup> This was reflected in the relatively low confidence grades assigned to

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<sup>325</sup> [Northumbrian's reply to responses to the provisional findings](#), paragraph 44

<sup>326</sup> [Northumbrian's reply to responses to the provisional findings](#), paragraph 46

<sup>327</sup> [Northumbrian's reply to responses to the provisional findings](#), paragraphs 47-48

<sup>328</sup> [Northumbrian's reply to responses to the provisional findings](#), paragraph 49

<sup>329</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), paragraph A.4.3

<sup>330</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), paragraphs A.4.3-A4.8

<sup>331</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), paragraph A4.4

APH by companies. In contrast, counting the number of booster pumping stations was simpler and relied mainly on the underlying definition that was used. Ofwat said that companies most commonly gave APH (for water resources, raw water distribution, water treatment, and treated water distribution) a confidence grade of B3 relative to A1, the highest grade, for booster pumping stations.<sup>332</sup>

- Booster pumping stations was a good driver of power costs. It provided evidence showing a positive relationship between wholesale water power costs and the number of booster pumping stations. This contrasted with the APH and power costs, which showed a negative relationship.<sup>333</sup>
- Ofwat had worked with the industry to ensure that all companies reported the number of booster pumping stations using the same definition. Ofwat had also submitted queries to water companies to ensure that the 2019/20 booster pumping station data was consistent with previously submitted data.<sup>334</sup>
- The power cost models submitted by Oxera were selective as they only included the impact of APH under one set of models and it was unclear how the impact would change with different specifications.<sup>335</sup>
- The inclusion of APH in the base cost models produced inconsistent results with low statistical significance.<sup>336</sup> For example, the sign and magnitude of the estimated coefficient on APH changed between different model specifications.

### *Decision*

4.74 Applying our framework, we considered that APH makes sense from an engineering and economic perspective. However, we had concerns regarding the quality of the APH data and its statistical significance.

- *Quality of the APH data*

4.75 We recognised that some of the uncertainty in the APH data may arise from allocating pumping to different parts of the value chain. For example, aggregate APH may have higher certainty than distribution APH. Therefore,

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<sup>332</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, paragraph A4.6 & Table A4.1 and Ofwat's submission following the second main party hearings – costs and outcomes, paragraphs 3.1-3.5

<sup>333</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, paragraph A.4.9

<sup>334</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, paragraph A4.5 and Ofwat's submission following the second main party hearings – costs and outcomes, paragraphs 3.1-3.5

<sup>335</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, paragraph A.4.15

<sup>336</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, paragraph A4.17

we considered the evidence on the reliability and accuracy of the aggregate APH data, as this could be used in the WW1 and WW2 models. We placed less weight on the evidence on confidence grades for aggregated APH submitted by Oxera because it was ten years old. We placed more weight on the more recent evidence submitted by Ofwat. This evidence showed the relatively low confidence grades assigned to APH.

- 4.76 We also recognised that measurement error may affect several variables and our aim was to reduce this. In this case, booster pumping stations was an alternative to APH that offered lower measurement error based on evidence from confidence grade data.<sup>337</sup> In terms of reliability, booster pumping stations had a better reliability grade than aggregate APH for five companies and lower reliability grade for only Bristol. For 12 companies, booster pumping stations and aggregate APH had the same reliability grade. In terms of accuracy, booster pumping stations had a better accuracy grade than aggregate APH for eight companies and a lower accuracy grade for only two companies. For eight companies, booster pumping stations and APH had the same accuracy grade. We were also told by Ofwat that the 2019/20 booster pumping station data had been made consistent with previously submitted data.
- 4.77 We acknowledged that booster pumping stations is divided by length of mains, and that we assessed only the reliability and accuracy of booster pumping stations. We understood from Ofwat that confidence grades for booster pumping stations per length of mains is not available; however, the historical confidence grades are available separately for booster pumping stations and length of mains. Based on confidence grade data provided separately for booster pumping stations and length of mains, we understood the most common confidence grades across companies over the historical period were similar for these measures.<sup>338</sup>

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<sup>337</sup> Ofwat's confidence grades consist of a (i) reliability band between A and D and (ii) an accuracy band one to six and X. For example, reliability grade A is the most reliable based on sound textual records, procedures, investigations or analysis properly documented and recognised as the best method of assessment. Reliability grade D is the least reliable based on unconfirmed verbal reports, cursory inspections or analysis. Accuracy band One is the most accurate where the data is estimated to be within +/-1%. Accuracy band Six is the least accurate, where the data is estimated to within 50%-100% (and band X if outside of this, small numbers, or otherwise incompatible). The assignment of confidence grades is discussed in the following document: Ofwat (2018), *Final Reporting Guidance for PR19: Per Capita Consumption*, pp15-16

<sup>338</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, Table A4.1. This shows that the most common confidence grades across companies and across the historical period for total length of potable mains as at 31 March was A2; for total length of non-potable and partially treated main for supplying customers it was A1; for number of booster pumping stations it was A1; and for APH it was B3.

- *Statistical significance*

4.78 While we recognised that small sample sizes may make it more difficult to identify statistical relationships, since the model will be used to forecast the cost allowance for the 2020/21-2024/25 period, we needed to be confident that these relationships were significant. The reason for this was that with higher thresholds for statistical significance (for example to 20%), there was a higher likelihood of finding a statistically significant relationship when in fact the underlying relationship did not exist.

4.79 We report the p-values of the coefficient for APH in Table 4-3.<sup>339</sup>

**Table 4-3: P-values of the coefficient for APH in Anglian's results**

<i>Model specification</i>	<i>P-value for APH</i>	<i>P-value for booster pumping stations</i>
WRP1	0.897	0.629
WRP2	0.689	0.662
TWD1	0.008	0.000
WW1	0.106	0.004
WW2	0.129	0.001

Source: CMA analysis.

Note: this table reports the statistical significance of APH and booster pumping stations in models WRP1 and WRP2 despite our models not including either variables in these model specifications.

4.80 When judged on statistical significance, booster pumping stations was superior to APH, and therefore we prefer to use booster pumping stations.

4.81 We recognised that excluding APH risked causing omitted variable bias. However, excluding booster pumping stations and including APH would also create omitted variable bias. Including both would not be appropriate as APH would not be statistically significant in the WW1 and WW2 models. Therefore, in this case, we did not consider omitted variable bias was a substantial enough reason to use APH in the base cost models.

4.82 We also considered the evidence on APH and power costs. The limited evidence submitted showed that APH performed reasonably well in explaining power costs. However, this did not lead us to change our approach in the base cost models, as we aimed to model overall base costs, not only power costs.

4.83 We recognised APH was used by Ofwat in PR14 and in the CMA's Bristol PR14 Determination. However, the appropriate modelling approach should be

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<sup>339</sup> [Anglian's response to the provisional findings](#), Table 2

influenced by the data available and in this case a superior alternative was available.

- 4.84 Therefore, based on a decision in the round, we decide that APH should not be included as an explanatory variable in the econometric models. We consider Anglian's cost adjustment claim in paragraphs 4.933 to 4.951.

#### *Treatment complexity*

- 4.85 In order to comply with water quality requirements, companies need to treat the abstracted water, so that it becomes fit for consumers. A higher treatment complexity means higher costs, including costs for power and chemicals.<sup>340</sup> Water companies reported the volume of water treated at treatment works of different complexity levels, ranging from zero to six.<sup>341</sup>

#### *Parties' arguments*

- 4.86 Ofwat selected two measures of complexity of water treatment to use in its models:
- Percentage of water treated at level three or higher. Ofwat said there was a step change in treatment costs between zero to two and three to six.
  - Weighted average complexity. Ofwat said complexity was calculated as the weighted average of the numbers one to seven, where each number corresponded to a treatment complexity level. The weight for each level of complexity was determined by the proportion of water treated at that level.<sup>342</sup>
- 4.87 Whilst Ofwat considered additional measures, these were not pursued because Ofwat did not consider them direct measures of treatment complexity and they did not perform well statistically.<sup>343</sup>
- 4.88 Anglian said that the measure of complexity needed to be revised:<sup>344</sup>
- (a) *Water treated above complexity level three.* Anglian said that the percentage of water treated above complexity level three was problematic because, 'as there was very little surface water treated below level three,

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<sup>340</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p12

<sup>341</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), pp12-13

<sup>342</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p13

<sup>343</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p13

<sup>344</sup> [Anglian SoC](#), paragraph 563

the comparison was between all high treatment water and low treatment ground water.’<sup>345</sup>

(b) *Weighted average complexity*. Anglian said that it was concerned about this variable because Ofwat did not provide a justification of the weights that it used in the calculation of the variable.<sup>346</sup>

4.89 Anglian said that a better approach to model complexity was to look at the share of water with low treatment complexity (level two and below) and the share of water with high treatment complexity (level five and above).<sup>347, 348</sup>

4.90 Severn Trent Water welcomed the use of water treatment complexity in the econometric models but said that it was preferable to use treatment bands four to six, given there was a substantial jump in treatment costs at bands three to four and this variable had more explanatory power.<sup>349</sup>

4.91 Ofwat did not agree with Anglian’s suggestions. Ofwat said that the proportion of water treated at complexity levels two and below was the complement of the proportion of water treated at complexity levels three and above and therefore statistically equivalent. Ofwat also tested water treated at levels five and above in its models.<sup>350</sup> Ofwat found this variable had no effect in the water resource plus models (WRP1 and WRP2). Ofwat said that its models appropriately accounted for treatment complexity.<sup>351, 352</sup>

4.92 Yorkshire said that Ofwat’s approach could not account for the type of increase in treatment complexity that Yorkshire was expecting.<sup>353</sup> As a result, the expenditure associated with raw water deterioration in Yorkshire was not funded. Yorkshire suggested using alternative cut-off thresholds which could account for this increased treatment complexity. Yorkshire said that this approach would address the changing in treatment complexity it was facing and would increase Yorkshire’s allowance to fund the expected funding shortfall. Similarly, on wastewater, Yorkshire was facing statutory requirements to tighten phosphorus consents. Ofwat’s models only controlled

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<sup>345</sup> [Anglian SoC](#), paragraph 563

<sup>346</sup> [Anglian SoC](#), paragraph 563

<sup>347</sup> [Anglian SoC](#), paragraph 563(ii)(b)

<sup>348</sup> Professor Saal in an unpublished presentation suggested that the share of treatment complexity between complexity bands three and six was conceptually more appropriate than weighted average treatment complexity, but it also indicated that the thresholds (three to six) used for treatment complexity were arbitrary/poorly justified.

<sup>349</sup> [Severn Trent submission](#), p4, p10-11

<sup>350</sup> Ofwat did not test both variables at the same time.

<sup>351</sup> [Ofwat’s Response to common issues in companies’ SoCs: Cost efficiency](#), paragraph 3.14

<sup>352</sup> [Ofwat’s Response to Anglian’s SoC](#), paragraph 3.23

<sup>353</sup> [Yorkshire SoC](#), paragraph 197(b)

for tightness of ammonia consents, so this increased expenditure was also unfunded.<sup>354</sup>

4.93 Yorkshire's economic consultants (Oxera) said that Ofwat did not respond to Yorkshire's comments, but that Ofwat had responded to similar issues raised by Anglian. Oxera said the following:<sup>355</sup>

- Ofwat presented selective evidence to support the exclusion of the alternative treatment complexity variable from its cost assessment models. Oxera said that while the coefficient was statistically insignificant when it was included as an additional variable in Ofwat's water resources plus models, it was both positive and statistically significant when it was included in its wholesale water models.
- It questioned whether Ofwat's models were the appropriate basis for the inclusion of Oxera's proposed treatment complexity variables. Oxera had developed models that controlled for this variable and the coefficient was positive and statistically significant (or close to being statistically significant).

4.94 In response to our Provisional Findings, Oxera said that Ofwat's treatment complexity variable (the proportion of water treated in complexity bands three to six) could not account for the increase in treatment complexity that Yorkshire was anticipating between complexity bands three and five in AMP7. Therefore, Oxera argued that an upward adjustment to Yorkshire's cost allowance was required. Oxera said that the:

- (a) operational argument for an upward adjustment was clear given the cost of treating water at complexity band five was higher than treating water at complexity band three; and
- (b) increased complexity in Yorkshire's treatment processes was caused by factors outside management control and was supported by the DWI.

4.95 Oxera also said that the weighted average complexity measure should be modelled in levels as opposed to logarithms to facilitate interpretation of the coefficient.

4.96 Finally, Oxera said that Yorkshire was undertaking a significant phosphorous removal programme, which affected Yorkshire's wastewater base costs and

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<sup>354</sup> Yorkshire SoC, paragraph 197(b)

<sup>355</sup> Oxera criticised Ofwat's decision to model the weighted average complexity measure in logarithms as inappropriate because it limited the impact of increased treatment complexity on Yorkshire's cost allowance.



enhancement expenditure.<sup>356</sup> Oxera said that this had not been addressed in Ofwat's Response. Furthermore, Oxera acknowledged that accounting for Phosphorus-consents in the historical models was complicated due to limited historical variation across the industry. However, it did consider it was possible to create a variable to address this issue.

### *Decision*

- 4.97 We decide that Anglian's argument on the lack of justification over the choice of weights in the weighted average treatment complexity is not a valid concern. Specifically, when calculating a weighted average, it is a common approach to use the sub-populations as weights.
- 4.98 Moreover, Anglian did not specified which weights it considered more appropriate. We therefore decide that Ofwat's approach to weights is reasonably transparent and appropriate and no alternative approach is warranted.<sup>357</sup>
- 4.99 We next considered Anglian's argument on using different complexity measures from an engineering and economic perspective. Anglian's argument was that water treated at complexity levels two and below and water treated at complexity levels five and above should be used as variables for complexity. Ofwat consulted with its engineers and the water industry on this measure prior to forming its view.<sup>358</sup> Given their similarity, we tested Anglian's proposed variables together with Oxera's submission.
- 4.100 We assessed Oxera's proposed alternative variables for water treatment complexity.
- The proportion of water treated in complexity band one and below, and the proportion of water treated in complexity band five and above. The two variables made economic and engineering sense because they captured the differences in costs of treating water with different complexity. However, since the proportion of water treated in complexity

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<sup>356</sup> Phosphorus is a normal part of domestic sewage and ends up at sewage works as it is contained in household products such as shampoo, washing powders and washing up liquid. The problem with phosphates is when they are at high levels in water bodies, they can trigger algal blooms that block sunlight from reaching lower waters, thereby causing plants to die. As the plants and algae decay they cause depletion of oxygen levels, resulting in fish suffocating. Upgrading wastewater treatment processes can remove more phosphorus (p-removal) so that it is not released into the natural environment where it can negatively impact on aquatic life. See Yorkshire, [£17m phosphorus removal schemes to improve water quality of northern becks and rivers webpage](#)

<sup>357</sup> We have not further considered whether the variable meets the additional model selection criteria, such as endogeneity, because we are not satisfied that the criticism is valid on statistical grounds.

<sup>358</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p13



band five and above was not statistically significant, we decided not to use these variables.

- The proportion of water treated in complexity band two and below, and the proportion of water treated in complexity band five and above. The latter was not statistically significant, so we decided not to use these variables.
- The weighted average of complexity in linear terms (rather than in logarithm). Oxera said that if the variable was modelled in levels its interpretability was clearer. However, we find the interpretation of the log of weighted average of complexity to be reasonable. The variable measures the average level of complexity of water; therefore, the coefficient of this variable is interpreted as the percentage increase in costs due to a 1% increase in the average level of complexity of water.

4.101 Based on our assessment, we decide to use weighted average complexity in logarithm and the proportion of water treated at complexity band three and above.

4.102 We reviewed the evidence in relation to the submission that model specifications WRP1 and WW1 did not account for the increase in treatment complexity that Yorkshire was anticipating in AMP7. We checked other companies' data and found this was not a common issue across companies. Therefore, we decided not to control for this in our models. Rather, we assessed Yorkshire's arguments as a company-specific cost adjustment in paragraphs 4.960 to 4.971.

4.103 As they do not directly affect base cost models, we find that Yorkshire's submissions on phosphorus consents are better dealt with outside of the econometric modelling. Therefore, they are discussed in the wastewater enhancement in paragraphs 5.73 to 5.105.

### *Water volume*

4.104 Water volume is an explanatory variable which accounts for the volume of water abstracted. It can be calculated as either a gross value, which is the amount of water treated, or a net value, where leakage is subtracted from treated volumes to derive the amount of water delivered.<sup>359</sup>

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<sup>359</sup> Leakage here refers to leakage in the transport of water to customers, excluding leakage on the customer-side.

## *Parties' arguments*

- 4.105 Ofwat did not use a direct measure for water volume in its base cost models. Instead, it used the number of connected properties to account for companies' scale. Ofwat considered including the total volume of water treated as an input into the base cost models but decided against this because it was concerned that the volume of water treated was within companies' control. Specifically, by reducing leakage, companies could reduce the volume of water treated.<sup>360</sup>
- 4.106 In addition, Ofwat stated that the same view was expressed by a few companies in response to its consultation, and the number of households was generally the favoured driver for WRP1 and WRP2 models.<sup>361</sup>
- 4.107 Anglian said that additional scale drivers such as water delivered or DI minus leakage had merit as they incorporated the network performance, namely the volume of water distributed and the level of leakage.<sup>362</sup>
- 4.108 Professor Saal, in a report for Anglian, said that both water treated and delivered were valid measures.<sup>363</sup>
- 4.109 In response to Anglian's criticism, Ofwat said that it did not agree that Anglian's proposed variable was superior.<sup>364</sup> Ofwat said that it had consulted on its econometric model and based its final models on responses from the industry, which included submissions from Anglian, as well as statistical performance and engineering rationale.<sup>365</sup>
- 4.110 Ofwat did not directly respond to the possibility of including delivered water as an explanatory variable.
- 4.111 Oxera, in a submission for Anglian, said that water delivered was not endogenous and was not under substantial management control. The variable could therefore be used in a triangulation approach as an alternative scale driver.

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<sup>360</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p2

<sup>361</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p12

<sup>362</sup> [Anglian SoC](#), paragraph 564(iii)

<sup>363</sup> Saal and Nieswand (2019), [A Review of Ofwat's January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19](#), p8, p36, p38, pp46-47 and Saal (2019), [A Comment on Misspecification and Systematic Bias in Ofwat's PR19 Draft Determination Integrated Wholesale Water and Wastewater Models](#), p3, p9

<sup>364</sup> [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), paragraph 3.27

<sup>365</sup> [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), paragraph 3.27

- 4.112 Northumbrian said that a variable for water delivered suffered from endogeneity issues and was not an appropriate candidate for inclusion in our base cost models.
- 4.113 United Utilities said that water delivered, or DI-Leakage were not suitable and credible explanatory variables. United Utilities said the variables created perverse incentives due to their relationship with leakage.<sup>366</sup>

#### *Decision*

- 4.114 Applying our framework, we decide that water treated, which includes leakage, should not be included in the econometric models because it is substantially under management control.
- 4.115 We consider delivered water, in principle, to represent an alternative approximation for companies' scale, based on the views of the Main Parties. However, scale is already well approximated by the number of connected properties. This is confirmed by the high correlation we found between delivered water and number of connected properties. We therefore decide that water volume should not be included as an explanatory variable in the models.

#### *Percentage of lengths of mains renewed or relined*

- 4.116 As part of its consultation process Ofwat asked for companies' views on cost drivers and one of the suggestions was lengths of mains renewed or relined.<sup>367</sup> Ofwat included this explanatory variable in one of its alternative model specifications (see paragraphs 4.247 to 4.257).<sup>368</sup>

#### *Decision*

- 4.117 None of the Disputing Companies in their submissions to us mentioned this explanatory variable, but we have two concerns regarding this variable.
- 4.118 Applying our framework, we first considered whether the variable made sense from an engineering and economic perspective. We found that this variable did make engineering and economic sense since the rate at which water companies replace and/or renew mains was likely to influence costs.

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<sup>366</sup> [United Utilities submission](#), paragraph 3.6.3

<sup>367</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p15

<sup>368</sup> Ofwat (2019), [Base Adjustments Model](#), sheet: Analysis. Percentage of length of mains renewed is TV4.

4.119 However, we found that this variable was substantially under management control. Indeed, the companies' management have considerable discretion over the number of mains that are renewed or relined.

4.120 Therefore, we decide not to use this explanatory variable in the base cost models.

#### *Number of new connected properties*

4.121 In PR19, unlike in PR14, Ofwat included in base costs the expenditure related to new connections from network expansion and improvement.<sup>369</sup>

#### *Parties' arguments*

4.122 Anglian said that Ofwat's approach allowed a single per property cost for both maintaining service to a property and adding a new one, and even in the medium term there was not necessarily a direct relationship between the recording of new connections and the expenditure needed to service the needs of those new properties. Furthermore, the off-site costs associated with new connections were 'lumpy'.<sup>370</sup>

4.123 Ofwat considered new connected properties in one of its alternative model specifications (TV2).<sup>371</sup> This explanatory variable was added to the Treated Water Distribution model.

4.124 Northumbrian said that it was concerned with the log-log functional form of the TV2 model. It said that a 1% increase in the number of connected properties would be expected to have a different impact on growth expenditure depending on whether it was based on a low or high number of connections. Northumbrian said that the scale drivers in the water models showed constant returns to scale, but this constant returns to scale was not present in the TV2 models. Northumbrian said that this was likely because the number of new connected properties was highly correlated with the scale variable. It said that based on its analysis Ofwat's base models should be preferred over the alternative growth specification.

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<sup>369</sup> [Anglian SoC](#), Table 8

<sup>370</sup> [Anglian SoC](#), paragraph 594 (ii). Anglian said that 'For example, Anglian will incur the cost of laying a main to service a large new development several years before the last properties to be served by it are connected. Conversely, if the demand from the new properties can be met by existing headroom in the network investment might lag behind the connection of those properties.'

<sup>371</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), pp36–37. See paragraphs 4.247 to 4.257 for more discussion of Ofwat's alternative model specifications.

### *Decision*

- 4.125 Applying our framework, we considered that the inclusion of the number of new connected properties makes sense from an engineering and economic perspective. We would expect companies to face higher costs as the number of new properties they connect increases.
- 4.126 However, the total number of properties should already reflect, at least to some extent, the variation in (net) new connected properties. We checked the correlation between the two variables, which was 90%. A similarly high correlation occurs between new connected properties and lengths of mains. Therefore, we decide that the number of new connected properties should not be included as an explanatory variable.
- 4.127 We do not exclude, however, that an adjustment may be necessary to fully account for differences in companies' rates of growth. We discuss this in paragraphs 4.760 to 4.787 in the section on growth.

### *Proportion of metered properties*

- 4.128 Ofwat included the proportion of metered properties (in a company's total connected properties) in its retail cost models. We considered whether there was any merit in including the proportion of metered properties as a cost driver in the wholesale water base cost models.
- 4.129 Professor Saal supported using water metering to control for wholesale water costs.<sup>372</sup>

### *Decision*

- 4.130 Following our framework, first, we assessed the engineering and economic rationale of the variable. Water metering affects water consumption, and hence wholesale water costs, through three possible mechanisms.<sup>373</sup>
- Awareness – consumers are more aware of their water consumption.
  - Price effect – companies switch metered customers to metered tariffs.
  - Leakage management – companies can better detect leakages when a meter is installed at the final point of consumption.

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<sup>372</sup> Saal and Nieswand (2019), [A review of Ofwat's January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19](#), p7 & p34

<sup>373</sup> See for example, Environment Agency (2008), [The costs & benefits of moving to full water metering](#), and Carmine Ornaghi and Mirco Tonin, (2017), [The Effect of Metering on Water Consumption - Policy Note](#).

4.131 Second, we considered that the proportion of metered properties was substantially under management control.<sup>374</sup> For example, in the short run companies may promote the use of meters. For this reason, we decide that the proportion of metered properties should not be included in the base cost models.

#### *The number of properties per sewer length*

4.132 In one of its wastewater models (SWC1), Ofwat included the number of properties per sewer length as a variable to reflect the effect on costs of the density of properties served. The engineering and economic rationale for including density in the regression was to reflect the likelihood that a higher number of properties relative to a given length of sewer may lead to higher costs due to the additional costs of working in a more densely populated area.

#### *Parties' arguments*

4.133 The SWC1 model includes three explanatory variables: sewer length, pumping capacity divided by sewer length, and number of properties divided by sewer length.

4.134 Anglian said that by re-arranging the terms and using the properties of the logarithms, it was possible to re-write the model with sewer length, pumping capacity and number of properties. Anglian said that the results in the SWC1 model showed that the overall effect of the length of sewers on costs was negative. Anglian said that this suggested that all other things being equal (pumping capacity and properties served), increasing the length of the sewerage network would reduce costs. Professor Saal also said that the overall effect of the length of sewers on costs in the SWC2 model should be considered low.<sup>375</sup>

4.135 Ofwat said that Anglian's interpretation of the estimated effect was not correct. Ofwat said that the length of sewers variable captured what happened to costs as a water company become bigger, holding the other variables, density and energy intensity per kilometre, constant.<sup>376</sup> In Ofwat's view, Anglian's approach, which considered 'what happens to costs when length only increases, means that we are asking the question what happens if we

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<sup>374</sup> This concern was also raised during the CMA's Bristol PR14 Determination: CMA (2015), [Bristol Water plc. A reference under section 12\(3\)\(a\) of the Water Industry Act 1991 \(Bristol PR14 Determination\)](#), Appendix 4.2 paragraph 99-101, where the logarithm of proportion of properties that are metered was not used.

<sup>375</sup> [Anglian SoC](#), paragraph 587, see also [Nieswand and Saal submission](#)

<sup>376</sup> [Ofwat's Response to Anglian's SoC](#), paragraph 3.41

increase length and at the same time decrease the density variable and energy intensity.’ Ofwat did not agree with this approach.<sup>377</sup>

- 4.136 In response to Provisional Findings, Ofwat said that the model was built to capture a ‘size effect’, a ‘density effect’ and a ‘geography effect’.<sup>378</sup> It said that Anglian’s interpretation was not correct because the model ‘may not provide a plausible answer to the wrong question.’<sup>379</sup>
- 4.137 Oxera, submitting on behalf of Yorkshire, also disagreed with Anglian’s interpretation. Oxera said the interpretation assumed sewer length increased while holding the number of properties and total pumping capacity constant, which was equivalent to assuming that the company was getting bigger but was operating in a less dense, less energy-intensive environment. A similar argument was also made by Ofwat.<sup>380</sup> Oxera also highlighted that Anglian’s interpretation could have precluded the use of relevant ratio variables commonly used in benchmarking cost models.
- 4.138 Northumbrian also disagreed with Anglian. It said that Anglian’s interpretation was not meaningful. It also said that the results for SWC1 were not counterintuitive because longer sewer length decreased costs through reduced energy intensity and reduced density.<sup>381</sup> Northumbrian restated its position in response to Provisional Findings and said that SWC1 should be included among the model specifications.<sup>382</sup>

### *Decision*

- 4.139 Applying our framework, we assessed the economic and engineering interpretation of the model. We agreed with Ofwat and Oxera that the model was built to assess the impact of sewer length, energy intensity and density. If correctly interpreted, the model did not lead to counterintuitive results.
- 4.140 Anglian’s interpretation focused on the aggregate effect of sewer length on costs, whereas Ofwat’s original model included the direct effect of length of sewer and, separately, the indirect effect it had on costs through the density and scale variables. While both interpretations were theoretically valid, we found that Anglian’s interpretation was affected by multicollinearity.<sup>383</sup> This undermined the practical validity of Anglian’s interpretation.

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<sup>377</sup> Ofwat’s Response to Anglian’s SoC, paragraph 3.41

<sup>378</sup> Ofwat’s response to the provisional findings - costs and outcomes, paragraph A1.7

<sup>379</sup> Ofwat’s response to the provisional findings - costs and outcomes, paragraph A1.11

<sup>380</sup> Ofwat’s reply to responses to the provisional findings – costs and outcomes, A5.2-A5.7

<sup>381</sup> Northumbrian’s response to the provisional findings, section 3.2.2, pp12-13

<sup>382</sup> Northumbrian’s response to the provisional findings, paragraph 47

<sup>383</sup> Sewer length and number of properties have a correlation greater than 90%.

- 4.141 Overall, we found that Ofwat's use of the number of properties per sewer length in model specification SWC1 made economic and engineering sense. Moreover, following our framework, we found that none of the variables included in SWC1 were substantially under management control, all coefficients were of the expected sign and statistically significant, none of the explanatory variables were highly correlated with each other (maximum correlation was 59%), and SWC1 was parsimonious as it included only three variables (plus the constant) but had high explanatory power. Therefore, we decide to include SWC1 within our model specifications.
- 4.142 We also performed a similar check on SWC2. We found no evidence indicating that the overall effect of sewer length on costs in the SWC2 model was underestimated.

#### *Proportion of load treated*

- 4.143 This explanatory variable reflects the proportion of sewage treatment that is carried out at different sized sewage treatment works (STWs), as larger STWs benefit from economies of scale. The economic and engineering rationale of the variable was not disputed. STWs are allocated to bands according to their size, with the smallest STWs allocated to band one and the largest to band six.
- 4.144 Size bands vary in their size coverage. For example, size bands one to three cover STWs up to 2,000 population equivalent, whereas size band six covers STWs over 25,000 population equivalent, including STWs larger than one million population equivalent. Population equivalent is a measure of the size of a sewage treatment works (STW). For example, a STW with a population equivalent of 250,000 can treat waste from 250,000 people. These size bands also cover different percentages of the total amount of sewage works treated.<sup>384</sup>

#### *Parties' arguments*

- 4.145 To capture the economies of scale, Ofwat used two different measures of STWs.<sup>385</sup>
- Load treated in size bands one to three (%) as a measure of diseconomies of scale from operating small STWs, used in models for

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<sup>384</sup> According to Anglian, 2.7% of the industry works in 2019 were treated in size band one to three, while 65.5% were treated in size band six.

<sup>385</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p21



sewage treatment (SWT1), bioresources (BR1) and bioresources plus (BRP1).<sup>386</sup>

- Load treated in size band six (%) to capture economies of scale at large STWs in its SWT2 and BRP2 models.

4.146 Oxera, advisers to Anglian, stated that Ofwat's definition of large STWs was too broad and that this variable was unlikely to appropriately capture the impact of the economies of scale present at very large STWs. To solve this problem, Oxera suggested using narrower size bands. Given data for these narrower size bands was not available for the years 2013/14 to 2015/16, Oxera inferred the data based on data for the previous and subsequent years and some simple modelling assumptions. Oxera and Anglian suggested the use of inferred data, which would allow size band six to be split into smaller size bands from six to eight or nine.<sup>387</sup>

4.147 Oxera presented the following evidence to support the change:

- There was substantial variation in STWs within band six.
- The population equivalent of a STW in band six and above was between 25,000 and 3.8 million.
- Defining 'large' STWs as size band six and above implied that on average, 83% of industry load was assessed as being treated at 'large' STWs. Drawing stricter thresholds, such that the vast majority of sewage treatment activity was not defined as 'large', would better capture the cost variation resulting from economies of scale.

4.148 Anglian said that inferred data could be used because there were typically small incremental changes from year to year in the load received by each STW in response to local demographic trends. Anglian said these would rarely be sufficient to move works between one size band and another. In response to Provisional Findings, Anglian provided a similar analysis to the one presented in paragraphs 4.146 and 4.147.

4.149 Anglian also provided some evidence in relation to the existence of economies of scale within size band six. We address this evidence in relation to Anglian's cost adjustment claim in paragraphs 4.952 to 4.959.

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<sup>386</sup> See paragraph 4.6

<sup>387</sup> Oxera suggested from six to eight, Anglian from six to nine.

4.150 Further, supporting Anglian's argument, Professor Saal said that:<sup>388</sup>

- the absence of data collection was a failure on Ofwat's part and not that of the companies;
- it was not 'unequivocally inappropriate' to use inferred data in the panel dataset given the random effect models and the stable number of plants and their configurations;
- the CMA should provide 'more careful statistical and empirically evidenced arguments' to discard the use of models using inferred data;
- even if the CMA disallowed models based on inferred data, it should be willing to accept cost adjustment claims from companies that suffered from plant level diseconomies of scale not controlled for in Ofwat's models; and
- the CMA should consider the models presented in Saal (October 2020) and Saal & Nieswand (2020b).

4.151 Moreover, Professor Saal tested and argued for the use of two explanatory variables in the SWT and BRP models. First, the proportion of load treated in size bands one and two. Second, the proportion of load treated in STWs larger than 250,000 population equivalent.<sup>389</sup>

4.152 Professor Saal also proposed to use size band six in the specification BR1 for Bioresources.<sup>390</sup>

4.153 Northumbrian said that attempting to precisely capture economies of scale in load treatment was likely to introduce endogeneity into the models and may produce unintuitive results. Northumbrian supported Ofwat's use of the proportion of load treated in size band six.

4.154 Other Disputing Companies did not express views on the use of these variables.

### *Decision*

4.155 We have considered whether Ofwat's definition of the percentage of load treated in size band six is too broad. We decide that, from an engineering and economic perspective, it is appropriate to include this variable to account for

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<sup>388</sup> [Professor David Saal's response to the provisional findings](#), p16

<sup>389</sup> [Professor David Saal's response to the provisional findings](#), p7

<sup>390</sup> [Professor David Saal's response to the provisional findings](#), pp10-13

possible economies of scale in wastewater treatment. We acknowledge that band six covers a large variety of treatment works sizes, but no alternative (actual) data is available for band six that is disaggregated for the full time period we use.

4.156 While Anglian argued in support of inferred data by stating that changes in load would rarely be sufficient to move works between one size band and another, we note that:

- We have not been provided with any evidence supporting Anglian's argument that load does not often move between one size band and the other. In fact, the data available to us shows that a non-negligible percentage of load treated moved across size bands between 2011/12 and 2019/20.<sup>391</sup>
- The method used by Anglian to infer the data for 2013/14 to 2015/16 works better on variables that increase/decrease at a constant rate. However, we found that the proportion of load treated in size band six fluctuated over time. This suggested that Anglian's inferred data would lose information and increase measurement error in our dataset.

4.157 In relation to Professor Saal's arguments:

- In relation to Professor Saal's argument that the absence of data collection was a failure on Ofwat's part, our decision on the use of these variables is not affected by whether or not it was Ofwat's failure to collect the data.
- We addressed Professor Saal's argument about the use of empirical evidence and the stability of the works treated in different size bands when we assessed the similar argument made by Anglian in paragraph 4.156.
- Professor Saal supported Anglian's claim for a cost adjustment. We address Anglian's cost adjustment claim in paragraphs 4.952 to 4.959.
- We found Professor Saal's tests on SWT and BRP models described in paragraph 4.151 not to be valid for statistical inference due to multicollinearity.

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<sup>391</sup> For example, the difference between the year with the maximum and the year with the minimum proportion of load treated in band six for South West Water was 4.70%, for Wessex Water was 4.25%, and for Dŵr Cymru was 3.85%.

- We assessed the models presented in Saal (October 2020)<sup>392</sup> and Saal & Nieswand (March 2019).<sup>393</sup> We were concerned that the proposed models are either based on inferred data or do not control for economies of scale in sewage treatment by excluding the proportion of load treated in different size bands.

4.158 In conclusion, we decide our use of load treated in size band six in the SWT and BRP models is appropriate. Given there is an engineering and economic rationale to include the proportion of load treated at size band one to three and size band six to capture (dis)economies of scale, we decide to include these variables.

4.159 In relation to Professor Saal's argument for the use of proportion of load treated in size band six in BR1, we found that load treated at size band one to three in BR1 was to proxy for sparsity in order to explain variations in sludge transport costs. This was different from its use in SWT and BRP models where it is used to capture economies of scale. In BR1, while size bands one to three capture transport costs, it was not clear what costs size band six would capture. Therefore, we decide not to use the proportion of load treated in size band six as we do not see its economic and engineering rationale.

#### *Proportion of sludge not produced at a co-location site*

4.160 Anglian said that Ofwat's models did not fully account for the higher costs incurred by companies facing a high ratio of STWs to sludge treatment centres. This was because such companies must transport sludge from one to the other to a much greater extent, which increased costs. To capture this effect, Anglian suggested including the percentage of sludge not produced at a co-location site.

4.161 Anglian applied for a cost adjustment claim for sludge transport as part of Ofwat's claim process.<sup>394</sup> This is discussed in paragraphs 4.926 to 4.932. We therefore decide not to include this variable in the econometric modelling and instead to treat this issue as a cost-adjustment claim.

#### *Phosphorus consents*

4.162 Anglian suggested including a variable combining the proportion of load subject to tight ammonia consent with the proportion subject to tight

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<sup>392</sup> [Professor David Saal's response to the provisional findings](#), pp 14-19

<sup>393</sup> Saal & Nieswand (2019), [A Review of Ofwat's January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19](#), pp61-65

<sup>394</sup> Anglian (2019), [PR19 Draft determination: Sludge transport cost adjustment claim](#)

phosphorus consents (below 0.5mg/l) in the sewage treatment and bioresources plus model.

4.163 Ofwat has provided separate cost allowances for phosphorus removal. This is discussed further in paragraphs 5.73-5.105. We therefore decide not to include this variable in the econometric modelling and instead to treat this issue as an enhancement claim.

### *Population density*

4.164 Population density could have two opposing effects on costs.

- In wholesale water, on the one hand, the density variable captures the potential for a water treatment business to treat water using larger and fewer treatment works incurring lower unit costs. On the other hand, dense areas may be associated with higher property, rental and access costs.<sup>395</sup>
- In wholesale wastewater, on one hand, higher density may allow for the use of larger, more efficient, STWs. On the other hand, at high level of population density, for sewage collection mainly, higher density may be associated with a more complicated operating environment and higher access costs.<sup>396</sup>

4.165 Our models directly control for population density in different ways.

- All the wholesale water model specifications and two wholesale wastewater model specifications (SWC2 and BR1) control for density using the weighted average of population density at local authority district (LAD) level, using the population of the LAD as weights.
- The wholesale wastewater model specification SWC1 controls for density using the number of connected properties per sewer length. We discussed this variable in paragraphs 4.132 to 4.142 and do not discuss this further here.

### *Parties' arguments*

4.166 Saal and Nieswand noted that in model WRP2, which used weighted average complexity, the density variable was not significant, a finding they said

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<sup>395</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p.14

<sup>396</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p.22

showed that Ofwat's reliance on weighted population density was inappropriate.<sup>397</sup>

- 4.167 Saal and Nieswand said that LAD density measures may not measure density at the appropriate level to capture many of the differences in water industry costs. As an example, they indicated that decisions regarding plant size and location (which affect costs) were made at a local level of population settlement (smaller than LAD).<sup>398</sup>
- 4.168 Professor Saal proposed a series of models for sewage collection and bioresources. We assessed one of the proposed models in paragraphs 4.132-4.142. In this sub-section, we assess whether to include both the weighted average of population density and its squared term<sup>399</sup> in model specifications SWC2 and BR1.<sup>400</sup>
- 4.169 Professor Saal proposed some model specifications that used Ofwat's population density indices.<sup>401</sup> These indices were jointly developed by Ofwat and the industry in the Cost Assessment Working Group during 2016 and 2017 and were based on Office for National Statistics (ONS) data. These indices measured the proportion of population, within the water or wastewater company area, that resided in highly dense or highly sparse areas.<sup>402</sup> For example, Professor Saal proposed using indices for areas with a population density higher than 4,000 people per square km, and areas with a population density lower than 600 people per square km. In some specifications, Professor Saal proposed to use the index for areas with a population density higher than 6,000 people per square km. In other specifications, Professor Saal proposed to use population density indices of less than 2,000, 2,000 to 4,000, and 4,000 to 6,000.
- 4.170 Some of these models were also submitted by Anglian. Anglian said that population sparsity and density were key exogenous cost drivers for both water and wastewater networks. It said that the density indices were 'straightforward to use, straightforward to understand and based on readily understood data.'

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<sup>397</sup> Saal and Nieswand (2019), *A Review of Ofwat's January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19*, p7, p28, p34 & p39

<sup>398</sup> Saal and Nieswand (2019), *A Review of Ofwat's January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19*, p29, p35, p52, p56 & p58

<sup>399</sup> In this section, by square term of weighted average, we mean the square of the logarithm of weighted average.

<sup>400</sup> Professor David Saal's response to the provisional findings, pp6-9

<sup>401</sup> Professor David Saal's response to the provisional findings, p8-9

<sup>402</sup> Ofwat, *Density indices historical FD*

- 4.171 On the other hand, Anglian said that the drawback of using the density indices was the need to choose particular density thresholds and that the approach it followed was to take a 'pragmatic' choice and let the results of the modelling drive the choice of the threshold. It also said that the non-linear effects of population density on wastewater costs were more important in sewage collection than in sewage treatment.
- 4.172 Northumbrian also assessed Professor Saal's proposed models. It said that the models had good explanatory power and all of the variables were statistically significant. However, they did not represent a material improvement on Ofwat's FD19 models because they did not include sewer length, which Northumbrian said was the most fundamental and robust driver of sewage collection costs.
- 4.173 Severn Trent Water welcomed the use of the weighted density variable. It said that at both extremes of density, costs were likely to rise due to smaller asset sizes for rural networks and because of higher congestion and labour costs for urban networks.<sup>403</sup>
- 4.174 Thames Water supported Ofwat's and the CMA's approach to control for population density including both its linear (log) and squared terms.<sup>404</sup>

### *Decision*

- 4.175 We found that Saal and Nieswand's result that weighted average density was insignificant in WRP2 held only when data was restricted to years up to 2017/18. When the whole period 2011/12 to 2019/20 was used in the regressions, the weighted average of population density and its squared terms were statistically significant, both individually and jointly.<sup>405</sup> For these reasons, we decide to include both the weighted average of population density and its squared term in WRP2.
- 4.176 Following Professor Saal's submissions, we considered the inclusion of the weighted average of population density and its squared term in sewage collection specification SWC2.
- 4.177 As explained in paragraph 4.164, in sewage collection population density may have two opposing effects. These effects may vary according to the level of density. One way to capture these opposing effects is to include non-linear

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<sup>403</sup> [Severn Trent submission](#), p12

<sup>404</sup> [Thames Water submission](#), paragraph 2.7-2.11, appendix B, [Thames Water's response to the provisional findings](#), paragraph 20

<sup>405</sup> Also when the period is restricted to 2012/13-2018/19.

terms of population density. Therefore, we think it makes economic and engineering sense to include the squared term of population density.

4.178 Ofwat said that it explored their use, but that it did not find them to be statistically significant.<sup>406</sup> We found the SWC2 coefficients for both the weighted average of population density and its squared term to be statistically significant.<sup>407</sup> The coefficients were also of the expected sign (the former was negative and the latter was positive). Indeed, the population density terms in our SWC2 model suggested a similar effect to that of population density on wholesale water costs. At lower levels of density, scale economies are strong and therefore increasing density reduces costs. However, the positive effect of the quadratic term suggests that as density rises its negative impact on costs decreases, ultimately becoming positive at high values of density.<sup>408</sup>

4.179 For these reasons, we decide to include both the weighted average of population density and its squared term in SWC2.

4.180 Following Professor Saal's submissions, we considered the inclusion of the weighted average of population density and its squared term in the bioresources specification BR1.<sup>409</sup>

- From an economic and engineering point of view, we did not expect higher population density to have opposing effects on costs. Indeed, as explained in paragraph 4.164, the additional wastewater costs due to higher population density were likely to occur in sewage collection only.
- Our model specifications confirmed this. Indeed, we found that including the squared term of weighted average population density led both its linear and squared terms to be statistically insignificant. The coefficients were jointly significant at the 1% level, but their individual p-values were over 48%. We found the inclusion of only the linear term of weighted average population density to be more robust as its coefficient was statistically significant at the 1% level.
- For these reasons, we decide to include only the linear terms of the weighted population density, and not its squared term.

4.181 We found that the definition of population indices was conditional on the choice of the threshold. This choice was arbitrary and could drive the results.

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<sup>406</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p.23

<sup>407</sup> More precisely, the coefficient for the weighted population density is statistically significant at the 10% level, its squared term is statistically significant at the 5% level, and both are jointly significant at the 1% level.

<sup>408</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p14

<sup>409</sup> All these variables are included as logarithm.



We found no economic or engineering rationale to choose a specific threshold. While this may be true for other variables that we rely on, for example, size bands for treatment works, in this case other measures of population density are available. For example, weighted average population density is based on similar data and is not dependent on the choice of the density thresholds. For these reasons, we decide not to use population density indices but instead rely on weighted average population density.

4.182 Moreover, regarding the Saal and Nieswand critique of LAD density measures, we have not found a robust density variable that would control for local level population settlement patterns.

#### *Service level variables*

4.183 In this section, we consider whether service level variables, in particular leakage, should be included in the econometric models. Providing a high-quality service could be more costly and therefore costs may be related to service quality variables.

#### *Parties' arguments*

4.184 We first present the Parties' views on the wider issue of whether there is a relationship between costs and service. We then present their views on the specific issue of including service level variables in the econometric models.

- *Cost service relationship*

4.185 Ofwat said that better outcome performance did not necessarily require cost increases. It was important that customers of poorer performing companies should not pay extra for the costs of catching up with the service levels other companies had achieved. This was particularly important where companies had underspent in previous periods and so enjoyed higher returns and dividends for investors.<sup>410</sup>

4.186 Ofwat said that some cost-efficient companies were already meeting the 2020 to 2025 performance commitment levels. Therefore, if there were higher marginal costs of meeting these higher service levels, then this would already have been accounted for in Ofwat's cost benchmarks, which were based on historical costs.<sup>411</sup>

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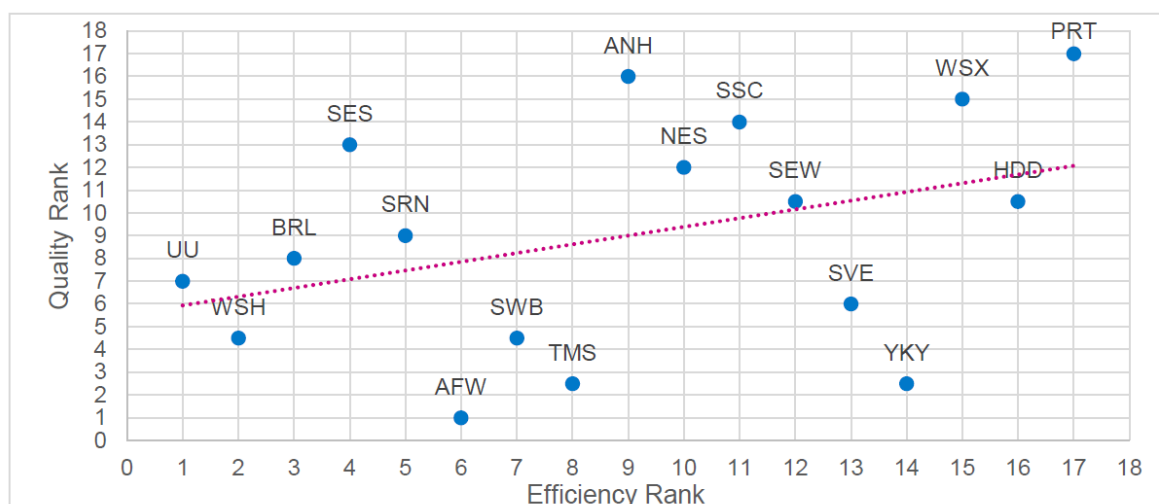
<sup>410</sup> Ofwat (2020), [Reference of the PR19 final determinations: Cross-cutting issues](#), paragraph 3.43

<sup>411</sup> [Ofwat's further submission on cross-cutting issues in companies' responses](#), paragraph 3.7

4.187 Ofwat said it agreed that, in some circumstances, the marginal costs of improving service would increase at higher service levels. However, Ofwat had taken account of this and found that companies were unlikely to be at the point of diminishing marginal returns. Ofwat said it had avoided requiring service improvements where marginal costs might increase rapidly.<sup>412</sup>

4.188 Ofwat provided evidence of a relationship between efficiency and quality. Ofwat said ‘the data suggests a positive correlation between our estimates of historical cost efficiency and good outcome performance. This implies that better outcomes could be associated with lower costs.’<sup>413</sup>

**Figure 4-1: Ofwat scatter plot of total efficiency and quality ranks**



Note: 1 indicates worst performance and 17 indicates best performance.

Source: Ofwat (2019), [Reference of the PR19 final determinations: Cross-cutting issues](#), Figure 3.1.

4.189 Anglian said that:

- Ofwat’s belief was that there was no trade-off between costs reduction and quality.
- Ofwat’s analysis of the ranking of efficiency and quality was unreliable.
- Economic theory predicted that quality was not free.
- It cost more to create and maintain a high performing network than a mediocre one.

<sup>412</sup> [Ofwat’s further submission on cross-cutting issues in companies’ responses](#), paragraph 3.6

<sup>413</sup> Ofwat (2020), [Reference of the PR19 final determinations: Cross-cutting issues](#), paragraph 3

- As a high performing company, Anglian was particularly exposed to these issues.
- Ofwat's failure to recognise the links between costs and quality compromised Anglian's ability to meet its statutory obligations and was inconsistent with Ofwat's duties.<sup>414</sup>

4.190 Anglian also submitted analysis showing the marginal costs of leakage reduction were increasing.<sup>415</sup> An example on investment against interruptions to supply also showed the link between costs and improved quality.<sup>416</sup> Anglian and its consultants ICS also criticised Ofwat's methodology and interpretation of the scatter plot presented in Figure 4-1. For example, ICS said that the positive relationship was not statistically significant.<sup>417</sup>

4.191 Bristol stated that Ofwat's approach was 'unjustified' for three reasons: a) Ofwat's failure to make adjustments led to Bristol's efficient costs being understated; b) Ofwat was on notice of company concerns but failed to make sufficient adjustments; and c) the error led to a material shortfall in Bristol's base cost allowance.<sup>418</sup>

4.192 Bristol submitted its own modelling, which made adjustments to other companies' base cost allowances to reflect the costs they would have had to incur historically in order to achieve service levels equivalent to Bristol. This analysis concluded that Bristol should have received an extra £15m over the control period.<sup>419</sup> A KPMG report prepared for Bristol, said that, at a conceptual level, the Bristol approach was a pragmatic solution to the inclusion of service level/quality in the econometric models. However, there were potential problems with Bristol's approach. For example, some companies may have had higher service levels than Bristol and the analysis did not account for this.

4.193 Northumbrian stated that it was broadly supportive of Ofwat's framework for assessing efficient cost allowances and did not see any rationale for the CMA to revisit the econometric models as part of the price control.<sup>420</sup> Northumbrian was not supportive of including service quality variables as explanatory variables.

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<sup>414</sup> [Anglian SoC](#), Chapter F, Overview paragraph (i) to (vi)

<sup>415</sup> [Anglian SoC](#), paragraphs 920-923

<sup>416</sup> [Anglian SoC](#), pp 207-209

<sup>417</sup> [Anglian SoC](#), paragraphs 917-919

<sup>418</sup> [Bristol SoC](#), Chapter 10

<sup>419</sup> [Bristol SoC](#), paragraph 364

<sup>420</sup> [Northumbrian SoC](#), paragraph 291

- 4.194 Yorkshire stated that firms at the efficiency frontier could not simultaneously improve costs and outcomes, but instead could only move along the frontier.<sup>421</sup> Yorkshire also noted that Ofwat had included service variables in some of its alternative models and, on this basis, decided to give one water company an extra £50m.<sup>422</sup> Yorkshire's advisors Oxera noted that this adjustment meant that Ofwat had accepted in principle and in practice that higher quality increased costs.
- 4.195 Yorkshire also commissioned a report by Oxera which concluded that the Ofwat scatter plot was misleading for multiple reasons. For example, using ranks resulted in a substantial loss of information because both quality measures and cost efficiency were continuous variables.
- 4.196 Dŵr Cymru, South East Water, South West Water, Southern Water, Thames Water, Water UK, and Wessex Water also raised concerns about the disconnect between cost assessment and service levels.<sup>423</sup> Thames Water thought that service levels should be taken into consideration.<sup>424</sup>
- 4.197 The Consumer Council for Water said that Anglian should not receive a cost adjustment for leakage as it felt that funding companies to achieve ODIs would result in the customer paying twice.<sup>425</sup> It said customers should not pay for inefficiency.<sup>426</sup>

- *Inclusion of service level variables*

- 4.198 CEPA, Ofwat's advisors, considered including service level variables and tested a large number of different models.<sup>427</sup> Models with service levels were not included in the final models as they did not fulfil the criteria adopted by CEPA.
- 4.199 Ofwat set out modelling criteria which a model must satisfy to be selected. The models selected satisfied the following conditions.<sup>428</sup>

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<sup>421</sup> [Yorkshire SoC](#), paragraph 149

<sup>422</sup> [Yorkshire SoC](#), paragraph 146

<sup>423</sup> [South West Water submission](#), p4 & p7, [Southern Water submission](#), p4, [Thames Water submission](#), section 3, [Water UK submission](#), p4, [Wessex Water submission](#), p2 and references therein, [Dŵr Cymru \(Welsh Water\) submission](#), p2

<sup>424</sup> [Thames Water submission](#), paragraph 3.10

<sup>425</sup> [CCWater response to Anglian's SoC](#), paragraphs 8.12-8.13

<sup>426</sup> [CCWater response to Yorkshire's SoC](#), paragraph 5.4

<sup>427</sup> CEPA (2018), [PR19 Econometric Benchmarking Models](#), p51. The service levels tested included: leakage, total number of sewer blockages, total number of gravity sewer blockages, total number of sewer rising main bursts/collapses, number of designated bathing waters, intermittent discharge sites, number of designated bathing areas and number of odour related complaints.

<sup>428</sup> CEPA (2014), [Cost assessment – advanced econometric model](#), p50

- (a) The variables were individually significant at a 10% confidence level.
- (b) No two variables included in a model were correlated by more than 90%.
- (c) All coefficients were consistent with CEPA's prior expectations based on engineering and economic rationale.
- (d) The adjusted R-squared was higher than 80%.
- (e) The coefficients were consistent with Ofwat's incentives for PR19 (for example models where greater leakage would grant higher allowance to companies would be excluded).<sup>429</sup>

4.200 While Ofwat did not include service level variables in the base cost model, it also carried out some sensitivity analysis on its modelled base cost allowances for wholesale water and wastewater, comparing its model to alternative specifications, informed by company representations. This is further discussed in paragraphs 4.247 to 4.257.

4.201 Ofwat also engaged PwC to assess whether to include leakage levels as explanatory variables.<sup>430</sup> PwC used as an explanatory variable the difference between the company's leakage level and industry upper quartile leakage level, because it considered this variable was exogenous.<sup>431, 432</sup> PwC showed that the coefficient of the leakage measure it used had the expected sign.

4.202 Anglian said that Ofwat had made a £50.2m upward adjustment to Anglian's cost allowance, £24.5m of which related to a model which included leakage levels as an explanatory variable.<sup>433</sup>

4.203 Northumbrian said that it remained supportive of Ofwat's FD base cost models over the proposed alternative models which included service drivers.<sup>434</sup> Northumbrian also commented on the coefficients from the PwC model, pointing out that the estimated coefficients for leakage were close to zero or not statistically significant.

4.204 Oxera, on behalf of Yorkshire, submitted an analysis that included two service level variables.

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<sup>429</sup> CEPA (2018), [PR19 Econometric Benchmarking Models](#), p50

<sup>430</sup> PwC (2019), [Funding approaches for leakage reduction](#)

<sup>431</sup> PwC also include a squared term of the variable.

<sup>432</sup> PwC considered that leakage levels relative to SELL were not exogenous.

<sup>433</sup> [Anglian SoC](#), paragraph 902

<sup>434</sup> [Northumbrian's reply to Ofwat's response](#), paragraph 201

- To capture quality complaints, Oxera used a variable related to the number of quality contacts per person, which was a measure of the volume of customer complaints relating to water taste, odour and discoloration.
- To capture leakage levels, Oxera used the volume of leakage above or below the SELL per property.<sup>435</sup> SELL is the level of leakage where the incremental costs and benefits of reducing leakage are exactly equal, taking into account both the costs and benefits to the company, and the costs and benefits to other affected parties.

4.205 Ofwat commented on the Oxera analysis and said that its models did not include service level variables. It said the following.

- Service quality was under management control, which could lead to perverse incentives.
- Companies had submitted 220 models to Ofwat and none of these included service level variables.
- The analysis suggested that lower quality was related to higher costs.
- The results could be driven by Oxera using SELL in its measurement of leakage. SELL was influenced by the companies' own costs and did not provide an objective and homogenous approach across the industry.
- The models presented by Oxera might be selective.<sup>436</sup>

4.206 Oxera responded to the Ofwat submission and said the following:

- Oxera's models controlled for leakage in a non-linear manner, and therefore Ofwat's interpretation, that lower quality was related to higher costs, was inappropriate.
- Not including leakage would likely result in omitted variable bias and was also likely to result in an endogeneity bias, given the likely correlation between service quality measures and some of the other cost measures.
- Ofwat had mischaracterised the process of submitting econometric models.

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<sup>435</sup> Oxera also included the square of the volume of leakage above or below the SELL per property. The squared term was included to account for potential economies of scale in costs.

<sup>436</sup> [Ofwat's response to Yorkshire's SoC](#), paragraphs 3.20-3.30

- It acknowledged there were issues related to SELL, but considered that the operational importance of the variable outweighed concerns with its measurement.
- 4.207 Northumbrian also undertook work to assess the Oxera model and stated there was a positive correlation between service quality and costs, however, for most models the variable was statistically insignificant, which suggested low predictive power for the variable.
- 4.208 NERA submitted an econometric analysis commissioned by several companies.<sup>437</sup> The NERA analysis included leakage levels and used a similar approach to Oxera. NERA used the volume of leakage above or below the SELL per property.<sup>438</sup>
- 4.209 Ofwat, in response to the report by Oxera, said it did not consider it was appropriate to measure and use leakage relative to SELL because:<sup>439</sup>
- (a) the positive coefficient created a perverse incentive, providing a higher cost allowance to firms with higher leakage; and
  - (b) SELL was influenced by the companies' own determinations of costs and benefits and did not represent an objective and consistent approach across the industry.<sup>440</sup>
- 4.210 Ofwat also said that there were multiple problems with the use of SELL, including:<sup>441</sup>
- (a) it tended to reinforce the status quo;
  - (b) it did not incentivise efficiency or innovation;
  - (c) there were many significant uncertainties in estimating SELL, particularly in incorporating the social and environmental costs of leakage; and
  - (d) a company's SELL was evaluated based on the company's own costs of reducing leakage, such that companies that were inefficient in reducing leakage would have a softer leakage reduction target.

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<sup>437</sup> Those companies are SES in collaboration with Affinity Water, Anglian, Dŵr Cymru, South East Water, South Staffs Water, Southern Water, Thames Water and Yorkshire.

<sup>438</sup> NERA also includes a squared term of the variable.

<sup>439</sup> [Ofwat's Response to common issues in companies' SoCs: Cost efficiency](#), paragraph 3.41

<sup>440</sup> [Ofwat's Response to common issues in companies' SoCs: Cost efficiency](#), paragraph 3.41

<sup>441</sup> [Ofwat's Response to common issues in companies' SoCs: Cost efficiency](#), paragraph 5.16

- 4.211 PwC, in its report for Ofwat, also excluded this variable because it considered it to be a less important driver of leakage performance.<sup>442</sup>
- 4.212 Northumbrian also expressed concerns about the use of SELL when measuring leakage because the models were unlikely to capture the complex relationship between service quality improvement and costs and the data might not be comparable, as SELL was evaluated by companies involving judgement on costs and benefits, rather than being a directly observed measure.
- 4.213 Yorkshire said that when the cost models were modified to control for phosphorous removal and service quality, the gap between Yorkshire's proposed expenditure and Ofwat's view of efficient expenditure could be fully explained.<sup>443</sup>
- 4.214 In its response to Provisional Findings, Yorkshire requested that the CMA recommend to Ofwat that the need for service quality improvement should be assessed jointly with cost assessment, acknowledging that these approaches should be explored further.<sup>444</sup>
- 4.215 Oxera, in a report for Yorkshire, said that omitting service level variables could i) cause endogeneity bias; ii) provide perverse incentives to companies to reduce costs at the expense of service quality; and iii) lead to biased correlation analyses of cost efficiency and service quality. Oxera said that alternative measures, such as monetising quality, could be used and regulators needed to robustly and analytically integrate service quality measures.
- 4.216 Professor Kumbhakar, Anglian's advisor, said that excluding leakage was inappropriate because:
- the endogeneity of service level variables was not a valid reason for excluding them; and
  - excluding variables from the model was never a solution because it would lead to omitted variable bias.
- 4.217 In its response to Provisional Findings, Anglian said that the CMA's base cost models did not include leakage explanatory variables; therefore they did not

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<sup>442</sup> PwC (2019), *Funding approaches to leakage reduction*, p5

<sup>443</sup> Yorkshire's reply to Ofwat's response, paragraph 3.10.1

<sup>444</sup> Yorkshire's response to the provisional findings, paragraph 5.5.8



reflect the higher costs of Anglian maintaining leakage at industry leading levels and the higher costs Anglian faced reducing leakage further.<sup>445</sup>

- 4.218 Saal and Nieswand said that Ofwat's models did not include enough variables to capture the complex factors influencing water supply costs, including efforts to reduce leakage.<sup>446</sup>
- 4.219 Thames Water said that drivers of leakage, for example age of pipes, density and soil types, could be used, if robust explanatory variables were found.<sup>447</sup>
- 4.220 United Utilities said that any cost-drivers should be exogenous. If any companies believed that higher service levels led to them being deemed comparatively inefficient, then those companies should submit well-evidenced cost adjustment claims.<sup>448</sup>

### *Decision*

- 4.221 We have considered carefully what conclusions can be drawn from the evidence discussed in paragraphs 4.185-4.220. Ofwat said that its scatter plot analysis 'suggests a positive correlation'. We do not agree that this scatter plot provides robust evidence to support Ofwat's view. Simple statistical analysis shows that the correlation coefficient is not statistically significant from zero.
- 4.222 However, if all the water companies were at the frontier of efficiency and service levels, and higher service levels resulted in higher costs, we would expect to see a downward relationship on the scatter plot, with different companies choosing different combinations of efficiency and service levels. The fact that we do not see a downward sloping relationship is consistent with the view that few water companies are operating close to the frontier. However, it may also be the result of the methodological issues highlighted by the Disputing Companies and their advisors.
- 4.223 Overall, we placed little weight on the Ofwat scatter plot, but it is consistent with the view that there is likely to be scope for the water companies to improve service levels without necessarily increasing their costs. This is also consistent with the outcome of PR14, where companies were generally able to meet their performance commitments without materially overspending their allowances. For these reasons, and the fact that we have adjusted

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<sup>445</sup> [Anglian's response to the provisional findings](#), paragraph 305

<sup>446</sup> Saal and Nieswand (2019), [A Review of Ofwat's January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19](#), p7, p9, p36 & p37

<sup>447</sup> [Thames Water submission](#), paragraph 3.9

<sup>448</sup> [United Utilities submission](#), section 3.2

performance targets where they were not appropriately funded or provided extra funding (see Section 7 Outcomes and Performance Commitments), we are confident that our base models will provide appropriate funding for the Disputing Companies.

4.224 Turning to service levels, we applied our framework and considered whether the inclusion of service variables was appropriate. We discuss each of the three variables in turn and then consider Yorkshire's request for recommendations.

- *Leakage relative to SELL*

4.225 We found that leakage relative to SELL was substantially under management control. We also had concerns about measuring leakage relative to SELL, as SELL itself would be influenced by how efficient the company was. For example, if the company had poor technology and had higher costs for repairing leaks, its SELL would be higher. Therefore, SELL was not an exogenous measure to management.

4.226 For this reason, we decide not to use leakage relative to SELL as an explanatory variable in the econometric models.

- *Leakage relative to an upper quartile target for leakage*

4.227 We found that leakage was substantially under management control.<sup>449</sup> Specifically, by managing their leakage levels, companies may influence their position relative to the upper quartile target for leakage.<sup>450</sup> We therefore decide that leakage relative to an upper quartile target for leakage is endogenous.

4.228 We considered whether it was appropriate from an engineering and economic perspective to measure leakage relative to the upper quartile service level. It was not clear why the distance between the company's actual leakage level and a leakage target set by Ofwat was a meaningful cost driver from an engineering or economic perspective. Companies optimise leakage levels considering their specific circumstances. We therefore found that this difference could not be justified from an economic and engineering perspective.

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<sup>449</sup> For PR19 Ofwat moved to an upper quartile performance measure for leakage using historical data. Ofwat said that its previous measure, a performance commitment set by the companies, was not stretching enough.

<sup>450</sup> In other words, there is still a substantial part of the variation of the variable that comes from an endogenous variable, ie leakage.

4.229 For these reasons, we decide not to use leakage relative to an upper quartile target as an explanatory variable in the econometric models.

- *Quality contacts per person*

4.230 We found that the number of customer complaints was substantially within management control. For example, if a company decided to reduce the spend on reducing water discolouration, it might receive a higher number of complaints. Including variables which were substantially under management control was likely to lead to endogeneity problems and thus biased coefficient estimates.

4.231 For this reason, we decide not to use quality contacts per person as an explanatory variable in the econometric models.

- *Yorkshire request*

4.232 We have interpreted Yorkshire's request in paragraph 4.214 to mean that we should recommend to Ofwat that Ofwat should continue to seek to integrate service level variables as explanatory variables in the econometric modelling of base costs. Our view is that including service level variables which are substantially under management control is likely to lead to endogeneity problems and thus biased coefficients.

#### *Other proposed variables*

4.233 Professor Saal said that Ofwat's models did not allow for sufficient controls to capture the complex factors influencing water supply costs.<sup>451</sup> These included:

- Differences in abstracting water from boreholes, rivers, impounding, and pumped reservoirs;<sup>452</sup>
- Regional variation in water scarcity in aggregated wholesale water models;<sup>453</sup>

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<sup>451</sup> Saal and Nieswand (March 2019), [A review of Ofwat's January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19](#), p7 (bullet 1)

<sup>452</sup> Saal and Nieswand (March 2019), [A review of Ofwat's January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19](#), p19, p7 (bullet 1) & p34 (bullet 1)

<sup>453</sup> Saal and Nieswand (March 2019), [A review of Ofwat's January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19](#), p11 (bullet 1 and 2), p48 (bullet 3)

- Size and fragmentation of sewage systems, 'prevalence of combined sewers to SWC model', and prevalence of gravity fed sewers.<sup>454</sup>

4.234 We recognise that in modelling base costs, we needed to balance the benefits of controlling for additional cost drivers and the disadvantages of increasing the complexity of our models. In facing this trade-off, we noted the risk of overfitting the data. This was particularly important given the small number of observations in our sample and our final aim of forecasting the companies' cost allowances for the period 2020/21-2024/25. In addition, we note that Professor Saal's submissions on these topics did not include specific variables able to address these limitations and fulfil the economic and engineering rationale. For these reasons, we have not prioritised the assessment of these limitations in detail. Nonetheless, our assessment found that

- Our WRP and WW models controlled for water complexity through the use of the percentage of water treated in complexity bands three to six and the weighted average treatment complexity (see paragraphs 4.85 to 4.103).
- Any managerial factor that influenced base costs would be endogenous (see for example paragraph 4.227).

4.235 United Utilities said that the inclusion of a variable for urban runoffs would capture drainage costs.<sup>455</sup> In one of its previous submissions to Ofwat, United Utilities said the greater the volume of such inflows, the larger network and storage assets needed to be, and the greater the amount of pumping.<sup>456</sup> We found that our models already captured both scale and pumping. Therefore, we decide not to add an additional drainage variable.

4.236 Given our assessment, we decide not to include additional variables in our models.

### ***Should we adopt aggregate wholesale water and treated water distribution specifications?***

4.237 In PR19, Ofwat used two specifications to model aggregate wholesale water costs, namely WW1 and WW2, and one for treated water distribution, TWD1.

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<sup>454</sup> Saal and Nieswand (March 2019), [A review of Ofwat's January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19](#), p52 (paragraph 2)

<sup>455</sup> [United Utilities submission](#), paragraph 2.2.6

<sup>456</sup> United Utilities (2018), [Response to econometric model consultation](#), p.22

We used the same models in our Provisional Findings. In this section, we assess the arguments made around the validity of these models.

### *Parties' arguments*

- 4.238 Anglian, advised by Professor Saal, said that Ofwat's aggregated water models and treated water models were statistically and conceptually inappropriate because they arbitrarily restricted their coefficients.<sup>457</sup> Professor Saal said that WW1, WW2 and TWD1 implicitly assumed the coefficient on length of mains to be the negative of the coefficient of the number of booster pumping stations.<sup>458</sup> He statistically tested the appropriateness of this assumption and the results suggested the assumption did not hold.
- 4.239 In response to our Provisional Findings, Ofwat supported our provisional decision to adopt the same wholesale water models it adopted at Ofwat's FD.<sup>459</sup> Moreover, Ofwat said that whenever a logarithm of a ratio was used, due to the properties of the logarithms, the coefficient on the top and bottom variables of the ratio were the same.<sup>460</sup> It said that was the nature of saying that a ratio affected costs. Ofwat said that assessing the impact of increasing the length of mains while holding properties, density and booster pumping stations constant was irrelevant both from an engineering perspective and in light of the data.<sup>461</sup>
- 4.240 Northumbrian also said that it was inappropriate to decompose variables that were ratios designed to capture density or complexity into their constituent parts and then interpret the coefficients in isolation.<sup>462</sup> It added that it was perfectly reasonable to include variables that separately controlled for scale and density/complexity so that the individual impacts of these variables could be assessed to ensure they aligned with the expected economic and engineering rationale.<sup>463</sup>
- 4.241 Professor Saal proposed alternative WW1, WW2 and TWD1 models that did not impose any restriction on the coefficients.<sup>464</sup> Ofwat said the two models

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<sup>457</sup> [Anglian's response to the provisional findings](#), paragraphs 106-117

<sup>458</sup> [Anglian's response to the provisional findings](#), paragraph 106-117. See also Saal and Nieswand (March 2019), *A Review of Ofwat's January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19*, p23 (comment 5), pp42-43 & Saal (2019), *A Comment on Misspecification and Systematic Bias in Ofwat's PR19 Draft Determination Integrated Wholesale Water and Wastewater Models*, p6 (comment 5)

<sup>459</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p15

<sup>460</sup> In a formula,  $b * \log(x / z) = b * \log(x) - b * \log(z)$

<sup>461</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), Appendix 5, paragraph A5.7

<sup>462</sup> [Northumbrian's reply to responses to the provisional findings](#), paragraph 50

<sup>463</sup> [Northumbrian's reply to responses to the provisional findings](#), paragraphs 50-51

<sup>464</sup> Saal and Nieswand (March 2019), *A Review of Ofwat's January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19*, p8, p15, p19, p24, p28 & p45-47

included two highly correlated variables (properties and length of mains) and the VIF statistics (a measure of multicollinearity) of the models were high.<sup>465</sup>

### *Decision*

- 4.242 We find that models WW1, WW2, and TWD1 are specified to estimate the effect on costs of the ratio between the number of booster pumping stations and length of main, not of the two individual components. It makes economic and engineering sense to specify a model using the ratio as an explanatory variable able to capture the impact of water companies' different topographies on costs. We acknowledge that using a ratio as an explanatory variable will impose a restriction. However, this restriction is informed by economic and engineering intuition.
- 4.243 Moreover, the statistical test performed by Professor Saal was not valid as the resulting equation was affected by multicollinearity: number of properties and lengths of main are 92% correlated (97% in log). Therefore, it was not possible to draw inferences from Professor Saal's test.
- 4.244 For these reasons, and consistent with our decision on SWC1, we decide to include model specifications TWD1, WW1 and WW2.
- 4.245 We assessed Professor Saal's proposed different model specifications for TWD1, WW1 and WW2.
- (a) Professor Saal proposed using the number of booster pumping stations as an explanatory variable instead of the ratio of number of booster pumping stations and sewer length. However, similarly to what we explained in paragraphs 4.139-4.142, the use of the ratio (as in Ofwat's WW1 model at Final Determination) has a stronger economic and engineering rationale.
  - (b) Professor Saal also proposed to include both length of mains and connected properties as explanatory variables. We find that these two variables are highly correlated with each other. The resulting regressions will therefore be affected by multicollinearity issues.
- 4.246 For these reasons, we decide not to use Professor Saal's proposed different model specifications for TWD1, WW1 and WW2, but adopt Ofwat's model specifications.

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<sup>465</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), paragraph 3.30

### ***Should the alternative model specifications be used?***

4.247 In PR19, Ofwat carried out a sensitivity analysis on its main models using econometric models which included different explanatory variables. Ofwat's alternative model specifications were informed by company representations and included the following cost drivers.

- (a) The number of new connected properties to more explicitly control for differences in growth related expenditure.
- (b) APH to proxy for the energy requirements of each company, in place of the number of booster pumping stations.
- (c) The percentage of length of mains renewed or relined as a proxy for the level of maintenance activity undertaken and network age.
- (d) The distance from the upper quartile 2024–25 leakage target, and its squared term, as a driver of leakage costs based on PwC analysis.
- (e) The distance from the upper quartile 2019–20 leakage target (and its squared term) as a driver of leakage costs based on PwC analysis.

4.248 These alternative model specifications led to Anglian receiving an extra £50.2 million.<sup>466</sup>

### ***Parties' arguments***

4.249 Anglian stated that the alternative model specifications introduced in Ofwat's FD did not adequately address Anglian's funding gap in its base costs.<sup>467</sup> Anglian said that 'at FD, Ofwat still rejected Anglian's cost adjustment claim but allowed a £50.2 million uplift (£24.5 million of which was leakage driven) to Anglian's 'Botex Plus' allowances on the basis of adjusting for alternative specifications to its econometric models, so implicitly admitting the insufficiency of the base allowance'.<sup>468</sup>

4.250 Anglian stated that the quality of the alternative specification models was low and that the additional allowance made on the basis of these alternative specifications was insufficient.<sup>469</sup>

4.251 Bristol said that Ofwat's alternative models on leakage demonstrated that better leakage performance required higher costs and that, given the outcome

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<sup>466</sup> Ofwat (2019), *PR19 final determinations: Securing cost efficiency technical appendix*, p37

<sup>467</sup> Anglian SoC, paragraph 563

<sup>468</sup> Anglian SoC, paragraph 1038(iii)

<sup>469</sup> Anglian SoC, paragraph 1039(iii)

of applying alternative models, Ofwat was unjustified in not providing Bristol with adequate cost allowances for leakage.<sup>470</sup>

4.252 Northumbrian said that none of the alternative specifications used by Ofwat perform as well as Ofwat’s FD19 models. Northumbrian did not think that these alternative specifications provided a sound basis for relative efficiency assessment.

4.253 Anglian, in its response to the Provisional Findings, said it did not dispute the dropping of the alternative specification models, but was concerned that the net effect of our Provisional Findings was to reduce its allowance attributable to APH.<sup>471</sup>

4.254 Ofwat said that each alternative specification model was not very strong on its own merit, but that collectively they could be used to sense check the results of the base models and potentially make cost adjustments.

### *Decision*

4.255 For the reasons explained in paragraphs 4.59 to 4.236, we decide not to include in our models any of the explanatory variables listed in paragraph 4.247.

4.256 The results of these decisions are summarised in Table 4-4.

**Table 4-4: Summary of CMA decisions and reasoning on Ofwat alternative specifications**

<i>Ofwat model</i>	<i>Explanatory variable</i>	<i>Reasoning</i>	<i>Decision</i>
TV2 – Growth driver	Number of connected properties	High correlation with scale variables	Do not use
TV3 – Average pumping head	Average pumping head	Poor quality data and lack of statistical significance	Do not use
TV4 – Length of mains	Percentage of mains renewed or relined	Endogeneity concerns	Do not use
TV5 – Leakage specification 1	Leakage and distance from 2024/25 target and Thames interaction variable	Endogeneity concerns	Do not use
TV6 – Leakage specification 2	Leakage and distance from 2019/20 target and Thames interaction variable	Endogeneity concerns	Do not use

Source: CMA analysis.

4.257 Therefore, we decide not to use any of the alternative specifications individually. Consistent with this, we do not use them collectively, since this would involve introducing inappropriate explanatory variables into our modelling. This decision results in our not accepting Anglian’s arguments for

<sup>470</sup> Bristol SoC, paragraphs 389 & 390

<sup>471</sup> Anglian’s response to the provisional findings, paragraph 79



additional funding and removing the £50.2 million allowance that Anglian received from these sensitivities.

### ***Is capital maintenance addressed appropriately?***

4.258 Companies use and manage assets to produce water and wastewater services. Those assets need to be maintained in order to function efficiently. Therefore, companies incur capital maintenance costs maintaining the assets they own and operate.

4.259 In this section, we assess the points raised by the Parties on capital maintenance that concern the base cost models.

### ***Parties' arguments***

4.260 Ofwat's approach to capital maintenance was to rely on the econometric model as the starting point. In addition, Ofwat supplemented the base costs allowances with an adjustment process, through which companies could request cost adjustment claims, including capital maintenance costs.<sup>472</sup>

4.261 Ofwat said that the data used in the econometric model included 'lumpy' investment as well as peaks and troughs in capital investment costs.<sup>473</sup> Specifically, it found evidence of peaks and troughs for companies at different percentile levels (for example, upper or lower quartile). However, the econometric model covered eight years which, in Ofwat's view, ensured that the cost allowance was set in the long-run and thus addressed issues relating to peaks and troughs and 'lumpy' investments.<sup>474</sup> Ofwat said that none of the companies that defined the efficiency benchmark were in a trough of capital maintenance.

4.262 Northumbrian said that Ofwat's approach to cost assessment had continued to over-emphasise historical data and therefore had not sufficiently taken into account the longer-term and variable nature of resilience investment requirements. Northumbrian said that capital maintenance requirements varied with a company's historical investment profile and therefore the base cost model might not adequately account for those costs. As a result, Northumbrian said that capital maintenance might be underfunded.<sup>475</sup> However, in response to Provisional Findings, Northumbrian agreed with our

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<sup>472</sup> Ofwat (2019), [PR19 final determinations: Anglian Water Cost efficiency additional information appendix](#), p4

<sup>473</sup> Ofwat (2019), [PR19 final determinations: Anglian Water Cost efficiency additional information appendix](#), p4

<sup>474</sup> Ofwat (2019), [PR19 final determinations: Anglian Water Cost efficiency additional information appendix](#), p5

<sup>475</sup> [Northumbrian SoC](#), paragraph 592

approach to modelling capital maintenance spend and supported the arguments not to smooth the expenditure.<sup>476</sup>

- 4.263 Anglian said that Ofwat's approach was putting assets' health and resilience at risk by underfunding capital maintenance.<sup>477</sup> It also argued that Ofwat relied on a top-down approach, namely, the econometric models, which led to a shortfall in cost allocation for capital maintenance expenditures in AMP7.<sup>478</sup> Anglian said that Ofwat should have validated its top-down models by using a bottom-up approach. To mitigate the issue, Anglian proposed to triangulate costs based on an historical (top-down approach) and forward looking (bottom-up approach) cost assessment.<sup>479</sup>
- 4.264 Anglian said that companies could be in peaks and troughs with respect to their capital maintenance expenditures.<sup>480</sup>
- 4.265 In response to Anglian, Ofwat said that Ofwat's approach to setting an allowance for capital maintenance costs had been consulted upon. While some companies raised concerns about including enhancement costs in the econometric model, they had not raised concerns about capital maintenance.<sup>481</sup> Ofwat said that it had assessed the peaks and troughs in the data and concluded that there was not an issue.<sup>482</sup>
- 4.266 In response to Ofwat, Anglian said that Ofwat had not established a framework to monitor 'companies' serviceability'.<sup>483</sup> To mitigate the issue, Anglian re-iterated its suggestion to triangulate costs based on historical top-down and forward-looking bottom-up assessments.
- 4.267 Bush and Earwaker, Anglian's advisers, said that Ofwat's approach risked underfunding capital maintenance because the approach did not sufficiently account for differences in capital maintenance needs across companies and within a company over time.<sup>484</sup> Bush and Earwaker said that Ofwat should

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<sup>476</sup> [Northumbrian's response to the provisional findings](#), paragraph 34

<sup>477</sup> [Anglian SoC](#), p8

<sup>478</sup> [Anglian SoC](#), pp11–12

<sup>479</sup> Anglian's approach was informed by a report by Bush and Earwaker which stated that Ofwat's approach 'looks to us to create a significant risk of mis-provision for capital maintenance on an individual company basis', which they said was caused by differences between companies, for example due to difference in asset health or age.

<sup>480</sup> [Anglian SoC](#), p11–12

<sup>481</sup> [Ofwat's response to Anglian's SoC](#), paragraph 1.27

<sup>482</sup> [Ofwat's response to Anglian's SoC](#), paragraph 1.29

<sup>483</sup> [Anglian's reply to Ofwat's response](#), Part G, p12

<sup>484</sup> Anglian pointed out that its business plan forecast had been carefully developed, following the recommendations in Bush and Earwaker.

have triangulated historical and forward-looking cost assessments to address the capital maintenance issue.<sup>485</sup>

- 4.268 Anglian said that Ofwat incorrectly assumed that companies' long-term capital maintenance requirements were constant over time. Anglian said that the evidence showed that capital maintenance was cyclical and would grow in the future.<sup>486</sup> Anglian said that the efficiency benchmark might be set based on companies being in a cost trough. Anglian re-iterated its suggestion that, to assess future needs, Ofwat should have used a bottom up approach.<sup>487</sup>
- 4.269 Anglian said that Ofwat's econometric models captured scale drivers, but did not address in any form the age, asset condition or risk of failure, which were core drivers of maintenance expenditure requirements.<sup>488</sup> Anglian said this meant there was a likelihood that the econometric models did not fully address the capital maintenance requirements, in particular in light of increasing asset maintenance requirements.<sup>489</sup>
- 4.270 Anglian said that Ofwat used only a limited number of models to set allowances, not taking into account any non-modelling evidence.<sup>490</sup>
- 4.271 Anglian said that it was reasonable to conclude that historical levels of capital maintenance would not be sufficient in future AMPs to ensure the continued serviceability of Anglian's asset base.<sup>491</sup>
- 4.272 Ofwat said that it did not use an age-based assessment of capital maintenance because asset age did not directly correlate with asset performance.<sup>492</sup>
- 4.273 Oxera said that, contrary to Ofwat's statement, there was evidence that the benchmark companies were in a capital maintenance trough as capital expenditure per property was lower than the industry average.
- 4.274 Oxera said the issue of cyclical capital maintenance could be mitigated by using a smoothing approach to the cost variable in the estimation of the

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<sup>485</sup> Anglian also stated that Ofwat's approach at PR19 was similar to the approach at PR99, which was heavily criticised in the House of Commons Environmental Audit Committee in 2000 for relying on past levels of spend to determine what was appropriate for the forthcoming period.

<sup>486</sup> It also acknowledged that other costs may be cyclical as well.

<sup>487</sup> [Anglian's reply to Ofwat's response](#), Part G, p15. [Anglian SoC](#), paragraph 603.

<sup>488</sup> [Anglian's reply to Ofwat's response](#), Part G, p21

<sup>489</sup> Anglian also referred to an Oxera report which showed that using smoothed base costs expenditures reduced the accuracy of the model. Anglian's interpretation of this was that the base cost model would under-provision cost allowances for capital maintenance.

<sup>490</sup> [Anglian SoC](#), paragraphs 578–579

<sup>491</sup> [Anglian's reply to Ofwat's response](#), Part G, p29

<sup>492</sup> Ofwat (2019), [PR19 final determinations: Anglian Water Cost efficiency additional information appendix](#), p6

econometric model and this led to tighter confidence intervals of the predicted costs.<sup>493</sup>

- 4.275 In its response, Ofwat said that smoothing had disadvantages as recognised by the CMA in its Bristol PR14 Determination and this approach should not be used.<sup>494</sup> Ofwat said that it decided not to use capital smoothing because of increased substitutability between opex and capex.<sup>495</sup> It also said that efficiency scores were calculated over a five-year period in order not to place undue weight on a single year.<sup>496</sup>
- 4.276 In response to Provisional Findings, Water UK, the Institution of Civil Engineers (ICE), and Professor Binnie welcomed the CMA's suggestion that Ofwat's cost assessment should be enhanced with a forward-looking element for capital maintenance.
- 4.277 Professor Binnie went further and said the sector should work together to develop an asset focussed, forward-looking approach, which could complement other regulatory tools.<sup>497</sup> ICE considered a disproportionate emphasis had been placed on the assessment of econometric models based on historical costs and little weight was given to future requirements based on engineering assessments of asset health, condition, and serviceability.<sup>498</sup>
- 4.278 Anglian said that it was important that a forward-looking approach was in place before discussions on PR24 begin. It also said that this approach should be informed by independent analysis.<sup>499</sup>
- 4.279 We note that the Scottish government's Commissioning Letter and revised Commissioning Letter both highlighted capital maintenance as an important issue.<sup>500</sup>

## *Decision*

- 4.280 We consider that our base cost models provide adequate funding for capital maintenance costs. This is because capital maintenance costs will be related to the capital employed, which will be related to the scale of the business. Our

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<sup>493</sup> Oxera also discussed similar arguments made by Anglian, such as the cyclicity of capital maintenance. We do not repeat those points again.

<sup>494</sup> [Ofwat's further submission on Anglian](#), p15

<sup>495</sup> [Ofwat's further submission on Anglian](#), p15

<sup>496</sup> [Ofwat's further submission on Anglian](#), p16

<sup>497</sup> [Institution of Civil Engineers' response to the provisional findings](#), [Water UK's response to the provisional findings](#), p2, [Professor Chris Binnie's response to the provisional findings](#)

<sup>498</sup> [Institution of Civil Engineers' response to the provisional findings](#)

<sup>499</sup> [Anglian's response to the provisional findings](#), paragraphs 72-75 & 486-489

<sup>500</sup> Water Industry Commission for Scotland (2020), [Strategic review of charges 2021-27, draft determination](#), Appendix 1 & 2

econometric models include scale variables, so will give higher funding for companies with more assets.<sup>501, 502</sup> In addition, the base cost allowance permits growth of capital maintenance costs if the increase in costs is related to the growth of the cost drivers.<sup>503</sup>

- 4.281 Anglian also argued that asset health and age should be taken into account when assessing the capital maintenance spend. However, we are concerned that those measures are within the control of a company. For example, a company may decide to reduce spend on maintaining, or postpone replacing, an asset. This means that it may save costs in the short run but increase costs in the long run and, as a result, asset age and health could be biased indicators of capital maintenance requirements.
- 4.282 We recognise that the base cost models may not cover all capital maintenance costs. For example, capital maintenance costs can be 'lumpy', and companies could face peaks and troughs, which may not be reflected in the correlation with the cost drivers. However, while some companies may be in peaks and troughs in individual AMPs, there should be no systematic underfunding in the long run.
- 4.283 We also considered Oxera's submissions that the companies representing the benchmarks may be in a capital maintenance trough. If this is the case this could overstate their efficiency levels, since they could appear more efficient compared to companies which are at peaks of capital maintenance expenditure. If these companies in troughs are used as benchmarks this could lead to underfunding average capital maintenance levels.
- 4.284 On the evidence presented by Oxera, we first note that the difference between the benchmark companies and the industry average could be explained by those companies being more efficient, a possibility which Oxera acknowledged. Ofwat has also, implicitly, allowed for this issue by not selecting the frontier company as the benchmark.
- 4.285 We assessed whether there was evidence that the companies which influenced the efficiency benchmark had uncharacteristically low capital spend

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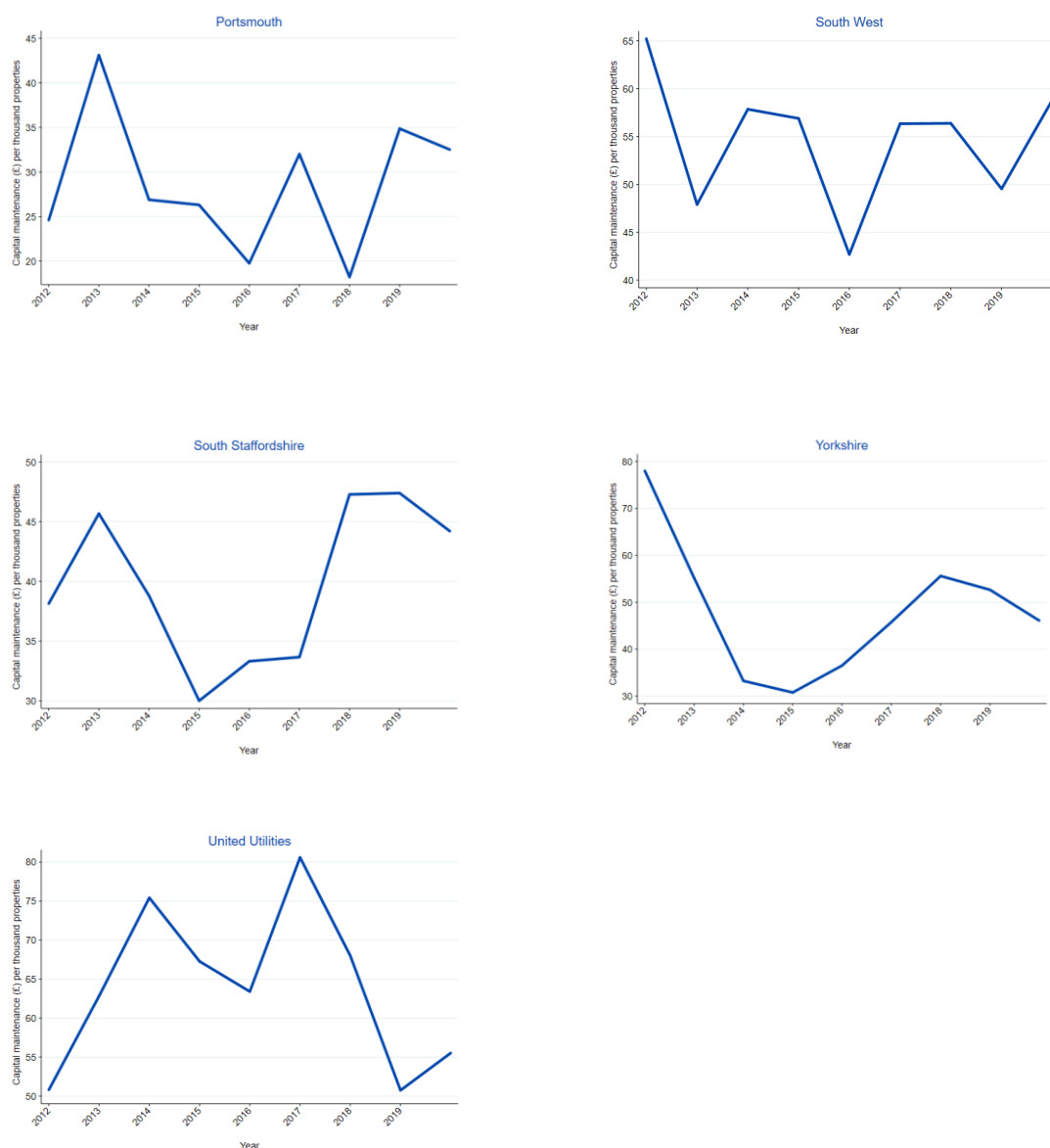
<sup>501</sup> For example, a larger network may mean higher costs related to maintaining that network.

<sup>502</sup> Anglian raised the issue that it had taken over private sewers and pumping stations which increased its capital maintenance costs. However, this should have been reflected in an increase in the cost drivers in the econometric model.

<sup>503</sup> For example, if the scale of a company is expected to increase, the base cost allowance for capital maintenance increases with it.

per property during AMP6.<sup>504</sup> Our analysis for the wholesale water companies is in Figure 4-2.

**Figure 4-2: Capital maintenance expenditure for wholesale water**



Source: CMA analysis

Note: we use the definition of capital maintenance as proposed by Oxera, which includes renewals opex.

4.286 These graphs do not support the argument that the most efficient companies were in a capital maintenance trough during 2014/15 to 2019/20.

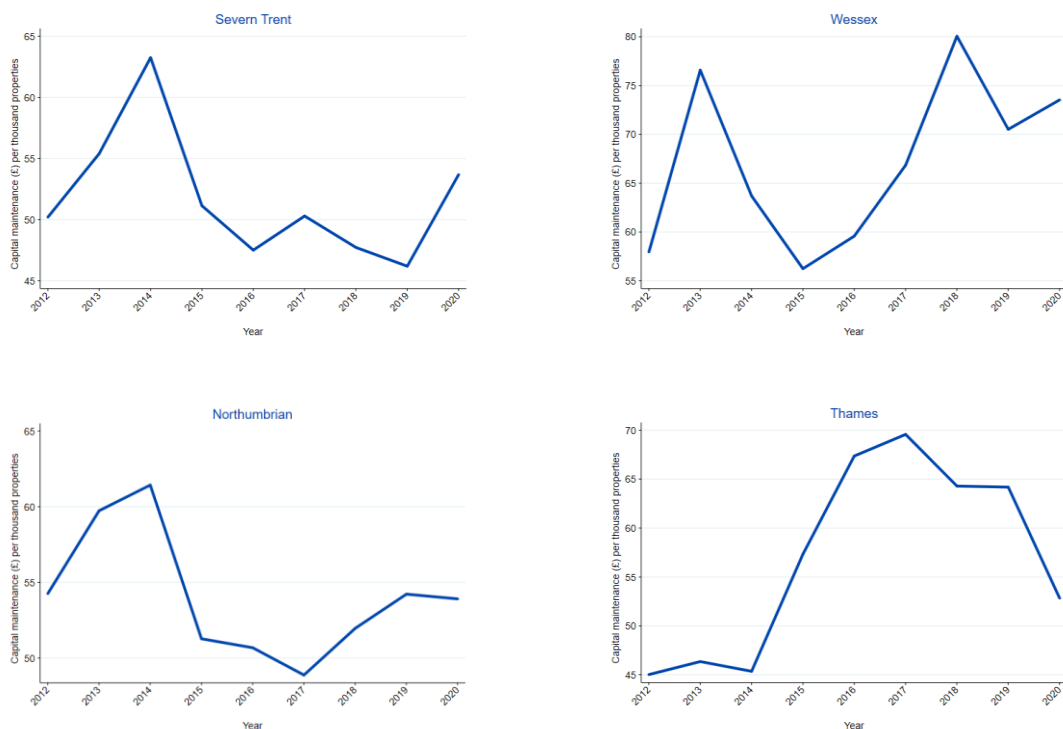
<sup>504</sup> Our decision to move the efficiency benchmark to the upper quartile implies having five efficient companies, rather than four. Our analysis is limited by the data available, as we have only three years of data before 2015, but this should still be sufficient to give us a reasonable picture of the companies' investment cycles.

- (a) Portsmouth Water and South West Water show volatile spending.<sup>505</sup>
- (b) South Staffordshire Water and Yorkshire started (in 2015) from a trough but reached relatively high levels of expenditure by the end of the time period.
- (c) United Utilities reached a peak in 2017.

4.287 We also note that the graphs in Figure 4-2 shows a variety of distributions, some of which are inconsistent with capital maintenance being cyclical.

4.288 Figure 4-3 shows the same analysis for wholesale wastewater.

**Figure 4-3: Capital maintenance expenditure for wholesale wastewater**



Source: CMA analysis

Note: we use the definition of capital maintenance as proposed by Oxera, which includes renewals opex.

4.289 These graphs do not support the argument that the most efficient companies were in a capital maintenance trough during 2014/15 to 2019/20.

<sup>505</sup> South West Water's capital maintenance expenditure was computed as the sum of SWT and BWH from the period before 2016.

(a) Severn Trent Water is likely to be in a trough. However, this is far from clear, and looking at multiple charts we would expect some companies to be in a trough due to the variation in the data.

(b) Wessex Water, Thames Water and Northumbrian do not appear to be in a trough.<sup>506</sup>

4.290 Overall, we note that the graphs show a variety of distributions, suggesting that there was no systematic bias in the investment cycles of the companies influencing the efficiency threshold.

4.291 Based on the evidence at paragraphs 4.260 to 4.290, in particular the evidence showing no substantial bias in the wholesale water or wastewater companies, we decide not to adjust our approach to setting capital maintenance allowances.

4.292 With respect to using a smoothed model to address the capital maintenance issue we do not see a clear justification to use the smoothed approach. The approach may introduce a distortion between the time covered by the cost variable and the time covered by the cost drivers. Smoothing would reduce the number of periods available in the data and a longer time period of data is preferable.<sup>507</sup> On the former point, if there is a correlation between costs drivers and the peaks and troughs or the 'lumpy' capex, this will not be picked up by the smoothed model. Therefore, we decide not to use smoothed data in our econometric modelling.

4.293 We acknowledge Anglian's and Northumbrian's argument that Ofwat's cost assessment is backward looking and that potential issues with capital maintenance may be forward looking. This is a complex issue, which, going forward, may become more important. We therefore suggest that Ofwat considers developing indicators to track this issue and to enable it to enhance its analysis with a forward-looking element that will assist in triangulating results from its econometric modelling of historic costs.

### ***Is there a log-transformation bias?***

4.294 Ofwat used log-log models to estimate costs and these models may systematically underestimate costs. This is because log-log models estimate

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<sup>506</sup> While Anglian performed worse than the efficiency benchmark, it still affects the precise level of the benchmark as the upper quartile calculation for wholesale wastewater is based on the average of the third and fourth companies.

<sup>507</sup> We acknowledge that the confidence intervals for the model Oxera provides are tighter. However, this is unsurprising because of the reduction in variation in the dependent variable due to the smoothing.



the logarithm of costs and when this is transformed into a monetary amount, it can potentially result in transformation-bias.<sup>508</sup>

4.295 A few potential solutions can be considered to correct for log-transformation bias, however, none of these estimators are unbiased.<sup>509</sup> These estimators include:

- (a) Naïve estimator – This estimator makes no adjustment for the transformation bias.
- (b) Conditional mean estimator – This adjustment factor is calculated as the exponentiated variance of the error from the model multiplied by 0.5. This adjustment would increase the raw modelled cost.<sup>510</sup> The adjustment factor is not unbiased but is consistent.<sup>511</sup> This assumes the errors of the model are normally distributed.
- (c) Smearing estimate<sup>512</sup> – The adjustment factor is calculated as the average of the exponentiated errors from the model. This adjustment may increase the raw modelled cost. The adjustment factor is not unbiased but is consistent.<sup>513</sup>
- (d) Alpha factor<sup>514</sup> – This is calculated as the correlation between actual costs (£m) and predicted costs from the model (£m transformed from logs). This should indicate the extent to which predicted costs overstate actual costs. However, in practice, this adjustment may increase or decrease the raw modelled cost. The adjustment factor is not unbiased but is consistent.

### *Parties' arguments*

4.296 Ofwat did not make an adjustment for log-transformation bias in its models.

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<sup>508</sup> We would expect the error from the model to be zero on average (across all companies and years) so there is no need to make an adjustment to the estimated log of base costs. However, for statistical reasons, the average of the exponentiated error from the model may be a multiple of more than one – called the 'log-transformation bias'. As this is not incorporated into the estimated base costs, an adjustment may be required. For further explanation see Wooldridge (2012), *Introductory Econometrics: A Modern Approach*, 5<sup>th</sup> Edition, pp212–214.

<sup>509</sup> The 'raw modelled cost' in this paragraph refers to estimated modelled base costs that exclude the catch-up efficiency and frontier shift adjustments.

<sup>510</sup> Where the variation of the error term from the model is large, the adjustment may be substantially larger than a multiple of one.

<sup>511</sup> Intuitively, if an estimator is consistent, this would indicate that as the sample size increases, the estimate will converge to the 'true' value.

<sup>512</sup> This does not require errors from the model to be normally distributed.

<sup>513</sup> This means that with a sufficiently large dataset the adjustment factor gets very close to the 'true' adjustment factor.

<sup>514</sup> The Alpha factor is calculated as the coefficient of the regression when running the actual cost (£m) on the predicted cost (£m transformed from logs) without a constant. This does not require errors from the model to be normally distributed.

- 4.297 Anglian stated that statistical theory showed that log-log models systematically underestimated costs unless allowances were suitably adjusted.<sup>515</sup> Anglian also stated that, as part of PR14, Ofwat recognised and adjusted for this statistical issue which had a material impact.<sup>516</sup>
- 4.298 Vivid Economics, adviser to Anglian, argued that conditional mean and smearing factor approaches offered more robust ways of obtaining consistent cost estimates from Ofwat's models.<sup>517</sup> Vivid Economics also said that in this case, the alpha factor approach did not correct for the statistical issue described since it adjusted all cost estimates downwards in parallel and exacerbated model prediction error.
- 4.299 In response to the Provisional Findings, Northumbrian said it agreed with the CMA's provisional decision not to adjust for log-log bias.<sup>518</sup>

### *Decision*

- 4.300 We have estimated the smearing and alpha adjustment factors required to adjust the CMA's model for log-transformation bias.<sup>519</sup> As the log-transformation bias leads to an underestimation of costs, we would expect the adjustment factors to be more than 100%. Table 4-5 shows the calculated adjustment factors for the wholesale water and wastewater models.
- (a) The smearing factor adjustments implies an upwards adjustment to the raw model cost estimates by 0.2% to 4.4% across the wholesale water and wastewater models.
  - (b) The alpha factor adjustments imply either an upward adjustment to the raw model cost of up to 2.9% or a downward adjustment of up to -3.5%.
- 4.301 We note the alpha adjustment factors that require a downward adjustment (those <100% in Table 4-5) are not aligned with statistical theory and for this reason we decide that the estimated adjustment factors are unreliable.<sup>520</sup>

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<sup>515</sup> [Anglian SoC](#), paragraph 610

<sup>516</sup> [Anglian SoC](#), paragraph 611

<sup>517</sup> Anglian (2019), [Draft Determination Representation, Log Model Prediction Error](#), p5

<sup>518</sup> [Northumbrian's response to the provisional findings](#), paragraph 34

<sup>519</sup> We did not estimate the conditional mean estimator adjustment as this required a normality assumption.

<sup>520</sup> We note the alpha factors that are below 100% are not statistically significantly different from 100% at the 95% level.

**Table 4-5: Smearing and Alpha adjustment factor for wholesale water and wastewater models**

<i>Model</i>	<i>Smearing factor</i>	<i>Alpha Factor</i>
	<b>Wholesale Water Models</b>	
WRP1	102.9%	102.0%
WRP2	102.8%	102.9%
TWD1	101.7%	96.5%
WW1	100.4%	99.1%
WW2	100.2%	100.6%
	<b>Wastewater Models</b>	
SWC1	100.7%	101.4%
SWC2	101.0%	98.4%
SWT1	101.8%	98.1%
SWT2	101.9%	98.8%
BR1	103.8%	102.2%
BR2	104.4%	99.7%
BRP1	101.2%	97.1%
BRP2	101.2%	98.0%

Source: CMA analysis.

4.302 Notwithstanding our criticisms of the adjustment factors, we note that as the application of the adjustment factors affects the modelled cost estimates, it also affects the efficiency scores.

4.303 We separately applied the smearing and alpha factors and recalculated the efficiency scores. Table 4-6 shows a comparison of the efficiency scores. Following the application of the smearing factor, the efficiency score decreases by 1.2 percentage points for wholesale water and 1.3 percentage points for wholesale wastewater. Following the application of the alpha factor, the efficiency score increases by 0.5 percentage points for wholesale water and 1.0 percentage points for wholesale wastewater.

**Table 4-6: Comparison of efficiency scores for CMA model, and models including smearing and alpha factors<sup>521</sup>**

<i>Model</i>	<i>WW model</i>	<i>WWW model</i>
CMA	97.1%	97.6%
CMA with smearing factor adjustment	95.9%	96.3%
CMA with alpha factor adjustment	97.5%	98.6%

Source: CMA analysis.

<sup>521</sup> This model includes only decisions taken on including 2019/20 data, removal of alternative specifications and changes to SWC2.

4.304 We applied the adjustments for the log-transformation bias and the change to the efficiency scores to estimate the change to the base cost estimates. We found the overall change to the modelled base costs was not material.<sup>522</sup>

4.305 Table 4-7 shows the change to the base costs for the wholesale water model. We found that the change to the base costs was less than 0.6% for each company, and on average less than 0.2% for the industry.

**Table 4-7: Comparison of base costs between CMA model, with smearing and alpha adjustments (2020 to 2025, wholesale water model)<sup>523</sup>**

Company	CMA (£m)	CMA + Smearing Factor			CMA + Alpha Factor		
		£m	Change (£m)	Change (%)	£m	Change (£m)	Change (%)
AFW	1,017.5	1,017.1	-0.4	-0.0	1,015.0	-2.5	-0.2
ANH	1,281.8	1,282.5	0.7	0.1	1,283.1	1.3	0.1
BRL	354.2	354.1	-0.1	-0.0	353.8	-0.4	-0.1
HDD	106.9	106.9	0.0	0.0	106.4	-0.5	-0.5
NES	1,154.5	1,154.6	0.1	0.0	1,154.6	0.1	0.0
NWT	1,992.2	1,992.4	0.1	0.0	1,990.4	-1.8	-0.1
PRT	159.1	159.1	-0.0	-0.0	158.6	-0.5	-0.3
SES	181.3	181.3	0.0	0.0	181.2	-0.1	-0.1
SEW	646.0	646.0	0.0	0.0	646.7	0.7	0.1
SRN	707.5	707.3	-0.2	-0.0	705.9	-1.5	-0.2
SSC	416.8	416.7	-0.1	-0.0	416.1	-0.7	-0.2
SVE	2,261.5	2,261.5	0.0	0.0	2,256.2	-5.3	-0.2
SWB	661.4	661.7	0.2	0.0	660.8	-0.7	-0.1
TMS	3,459.6	3,457.9	-1.8	-0.1	3,440.1	-19.5	-0.6
WSH	1,061.5	1,061.7	0.1	0.0	1,060.1	-1.4	-0.1
WSX	492.8	492.8	0.0	0.0	491.4	-1.4	-0.3
YKY	1,393.1	1,393.0	-0.0	-0.0	1,393.5	0.4	0.0
<b>Total</b>	<b>17,347.8</b>	<b>17,346.6</b>	<b>-1.2</b>	<b>-0.0</b>	<b>17,313.9</b>	<b>-33.9</b>	<b>-0.2</b>

Source: CMA analysis

4.306 Table 4-8 shows the potential changes to the base costs for the wholesale wastewater model. We found that the potential change to the base costs was less than 0.13% for each company, and on average less than 0.1% for the industry.

<sup>522</sup> The adjustments were also applied to the CMA final model, also with a finding that the change to the modelled base costs were not material.

<sup>523</sup> This model includes only decisions taken on including 2019/20 data, removal of alternative specifications and changes to SWC2

**Table 4-8: Comparison of base costs between CMA model and with smearing and alpha adjustments (2020 to 2025, wholesale wastewater model)<sup>524</sup>**

Company	CMA (£m)	CMA Smearing Factor			CMA + Alpha Factor		
		£m	Change (£m)	Change (%)	£m	Change (£m)	Change (%)
ANH	2,047.8	2,050.2	2.4	0.1	2,047.2	-0.7	-0.0
HDD	23.8	23.8	0.0	0.1	23.8	-0.0	-0.1
NES	840.0	840.1	0.1	0.0	840.1	0.2	0.0
NWT	2,055.4	2,057.0	1.6	0.1	2,053.9	-1.5	-0.1
SRN	1,487.3	1,487.1	-0.2	-0.0	1,488.7	1.4	0.1
SVE	2,510.1	2,512.9	2.8	0.1	2,509.6	-0.5	-0.0
SWB	744.2	744.4	0.1	0.0	743.7	-0.5	-0.1
TMS	3,802.0	3,803.6	1.6	0.0	3,797.1	-4.9	-0.1
WSH	1,155.6	1,156.4	0.8	0.1	1,154.7	-0.9	-0.1
WSX	945.3	945.5	0.2	0.0	944.5	-0.8	-0.1
YKY	1,581.2	1,583.0	1.8	0.1	1,580.8	-0.4	-0.0
<b>Total</b>	<b>17,192.8</b>	<b>17,204.0</b>	<b>11.2</b>	<b>0.1</b>	<b>17,184.2</b>	<b>-8.7</b>	<b>-0.1</b>

Source: CMA analysis

4.307 Overall, although we considered that log-transformation bias might affect companies' cost allowance estimates, we decide that adjusting for log-transformation bias adds complexity to the model without necessarily mitigating the bias if the sample size is not sufficiently large.

4.308 Also, since some of the alpha adjustment factors required a downward adjustment of base costs, which does not align with statistical theory, we decide that these adjustment factors should not be used.

4.309 Furthermore, and notwithstanding our conceptual concerns, we find that the smearing and alpha factor adjustments would not have a material effect on the base cost estimates.

4.310 For these reasons, we decide that it is appropriate to use naïve estimators.

### ***Which forecast data should be used?***

4.311 Ofwat used historical data from 2011/12 to 2018/19 to estimate the PR19 base cost models. Forecasts for each of the explanatory variables for 2020/21 to 2024/25 were then used, in conjunction with coefficients from the PR19 base cost models, to forecast the cost allowances for 2020/21 to 2024/25.

4.312 Ofwat estimated forecasts for its cost drivers using a variety of methodologies. These are summarised in Table 4-9.

<sup>524</sup> This model includes only decisions taken on including 2019/20 data, removal of alternative specifications and changes to SWC2

**Table 4-9: Ofwat's forecast method for the explanatory variables**

Variable	Forecast method
Connected properties (water and wastewater)	Forecasts based on household growth rate projections produced by the Office for National Statistics (ONS).
Length of mains (water), Sewer length (wastewater)	Forecasts based on each company's forecast of the variable (50% weight) and a linear projection of the historical growth rate of the asset (50%)
Water treatment complexity (water)	Forecasts based on each company's forecast of the variable.
Number of booster pumping stations (water)	Forecasts based on a linear projection of historical growth rates.
Load received at sewage treatment works (wastewater)	Forecasts based on each company's forecast of the variable (100%), except for Anglian Water and Northumbrian Water where we place 50% on a linear projection of historical growth rates of sewage load for the company*.
Sludge produced (wastewater)	Forecasts based on each company's forecast of the variable.
Percent load treated in size bands 1-3 or in size band 6 (wastewater)	Forecasts based on the average of the last four years of historical data for each company.
Pumping capacity (wastewater)	Forecasts based on the average of the last four years of historical data for each company.
Load with ammonia consent below 3mg/l (wastewater)	Forecasts based on each company's 2018-19 level.
Weighted average density (water and wastewater)	Forecasts based on ONS population projection numbers for water and wastewater.
Sewage treatment works (wastewater)	Forecasts based on each company's forecast of the variable.

\* Anglian Water and Northumbrian Water forecast sewage loads that are significantly higher than would be expected from historical growth rates. We therefore put some weight on historical growth rates for these two companies.

Source: Ofwat (2019), 'PR19 final determination: Securing cost efficiency technical appendix', Table 5

### *Parties' arguments*

4.313 Yorkshire said that Ofwat did not appropriately account for changes in future cost drivers and that Ofwat should have adopted Yorkshire's forecasts for new connections, length of mains, and booster pumping stations.<sup>525</sup>

4.314 Yorkshire said that its forecasts were developed alongside other areas of its plan, including enhancement and maintenance programmes. For this reason, Yorkshire indicated that its forecasts for key variables were aligned with the activity that it had planned to undertake. Yorkshire estimated that its forecasts increased its allowance by £14 million in wholesale water.<sup>526</sup>

<sup>525</sup> Yorkshire SoC, paragraph 198

<sup>526</sup> Yorkshire SoC, paragraph 198

- 4.315 Ofwat said that during its PR19 process it placed some weight on companies' forecasts where it considered these reliable.<sup>527</sup>
- 4.316 Ofwat noted that Yorkshire did not make representations on the forecast of sewer length (which places 50% weight on the company's forecast), nor on any wastewater cost driver, despite challenging Ofwat's forecast of length of water mains. Ofwat considered this clear evidence that companies' representations tended to focus on the areas where the companies considered they deserved a higher allowance.<sup>528</sup>
- 4.317 United Utilities said that the CMA should use gross new connections based on Local Authorities' forecasts and sense-check them with an alternative source of data from a different organisation.<sup>529</sup>
- 4.318 We received no new evidence or arguments on this topic in response to our Provisional Findings. In response to Provisional Findings, Northumbrian said it agreed with the CMA's provisional decision to use updated ONS data for new connections.<sup>530</sup>

### *Decision*

- 4.319 Yorkshire's criticisms relate to three variables (new connections, length of mains and booster pumping stations), but Yorkshire provided us only with evidence relating to new connections.
- 4.320 We assessed companies' forecasts on the number of connected properties in paragraphs 4.788 to 4.804. There, we decide to use ONS forecasts for the number of connected properties.
- 4.321 We reviewed the Ofwat forecast data for new mains and booster pumping stations. Ofwat's forecasting methodology accounts for companies' historical growth and is relatively simple. Moreover, for the length of mains, Ofwat placed 50% weight on the companies' business plans forecasts, recognising the need to account for companies' specific future plans. We decide that this is a reasonable approach and we adopt the same approach. Furthermore, we have not received evidence that would suggest adopting a different forecasting methodology.

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<sup>527</sup> [Ofwat's response to Yorkshire's SoC](#), p29 & paragraph 3.63

<sup>528</sup> [Ofwat's response to Yorkshire's SoC](#), paragraphs 3.70-3.72

<sup>529</sup> [United Utilities submission](#), paragraph 3.5.7

<sup>530</sup> [Northumbrian's response to the provisional findings](#), paragraph 34

4.322 We note that Yorkshire did not submit any evidence in support of its forecasts for length of mains and booster pumping stations. Therefore, we decide to use Ofwat's forecasts.

4.323 In addition, we decide to use the updated forecasts for the number of connected properties and population density as estimated by the ONS. Furthermore, as a result of our decision to include 2019/20 data, we updated these forecasts accordingly.

### ***What is the appropriate aggregation and triangulation approach?***

4.324 Models may include a degree of error and uncertainty. Models that focus on specific parts of the value chain may allow the set of explanatory factors to be tailored to each model, whereas more aggregated models help account for differences between how companies allocate costs across the value chain. Triangulation of models that estimate costs for different parts and levels of the value chain may be helpful to mitigate these risks and avoid relying on one specification only.

### ***Parties' arguments***

4.325 Anglian made four main critiques of Ofwat's aggregation and triangulation methodology:

- (a) Adding together the different parts of the value chain before calculating the gap to the benchmark created an unrealistic frontier. This was because upstream factors influenced downstream structures.<sup>531</sup>
- (b) Ofwat triangulated similar wholesale water models and did not triangulate models at all for treated water distribution.<sup>532</sup>
- (c) In wastewater, Ofwat did not produce an integrated wastewater model. According to Anglian, Professor Saal demonstrated that acceptable integrated wastewater models could be created while still following Ofwat's model principles and selection criteria.<sup>533</sup> In its response to our

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<sup>531</sup> [Anglian SoC](#), paragraph 568. Anglian said: 'For example, the distribution of Anglian's recycling centres (which is driven by demographics and geography) influences the size and location of its sludge treatment facilities.'

<sup>532</sup> [Anglian SoC](#), paragraph 581

<sup>533</sup> [Anglian SoC](#), paragraph 590. See also Saal and Nieswand (2019), [A Review of Ofwat's January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19](#), p5, p10, p21 (comment 2), p25-26 (comment 8a), pp49-51 & pp58-59. See also Saal (2019), [A Comment on Misspecification and Systematic Bias in Ofwat's PR19 Draft Determination Integrated Wholesale Water and Wastewater Models](#), p10 (comment 2)



Provisional Findings, Anglian proposed another integrated wastewater model included in Saal and Nieswand (May 2020).<sup>534</sup>

(d) Ofwat failed to sense-check modelling results with bottom-up evidence of the companies' actual expenditure needs.<sup>535</sup>

4.326 Oxera, as adviser to Anglian, stated that, while not having thoroughly investigated the development of an integrated wastewater model, it considered that it was, 'in principle, possible to develop aggregate models that were statistically and operationally valid.'

4.327 Ofwat said that:

(a) The level of aggregation of the models captured different parts of the value chain and this was consistent with the engineering rationales.

(b) Where a particular level of aggregation was excluded, it was due to statistical or engineering reasons.<sup>536</sup>

4.328 Ofwat found the integrated wholesale wastewater specifications proposed by Anglian did not perform well against Ofwat's model principles and selection criteria. It also raised concerns on the use of load as a scale driver<sup>537</sup> and the lack of a density variable.<sup>538</sup>

4.329 Ofwat's consultants CEPA built a series of integrated wholesale wastewater models which, overall, performed well.<sup>539</sup> Ofwat, however, later rejected these models because scale had different effects in different parts of the value chain, and density had ambiguous effects across different parts of the value chain.<sup>540</sup>

4.330 Northumbrian supported Ofwat's finding that the aggregate wastewater models were not sufficiently robust to include in its triangulation.

4.331 Professor Saal proposed adding model specifications which used alternative scale variables and triangulate across these. He said that a large proportion of variation in costs was explained by a single scale variable included in each

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<sup>534</sup> [Anglian's response to the provisional findings](#), paragraphs 126-130

<sup>535</sup> [Anglian SoC](#), paragraph 552 (iii) & section 4.2

<sup>536</sup> [Ofwat's response to Anglian's SoC](#), paragraphs 3.32–3.36

<sup>537</sup> Ofwat stated that load was not appropriate from an engineering perspective because load only captured sewage collection and treatment activities, but not bioresources activities; [Ofwat's response to Anglian's SoC](#), paragraph 3.37

<sup>538</sup> [Ofwat's response to Anglian's SoC](#), paragraph 3.37

<sup>539</sup> CEPA (2018), [PR19 Econometric Benchmarking Models](#), pp110–113

<sup>540</sup> Ofwat (2019), [Supplementary technical appendix: Econometric Approach](#), p19

model, and alternatives to the scale variable should be included to reduce specification bias.<sup>541</sup> Professor Saal proposed the following specifications:

- Three integrated wholesale wastewater models which used different scale variables (number of connected properties, population served, or treatment load).<sup>542</sup>
- Additional integrated wholesale water (WW) models which used different scale variables (number of connected properties, effective water or length of mains).<sup>543</sup>
- Treated water distribution (TWD) models which used different scale variables (eg length of mains, number of connected properties or water delivered).<sup>544</sup>

4.332 In response to Provisional Findings, Northumbrian said it agreed with our triangulation between models and with our assessment of the proposed additional wholesale wastewater models.<sup>545</sup>

### *Decision*

4.333 We assess the Parties' arguments on aggregation and triangulation and then provide our decisions.

### *Aggregation*

4.334 On Anglian's argument that adding together the different parts of the value chain before calculating the gap to the efficiency benchmark creates an unrealistic frontier, we found that the approach taken by Ofwat aggregated costs before estimating the efficiency benchmark.

4.335 An alternative approach involving disaggregated benchmarking would require running a series of separate models for different parts of the value chain, calculating an efficiency benchmark for each model, and then producing an efficiency benchmark as the sum of these separate efficiency benchmarks from each model. This would be vulnerable to the criticism that it provides an unrealistic and unachievable efficiency benchmark by ignoring the interactions

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<sup>541</sup> Saal and Nieswand (2019), [A Review of Ofwat's January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19](#), p5 (comment 3), p9 (bullet 2), p18 (comment 1), p28 (comment 12) & p37

<sup>542</sup> Saal and Nieswand (2019), [A Review of Ofwat's January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19](#), pp68-70

<sup>543</sup> Saal and Nieswand (2019), [A Review of Ofwat's January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19](#), pp45-47

<sup>544</sup> Saal and Nieswand (2019), [A Review of Ofwat's January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19](#), p9 (bullet 2)

<sup>545</sup> [Northumbrian's response to the provisional findings](#), paragraph 34

and trade-offs across different parts of the value chain. This specific problem can be addressed by summing the estimated costs across different disaggregated models before calculating any efficiency benchmark.<sup>546</sup> Other methodologies, such as either relying on aggregate models only or setting a different efficiency benchmark for each disaggregated model, carry more risks than Ofwat's approach. We assessed similar arguments also in paragraphs 4.413 to 4.415 and arrived at the same conclusion.

- 4.336 Ofwat specified models at different levels of the value chain. We found that this was a reasonable and appropriate approach as there were benefits and disadvantages for both aggregated and disaggregated models and it was advisable to use both. This avoided over-reliance on a single set of models.
- 4.337 We reviewed CEPA's integrated wholesale wastewater models. Our review of these models indicated that these models were not suitable because of problems with the specification of the functional form.<sup>547</sup>
- 4.338 We reviewed Professor Saal's integrated wastewater model specifications. We agreed with Ofwat that the lack of a density variable was concerning as it had proven to be a key cost driver in other models. Moreover, we replicated the proposed model with two more years of data (up to 2019/20) and found that some coefficients considerably changed in size and the coefficient for sludge treated non-indigenously lost significance. For these reasons, we decide that Professor Saal's integrated wholesale wastewater model is not appropriate.<sup>548</sup>
- 4.339 We also reviewed Anglian's proposed model included in Saal and Nieswand (May 2020). We have concerns about the economic and engineering rationale of one of the explanatory variables included in the model, namely the ratio of sewer pumping stations to length of rising mains. In particular, we do not see the rationale for using length of rising mains as the denominator of the ratio.
- 4.340 Anglian said that the engineering logic behind the use of length of rising mains was that rising mains were required to be pumped within a sewer network. We understand this to mean that rising mains are, therefore, correlated with the costs of pumping water. We find this is not a valid rationale for including length of rising mains as the denominator of the ratio. In fact, according to Anglian's logic, we would find it more appropriate to use rising mains directly as a cost driver. However, we found that the length of rising mains was highly correlated with the number of pumping stations. Moreover, pumping costs

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<sup>546</sup> CMA (2015), [Bristol Redetermination Appendices](#), Appendix 4(1) paragraph 146

<sup>547</sup> The statistical test RESET indicated that the models likely required additional interaction or quadratic terms.

<sup>548</sup> We have not considered Oxera's suggestion further at this point as it did not provide a robust aggregate model. As Oxera stated, it had not 'thoroughly investigated the development of an aggregate model.' (p19)

were already captured by other variables included in the model (pumping capacity and number of pumping stations). Therefore, we decide not to use length of rising mains.

- 4.341 We also tested other variables as an alternative to the ratio of number of pumping stations to length of rising mains. We tested the use of sewer length as the denominator. This variable may have an economic and engineering rationale as it would capture the density of pumping stations in a geographic area. However, using this variable led to other variables included in the model not being significant.<sup>549</sup> In fact, Anglian submitted that dividing the number of pumping stations by the length of any other type of mains (either gravity, transferred, or sewer) did not lead to any of these variables becoming statistically significant. For these reasons, we decided not to use the integrated wholesale wastewater model proposed in Saal and Nieswand (May 2020) nor any of the other versions we developed based on the proposed integrated wholesale wastewater models.
- 4.342 Overall, we have not seen nor managed to develop a satisfying integrated wastewater model. Therefore, we decide not to include any model at this level of aggregation.

### *Triangulation*

- 4.343 We considered the arguments of Anglian and Ofwat on the most appropriate approach to triangulation.
- 4.344 We already considered the definitions of water complexity used in WRP1, WRP2, WW1 and WW2. For the reasons explained in paragraphs 4.97-4.101, we found that both explanatory variables for water treatment complexity were reasonably defined. Therefore, we decide to use those models, giving 50% weight each in their relative triangulations.
- 4.345 We assessed Ofwat's lack of triangulation for model specification TWD1. Ofwat relied on one model only. We tested alternative TWD models in paragraph 4.245 but did not find any model that would perform well enough to triangulate TWD1 with. We therefore decide not to triangulate TWD1 with any other model.
- 4.346 We assessed Professor Saal's additional model specifications.

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<sup>549</sup> Population density indices, which Professor Saal proposed to use, become not significant. When population density indices are replaced with the CMA's preferred variable for weighted average population density the coefficients for pumping capacity and number of pumping stations per sewer length become insignificant. This result holds also if the squared term of weighted average population density is added.

- We summarised in paragraph 4.338 our assessment of Professor Saal's integrated wholesale wastewater models and we decide not to include them among our specifications.
- We assessed Professor Saal's integrated wholesale water models which used alternative variables to connected properties as scale variables. We acknowledge that it may be helpful to triangulate specifications that use different scale variables, but this comes at the cost of increasing the complexity of the overall suite of models. We found that introducing integrated wholesale water models which replaced connected properties with lengths of main would increase complexity without adding any particular economic or engineering insight to our models. For this reason, we decide not to include these alternative models.
- We discussed the use of water volumes in paragraphs 4.104-4.115.
- We did not find an economic and engineering rationale to use properties as a scale variable in the TWD1 model instead of lengths of main. Therefore, we decide not to include these specifications.

### ***Should we estimate our models over five years?***

4.347 Ofwat used eight years of data from 2011/12 to 2018/19 for its base cost models. In Provisional Findings, we used the same approach. In this section, we consider whether using five years from 2015/16 to 2019/20 improves our models.

### ***Parties' arguments***

4.348 Professor Saal said that it was inappropriate to estimate an econometric model with an eight-year random effects model when efficiency was estimated over five years.<sup>550</sup> Professor Saal said that if the goal was to estimate efficiency in a five-year period, the random effect model should also be estimated over five years.<sup>551</sup> Professor Saal also pointed to the possible presence of structural breaks in the data after 2015, quoting Frontier Economics' report on productivity in the water industry for Water UK.<sup>552</sup>

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<sup>550</sup> [Professor David Saal's response to the provisional findings](#), p.3 and pp.24-25, Saal (2019), *A Comment on Misspecification and Systematic Bias in Ofwat's PR19 Draft Determination Integrated Wholesale Water and Wastewater Models*, p12 (comment 4)

<sup>551</sup> [Professor David Saal's response to the provisional findings](#), p.24

<sup>552</sup> Saal and Nieswand (2019), *A Review of Ofwat's January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19*, p17, Frontier Economics (2017), *Productivity improvement in the water and sewerage industry in England since privatisation*, Saal (2019), *A Comment on Misspecification and Systematic Bias in Ofwat's PR19 Draft Determination Integrated Wholesale Water and Wastewater Models*, p4 (comment 4)

- 4.349 Anglian said that if the CMA decided to use five years of data to estimate the efficiency challenge, it should also use five years to estimate the base cost models. Anglian said that using five years of data in the base cost models allowed the company-specific random effect that was effectively capturing relative efficiency to match the period over which efficiency was being measured. Anglian said that not doing so would bias the efficiency estimates because the models' random effects would be influenced by data and performance outside the period of efficiency assessment.<sup>553</sup>
- 4.350 Anglian suggested two possible solutions:
- (a) to estimate efficiency using an eight-year random effect with the CMA's eight-year panel models; or
  - (b) to estimate efficiency using a five-year random effect and move to a five-year panel.<sup>554</sup>
- 4.351 We assess the first option in paragraphs 4.416 to 4.430. In that section, we also assess Anglian's arguments on the potential bias of our models' random effects. In paragraphs 4.355 to 4.361 we assess Anglian's proposed second option, namely whether we should estimate our base cost models over five years instead of eight.<sup>555</sup>
- 4.352 Ofwat said Anglian misinterpreted the use of random effects in base cost models. It said that random effects were used to estimate the coefficients while recognising the panel structure of the data and that the decomposition of the residual into a time-invariant random effects component and an idiosyncratic error was not used in the calculation of the catch-up efficiency challenge.<sup>556</sup>
- 4.353 Ofwat said that using five years to calculate the catch-up efficiency challenge ensured the catch-up efficiency challenge was not based on a single low-cost year by any one company.<sup>557</sup>
- 4.354 Professor Saal said that Ofwat's econometric modelling assumed that both firm efficiency and the underlying relationship determining costs did not change over time. Professor Saal said this was a strong assumption. For example, he said there were changes in regulatory incentives for efficiency improvement, changes to cost allowances in different AMPs, and differences within the AMP cycle due to capital maintenance. Professor Saal said that

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<sup>553</sup> [Anglian's response to the provisional findings](#), paragraph 120

<sup>554</sup> [Anglian's response to the provisional findings](#), paragraph 121

<sup>555</sup> Given our decision to include 2019/20 data, we compare models with nine years, instead of eight.

<sup>556</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), Annex 5, paragraph A5.11-15

<sup>557</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), Annex 5, paragraph A5.14

Ofwat's modelling assumptions were logically inconsistent with its cost projections which would lead to bias. Professor Saal suggested controlling for this bias using time dummy variables.<sup>558</sup>

### *Decision*

4.355 Anglian compared the results of our Provisional Findings models for wholesale water models based on five and eight years of data.<sup>559</sup> We did a similar comparison based on our final model specifications and using our final models with nine years of data, instead of eight. Differently from Anglian, we also compared the models for wholesale wastewater.

4.356 Our models with five years had 86 observations in wholesale water and 50 in wastewater. With nine years of data, the observations became 158 and 90 respectively. Comparing our models estimated over five and nine years, we found that:

- (a) Using nine years increased our observations by at least 80% in both wholesale water and wastewater relative to only using five years of data.
- (b) While confidence intervals for some coefficients in wholesale water became narrower, most remained similar or larger, and in wholesale wastewater several coefficients became insignificant. For example, the coefficients for the load with ammonia consent below 3mg/l and the load treated in size band six became statistically insignificant across all the models where they were used.
- (c) Some coefficients changed substantially. For example, when estimating the models over five years, the coefficient for weighted average complexity in WRP2 more than doubled. This meant that basing our models on different years was likely to lead to different estimated allowances.
- (d) The changes to the R-squared were minimal. In wholesale water, the R-squared changed by less than one percentage point across all model specifications. In wholesale wastewater, using five years increased the R-squared for two models by a maximum of four percentage points and decreased the R-squared of the remaining six models by a maximum of five percentage points.

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<sup>558</sup> Saal and Nieswand (2019), *A Review of Ofwat's January 2019 Wholesale Water and Wastewater Botex Cost Assessment Modelling for PR19*, p6 (comment 5), p30 (comment 15, bullet 2), p31 (comment 16)

<sup>559</sup> Anglian's response to the provisional findings, table 3

- 4.357 The comparison of the models presented in paragraph 4.356 suggested that, overall, our models would not improve if only the last five years of data were used. In particular, we found that the performance of our wholesale wastewater models would worsen. We gave limited weight to the small increase in the R-squared of the wholesale water model specifications given the small sample size and the possibility of over-fitting.
- 4.358 We reviewed Professor Saal's and Ofwat's arguments on the consequences of estimating base cost models over nine years and the efficiency scores over five years. On balance, our models performed better over nine years and we have particular concerns regarding the risks of over-fitting if we use only five years of data. For these reasons, we decide to use nine years of data to estimate the allowances. We acknowledge that the estimation of random effects over nine years might not be consistent with the estimation of companies' efficiency scores over five years. However, on balance, the benefits of more robust models outweigh the risks of this potential discrepancy. We assess which period to estimate efficiency scores over in paragraphs 4.416 to 4.430.
- 4.359 We have not seen evidence of structural breaks in the data from 2014/15 and we note that the Water UK report mentioned by Professor Saal is based on a different set of data. In fact, we have not seen any evidence supporting the fact that any year before 2014/15 was 'atypical' and that the inclusion of years before 2014/15 would lead to biased estimates. This is consistent with the discussion in paragraphs 4.39-4.44 where we assessed the inclusion of 2019/20 cost data.
- 4.360 For these reasons, we decide to estimate our base cost models with nine years of data.
- 4.361 We have considered Professor Saal's suggestion of including time dummies in the model to capture changes that occur over time. While time dummies (either yearly or for full AMPs) may be helpful to capture common cost changes across the industry, they require strong assumptions when their coefficients are used for forecasting allowances. For example, time dummies would capture (at least partly) inefficiency too. For this reason, we decide not to use time dummies.

### ***Summary of our decision on base cost models***

- 4.362 In this section, we summarise our decisions on base cost models.
- 4.363 Our approach to econometric modelling is similar to that adopted by Ofwat but involved three main changes.



- (a) We added the squared term of weighted average of population density as an explanatory variable in wholesale wastewater model specification SWC2.
- (b) We did not find Ofwat's alternative specifications convincing based on our assessment of the following variables: the number of new connected properties (TV2), the average pumping head (TV3), the percentage of lengths of mains renewed or relined (TV4), and performance on leakage targets (TV5–TV6). We therefore decide to drop these models.
- (c) We added 2019/20 data to our dataset and updated the forecasts accordingly. As a consequence of this decision, we postponed frontier shift and RPEs by one year. We discuss this decision in paragraphs 4.641 to 4.643.

4.364 These changes resulted in different cost allowances from Ofwat's Final Determination for the four companies and these are summarised in Table 4-10.

**Table 4-10: Effect of CMA decisions on base cost econometric models on the contribution to base costs (water and wastewater)**

	Ofwat modelled base costs net of enhancement Opex	Impact of revisiting SWC2	Impact of removal of alternative specifications	Impact of adding 2019/20 data	Impact of postponing frontier shift and RPEs by one year	CMA modelled base costs net of enhancement Opex	£m % change from Ofwat's allowance
Anglian	3,368	13	-50	-2	24	3,354	-0.4%
Bristol	340	0	0	15	3	357	5.0%
Northumbrian	1,955	0	0	39	15	2,009	2.8%
Yorkshire	2,896	2	0	77	22	2,996	3.5%

Source: CMA analysis.

Note: This table does not show the effect of the CMA decisions on efficiency catch up (see from paragraph 4.405), frontier shift level (see from paragraph 4.496), RPE (see from paragraph 4.653), and growth (see paragraph 4.741).

### **Assessment of statistical performance**

4.365 In the following section, we assess the overall statistical performance of our models as a basis for base costs allowances. We acknowledge that our models, like any econometric model, are subject to some limitations and a degree of uncertainty in their final estimates. In the remainder of this section we assess the Parties' arguments in relation to some of these limitations.

4.366 Given the similarities between our models and Ofwat's base cost models, we assessed whether the criticisms made by the Disputing Companies' on Ofwat's models in regard to modelling principles and model accuracy also applied to our models. This assessment of the quality of the models also informed our views on the appropriate catch-up efficiency challenge. First, we

assess the arguments on multicollinearity; second, we consider criticisms around accuracy.

### *Assessment of multicollinearity*

#### *Parties' arguments*

- 4.367 One criticism concerned the approach to multicollinearity, in other words, high correlation among the explanatory variables.
- 4.368 Ofwat adopted the approach to multicollinearity suggested by its consultants CEPA and did not rely on models with a VIF – a measurement of multicollinearity – above ten.<sup>560</sup>
- 4.369 Anglian said that Ofwat applied its modelling principles with a lack of transparency and, at times, inconsistently. An example was Ofwat's acceptance of high levels of multicollinearity in its models. This was contrary to its originally stated modelling principles as the five wholesale water models had VIF statistics ranging from 212 to 230. For the alternative models put forward at Ofwat's FD, the VIF ranged from 215 to 1,570.<sup>561</sup>
- 4.370 Professor Saal, on behalf of Anglian, commented that a VIF threshold of ten was too low to reject models and a higher threshold should be allowed to accommodate the industry's complexity.<sup>562</sup>
- 4.371 Ofwat, in its response to Anglian, said that when Ofwat's models had high multicollinearity this was driven by the inclusion of density and its square term as explanatory variables.<sup>563</sup> Ofwat said that, while high multicollinearity might impair its ability to estimate accurately the impact of the individual explanatory variables on the dependent variable, it should not impair its ability to estimate accurately their collective impact. Since these two terms (density and its squared term) always varied together, the collective impact, measured by the elasticity of the variable, was more important.
- 4.372 Thames Water supported Ofwat's approach to the assessment of multicollinearity.<sup>564</sup> United Utilities tested for multicollinearity in Ofwat's models and found that the removal of density squared terms resulted in VIF scores below two for all models (under OLS) and that this highlighted that the

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<sup>560</sup> VIF is the variance inflation statistics, a measure used to quantify the severity of multicollinearity in an econometric model.

<sup>561</sup> [Anglian SoC](#), paragraph 571

<sup>562</sup> Saal, David (2018), [Comments on CEPA's Methodological Approach in its PR19 Econometric Benchmarking Models for Ofwat](#), p6

<sup>563</sup> [Ofwat's response to Yorkshire's SoC](#), paragraph 3.30

<sup>564</sup> [Thames Water submission](#), paragraph 7.13

multicollinearity was solely confined to the use of the squared term of density.<sup>565</sup>

### *Our assessment*

- 4.373 We assessed the Parties' arguments on multicollinearity. We found that a VIF of ten was standard in the literature.<sup>566</sup> Therefore, we decide to follow the same approach. We also recognised that if a transformation of one explanatory variable was included in the regression then multicollinearity might be higher. Therefore, we decide that a higher degree of multicollinearity can be accepted if this is due to the presence of both population density and its quadratic form in some of our models.
- 4.374 VIF results showed that multicollinearity was not a problem in our models since it was below 10 for all models without a transformation of an explanatory variable and for models with a transformation of an explanatory variable the VIF was below 10 for the non-transformed variables. Therefore, this did not undermine the models as a sound basis on which to set cost allowances.

### *Assessment of model accuracy*

- 4.375 In this section, we consider the accuracy of our estimates. Beside considering the Parties' arguments, this influenced our view on the appropriate level of efficiency challenge.<sup>567</sup>
- 4.376 Oxera, working for Yorkshire, presented three analytical approaches to examine the uncertainty (a measure of model accuracy) present in cost modelling: SFA (discussed in paragraphs 4.24-4.26), confidence intervals, and Monte Carlo simulation.<sup>568</sup> We address confidence intervals and Monte Carlo simulation in the following sub-sections.

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<sup>565</sup> [United Utilities submission](#), paragraph 3.4.4

<sup>566</sup> The Stata 16 manual states that most analysts rely on informal rules of thumb applied to the VIF; see Chatterjee and Hadi (2012). According to these rules, there is evidence of multicollinearity if i) the largest VIF is greater than ten (some choose a more conservative threshold value of 30) or ii) the mean of all the VIFs is considerably larger than one.

<sup>567</sup> We acknowledge that other aspects, such as sources of bias, explanatory power, etc., may influence the appropriateness of the efficiency challenge. These have been reviewed throughout this section.

<sup>568</sup> Confidence intervals estimate the range of values which the estimated costs almost certainly fall in (with 95% probability).

## Confidence intervals

- *Parties' arguments*

- 4.377 Oxera used Ofwat's model to compute the 95% confidence intervals around the companies' cost estimates. The analysis found that:<sup>569</sup>
- (a) The cost prediction for the fourth-ranked company in wholesale water (Ofwat's efficiency benchmark) had an uncertainty between +/- 8%-17.5%.<sup>570</sup>
  - (b) The cost prediction for the third ranked company in wholesale wastewater (Ofwat's efficiency benchmark) had an uncertainty between +/- 10.5%-25%.
- 4.378 Oxera said that the difference in the efficiency scores between the most and least efficient water companies was significantly larger than that estimated by Ofgem in RIIO-ED1.<sup>571</sup>
- 4.379 Anglian said that Ofwat's models were not robust because several companies received considerably higher contributions to base allowances than they requested. Allowances ranged from -9% of base costs needs for Sutton & East Surrey Water and Yorkshire to 14% in excess of base costs needs for Portsmouth Water.<sup>572</sup>
- 4.380 Anglian said that its analysis of the quality of the Ofwat models, as measured by the confidence intervals around the cost predictions, showed that there was substantially more variability around the wholesale wastewater models than around the wholesale water models. Therefore, it was not clear why the same efficiency benchmark was used for both wholesale water and wholesale wastewater. Instead, wastewater should have had a less challenging benchmark than water.<sup>573</sup>
- 4.381 Ofwat's response to Oxera said that any statistical model had a degree of error and Oxera did not present alternatives with higher accuracy levels.<sup>574</sup>
- 4.382 Ofwat said that Oxera did not take into account that the models were aggregated and triangulated to obtain the final result. Ofwat said that the

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<sup>569</sup> [Yorkshire SoC](#), Annex 10, p9

<sup>570</sup> The confidence intervals are symmetric around the central estimate and therefore range from, say, -8% to +8%. We use the symbol +/- to indicate this.

<sup>571</sup> [Yorkshire SoC](#), Annex 10, p9

<sup>572</sup> [Anglian SoC](#), paragraph 554

<sup>573</sup> [Anglian SoC](#), paragraph 603

<sup>574</sup> [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), paragraph 3.27

confidence intervals could be reduced by including additional variables, however, this might compromise the reliability of the estimated coefficients and increase forecast error.<sup>575</sup>

4.383 In response to Provisional Findings, Oxera also said that aggregating confidence intervals across models masked the fact that the confidence intervals in the disaggregated models were particularly wide.

4.384 Professor Kumbhakar and Oxera, in submissions on behalf of Anglian, said that the approach taken by the CMA in its Provisional Findings when comparing confidence intervals across models was incorrect. This was because:

- the CMA's approach to comparing confidence intervals was sensitive to the standard error measure used; and
- the CMA's approach of taking an average of the confidence intervals across models was incorrect.

4.385 Professor Kumbhakar said that finding a formula that calculated the confidence intervals for cost predictions that were themselves a function of different underlying models was not feasible. Professor Kumbhakar suggested that the only feasible option was bootstrapping, a resampling technique that could be used to estimate standard errors and confidence intervals.<sup>576</sup>

4.386 Oxera used different methodologies for calculating standard errors and concluded that there was a greater level of uncertainty in our PR19 water and wastewater models than in the CMA PR14 models.

4.387 Ofwat said it was not clear that a bootstrap approach was appropriate for this context. It highlighted the large discrepancy between the confidence intervals estimated by the CMA in Provisional Findings and Oxera. It said that the properties of bootstrap estimators depended on asymptotic theory<sup>577</sup> and there was no evidence provided by Oxera on whether bootstrapping was appropriate given the small number of observations.<sup>578</sup>

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<sup>575</sup> [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), paragraph 3.28

<sup>576</sup> In practice, the technique creates 500 versions of our dataset by random sampling with replacement. With each dataset we calculate the desired sample statistics, in this case regression coefficients of the underlying models, a triangulation, efficiency benchmark and the final allowances. By calculating the standard deviation of results from the 500 samples we get an approximation of the standard error of the allowances. We can then use this bootstrapped standard error to derive confidence intervals around the estimated allowances.

<sup>577</sup> Statistical frameworks that depend on asymptotic theory (also known as large sample theory) assume that the number of observations tends to infinity in order to draw conclusions about statistical properties. As such, a large sample is required in these settings to get reliable results.

<sup>578</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), paragraph A5.22

- *Our assessment*

- 4.388 We acknowledge that in any benchmarking of cost assessment there will be a degree of uncertainty attached to the results. We looked at the 95% confidence intervals for the fitted values of our proposed models.<sup>579</sup>
- 4.389 We looked at the approach proposed by Oxera to calculate confidence intervals with bootstrapping. We found that bootstrapping was sensitive to the sampling method used. In particular, the sampling method proposed by Oxera might not be the most appropriate for panel data. We also noted that bootstrapping might not be appropriate in our unbalanced panel dataset because two companies (post-merger Severn Trent Water and Hafren Dyfrdwy) appeared only in 2019/20.<sup>580</sup>
- 4.390 While we acknowledge that the method we used (delta method) also required assumptions on the distribution of the underlying error and variance of the explanatory variable, we found it more intuitive and practical for the purposes of this assessment.<sup>581</sup> Therefore, we decide not to use bootstrapping.<sup>582</sup>
- 4.391 Table 4-11 and Table 4-12 show the range of confidence intervals across underlying water and wastewater models. For wholesale water models, confidence intervals range from +/-9% to +/-17%. For wastewater models, they range from +/-12% to +/-23%. In the CMA's Bristol PR14 Determination, confidence intervals for wholesale water models ranged from -13.1% to +14.1% across the seven preferred models.<sup>583, 584</sup>

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<sup>579</sup> 95% is the probability that the point estimate, ie the estimated costs, is within the confidence interval. In other words, as a thought experiment, if the same population is sampled on 100 occasions and interval estimates are made on each occasion, the resulting intervals would include the true population parameter in approximately 95 cases.

<sup>580</sup> Oxera's proposed bootstrap re-sampling approach took random years from each company (with replacement). The 95% confidence intervals around triangulated costs were 59% for both water and wastewater. This approach did not respect the panel nature of the data. A way to account for the panel structure of the data is to use either 'cross-sectional re-sampling', or 'time-dimensional resampling.' These methods lead to confidence intervals ranging from 61% to 156%.

<sup>581</sup> The delta method approximates standard errors of non-linear transformations of explanatory variables, such as the natural logarithm. Assuming that the variance of the explanatory variable is low and its error is normally distributed, the Delta method uses a Taylor series approximation using the first order derivative of the function to get a linear approximation of the non-linear function. Assuming this approximation is normally distributed, it is possible to calculate standard errors and associated confidence intervals.

<sup>582</sup> We acknowledge we used a similar argument to reject SFA. The two assessments (on the correct functional form and model accuracy) are substantially different and require a different analytical framework. For example, an assumption on the error term in SFA has a direct effect on the estimated coefficients. In contrast, confidence intervals are only a part of our in-the-round assessment of the quality of the models, which influences the efficiency challenge.

<sup>583</sup> CMA (2015), [Bristol Redetermination Appendices](#), Appendix 4.2 p47

<sup>584</sup> Confidence intervals for CMA's Bristol PR14 Determination were not estimated using the same method used in this determination (the delta method). We adopted this approach to reflect the logarithmic nature of our dependent variable.

**Table 4-11: Confidence intervals of the predicted values for the underlying wholesale water models in CMA final decision**

<i>Wholesale water models</i>	<i>95% confidence intervals</i>	<i>%</i>
WRP1		+/-15
WRP2		+/-17
TWD1		+/-13
WW1		+/-10
WW2		+/-9

Source: CMA analysis.

**Table 4-12: Confidence intervals of the predicted values for the underlying wastewater models in CMA final decision**

<i>Wastewater models</i>	<i>95% confidence intervals</i>	<i>%</i>
SWC1		+/-12
SWC2		+/-16
SWT1		+/-14
SWT2		+/-15
BR1		+/-19
BR2		+/-23
BRP1		+/-13
BRP2		+/-12

Source: CMA analysis.

4.392 We acknowledge Oxera's argument that comparing confidence intervals of models that estimate coefficients with different estimation methodologies (for example, Pooled OLS used at PR14 and Random Effects used at PR19) may not be valid. Therefore, we refrained from a direct comparison of the confidence intervals across different price determinations.

4.393 We found that our confidence intervals remained stable with the inclusion of 2019/20 data in our models. Indeed, the largest difference in confidence intervals with and without 2019/20 is one percentage point. This supported our view that our models were appropriate for setting base cost allowances.

### *Monte Carlo simulation*

- *Parties' arguments*

4.394 In its Monte Carlo analysis, Oxera tested Ofwat's models by adding a random error component to all expenditure and cost drivers. Oxera said that, based on data uncertainty alone, there was substantial uncertainty regarding the identity of the efficient companies:<sup>585</sup>

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<sup>585</sup> Oxera add up to +/- 5% to each variable in the data. Note that Oxera's analysis uses the forecasted variables only.

- (a) In wholesale water, the 11<sup>th</sup> most efficient company (as estimated by Ofwat) was estimated to be efficient (within the top four) in at least 1% of the simulations.
- (b) In wholesale wastewater, the eighth most efficient company was estimated to be efficient (within the top three) in at least 5% of the simulations, and the tenth most efficient company was estimated to be within the top five in 5% of the simulations.

4.395 In response to Provisional Findings, Oxera said that:

- (a) Our view that there was a low probability of a low ranked company impacting the top of the rankings was subjective.
- (b) The potential measurement error for most variables was to some extent 'known' because companies reported the percentage uncertainty in the data for their APRs.

4.396 Northumbrian tested Ofwat's FD models' stability and ran sensitivities on the inclusion of certain companies, outlier characteristics, and/or additional years, as well as the ability of the models to provide a robust estimate of efficient costs for the sector. Northumbrian said that Ofwat's models appeared to be robust and stable to variations in the underlying data sample. Northumbrian was confident that the sample Ofwat used to determine efficient costs was to a large extent representative of the sector's historical performance.

- *Our assessment*

4.397 We reviewed the Monte Carlo analysis of Oxera, an advisor to Yorkshire. We recognise that small variations to the underlying data may have implications for the final outcomes. However, the Oxera's findings did not appear particularly concerning because the analysis suggested that there was a low probability of a low ranked company affecting the efficiency benchmark. Moreover, this was a theoretical exercise and the actual potential for measurement error was hard to judge.

4.398 Oxera, as advisor to Yorkshire, said that our view that there was a low probability of a low ranked company impacting the efficiency benchmark was subjective. Oxera's calculations showed that in at least 5% of simulations the eighth most efficient wastewater company and tenth most efficient water company influenced the efficiency benchmark. However, these figures derived from Oxera's assumptions that the random error component was uniformly distributed and had a range of +/-5%. Changing either assumption would give different results.



4.399 Oxera also argued that the potential measurement error in most variables was to some extent 'known' because companies reported uncertainty grades. We do not accept this argument as the random error component used by Oxera was a uniformly distributed error between -5% and +5% for each variable. As such, Oxera's random error component was not linked to the confidence grades of variables.

4.400 We take these factors into account when we set our efficiency challenge based on our assessment of the quality of the econometric modelling.

#### *Conclusion on overall statistical performance*

4.401 In paragraphs 4.365 to 4.400, we evaluated the overall effectiveness of our models to decide whether they were sufficient for the purposes of setting base cost allowances. We assessed the Parties' arguments on multicollinearity and model accuracy. This section provides conclusions on each aspect.

4.402 On the assessment of multicollinearity, we decide to follow the approach adopted by Ofwat since we found higher levels of multicollinearity were acceptable where transformations of variables were included in models. We considered our models to be sufficiently robust to multicollinearity issues for the purpose of setting base cost allowances.

4.403 On the assessment of model accuracy, we acknowledge that there is a degree of uncertainty for the modelled costs, as reflected by the confidence intervals and Monte Carlo simulation. We also acknowledge that a degree of uncertainty will be present in any econometric model. We reflect this degree of uncertainty in the choice of the efficiency challenge and other parts of the determination (for example, cost adjustment claims).

4.404 Overall, we decide that the models are sufficiently reliable for us to use to set companies' base cost allowances.

#### **Catch-up efficiency challenge**

4.405 In this section we discuss the analysis we have done on the catch-up efficiency challenge. The section is structured as follows:

- We first summarise Ofwat's FD catch-up efficiency challenge.
- We discuss the methodological issues raised.
- We summarise our approach to efficiency challenge and the implications this has for the companies' base cost allowances.

### ***Ofwat's FD efficiency challenge***

4.406 Ofwat's cost models estimate how much it would cost the averagely efficient water company to cover base operations over the next five years, given the company's forecast cost drivers. Ofwat wanted to set cost allowances for a more than averagely efficient water company and therefore built a ranking of the companies, from most efficient to least efficient. This ranking was based on comparing the companies' historic costs in 2014/15 to 2018/19 with the costs the model predicted they should have incurred.

4.407 At draft determination in PR19 Ofwat set an upper quartile efficiency challenge. This meant that Ofwat used the company placed at the upper quartile, or 75<sup>th</sup> percentile, as the benchmark for an efficient company. At Ofwat's FD Ofwat chose a 'tougher' efficiency challenge.

- In wholesale water, Ofwat used the fourth placed company out of seventeen companies – South West Water. This resulted in all the companies' wholesale water cost allowances being reduced by 4.6%.
- In wholesale wastewater Ofwat used the third placed company out of ten companies – Northumbrian. This resulted in all the companies' wholesale wastewater cost allowances being reduced by 2.0%

### ***Methodological issues raised***

4.408 When considering the appropriate efficiency challenge we focused on answering five questions.

- What is the appropriate comparator set?
- Should we use aggregate efficiency challenges or set efficiency challenges for each sub-model?
- What time period should be used to calculate the efficiency challenge?
- What is the appropriate method to address the re-organisation of Dee Valley Water and Severn Trent Water?
- What is the appropriate level of the efficiency challenge?

#### ***What is the appropriate comparator set?***

4.409 Ofwat said that it used a credible set of companies to determine the efficiency challenge. The most efficient water companies included a mixture of smaller

and larger companies, performance outcomes and investment cycle positions.<sup>586</sup>

- 4.410 Bristol said that the top company, Portsmouth Water, was incomparable with the other water companies and Ofwat had acknowledged this.<sup>587</sup> Bristol said that NERA, in a report for Bristol, said that Bristol's allowance would be £10 million higher if Portsmouth Water was excluded from Ofwat's models.<sup>588</sup>
- 4.411 Northumbrian said that Ofwat had used companies with different characteristics to set the efficiency challenge. Large and complex water and sewerage companies should not be compared to smaller water only companies which were able to reduce costs to levels which were unachievable by larger companies.<sup>589</sup> Northumbrian said that in PR09 Ofwat had taken a different approach and had excluded companies when their totex was less than 3% of industry totex. Reworking Ofwat's analysis to exclude smaller companies resulted in a 2% efficiency challenge rather than a 5% efficiency challenge.<sup>590</sup> Northumbrian said that its analysis showed that the efficiency scores were quite stable when it conducted robustness tests through dropping the most and least efficient companies.

### *Decision*

- 4.412 The companies' arguments appear selective: they said that only the more efficient companies were not valid comparators. A more balanced approach might be to remove both the most efficient and least efficient comparators. However, none of the evidence we reviewed showed clear biases in the selection of companies used to set the efficiency challenge and the use of benchmarks which are not the frontier company reduces the impact of outliers on the results. We therefore decide that it is not appropriate to exclude any companies from the calculation of the efficiency challenge benchmark due to their characteristics.<sup>591</sup>

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<sup>586</sup> Ofwat (2019), *PR19 final determinations: Securing cost efficiency technical appendix*, p34

<sup>587</sup> Bristol SoC, paragraph 423.

<sup>588</sup> Bristol SoC, paragraph 424

<sup>589</sup> Northumbrian SoC, paragraphs 310–311

<sup>590</sup> Northumbrian SoC, paragraphs 312–314

<sup>591</sup> We consider in paragraphs 4.431 to 4.439 whether it is appropriate to exclude companies due to a lack of data.

*Should we use aggregate efficiency challenges or set efficiency challenges for each sub-model?*

4.413 A Bristol submission to Ofwat suggested an approach which would place full weight on the model that estimated the best efficiency score for each company.<sup>592</sup>

4.414 United Utilities said that efficiency challenges should be calculated on the aggregate wholesale water and wholesale wastewater models. This was superior to calculating efficiency challenges for each sub-model and calculating an efficiency challenge based on the sum of these sub-model challenges.<sup>593</sup>

#### *Decision*

4.415 We agree with the view expressed by United Utilities. Setting individual efficiency challenges for each sub-model risks setting an unachievable challenge which is too heavily influenced by differences in the way companies allocate costs across activities. Therefore, we decide to set the efficiency benchmark at the aggregate level. See paragraph 4.335 for further discussion of this issue.

*What time period should be used to calculate the efficiency challenge?*

4.416 Ofwat used data from 2011/12 to 2018/19 in its econometric modelling to estimate the efficient cost levels for the water companies. To calculate the efficiency rankings Ofwat used data from 2014/15 to 2018/19 to ensure that the catch-up efficiency challenge was not based on a single low-cost year by any one company.<sup>594</sup>

4.417 Anglian said that using eight years to estimate the random effects model and five years to calculate the efficiency challenge would lead to biased estimates

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<sup>592</sup> Bristol (2019), [Response to PR19 Draft Determination](#), p32

<sup>593</sup> [United Utilities submission](#), paragraph 2.2.9.

<sup>594</sup> Ofwat (2019), feeder model 2 for [Wholesale water calculation of catch-up efficiency challenge](#) and [Wholesale wastewater calculation of catch-up efficiency challenge](#); and [Ofwat's Further Submission on Anglian](#), paragraph 2.38

of the efficiency challenge and efficient base costs.<sup>595,596</sup> Professor Saal raised the same point.<sup>597</sup>

- 4.418 Anglian in its response to the Provisional Findings, said that there were two solutions: i) estimate efficiency using the eight-year panel data set and calculate efficiency over the eight years; or ii) estimate efficiency using a five-year panel data set and calculate efficiency over five years. Anglian's analysis compared the five-year and eight-year alternatives and said that it showed that the CMA should use the most recent five years to estimate the model.<sup>598</sup> Anglian said that there was potentially less chance of bias if the technology remained constant over time, but maintained that the best approach was to use the same time period for estimating coefficients and calculating the efficiency challenge.
- 4.419 Bristol, in its response to the Provisional Findings used a five-year period to calculate the efficiency challenge.<sup>599</sup>
- 4.420 Bristol said that using the 2019/20 data and a five-year period allowed the efficiency challenge benchmark to reflect the full AMP6 period, which had been used to target future industry service level improvements.<sup>600</sup>
- 4.421 Ofwat said that it was appropriate to use eight years of data to estimate the coefficients as accurately as possible and then use five years to calculate the efficiency challenge. Ofwat said that in its RIIO-GD2 draft determinations Ofgem used 13 years of data to estimate the coefficients and the latest five years to calculate the efficiency challenge. Ofgem had also used a similar approach in RIIO-1.<sup>601</sup> In the hearing following Provisional Findings, Ofwat said that it was appropriate to calculate the efficiency challenge on five years of data.
- 4.422 Northumbrian said that it was appropriate to use five years of data to calculate the efficiency challenge and the full data set to estimate the coefficients. There were substantial benefits to the inclusion of the 2019/20 data. These

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<sup>595</sup> [Anglian SoC](#), paragraphs 607 and 608. See also [Anglian's response to the provisional findings](#), paragraphs 118 to 125

<sup>596</sup> Note that some submissions were received before we made the decision to include the 2019/20 data. Therefore some submissions refer to using eight years of data, rather than nine years of data to estimate the coefficients.

<sup>597</sup> Anglian (2019), *A Comment on Misspecification and Systematic Bias in Ofwat's PR19 Draft Determination Integrated Wholesale Water and Wastewater Models*, p4. See also [Professor David Saal's response to the provisional findings](#), p24

<sup>598</sup> [Anglian's response to the provisional findings](#), paragraphs 118 to 125

<sup>599</sup> [Bristol's response to the provisional findings](#), Annex1, paragraph 25

<sup>600</sup> [Bristol's response to the 2019/20 data for base cost models working paper](#), paragraph 20

<sup>601</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), paragraphs A5.11 to A5.15

included providing more observations for the modelling, and a full AMP for the calculation of the efficiency challenge.<sup>602</sup>

- 4.423 Yorkshire said that if the CMA did not use the 2019/20 data the CMA would be estimating efficiency scores over an incomplete AMP, meaning the estimates would not be using the latest and complete planning cycle. This would lead to biased estimates.<sup>603</sup>
- 4.424 In the hearing following Provisional Findings, Yorkshire said that there was an inconsistency if different time periods were used to estimate the coefficients and calculate the efficiency challenge. However, there was merit in placing more weight on recent years when calculating the efficiency challenge.
- 4.425 Oxera, in a report for Yorkshire, said Ofwat had not justified its decision to use a five-year period to calculate the efficiency challenge and had not checked whether this represented a full investment/maintenance cycle. Oxera said that when efficiency scores were estimated over the full outturn period, the efficiency challenge reduced from 4.6% to 4.2% in water, and from 2.0% to 1.2% in wastewater. Estimating over the full outturn period also changed the composition of the top four in water and top three in wastewater. This suggested that the companies' estimated efficiency scores were being influenced by their position in the investment cycle rather than by differences in efficiency.
- 4.426 Oxera, in a report for Yorkshire, said that the CMA should set the efficiency challenge with regard to the quality of the models, rather than seek a specific outcome. Oxera said that using 2019/20 data would also allow the efficiency challenge benchmark to be calculated over a full AMP. Omitting the year would lead to downward bias in Yorkshire's estimated cost allowance.
- 4.427 Oxera, in a report prepared for Anglian, Northumbrian and Yorkshire incorporated 2019/20 data into the dataset and recalculated the efficiency challenge based on the last five years of data. Oxera said that this approach meant that the efficiency challenge was now estimated over a full AMP, which might better account for the impact of investment cycles and be more representative of typical efficiency levels than a period straddling multiple AMPs.

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<sup>602</sup> [Northumbrian's response to the 2019/20 data for base cost models working paper](#), paragraph 5

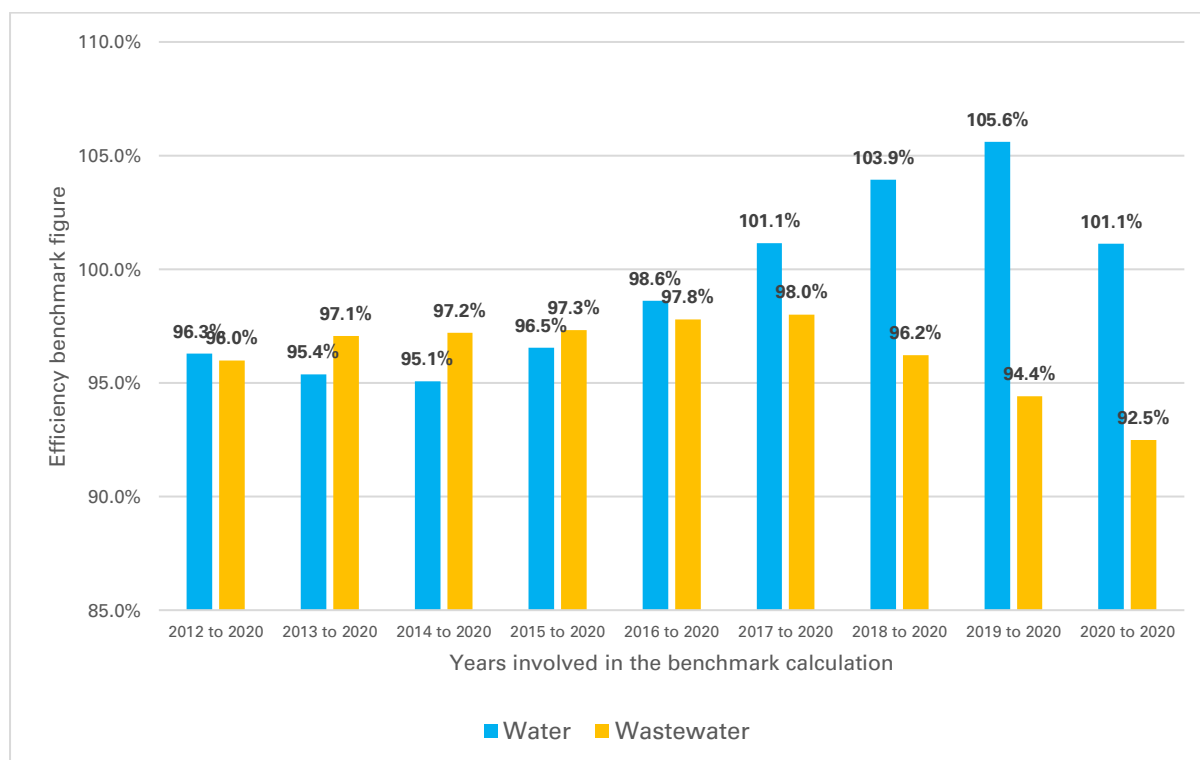
<sup>603</sup> [Yorkshire's response to the 2019/20 data for base cost models working paper](#), paragraph 1.9b

## Decision

4.428 When considering the appropriate time period to calculate the efficiency challenge we decide that more weight should be placed on more recent data, since this better reflects the recent efficiency levels of the industry. In particular, if the companies are becoming more efficient over time then setting an efficiency challenge using older data risks setting an insufficient challenge. This suggests that we should calculate the efficiency challenge based on a subset of the more recent years' data. However, using a small sample of years, for example, only the final year, to calculate the efficiency challenge could lead to results which are unrepresentative of typical efficiency levels.<sup>604</sup>

4.429 Figure 4-4 shows how the efficiency challenge figures for wholesale water and wholesale wastewater vary depending on the time period chosen. The results show that choosing the five-year period results in the fifth 'toughest' efficiency challenge (98.6%) for wholesale water and the eighth 'toughest' efficiency challenge for wholesale wastewater (97.8%). Using the period 2015/16 to 2019/20 gives results which, compared to the period 2011/12 to 2019/20, are 2.3 percentage points higher for water and 1.8 percentage points higher for wastewater.

**Figure 4-4: Comparison of efficiency challenges and time period chosen**



<sup>604</sup> The decision on the appropriate time period to estimate the coefficients is in paragraphs 4.355 to 4.360, where we decide that using nine years of data is the correct approach.

- 4.430 Based on the evidence in paragraphs 4.416 to 4.429 we decide that using data from 2015/16 to 2019/20 is the most appropriate approach as it provides the appropriate balance between using more recent data and using a large enough sample to calculate the efficiency challenge.

*What is the appropriate method to address the merger of Dee Valley Water and Severn Trent Water?*

- 4.431 One consequence of including 2019/20 data in our dataset is that it raises the issue of how to address the effect of the merger of Severn Trent Water and Dee Valley Water on the dataset. The issue of how to address the merger in the cost modelling regressions is dealt with in Appendix C. Here we focus on how the merger should be dealt with when calculating the efficiency challenge benchmark.
- 4.432 Ofwat proposed the following approach for wholesale water: calculate a five-year efficiency score for Severn Trent Water based on the average of the four years before the merger and the one year after the merger. Calculate a five-year efficiency score for Dee Valley Water based on the average of the four years of Dee Valley Water data before the merger and one year of Hafren Dyfrdwy data after the merger. For wholesale wastewater, combine the 2019/20 data for Hafren Dyfrdwy and Severn Trent Water to form one company and calculate an efficiency score based on an average of four years of data for Severn Trent Water and one year of data for Severn Trent Water plus Hafren Dyfrdwy.
- 4.433 Oxera, advisor to Yorkshire, proposed the following approach for wholesale water. Use the first four years of AMP6 to estimate an efficiency score for Dee Valley Water, excluding Hafren Dyfrdwy due to its substantial differences with Dee Valley Water. Use the full five years of AMP6 to calculate an efficiency score for Severn Trent Water, since the post-merger company was similar to the pre-merger company. For wholesale wastewater combine the 2019/20 data for Hafren Dyfrdwy and Severn Trent Water to form one company and calculate an efficiency score based on an average of four years of data for Severn Trent Water and one year of data for Severn Trent Water plus Hafren Dyfrdwy.

- 4.434 Our consultation paper on 19/20 data proposed the following approach.<sup>605</sup>

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<sup>605</sup> [Working paper: 2019/20 data for base cost models](#)



- In wholesale water exclude Hafren Dyfrdwy from the efficiency score calculation and calculate the Dee Valley Water efficiency score based on four years of data. Treat post-merger Severn Trent Water as a separate company, adding it to the efficiency score ranking as a new company based on one year of data. Calculate the pre-merger Severn Trent Water efficiency score using only four years of pre-merger data.
- In wholesale wastewater, combine Severn Trent Water and Hafren Dyfrdwy into a single entity and calculate an efficiency score based on one year of data from this combined company and four years of data from Severn Trent Water.<sup>606</sup>

4.435 Anglian said that it agreed with Oxera's approach to the calculation of the efficiency challenge.<sup>607</sup>

4.436 Northumbrian said that it did not have substantial concerns with our proposed approach.<sup>608</sup>

4.437 Oxera said that its proposal was the best approach for wholesale water. Oxera said that it agreed with our approach in wholesale wastewater.

4.438 Ofwat disagreed with part of our approach on wholesale water. Ofwat disagreed with excluding Hafren Dyfrdwy from the efficiency score calculation.<sup>609</sup> Ofwat agreed that post-merger Severn Trent Water should not be treated as an extension of pre-merger Severn Trent Water. Ofwat said that it agreed with our proposed approach on wastewater.<sup>610</sup>

### *Decision*

4.439 Having reviewed the submissions we decide to calculate the efficiency scores as follows.

- Wholesale Water – First, calculate the efficiency score for Dee Valley Water using the four most recent years of data for Dee Valley Water and not using the one year of data from Hafren Dyfrdwy. We do not use Hafren Dyfrdwy as there is only one year of data and the merger resulted in substantial organisational changes. Second, calculate the efficiency scores for Severn Trent Water using four years of pre-merger data. We do not use the post-merger data as the evidence showed a large change in

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<sup>606</sup> Working paper: 2019/20 data for base cost models, p24

<sup>607</sup> Anglian's response to the 2019/20 data for base cost models working paper paragraph 50

<sup>608</sup> Northumbrian's response to the 2019/20 data for base cost models working paper, paragraph 47

<sup>609</sup> Ofwat's response to the 2019/20 data for base cost models working paper, paragraph 3.5

<sup>610</sup> Ofwat's response to the 2019/20 data for base cost models working paper, paragraph 3.6

the efficiency scores for Severn Trent Water following the merger. This approach is consistent with our approach to the merger when estimating coefficients. See Appendix C for more detail.

- Wholesale Wastewater – use the approach suggested by both Oxera and Ofwat, which was to treat the post-merger combination of Severn Trent Water and Hafren Dyfrdwy as a continuation of pre-merger Severn Trent Water, and calculate an efficiency score based on one year of data from the post-merger combined company and four years of data from pre-merger Severn Trent Water. Dee Valley Water was a water-only company, Hafren Dyfrdwy's wastewater presence is very small, and differences in wastewater efficiency scores between pre-merger Severn Trent Water and the post-merger aggregated compare are not substantial. Therefore we are satisfied this approach best represents operational reality.

#### *What is the appropriate level of efficiency challenge?*

4.440 When considering the appropriate level of efficiency challenge, we looked at the arguments on:

- the quality of the econometric modelling;
- how the efficiency challenge evolved over time;
- the outcome of PR14;
- comparisons with companies' forecasts;
- the role of intra-industry comparisons; and
- the decisions taken by other regulators.

4.441 We discuss these topics and then present our decision, but first we summarise third party responses.

- Bristol Challenge Panel asked whether there was scope for the CMA to review the base cost models and provide a higher allowance to Bristol.<sup>611</sup>
- Cadent Gas Limited said that it agreed with the Provisional Findings of an upper quartile performance benchmark providing this was based on a rigorous assessment of the quality of the modelling.<sup>612</sup>

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<sup>611</sup> [Bristol Water Challenge Panel's response to the provisional findings](#), p2

<sup>612</sup> [Cadent's response to the provisional findings](#), pp 1-2

- ENA was generally supportive of our approach to setting the efficiency challenges. For example, there was extensive regulatory precedent in favour of a 75<sup>th</sup> percentile approach.<sup>613</sup> However, it said that we should avoid setting an unachievable target through the combination of the efficiency challenge and the frontier shift.<sup>614</sup> We should also articulate more fully how we have assured ourselves that the resulting allowances would be sufficient to ensure a base level of service.<sup>615</sup>
- The CCWater said we should demonstrate a robust efficiency challenge.<sup>616</sup> In response to Provisional Findings, CC Water said it was disappointed that the provisional findings had reduced the catch-up challenge and did not see how this was in customers' interests.<sup>617</sup>
- Water UK was concerned about overly aggressive efficiency challenges.<sup>618</sup> It said it welcomed the provisional finding to moderate the efficiency challenge.<sup>619</sup>

### *The quality of the econometric modelling*

- 4.442 The cost modelling approach used by Ofwat did not allow it to separate inefficiency from error in the model. To take account of this, Ofwat did not set the efficiency challenge at the frontier company, as one might do if one ascribed all the differences between estimates and outcomes to inefficiency. Instead Ofwat set the efficiency challenge at the fourth placed company for wholesale water and the third placed company for wholesale wastewater.
- 4.443 Ofwat said the efficiency challenge should be set on a case by case basis and regulators should not just default to the upper quartile.<sup>620</sup> Ofwat said that the quality of models had arguably improved from draft determination to Ofwat's FD. Ofwat said the Disputing Companies claimed that there was a large degree of uncertainty in Ofwat's analysis, which was demonstrated by the wide range of efficiency scores. Ofwat said that the improvement in its models was demonstrated by the range of efficiency scores narrowing between draft determination and Ofwat's FD. Therefore, it was appropriate to apply a more stretching efficiency challenge.<sup>621</sup>

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<sup>613</sup> [ENA's response to the provisional findings](#), section 13

<sup>614</sup> [ENA's response to the provisional findings](#), paragraph 12.2

<sup>615</sup> [ENA's response to the provisional findings](#), paragraphs 13.8 & 13.9

<sup>616</sup> See [CCWater response to Anglian's SoC](#), paragraph 6.1, [CCWater response to Bristol's SoC](#), paragraph 2.7, [CCWater response to Northumbrian's SoC](#), paragraph 7.3, [CCWater response to Yorkshire's SoC](#), paragraph 5.2

<sup>617</sup> [CCWater's response to the provisional findings](#), paragraph 6.6

<sup>618</sup> [Water UK submission](#), p4

<sup>619</sup> [Water UK's response to the provisional findings](#), p3

<sup>620</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p16

<sup>621</sup> [Ofwat's Response to common issues in companies' SoCs: Cost efficiency](#), paragraphs 6.24 to 6.36

4.444 Ofwat said that setting the catch-up efficiency challenge should not only be a function of model quality.<sup>622</sup> Ofwat said that when setting the efficiency challenge its role was to step back and reflect whether the cost allowances were efficient and in the best interests of customers. In particular, the following factors had influenced the Ofwat decision:<sup>623</sup>

- After the draft determinations, Ofwat incorporated 2018/19 data into its models, which substantially increased cost allowances. Ofwat also removed non-section 185 diversion costs from its base models. This removed lumpy expenditure and slightly improved the accuracy of its models.<sup>624</sup>
- Companies reduced their requested costs in their representations to Ofwat.<sup>625</sup>
- Ofwat changed its approach to cost sharing rates, so companies were incentivised to disclose better information about their efficient costs.<sup>626</sup>
- Following the inclusion of the new information, 12 of the 17 companies were outperforming the modelled base cost allowance.<sup>627</sup>

4.445 Ofwat said that it had taken actions to mitigate the risk of errors and bias in the econometric models: triangulating the set of models, careful consideration of the efficiency challenge, use of cost adjustment claims and consideration of company representations. These adjustments had reduced the base cost challenge range from 0.83 to 1.20 before adjustments to 0.88 to 1.14 after the adjustments. These adjustments also reduced the standard deviation from 0.09 to 0.07.

4.446 Anglian said the choice of the efficiency challenge choice should be informed by the quality of the models. Anglian made three points relating to the quality of the models. First, the models used in Ofwat's FD were not superior to the draft determination, so did not justify using a tougher efficiency challenge. Second, there was substantially more variability around the wastewater models than around the water models, and therefore wastewater should have a weaker efficiency challenge.<sup>628</sup> Third, the uncertainty of the PR19 models

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<sup>622</sup> [Ofwat's response to Yorkshire's SoC](#), paragraph 3.47

<sup>623</sup> [Ofwat's response to Yorkshire's SoC](#), paragraph 3.34

<sup>624</sup> [Ofwat's response to Yorkshire's SoC](#), paragraph 3.35

<sup>625</sup> [Ofwat's response to Yorkshire's SoC](#), paragraph 3.36

<sup>626</sup> [Ofwat's response to Yorkshire's SoC](#), paragraph 3.37

<sup>627</sup> [Ofwat's response to Yorkshire's SoC](#), paragraph 3.38

<sup>628</sup> [Anglian SoC](#), paragraph 604 See also [Anglian's response to the provisional findings](#), paragraph 133 (i)

was greater than those of the CMA in the Bristol PR14 Determination, which had used a median efficiency challenge.<sup>629</sup>

4.447 Anglian's adviser, Oxera, said that Ofwat's model accuracy was insufficient to set any cost challenge for Anglian. It said that Ofwat's choice of benchmark, when combined with other issues, may have resulted in companies outperforming the upper quartile benchmark. It submitted evidence showing there was a statistically insignificant gap between the efficiency scores for Anglian and the benchmark companies.<sup>630</sup>

4.448 In its response to the Provisional Findings, Anglian said that:

- the accuracy of our wholesale wastewater models was consistently worse than that of the wholesale water models;
- our assessment of model accuracy was dependent on the type of standard error used and there was no hard and fast rule about which standard error to use; and
- our approach did not account for the triangulation and aggregation of the outcomes from its suite of models.<sup>631</sup>

4.449 Anglian said that Oxera had found that there was greater uncertainty in our water and wastewater models than the CMA 2015 models, where an average benchmark was used.<sup>632</sup> Anglian said that the quality and uncertainty of our models did not justify an upper quartile efficiency challenge and we should adopt an average efficiency challenge.<sup>633</sup>

4.450 Anglian, in its response to the 2019/20 data consultation, said that the efficiency challenge should be proportional to the quality of the underlying models.<sup>634</sup>

4.451 Oxera, Anglian's advisor, said that our results showed that the wastewater models were consistently less accurate than the water models and therefore a less stringent benchmark should be used for wastewater.

4.452 Professor Kumbhakar, Anglian's advisor, said that our approach of using an average of the confidence intervals across the different models was incorrect. The correct approach was to use bootstrapped standard errors.

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<sup>629</sup> [Anglian SoC](#), paragraph 605. See also [Anglian's response to the provisional findings](#), paragraph 135

<sup>630</sup> [Anglian's reply to Ofwat's response](#), p22-23

<sup>631</sup> [Anglian's response to the provisional findings](#), paragraph 133.

<sup>632</sup> [Anglian's response to the provisional findings](#), paragraph 134.

<sup>633</sup> [Anglian's response to the provisional findings](#), paragraph 135

<sup>634</sup> [Anglian's response to the 2019/20 data for base cost models working paper](#), paragraph 52

- 4.453 Ofwat, in response to Anglian, said that the companies did not raise concerns with an upper quartile benchmark during Ofwat's draft determination. The use of an average cost benchmark would ignore the wider cost assessment framework, where companies had multiple opportunities to make representations and the objective of the price review was to reveal and set efficient cost allowances.<sup>635</sup> It said the CMA's decision to apply an average catch-up challenge for Bristol in 2015 was very context specific and could not and should not be used as a reason not to apply a stretching catch-up challenge.<sup>636</sup>
- 4.454 Bristol said Ofwat should not set a 'tougher' efficiency challenge than upper quartile. First, Ofwat's models could not separate inefficiency from data error.<sup>637</sup> Second, the quality of the Ofwat models had not improved materially throughout the course of the price review.<sup>638</sup> Third, Ofwat's estimate of the implicit allowance for enhancement opex, which Ofwat removed as one of its adjustments, was imprecise, which supported a less stringent efficiency challenge.<sup>639</sup> Bristol, in its response to the Provisional Findings, said that the provisional decision to use upper quartile concurred with Bristol's statement of case and reflected regulatory precedent.<sup>640</sup>
- 4.455 NERA, advisor to Bristol, said that the regulatory precedent showed that the efficiency target should be defined based on the reliability of the data and models.<sup>641</sup>
- 4.456 Ofwat, in its response to the consultation on the 2019/20 data, said that it did not agree with our view that the level of the efficiency challenge should be based on the quality of the models, rather than set to seek specific outcomes. Instead, the efficiency challenge should be informed by other factors, including Ofwat's consumer objective and the credibility of the companies that formed the benchmark. If we decided to include 2019/20 data we should consider a more stretching efficiency challenge for two reasons. First, the discrepancy between the modelling results and companies' forecasts of base costs would be larger than at Ofwat's FD. Second, including 2019/20 data would lead to the sample having an over-representation of high cost years.<sup>642</sup>

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<sup>635</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), paragraphs A5.16–A5.18

<sup>636</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), paragraph A5.27

<sup>637</sup> [Bristol SoC](#), paragraphs 403–406

<sup>638</sup> [Bristol SoC](#), paragraph 415

<sup>639</sup> [Bristol SoC](#), paragraphs 425–427.

<sup>640</sup> [Bristol's response to the provisional findings](#), paragraph 178 and p46

<sup>641</sup> NERA, in an earlier report, used the upper quartile for benchmarking purposes. Oxera also used upper quartile in its analysis.

<sup>642</sup> [Ofwat's response to the 2019/20 data for base cost models working paper](#), paragraphs 3.7–3.12.

- 4.457 Ofwat said it was difficult to calibrate the efficiency challenge based only on the quality of the econometric models. The magnitude of the challenge could vary materially based on non-trivial decisions, such as the length of sample used to determine the catch-up challenge benchmark or whether the challenge was set at the price control level or service level.<sup>643</sup>
- 4.458 Northumbrian said that an upper quartile efficiency challenge was appropriate.<sup>644</sup> It said that the choice of benchmark should be based on the quality of the modelling and the rationale for Ofwat's change in the benchmark between DD and FD was not robust.<sup>645</sup> Ofwat should not set a more demanding benchmark because the modelling omitted important cost drivers and the companies' efficiency rankings and scores varied substantially over time.<sup>646</sup> Northumbrian, in its response to the Provisional Findings, said it agreed with our decision to adopt an upper quartile efficiency challenge.<sup>647</sup>
- 4.459 Yorkshire said that Ofwat's models resulted in an unexplained residual and then Ofwat applied an ad-hoc adjustment through setting a specific benchmark. The choice to move from the upper quartile benchmark to a more stringent benchmark was not based on empirical evidence. Ofwat's analysis took no account of the uncertainty in its modelling. Oxera analysis showed that there was a substantial level of uncertainty in Ofwat's analysis, which manifested in the form of substantial uncertainty in cost predictions, in the identification of benchmark companies, and in the inability to separate modelling noise from inefficiency.<sup>648</sup>
- 4.460 Oxera, in a report for Yorkshire, said that Ofwat's choice of benchmark was a qualitative judgement, while the benchmark should be informed by the quality of the models. Oxera used confidence intervals, stochastic frontier analysis and Monte Carlo simulation to examine the uncertainty in Ofwat's modelling. It found Ofwat's models were highly sensitive to small changes in the data. Oxera concluded that the models were unable to robustly identify which companies were efficient and which were inefficient. Oxera said there was a substantial level of uncertainty Ofwat's analysis.
- 4.461 Ofwat responded to Oxera's submissions and said the following. The Oxera work isolated modelling results from the wider process. For example, the comparison of efficiency scores to Ofgem's models appeared to disregard any

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<sup>643</sup> [Ofwat's response to the 2019/20 data for base cost models working paper](#), paragraph 3.10

<sup>644</sup> [Northumbrian SoC](#), paragraphs 337 and 315-317

<sup>645</sup> [Northumbrian SoC](#), paragraphs 305-309

<sup>646</sup> [Northumbrian SoC](#), paragraphs 318–326

<sup>647</sup> [Northumbrian's response to the provisional findings](#), p9. See also [Northumbrian's response to the 2019/20 data for base cost models working paper](#), paragraph 7

<sup>648</sup> [Yorkshire SoC](#), paragraphs 188-193.



adjustment process, as Ofgem's efficiency scores reflected its final allowances, whereas Ofwat's efficiency scores reflected modelling results before any adjustment. Oxera presented what appeared to be high confidence intervals for Ofwat's disaggregated models, but neglected to acknowledge that Ofwat aggregated these models and then triangulated them to obtain a final result. Oxera failed to recognise that confidence intervals could be reduced by adding more explanatory factors to the model. However, this could lead to unreliable point estimates of the individual coefficients and consequently to forecasting error.

4.462 Yorkshire said the choice of benchmark should be informed by the degree of confidence in the modelling. Yorkshire said that the accuracy of Ofwat's models was worse than those used by the CMA in the Bristol PR14 Determination where the CMA had chosen an average efficiency challenge.<sup>649</sup> Any outperformance may have been due to errors, such as omitted cost or service drivers.<sup>650</sup> The choice of the efficiency challenge should be influenced by the degree of confidence in the models used.

4.463 Oxera, in a report for Yorkshire, said that Ofwat was incorrect to impose a 'tougher' efficiency challenge because 2018/19 was a high cost year. In doing so, Ofwat had ignored the fact that other years were low cost years. Ofwat had also chosen a 'tougher' efficiency challenge because an upper quartile challenge would have resulted in too many companies being assessed as efficient. Ofwat were incorrectly driven by a desire to set lower cost allowances, rather than focussing on the quality of the modelling and the wider framework. Oxera said it was unclear how Ofwat had concluded that the models had improved from Draft Determination to Ofwat's FD. The range of efficiency scores from the Ofwat models was wider than Ofgem's RIIO-ED1 modelling, where an upper quartile efficiency challenge had been applied. The confidence intervals in Ofwat's modelling were larger than the intervals in the Bristol PR14 Determination, where an average efficiency challenge was used. Oxera re-estimated the Ofwat models using AMP7 forecast data and this resulted in lower quality models and wider confidence intervals. Oxera carried out Monte Carlo simulations on the Ofwat cost models to assess the robustness of the econometric models and said that the results showed Ofwat's models were highly sensitive to small changes in the data.<sup>651</sup>

4.464 Oxera, in a report for Yorkshire submitted in response to the Provisional Findings, said that it welcomed our approach of placing weight on the quality

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<sup>649</sup> [Yorkshire's Reply to Ofwat's Response](#), paragraph 3.16.1 (b)

<sup>650</sup> [Yorkshire's Reply to Ofwat's Response](#), paragraph 3.16.1 (e)

<sup>651</sup> Monte Carlo simulation is a model used to predict the probability of different outcomes when the intervention of random variables is present.



of the econometric modelling and no weight on achieving specific outcomes. Oxera said that we had not fully explored the range of empirical evidence that was available to assess model quality and inform benchmark choice. Oxera said that the CMA's confidence intervals were narrower in the CMA's Bristol PR14 Determination, where an average benchmark was used, than in Ofwat's wastewater models and slightly wider than Ofwat's water models. Assessing average confidence intervals masked the fact that the confidence intervals for the disaggregated models were particularly wide.

- 4.465 In relation to its Monte Carlo analysis, Oxera said that our provisional view, that there was a low probability of a low ranked company of impacting the top of the rankings, was subjective. For example, in Ofwat's wastewater models, the eighth most efficient company (equivalent to the third least efficient company) had a 5% chance of influencing an efficiency benchmark set at the upper quartile. Oxera said that, while the CMA said it was difficult to judge measurement error, the potential for measurement error was 'known'. This was because the levels of confidence in the data were in the water companies' Annual Performance Reports.
- 4.466 Oxera, advisors, to Yorkshire, said that that it welcomed our decision to set the efficiency challenge based on model quality, rather than seeking to achieve a specific outcome.
- 4.467 Ofgem said that in RIIO-1 it had set the efficiency benchmark at the upper quartile to account for potential measurement errors in the models. The statistical robustness of the models might justify a benchmark tougher than the upper quartile, as Ofwat had done.<sup>652</sup>
- 4.468 Thames Water said that in the random effects models the error could be split into modelling error and inefficiency and specifying this more precisely would help set the efficiency challenge.<sup>653</sup>

#### *The efficiency challenge over time*

- 4.469 Ofwat said that the efficiency challenge had steadily decreased through PR19 and was below the PR14 challenge. Table 4-13 summarises the Ofwat figures and the figures from our analysis.

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<sup>652</sup> [Ofgem submission](#), p4

<sup>653</sup> [Thames Water submission](#), paragraph 7.15

**Table 4-13: Comparison of efficiency challenges**

<i>Efficiency challenge</i>	<i>Efficiency challenge benchmark</i>	<i>Cost reduction in wholesale water</i>	<i>Cost reduction in wholesale wastewater</i>
			%
PR14	UQ	6.5	10.4
PR19 Initial Assessment of Plans	UQ	4.8	3.7
PR19 Draft Determinations	UQ	4.2	1.4
PR19 FDs	UQ	3.9	1.2
PR19 FDs	Third/Fourth	4.6	2.0
CMA Modelling	UQ	1.4	2.2
CMA Modelling	Third/Fourth	2.9	2.4

Source: Ofwat (2020) [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), Table 6.1 and CMA analysis.

4.470 Bristol's advisers, NERA, said that the upper quartile challenge became less demanding because Ofwat changed the definition of the dependent variable, and changes in the companies' costs forecasts during PR19 did not justify a more demanding efficiency target.<sup>654</sup>

4.471 Northumbrian said that Ofwat's comparison of Ofwat's FD decision with previous decisions was misleading as the reduction was not driven by a reducing efficiency challenge, but instead by the companies reducing their business plan bids.<sup>655</sup> Northumbrian said the 2018/19 data which Ofwat incorporated into the model was not an atypically high cost year and did not justify tightening the efficiency challenge.<sup>656</sup>

4.472 Ofwat said that 2018/19 was a high cost year and the inclusion of this data played a role in its decision to reconsider the efficiency benchmark.<sup>657</sup>

4.473 Yorkshire said that Ofwat's comparison between the PR14 and PR19 efficiency challenges was incorrect as the maximum totex gap (the gap between the company's and Ofwat's view of efficient costs) was larger in PR19 than in PR14.<sup>658</sup>

4.474 Oxera, Yorkshire's advisers, said that Ofwat's argument that because an upper quartile challenge at PR19 would be less stringent than the PR14 challenge it was achievable was misleading because the appropriate comparison was between the forward looking difference between Ofwat's view and the companies' proposed business plan expenditure.

<sup>654</sup> [Bristol SoC](#), paragraph 401

<sup>655</sup> [Northumbrian's reply to Ofwat's response](#), paragraph 241

<sup>656</sup> [Northumbrian's reply to Ofwat's response](#), paragraphs 237-243. See also [Northumbrian's reply to Ofwat's further submission](#), section 2.2.1

<sup>657</sup> [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), paragraphs 6.18-6.21

<sup>658</sup> [Yorkshire's reply to Ofwat response](#), paragraph 3.15.1

### *The outcome of PR14*

4.475 The industry overspent its cumulative wholesale totex allowances by 1% in 2015 to 2020. The four Disputing Companies' individual results were: Anglian underspent by 8%, Bristol overspent by 1%, Northumbrian underspent by 6%, and Yorkshire overspent by 3%.<sup>659</sup> Although we recognise this is based on total allowances, rather than base cost allowances, this could be interpreted as suggesting that the previous upper quartile efficiency challenge was particularly manageable for Anglian and Northumbrian.

### *Comparison with companies' forecasts*

4.476 Anglian said that Ofwat's change to the efficiency challenge created perverse incentives to the detriment of customers. Anglian said companies would be less inclined to submit lower costs after draft determinations in PR24 if they knew that Ofwat would move the benchmark in response.<sup>660</sup>

4.477 Bristol said that Ofwat had justified its approach to setting a more demanding efficiency challenge based on its subjective judgement of appropriate cost levels.<sup>661</sup> Bristol said that changes in the companies' costs did not justify a more demanding efficiency target.<sup>662</sup>

4.478 Northumbrian said that an upper quartile challenge was stretching as three quarters of the industry needed to reduce its historical costs to live within their allowances. When the allowances in Ofwat's FD were compared with initial versions of the business plans, which were arguably a better representation of their true expectations of efficient spend than the August 2019 business plans, only five out of 17 companies submitted lower base costs than the allowances in Ofwat's FD allowances. Even when the August business plans were considered the PR19 efficiency challenge was greater than that seen at PR14. This showed that Ofwat's FD was not comfortably achievable.<sup>663</sup> Northumbrian said that the 12 out of 17 companies were only bidding lower than the modelled allowance – they were not achieving this nor revealing this as their efficient level of costs.<sup>664</sup>

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<sup>659</sup> Ofwat (2020), [Service delivery report 2019-20](#), p7

<sup>660</sup> [Anglian's reply to Ofwat's response](#), p23

<sup>661</sup> [Bristol SoC](#), paragraph 401-402.

<sup>662</sup> [Bristol SoC](#), paragraph 411

<sup>663</sup> [Northumbrian's reply to Ofwat response](#), paragraph 39. Northumbrian was also concerned that the change from upper quartile did not undergo reasonable consultation and scrutiny. [Northumbrian's reply to Ofwat's response](#), paragraph 233

<sup>664</sup> [Northumbrian's reply to Ofwat's response](#), paragraph 236

4.479 Ofwat said that Northumbrian's argument had no merit. While some companies had submitted efficient proposals, others had work to do.<sup>665</sup> Ofwat said that it had set the benchmark at a comfortably achievable level and reflected the information disclosed by companies about their efficient costs. Eight out of 17 companies were still forecasting more efficient costs than Ofwat's benchmark.<sup>666</sup>

4.480 Ofwat said that the level of the efficiency challenge should be informed by a comparison of the modelled allowances with what the companies had asked for in their business plans. If the allowances were deemed too high, then one option would be to increase the level of frontier shift or catch-up challenge. This would ensure the companies were sufficiently incentivised to deliver cost efficiency savings, which was a core component of the regulatory framework.

#### *The role of intra-industry comparisons*

4.481 Ofwat said that it had also considered that its efficiency challenge was set using data from long standing monopolies in one industry. Even the relatively efficient companies within this sector were unlikely to be as efficient as companies in other industries facing competitive pressure. This was related to the concept of x-inefficiency, where in non-competitive sectors there was inefficiency due to a lack of competitive pressure.<sup>667</sup>

4.482 Oxera said Ofwat, when it had mentioned x-inefficiency, had not considered the fact that much of the water companies' activity was subcontracted to private companies and the sector had been under intensive regulation since privatisation.

#### *The decisions of other regulators*

4.483 Ofwat said that other regulators had previously set 'tougher' efficiency challenges than the upper quartile. The Northern Ireland Utility Regulator (NIUR) used the fourth placed company out of 15, which was 'tougher' than upper quartile, which would have been 4.5. Monitor, Ofcom and Postcomm had used upper decile efficiency challenges.<sup>668</sup>

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<sup>665</sup> [Ofwat's further submission on cross-cutting issues in companies' responses](#), paragraph 2.8

<sup>666</sup> [Ofwat's response to Yorkshire's SoC](#), p28

<sup>667</sup> [Ofwat's Response to common issues in companies' SoCs: Cost efficiency](#), paragraph 6.36

<sup>668</sup> Ofwat (2019), *PR19 final determinations: Securing cost efficiency technical appendix*, pp33–34; [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), paragraph 6.39; [Ofwat's response to the provisional findings – cost and outcomes](#), p16

- 4.484 Anglian said that other regulators rarely selected an efficiency challenge ‘tougher’ than upper quartile.<sup>669</sup>
- 4.485 Bristol said that regulatory precedent did not support Ofwat’s approach.<sup>670</sup> A NERA report commissioned by Bristol contained similar arguments.
- 4.486 Northumbrian produced a table showing that Ofwat, Ofgem and the CMA had never chosen efficiency challenges ‘tougher’ than upper quartile. Northumbrian said that the circumstances in the Postcomm, Ofcom and Monitor decisions were different and therefore did not support Ofwat’s claims.<sup>671</sup>
- 4.487 Yorkshire said that the regulators cited by Ofwat that applied an upper decile efficiency challenge only did so after conducting stochastic frontier analysis.<sup>672</sup> Oxera, in a report for Yorkshire said that the NIUR had used the fourth placed company, but since the upper quartile would have been the 3.75 placed company, the efficiency challenge was actually less strict than the upper quartile.
- 4.488 We reviewed the approaches taken by other regulators and our summary is below.
- Ofgem said that in RII0-1 it set the efficiency challenge at the upper quartile level to explicitly account for the potential measurement errors of models.<sup>673</sup>
  - Ofgem in its December 2020 RII0-2 final determination decided on an 85<sup>th</sup> percentile benchmark, with a three-year glide path, for the gas distribution networks.<sup>674</sup>
  - In 2016 Monitor assessed the comparative efficiency of NHS Trusts.<sup>675</sup> The data provided in the Monitor report was insufficient to calculate exactly Monitor’s efficiency challenge, but it appeared to be somewhere between the 50<sup>th</sup> and 60<sup>th</sup> percentile.<sup>676</sup> This was a softer target than an upper quartile, which would be at the 75<sup>th</sup> percentile.

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<sup>669</sup> [Anglian SoC](#), paragraph 601

<sup>670</sup> [Bristol SoC](#), paragraphs 403-406 and 417-422

<sup>671</sup> [Northumbrian SoC](#), paragraphs 327-335

<sup>672</sup> [Yorkshire’s reply to Ofwat’s response](#), paragraph 3.23.1.

<sup>673</sup> [Ofgem submission](#), p4

<sup>674</sup> Ofgem (2020), *RIIO-2 Draft Determinations – GD Sector Annex*, paragraph 1.11

<sup>675</sup> Monitor (2016), *2016/17 National Tariff Payment System: A consultation notice, Annex B5: Evidence on efficiency for the 2016/17 national tariff*, Table 1

<sup>676</sup> Monitor set the target at 2%, which was composed of 1.4% trend and catch-up of 0.6%. The 60<sup>th</sup> percentile catch up is 2.0%, suggesting that a 0.6% catch-up is somewhere between 50<sup>th</sup> and 60<sup>th</sup> percentile.

- We have found no evidence that Ofcom used an upper decile efficiency challenge in its regulation of Royal Mail. Deloitte's analysis for Ofcom included upper decile efficiency scores, but our understanding is that these were not used directly to regulate Royal Mail.<sup>677</sup>
- The NIUR used an upper quartile efficiency challenge for its transmission and distribution price control in 2017.<sup>678</sup>

4.489 In response to the Provisional Findings, Ofwat said that the NIUR decision was tougher than upper quartile, as with 14 companies the upper quartile was 4.5 and the NIUR chose the fourth company.<sup>679</sup>

4.490 Bristol said that in its decision the NIUR explicitly recognised the cost challenge was approximately equal to the upper quartile and the efficiency challenge was zero for the fourth placed company. In its recent draft determination the NIUR had used an upper quartile challenge.<sup>680</sup>

### *Decision*

4.491 In coming to our decision we took account of multiple factors.

4.492 We considered the overall model effectiveness and whether there had been substantial improvements in the econometric modelling compared to the models used by Ofwat. The changes we made to the econometric modelling are set out in the section on base costs modelling. These changes, whilst appropriate, did not result in substantial improvements in the statistical performance of the econometric modelling. Furthermore, as discussed in paragraph 4.392 we are wary of placing too much reliance on comparisons of standard errors and confidence intervals. Over-fitting a model could lead to a smaller range of standard errors and confidence intervals, but would not necessarily imply that the model was better at predicting cost allowances. Following the responses to Provisional Findings we updated our approach and calculated the standard errors using a bootstrap methodology.

4.493 We placed little or no weight on the factors below.

- First, the fact that one regulator, Ofgem, had chosen an efficiency challenge 'tougher' than upper quartile. These regulators are regulating

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<sup>677</sup> Deloitte (2016), *Econometric benchmarking in the UK postal sector*, p25

<sup>678</sup> Northern Ireland Utility Regulator (2017), *Northern Ireland Electricity Networks Ltd, Transmission & Distribution 6<sup>th</sup> Price Control Final determination*, paragraph 5.176

<sup>679</sup> Ofwat's response to the provisional findings – cost and outcomes, p16

<sup>680</sup> Bristol's reply to responses to the provisional findings, paragraph 17

different sectors with different companies, so there is limited read across to our decision.

- Second, evidence that the absolute level of the efficiency challenge had fallen, particularly for wastewater. We found that it was more appropriate to set the efficiency challenge based on our assessment of the quality of the econometric modelling, rather than to seek specific outcomes.
- Third the evidence on past outperformance shows the industry, on average, overspent wholesale totex allowance by 1%.<sup>681</sup> This is only a relatively modest over-spend and multiple factors could have led to this outcome.
- Fourth, a comparison of the companies' business plans with the modelled allowances. We found it was more appropriate to set the efficiency challenge based on our assessment of the quality of the econometric modelling, rather than to seek specific outcomes.
- Fifth, while Ofwat is correct that monopolies may be less efficient than companies operating in competitive sectors, the regulatory regime is designed to mimic aspects of competitive pressure and reduce any x-inefficiency. Furthermore, we have no way of quantifying this theoretical effect.
- Sixth, in the CMA's Bristol PR14 Determination an average efficiency benchmark was used. This decision, however, employed a different methodology and therefore comparisons of modelling accuracy between that approach and our current approach are inapposite.

4.494 Taking these factors into account, we decide that the upper quartile is the appropriate level of the efficiency benchmark. This balances our objective of setting a challenging benchmark while acknowledging the limitations of the econometric modelling (and the consequent risk that the company will have insufficient allowed revenue). We address the wider issue of whether our allowances are sufficient to ensure the companies can provide the required service levels in Section 7.

### ***Summary of CMA approach to efficiency challenge***

4.495 We adopt a similar approach to Ofwat, use a similar comparator set, and use a five-year period to calculate the efficiency challenge benchmark. We differ in that we set the efficiency challenge at the upper quartile level and we use

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<sup>681</sup> Ofwat (2020), [Service Delivery Report 2019/20](#), p7



2019/20 data, which was not available to Ofwat at the time of its FD. This results in an efficiency challenge of 1.4% in wholesale water and 2.2% in wholesale wastewater.

## Frontier shift

4.496 Frontier shift refers to the reduction of cost allowances to account for expected productivity improvements in the sector.<sup>682</sup> Frontier shift represents the ability of even the most productive companies in the sector to increase their productivity over time through, for example, adopting new technologies. Frontier shift differs from catch-up efficiency gains, where companies lagging in efficiency catch-up with the performance of the industry leaders.

4.497 In the following subsection we:

- summarise Ofwat's FD approach to frontier shift;
- discuss the methodological issues raised in assessing the overall level of frontier shift and provide our own view on the correct approach;
- summarise the views on the overall frontier shift level and our decision on this;
- discuss the issues raised in relation to the application of frontier shift to different costs and our approach to this;
- consider whether a true-up would be appropriate and the link to RPEs;
- summarise our frontier shift decisions.

### ***Ofwat's FD approach to frontier shift***

4.498 Ofwat applied the frontier shift on an annual basis to all wholesale base costs,<sup>683</sup> WINEP enhancement costs and some metering enhancement costs.<sup>684</sup> Ofwat did not apply frontier shift to other wholesale enhancement costs or retail costs.

4.499 Ofwat said that there was scope for frontier shift productivity improvements in the water sector from two sources:

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<sup>682</sup> Productivity is commonly defined as 'a ratio of a volume measure of output to a volume measure of input use' Organisation for Economic Co-operation and Development (OECD) (2001), [Measuring Productivity OECD Manual](#), p11

<sup>683</sup> This included both modelled and unmodelled base costs.

<sup>684</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p122



- on-going productivity improvements in the economy that the water sector should be able to emulate; and
- one-off productivity improvements from water companies making greater use of the totex and outcomes framework in Ofwat's FD.<sup>685</sup>

4.500 Ofwat set the frontier shift uniformly at 1.1% per year based on a range of factors. This included analysis conducted by Ofwat's consultants Europe Economics (EE), who estimated a frontier shift productivity growth range of 0.6% to 1.2% per year,<sup>686</sup> and an estimate from KPMG that there could be an additional impact from one-off productivity gains of between 0.2% and 1.2% per year from the totex and outcomes framework.<sup>687</sup>

4.501 The approach taken by EE and KPMG is set out in paragraphs 4.502 to 4.511, followed by more detail on Ofwat's reasoning for its frontier shift estimate and application.

### *Europe Economics' approach*

4.502 EE assessed the scope for frontier shift based on an analysis of comparative sectors using a historical EU KLEMS dataset on UK productivity.<sup>688</sup> EE selected comparators which were in competitive sectors and had similar activities to the water sector. The comparators they used are set out in Table 4-14.

**Table 4-14: Comparators used by Europe Economics**

<i>NACE 1 dataset (1971 to 2007):</i>	<i>NACE 2 dataset (1999 to 2014)</i>
Construction	Construction
Transport and Storage	Transport and storage
Chemicals and Chemical products	Chemicals and chemical products
Machinery, n.e.c.*	Machinery, n.e.c.
Total manufacturing	Total manufacturing
n/a	Professional, scientific, technical, administrative and support service activities
n/a	Other manufacturing; repair and installation of machinery and equipment

Source: Europe Economics, [Real Price Effects and Frontier Shift](#) and the [EU KLEMS Growth and Productivity Accounts dataset](#)

\* n.e.c. stands for 'not elsewhere classified' (in the database)

<sup>685</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p121

<sup>686</sup> Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), p7

<sup>687</sup> KPMG (2018), [Innovation and efficiency gains from the totex and outcomes framework](#), p24

<sup>688</sup> The [EU KLEMS Growth and Productivity Accounts dataset](#) provides data on growth and productivity variables for most of EU28 countries and sectors over different time periods.

4.503 EE looked at the productivity growth of the comparator sectors over different time periods using the available data from the EU KLEMS database.<sup>689</sup> EE relied on two different statistical releases.

- The NACE 1 dataset released in 2009 covers the period from 1971 to 2007. EE calculated a productivity growth estimate using the entire period, the most recent two full business cycles (1990 to 2007 and 1980 to 1989), and the average of the two.
- The NACE 2 dataset released in 2017 includes some new sector classifications to reflect more accurately the modern economy. EE examined the entire period (1999 to 2014) as well as a period pre-crisis (1999 to 2007) and a period post-crisis (2010 to 2014).

4.504 The estimates used by EE primarily relied on the gross output (TFP) measure of productivity growth. Gross output is calculated using all the inputs that are used for production in a sector of the economy, including intermediate inputs purchased from other sectors. TFP in gross output terms represents the residual growth in output once growth in capital, labour and intermediate inputs have been taken into account. Value-added TFP on the other hand considers only capital and labour as inputs, thus omitting the effect of intermediate inputs.<sup>690</sup>

4.505 EE calculated the lower bound of its range (0.6%) by focusing on the post-crisis period (2010 to 2014) and taking a simple (unweighted) average of the comparator sectors' productivity growth levels. For the upper bound (1.2%) it focused on stronger performing sectors and their pre-crisis performance.<sup>691</sup> EE also stated that the upper bound was supported by the average productivity growth of individual comparator sectors in other time periods including the post-crisis period.<sup>692</sup>

4.506 EE recommended that Ofwat select a number towards the upper end of its range for two reasons.<sup>693</sup>

- TFP growth estimates in value added terms were higher than in gross output terms. Gross output was the most appropriate measure of frontier

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<sup>689</sup> The [EU KLEMS Growth and Productivity Accounts dataset](#) contains data on growth and productivity variables for most of EU28 countries and sectors over different time periods.

<sup>690</sup> Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), p75

<sup>691</sup> EE excluded 'Construction', 'Total manufacturing' and 'Transport and storage'.

<sup>692</sup> NACE 1 (pre crisis): Chemicals 1.3% and Transport and Storage 1%. NACE 2 (Post crisis): Machinery and equipment N.E.C. 1%, Other manufacturing; repair and installation of machinery and equipment 1.3% and Professional, scientific, technical, administrative and support service activities 1.5%.

<sup>693</sup> Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), p88

shift, but some lesser weight should also be placed on TFP growth in value added terms.

- A true measure of frontier shift should include quality improvements ‘embodied’ in the inputs used by the sector – labour, capital and intermediate inputs. However, the TFP estimates using EU KLEMS data reflect primarily ‘disembodied’ technical change. Although research on the issue was limited, the evidence it had analysed suggested that TFP growth estimates in some cases would need to be uplifted by 60 per cent to account for the cumulative impact of TFP and technical change embodied in inputs.

### *KPMG Approach*

- 4.507 KPMG stated that the shift to a totex and outcomes framework in PR14 removed a regulatory barrier which should allow productivity increases and innovations which were additional to those seen in comparator sectors.<sup>694</sup> This was supported by water company case studies which provided examples of them using the totex framework to realise greater efficiencies.
- 4.508 KPMG stated that it took a multi-step approach to identify the level of productivity increases arising from the totex and outcomes framework and the potential for this to continue over AMP7.<sup>695</sup>
- 4.509 KPMG first conducted an analysis of the water and energy companies’ current levels of outperformance on costs under totex and outcomes controls.<sup>696</sup> It then derived productivity gains by assuming that after adjusting for other factors the productivity gains were attributable to the introduction of the totex and outcomes framework.
- 4.510 To assess the extent to which this impact would continue into AMP7, KPMG compared the levels of outperformance in the second totex and outcomes based price control in electricity distribution against outperformance in the first totex and outcomes price control in electricity distribution.<sup>697</sup>
- 4.511 KPMG also carried out two cross checks, one based on changes in performance following other substantial regulatory changes and one based on a sample of case studies from the water sector.<sup>698</sup>

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<sup>694</sup> KPMG (2018), [Innovation and efficiency gains from the totex and outcomes framework](#), p5

<sup>695</sup> KPMG (2018), [Innovation and efficiency gains from the totex and outcomes framework](#), p8

<sup>696</sup> KPMG (2018), [Innovation and efficiency gains from the totex and outcomes framework](#), p9

<sup>697</sup> KPMG (2018), [Innovation and efficiency gains from the totex and outcomes framework](#), p10

<sup>698</sup> KPMG (2018), [Innovation and efficiency gains from the totex and outcomes framework](#), p10

## Ofwat Reasoning

4.512 Ofwat gave a range of reasons for choosing its overall 1.1% estimate but was not explicit as to the share of this estimate it attributed to each factor.<sup>699</sup> Ofwat stated that:

- 1.1% was consistent with using a frontier shift number towards the upper end of the 0.6% to 1.2% per year range identified by EE. EE's advice was to place some weight on the higher valued added measures and to take account of input quality effects. Ofwat highlighted that for the post financial period examined by EE the value-added measure was 1.3% compared to 0.6% for the gross output measure. It also pointed towards the scope for higher estimates, by up to 60%, if input quality effects were considered.
- A figure of 1.1% per year was within the range of 0.6% to 2.5% per year indicated by KPMG for the combined effect of frontier shift and the impact of the totex and outcomes framework.
- Recent performance data released following KPMG's analysis suggested that the additional impact on productivity growth from the totex and outcomes framework could be lower than it originally thought, and this was one of the reasons it lowered its draft determination frontier shift estimate from 1.5% to 1.1%.<sup>700</sup>
- A report by Frontier Economics showed the historical scope for productivity growth in the water sector as well as the lack of recent growth. The report found an average quality adjusted productivity growth of 2.1% per year in the water sector between 1994 and 2017 but only 0.1% per year from 2009 to 2017.<sup>701</sup> Ofwat stated that the recent lower productivity growth contrasted with the reasonable productivity growth in the comparator sectors.<sup>702</sup>
- Part of Ofwat's reasoning for lowering its 1.5% draft determination estimate to 1.1% in its final determination was to allow companies additional funding to meet the leakage challenge.<sup>703</sup>

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<sup>699</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p177

<sup>700</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p177

<sup>701</sup> Frontier Economics (2017), [Productivity improvement in the water and sewerage industry in England since privatisation](#), p24

<sup>702</sup> Ofwat (2019), [PR19 final determinations: Overall level of stretch across costs outcomes and allowed return on capital](#) p16

<sup>703</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p63 and [Ofwat's response to the provisional findings – cost and outcomes](#), paragraph 2.27

## ***Methodological issues in assessing the frontier shift level***

4.513 There were a range of issues we considered in coming to our frontier shift estimate, these included:

- choice of comparators;
- choice of time period;
- value added measure;
- embodied technical change;
- totex and outcomes framework;
- historical water sector productivity;
- COVID-19;
- comparator catch-up; and
- outcomes and frontier shift.

4.514 This subsection sets out for each issue the Parties' views before setting out our own decision on each issue.

### ***Choice of comparators***

#### ***Parties' views on comparator choice***

4.515 Anglian, Bristol and Yorkshire stated that EE was selective in its choice of comparators for the upper bound (see paragraphs 4.502 to 4.506 4.504 for a summary of EE's approach) and that it focused on higher performing sectors, which introduced upwards bias.<sup>704</sup>

4.516 EE stated that using an average of the comparator sectors was not appropriate for setting the upper bound.<sup>705</sup> It said this was because the historical performance of some of the comparator sectors demonstrated that higher performance was possible and that an average of the comparator sectors was a central value, not an upper bound.

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<sup>704</sup> [Anglian SoC](#), p189, [Yorkshire SoC](#), p66 and [Bristol SoC](#), p111

<sup>705</sup> Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), p136. See also: Europe Economics (2020), [Response to Some Key Points on Real Price Effects \(RPEs\) and Frontier Shift](#), p9 – 'composite nature of work can be arbitrary'.

4.517 Ofgem noted that the identification of suitable comparators was always necessary to establish an appropriate frontier shift, as there was not likely to be an exact match.<sup>706</sup>

4.518 ENA raised two issues in response to our Provisional Findings.<sup>707</sup> Firstly, it said aggregating different comparator estimates using a simple average was inappropriately simplistic and a weighted average approach was more appropriate. Secondly, it stated that we had inappropriately included the ‘Professional, scientific, technical, administrative and support service activities’ in our NACE 2 calculation.

4.519 Ofwat stated that the share of totex that the water companies spent on a given sector did not necessarily make it a closer comparator than other sectors which had a similar nature of activity to the water sector.<sup>708</sup>

4.520 Ofwat stated that ‘Professional, scientific, technical, administrative and support service activities’ met the criteria used to identify relevant wholesale comparators as it was both a competitive sector and captured a range of activities which shared similarities with the nature of tasks undertaken by the wholesale water sector.<sup>709</sup> It stated there was also regulatory precedent for using the sector as a comparator for the water sector.

#### *Our decision on comparator choice*

4.521 We found that the comparators examined in EE’s analysis (shown in Table 4-14) were appropriate as, having reviewed each comparator, they appeared collectively to be a reasonable approximation for the activities of the water sector.<sup>710</sup> We therefore examined the productivity growth of the same comparator set. This included the ‘Professional, Scientific, Technical, Administrative and support service activities’ sector in our NACE 2 calculation.<sup>711</sup> This sector includes activities similar to the water industry, in particular, scientific research and development and architectural, engineering and technical consultancy services reflect activities water companies undertake when managing and developing their networks.<sup>712</sup>

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<sup>706</sup> [Ofgem submission](#), p6

<sup>707</sup> [ENA’s response to the provisional findings](#), p27

<sup>708</sup> [Ofwat’s response to Yorkshire’s SoC](#), p48 see also Europe Economics, (2019) [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), p116

<sup>709</sup> [Ofwat’s reply to responses to the provisional findings – costs and outcomes](#), p6

<sup>710</sup> Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), pp68–70

<sup>711</sup> This sector is not included in the available data for the time period we focus on (see paragraphs 4.523 to 4.537 for a discussion of time period choice)

<sup>712</sup> Europe Economics (2020), [Response to New Points on Frontier Shift and Real Price Effects \(RPEs\) made by Companies and their Consultants following CMA’s Provisional Findings](#), p5

4.522 Rather than assessing upper and lower bounds we decide to calculate an average estimate using all the comparators as a starting point and then adjust this based on other factors. Across the comparator sectors there was a range of productivity growth figures with some sectors having relatively higher growth than others. There was not strong evidence to weight any one comparator more than the others. We decide that a central measure of what can be achieved in competitive sectors is likely to provide a stretching target and that focusing only on the highest performance sectors achieved could bias the estimate, particularly as for any one sector there is a risk of measurement error. Applying weights to specific comparators based on water sector cost data is likely to introduce spurious accuracy to the process and potentially result in some useful comparators being underweighted.<sup>713</sup> We decide that giving equal weight to a broad set of comparators is the most appropriate approach.

### *Choice of time period*

#### *Parties' views on time period choice*

- 4.523 Anglian, Bristol and Yorkshire said that the time periods used by EE were inappropriate given the pro-cyclical nature of productivity growth. They highlighted that excluding the recessionary years of 2008 and 2009 led to EE's pre crisis estimate (1999 to 2007) and post crisis estimate (2010 to 2014) being overinflated.<sup>714</sup>
- 4.524 Yorkshire stated that in selecting an estimate towards the upper end of the range Ofwat did not put enough weight on more recent, low productivity growth and disregarded the UK's industrial performance over the last 13 years.<sup>715</sup> It said this was because the upper bound estimate was based on the pre-crisis data. Oxera on behalf of Yorkshire stated that the period 1996 to 2014 or 1999 to 2014 would be a more appropriate reflection of the AMP7 period. It stated the period 1996 to 2014 would also cover a full business cycle and it was important we took into account the most recent data.
- 4.525 Ofwat stated that EE's forecast of frontier shift was based on an appropriate time period as it considered both growth over more recent years and a number of full business cycles.<sup>716</sup> It said that while data for a full business cycle would be ideal, this data was not available in the NACE 2 dataset. Ofwat said the inclusion of the crisis years would have made the figures downward

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<sup>713</sup> Europe Economics (2020), [Response to some key points on frontier shift](#), pp9-10

<sup>714</sup> [Anglian SoC](#), p189, [Bristol SoC](#), p111 and [Yorkshire SoC](#), p66

<sup>715</sup> [Yorkshire SoC](#), p66

<sup>716</sup> [Ofwat's response to Yorkshire's SoC](#), p46



biased, since the figures would include a full economic contraction but only an incomplete part of the period of economic expansion.<sup>717</sup>

- 4.526 EE also disagreed that insufficient weight had been placed on the post crisis period. It stated that the upper bound was consistent with evidence from comparator sectors post crisis after value-added measures and input quality improvements were taken into account.<sup>718</sup>
- 4.527 Ofwat stated that some weight should be placed on earlier economic cycles. In particular it suggested that the longer 1980 to 2007 period should be considered. In this period the average TFP growth in gross output of comparator sectors was 0.8% per year.<sup>719</sup> Ofwat also stated that EE set out a number of reasons why lower recent UK productivity did not imply a lower frontier shift assumption for the water sector.<sup>720</sup> EE stated that it was not clear the productivity slowdown would continue and that the factors driving the slowdown did not apply to the water sector.<sup>721</sup> It stated that given the uncertainty as to the cause of the historical slowdown there was uncertainty as to whether it would continue. It stated that there was a significant minority of academic literature which suggested a more optimistic picture for future productivity growth.<sup>722</sup>
- 4.528 EE also set out a list of factors which had been put forward in the academic literature as potential drivers of the productivity slowdown observed in advanced economies. EE examined how each factor affected productivity growth, the empirical evidence for this and reasons whether the factors applied to the water sector.<sup>723</sup> A summary table submitted by EE is included as Table 4-15.

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<sup>717</sup> Ofwat's response to common issues in companies' SoCs: Cost efficiency, p85. See also: Europe Economics (2020), [Response to Some Key Points on Real Price Effects \(RPEs\) and Frontier Shift](#), pp137–139

<sup>718</sup> Europe Economics (2020), [Response to Some Key Points on Real Price Effects \(RPEs\) and Frontier Shift](#), p11

<sup>719</sup> Ofwat's response to the provisional findings – cost and outcomes, p7

<sup>720</sup> Ofwat's response to the provisional findings – cost and outcomes, p7

<sup>721</sup> Europe Economics (2020), [Additional Evidence on Some Points Relating to Frontier Shift](#), p2 and pp7-20

<sup>722</sup> Europe Economics (2020), [Additional Evidence on Some Points Relating to Frontier Shift](#), p7

<sup>723</sup> Europe Economics (2020), [Additional Evidence on Some Points Relating to Frontier Shift](#), p8-p20



**Table 4-15: EE summary of factors contributing to the slowdown in productivity growth**

<i>Factor driving slowdown in productivity growth</i>	<i>Why this factor does not imply lower frontier shift in the water sector</i>
Underestimation of productivity growth in ICT and digital services	Factor has small effect and is not relevant to water sector; in any case, it would mean that true productivity growth was higher than reported figures.
End of temporary period of faster productivity growth driven by ICT and associated business reorganization Slowdown is confined to specific sectors, including manufacturing and financial services Labour hoarding following 2008-09 crisis	No reason why new technologies (eg smart water networks) will not materialise in the water sector over AMP7.  Productivity slowdowns in finance and manufacturing were driven by idiosyncratic factors not relevant to water sector (measurement issue in finance sector, reduced capital deepening in manufacturing). Even for the economy as a whole, unlikely still to apply this many years after the 2008-09 crisis; in any case, water sector not affected in the same way due to stable demand and revenues.
Lax monetary policy and low interest rates led to higher survival of less efficient ('zombie') firms	Capital misallocation less likely in the UK due to a more efficient financial system; none of the regulated water companies bear any resemblance to 'zombie' firms (where current profits do not cover debt interest costs over extended period); regulated framework requires laggard firms to catch up, regardless of monetary environment.
Credit constraints prevented firms investing to increase productivity	Ofwat is allowing substantial capex within allowed revenues at PR19 and has a financeability duty which means efficient water companies should not face credit constraints.
Weak anticipated consumption growth weakens investment incentives	Demand faced by water companies is less affected in periods of downturn and revenues are protected through revenue cap; further, firms have ability and incentive to invest due to funding for allowed capex programme within allowed revenue and the RCV mechanism which guarantees cost recovery and a return on investment.
Increase in industry concentration reduces aggregate productivity and causes TFP measurement problems	No significant changes in industry concentration or market power in water sector; in any case, regulation seeks to set frontier shift on basis of what would be achieved in competitive market.
While frontier firms have continued to increase productivity, laggard firms have fallen further behind	Frontier shift ideally measured on basis of performance of frontier firms in comparator sectors; hence, this explanation implies that our frontier shift estimate (based on sectoral averages) is an underestimate of true frontier shift.
Regional differences in productivity growth between London / the South East and the rest of the country	Water companies identified as efficient by Ofwat's assessment of efficient costs cover a range of geographical areas across England and Wales.

Source: EE [Additional Evidence on Some Points Relating to Frontier Shift](#) Table 1

4.529 EE concluded that these factors for the reasons set out in the table did not imply a lower frontier shift for the water sector.<sup>724</sup>

4.530 Bristol stated that there may be other factors which meant that productivity growth in the water sector might be slower relative to the wider economy. It said these should also be considered (for example, increasing regulation and quality obligations).<sup>725</sup>

4.531 ENA stated that it was wrong to ignore the most recent data and the time period should represent the economic outlook that was likely to prevail over the next price control period.<sup>726</sup>

<sup>724</sup> Europe Economics (2020), [Additional Evidence on Some Points Relating to Frontier Shift](#), p32

<sup>725</sup> Bristol's reply to responses to the provisional findings, p28

<sup>726</sup> ENA's response to the provisional findings, p 28

4.532 Ofgem said that the identification of a suitable time period was always necessary to establish an appropriate frontier shift, as there was not likely to be an exact match.<sup>727</sup>

*Our decision on time period choice*

4.533 Productivity growth should be assessed over full business cycles because productivity growth is typically procyclical. Therefore, we decide to use the most recent full business cycle for which data is available: 1990 to 2007.<sup>728</sup>

4.534 Table 4-16 shows the average NACE 1 annual productivity growth estimate for each comparator sector for the most recent full business cycle for which EU KLEMS data is available. It shows NACE 1 estimates based on a longer time period, as there are some arguments that looking at the longest available period is appropriate. It also shows NACE 2 estimates, which are based on some additional comparator sectors, but straddle two business cycles. The three estimates are within a range of 0.58% to 0.73%.

**Table 4-16: Average annual TFP growth of gross output for comparator sectors**

Sector/time period	%		
	1990 to 2007 (Most recent NACE 1 business cycle)	1971 to 2007 (full NACE 1 period)	1999 to 2014 (full NACE 2 period)
Construction	0.26	0.26	-0.08
Total Manufacturing	0.64	0.64	0.59
Transport and Storage	0.73	1.05	0.02
Chemicals and Chemical Products	1.21	1.26	0.78
Machinery and equipment n.e.c.	0.81	0.48	0.90
Professional, Scientific, Technical, Administrative and support service activities			0.86
Other manufacturing; repair and installation of machinery and equipment			0.96
Average	0.73	0.74	0.58

Source: Frontier shift data pack and CMA analysis.

4.535 As shown in the Table 4-16 looking at the average productivity growth for the five comparators in 1990 to 2007 provided an estimate of 0.73%. We decide to use this as a starting point for our frontier shift estimate. This is towards the lower end of the range calculated by EE but does not account for other factors.

<sup>727</sup> [Ofgem submission](#), p6

<sup>728</sup> Based on business cycles calculated by Europe Economics using GDP trough-to-trough analysis.

4.536 There has been lower UK-wide productivity growth since 2007.<sup>729</sup> Therefore, because our estimate was based on the productivity growth of comparators prior to the financial crises we considered adjusting down our estimate.

4.537 Overall, we decide not to apply a specific quantitative downwards adjustment but consider the lower post crisis productivity growth as a factor in the round when coming to our final frontier shift estimate. The weight we placed on this downwards adjustment was limited for two reasons.

- There were reasons which indicated that water companies were likely to be less impacted than other sectors.<sup>730</sup> For example, the water sector would be less impacted by lower capital investment given the certainty provided by the regulatory regime and the innovation fund encouraging investments in new technologies. This was demonstrated by the water companies' own frontier shift estimates, ranging from 0.75% to 1.5% (see Table 4-17), being higher than that suggested by the post crisis TFP growth figures.
- Some forecasts have indicated that UK wide productivity growth may begin to rise over the next five years, although there was substantial uncertainty given the current COVID-19 pandemic (see paragraphs 4.571 to 4.595).<sup>731</sup>

#### *Value added measure*

4.538 There are two different approaches which can be used when measuring output as part of calculating productivity growth. These are both recorded in the EU KLEMs dataset:

- The first measurement is based on gross output. Gross output includes intermediate inputs such as materials, energy and services used up in the process of production.
- The second approach is a value-added approach. Value added output only includes capital and labour as inputs and not the effect of intermediate inputs.

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<sup>729</sup> Office for Budget Responsibility (2020), [Economic and Fiscal Outlook, March 2020](#), downloaded on 23/02/2021, p206 – as demonstrated by chart B.1.

<sup>730</sup> Europe Economics (2020), [Response to Some Key Points on Real Price Effects \(RPEs\) and Frontier Shift](#), pp5-6, see also Europe Economics (2020), [Additional Evidence on Some Points Relating to Frontier Shift](#), p2 and pp7-20

<sup>731</sup> Europe Economics (2020), [Response to Some Key Points on Real Price Effects \(RPEs\) and Frontier Shift](#), p3

4.539 The value-added measure is systematically higher in magnitude than the gross output measure.<sup>732</sup>

*Parties' views on value-added measure adjustment*

4.540 Bristol said that Ofwat's decision to place weight on value-added TFP was not appropriate and was not supported by Ofwat's own advisers.<sup>733</sup> It said that the gross output measure was a more appropriate measure for estimating frontier shift as the cost base Ofwat applied frontier shift to included intermediate inputs, whereas the value-added measure only included capital and labour inputs.

4.541 Ofwat said that its estimate was consistent with EE's advice to take account of both gross output and value-added measures.<sup>734</sup> Many of the water companies' consultants originally used value-added measures to forecast productivity and other regulators such as Ofgem had used them in the past. Ofwat stated that EE's frontier shift estimate of 0.6% to 1.2% per year was based on gross output TFP growth and that EE advised Ofwat to use a value towards the upper end of this range to take account of the higher value-added measures.

4.542 In response to our Provisional Findings ENA stated that if placing weight on the value-added measure, the measure should be adjusted down to account for the fact the measure should only be applied to the costs of business excluding intermediate inputs.<sup>735</sup>

4.543 On the other hand, Ofwat stated that value-added measures continued to show materially higher estimates of frontier shift, even after allowing for the exclusion of relevant items.<sup>736</sup> Ofwat submitted a report from EE which provided further conceptual reasoning as to why even after making adjustments the value-added measure would always be higher than the gross output measure due to the way it was applied to totex.<sup>737</sup>

*Our decision on value added measure adjustment*

4.544 We agreed with Ofwat that some weight should be placed on the value-added metric for two reasons:

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<sup>732</sup> Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), p75

<sup>733</sup> Bristol SoC, p111

<sup>734</sup> Ofwat's response to common issues in companies' statements of case: Cost efficiency, p86

<sup>735</sup> ENA's response to the provisional findings, p30

<sup>736</sup> Ofwat's response to the provisional findings – cost and outcomes, p7

<sup>737</sup> Europe Economics (2020), [Additional Evidence on Some Points Relating to Frontier Shift](#), pp2-3 and pp20-25

- First, there was some theoretical basis for doing so. The Organisation for Economic Co-operation and Development's (OECD) manual on measuring productivity suggested that there was some empirical support for both approaches as a measure of technical change.<sup>738</sup>
- Second, the gross output estimates may be more prone to error.<sup>739</sup> This was because producing consistent sets of gross output measures across sectors required careful treatment of intra-sector flows of intermediate products which might be difficult empirically.<sup>740</sup>

4.545 We decide it would be inappropriate to fully weight the 1.5% value added estimate without some downward adjustment. This is because we apply the frontier shift to costs which are akin to intermediate inputs.<sup>741</sup> However, the evidence put forwards by EE suggested that the value added measure would be higher than the gross output measure (even after any adjustment).<sup>742</sup> We therefore decide to focus on the gross output measure but give some qualitative weight to the value added metric being higher.

### *Embodied technical change*

4.546 One of the reasons Ofwat gave for choosing a number towards the top end of the EE range was to account for the impact of embodied technical change (changes in the quality of inputs) on productivity growth. For example, having access to more advanced machinery.<sup>743</sup> EE set out that the productivity growth measures it used in its comparator analysis only reflected 'disembodied' technical change (technical change that was not embodied in labour or capital inputs).<sup>744</sup> It said for regulatory purposes, it was important to ensure the cost savings reflect both embodied and disembodied technical change.

### *Parties' views on adjustment for embodied technical change*

4.547 Yorkshire stated that Ofwat was wrong to suggest the frontier shift estimate could be higher because embodied technical change was not accounted for. It

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<sup>738</sup> Organisation for Economic Co-operation and Development (OECD) (2001), [Measuring Productivity OECD Manual](#), p28

<sup>739</sup> See also: Competition Commission (2014) [NIE RP5 final determination, appendix 1.1](#), A11(1)-2

<sup>740</sup> CEPA (2020), [Draft Determinations Frontier shift annex](#), p12, contained within Ofgem (2020), [RIIO-2 Final Determinations: Technical Annex part one](#),

<sup>741</sup> NACE 2 value added estimate for 1990–2007 is 1.5%. Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), p78. Europe Economics (2020), [Additional Evidence on Some Points Relating to Frontier Shift](#), pp 2-3 and pp 20-25

<sup>742</sup> Europe Economics (2020), [Additional Evidence on Some Points Relating to Frontier Shift](#), pp2-3 and pp20-25

<sup>743</sup> Ofwat (2019), [Securing cost efficiency technical appendix](#), p176

<sup>744</sup> Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), p66

stated that the academic evidence had been misinterpreted.<sup>745</sup> Yorkshire stated that any adjustment should be supported by robust quantitative evidence and that the academic papers EE refer to were based on old datasets and focused on a different country.<sup>746</sup>

4.548 Bristol also stated that the references put forward by EE were somewhat out of date and focussed on US data.<sup>747</sup> Bristol stated that the 1% estimate used in our Provisional Findings was towards the top end of the range derived from regulatory precedent and two outdated academic papers did not provide compelling evidence for us to break precedent.

4.549 Yorkshire submitted a report from Oxera which stated that the papers quoted by EE (Uri and Hulten),<sup>748</sup> actually suggested there was no change in TFP output measures when embodied technical change was accounted for. Oxera stated that the TFP estimates in Uri's study were similar regardless of the assumed level of embodied technical change. Oxera stated that the interpretation by EE which stated that there could be a 60% uplift to the frontier shift estimate would mean that the TFP estimates published by national statistical agencies were severely understated, which was not credible. ENA and Yorkshire in response to our Provisional Findings also submitted further reports from Oxera. Oxera stated that a recent report for the Netherlands Authority for Consumers and Markets had found that embodied technical change could reasonably be regarded as inconsequential and the great majority of overall technical change could be best characterised as disembodied technical change.<sup>749</sup> It also stated that to isolate the potential effects of embodied technical change, quality effects should be explicitly considered on both the input and the output side.<sup>750</sup>

4.550 Ofwat said that embodied technological change was not commonly accounted for in TFP analysis which focused on measuring disembodied technological change.<sup>751</sup> It said that it would be conceptually incorrect to offset an adjustment for embodied technical shift by stripping out the quality adjustments that had been made to outputs, since productivity improvements could take the form of either more output or higher quality output. Ofwat said that Oxera's argument was based on a report which was not credible due to a

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<sup>745</sup> [Yorkshire's Reply to Ofwat's Response](#), p80

<sup>746</sup> [Yorkshire's reply to responses to the provisional findings](#), p28

<sup>747</sup> [Bristol's reply to responses to the provisional findings](#), p29

<sup>748</sup> Uri, Noel D (1983), 'Embodied and disembodied technical change and the constant elasticity of substitution production function', *Journal of Applied Mathematical Modelling*, p403 and Hulten, Charles R. (1992), 'Growth Accounting When Technical Change is Embodied in Capital', *The American Economic Review*, pp964–980.

<sup>749</sup> Economic Insights (2020), [Frontier Shift for Dutch Gas and Electricity TSOs, Report prepared for Netherlands Authority for Consumers and Markets](#)

<sup>750</sup> [Yorkshire's reply to responses to the provisional finding](#), p28

<sup>751</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p6

flaw in its methodology. It stated that the analysis in the report appeared to be mis-specified and used data that was already adjusted for embodied technical change (leaving no residual effect in its data for it to identify).<sup>752</sup> EE on behalf of Ofwat stated that it was not credible to suggest that there had been no improvements in the quality of capital inputs between 1995 and 2017 and the author of the paper stated the result was problematic.<sup>753</sup>

4.551 EE stated that Oxera had misinterpreted the academic papers.<sup>754</sup> The TFP ranges that Oxera quoted from Uri's paper all excluded embodied technical change, and hence all Oxera's argument showed was that Uri's estimates were similar regardless of the amount of embodied technical change. EE stated that since embodied technical change was separate from disembodied technical change, Oxera's argument was not relevant to the question of whether an uplift should be applied to take account of embodied technical change. EE stated that applying an uplift for embodied technical change did not imply that national statistical agencies had underestimated TFP growth.<sup>755</sup> The estimates from the national statistical agencies were not seeking to measure productivity growth including embodied technical change.

4.552 In response to our Provisional Findings Ofwat stated that the adjustment required to take account of embodied technical change might be far higher than the 60% estimated by EE. It stated that new evidence put forwards by EE suggested that including disembodied technical change could increase the unadjusted estimate by as much as 140%.<sup>756</sup>

#### *Our decision on adjustment for embodied technical change*

4.553 We agreed with Ofwat that the EU KLEMS TFP data used in the comparator analysis did not seek to measure changes in productivity growth resulting from changes in embodied technical change.<sup>757</sup>

4.554 We therefore decide that there is a valid conceptual basis for increasing our 0.7% estimate. We did not agree with Oxera's view that there should be an offsetting adjustment to account for the impact of quality adjustment to outputs

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<sup>752</sup> Ofwat's response to the provisional findings – cost and outcomes, p6; for more detail see also Europe Economics (2020), [Response to New Points on Frontier Shift and Real Price Effects \(RPEs\) made by Companies and their Consultants following CMAs Provisional Findings](#), p7

<sup>753</sup> Europe Economics (2020), [Response to New Points on Frontier Shift and Real Price Effects \(RPEs\) made by Companies and their Consultants following CMAs Provisional Findings](#), p7

<sup>754</sup> Europe Economics (2020), [Response to Some Key Points on Real Price Effects \(RPEs\) and Frontier Shift](#), p12, see also Europe Economics (2020) [Response to Oxera's arguments on Embodied Technical change](#), p2

<sup>755</sup> Europe Economics (2020), [Response to Some Key Points on Real Price Effects \(RPEs\) and Frontier Shift](#), p14

<sup>756</sup> Ofwat's response to the provisional findings – cost and outcomes, p17 and Europe Economics (2020), [Additional Evidence on Some Points Relating to Frontier Shift](#), p3

<sup>757</sup> O'Mahoney, Mary, and Timmer, Marcel P (2009), [Output, Input and Productivity Measures at the Industry Level : The EU KLEMS Database](#), *The Economic Journal*, pp394–395



as outputs are already quality adjusted and productivity improvements can take the form of either more output or higher quality output.<sup>758</sup>

- 4.555 The Economic Insight paper Oxera referenced supporting no uplift had a number of methodological issues highlighted by EE. This meant we did not place weight on the finding in the paper that the impact of quality improvements could be negative or insignificant.
- 4.556 We decide to consider the adjustment for embodied technical change as a qualitative factor together with other adjustments in the round. This is because the evidence available to indicate the possible magnitude of the impact of embodied technical change had a number of limitations. In particular, it primarily reflected the US rather than UK economy and there was limited direct evidence on the effectiveness of quality adjustments in the EU KLEMS data.

#### *Totex and outcomes framework*

##### *Parties' views on totex and outcomes framework adjustment*

- 4.557 Anglian, Bristol and Yorkshire all raised concerns with the frontier shift being uplifted for additional productivity gains attributed to the implementation of the totex and outcomes framework.<sup>759</sup> Anglian stated that it did not agree with Ofwat's assumption (based on the analysis by KPMG) that water companies could achieve a 'special' productivity increase from the totex and outcomes framework. It said that this was based on flimsy evidence from the energy sector, selective use of comparator sector data and was incongruous with productivity evidence in the rest of the economy.<sup>760</sup>
- 4.558 Bristol said that the assumption that outperformance against allowances set in PR14 could be attributed to productivity gains was baseless and that outperformance could have arisen for other reasons.<sup>761</sup>
- 4.559 Yorkshire stated that the KPMG evidence was flawed.<sup>762</sup> Yorkshire's advisers Oxera stated that it was incorrect to arbitrarily attribute all outperformance to the implementation of the totex and outcomes framework when other factors could have driven this.

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<sup>758</sup> See for example the Office for National Statistics (2016), [Productivity Handbook](#), Chapter 12, p69, which describes the measures derived by the EU KLEMS method as reflecting differences in quality over time.

<sup>759</sup> [Anglian SoC](#), p189, [Bristol SoC](#), p110 and [Yorkshire SoC](#) p66

<sup>760</sup> [Anglian SoC](#), p189

<sup>761</sup> [Bristol SoC](#), p110,

<sup>762</sup> [Yorkshire SoC](#), p66



- 4.560 Ofwat stated that it did provide sufficient evidence to justify an uplift due to the totex and outcomes framework, including case studies put forward by the companies themselves.<sup>763</sup> Ofwat stated that the uplift it applied was small in comparison with the upper quartile company outperformance of 2.4% per year. It said that the alternative suggestion, that no account should be taken of the totex and outcomes regime going forward, would not reflect the balance of evidence.<sup>764</sup>
- 4.561 In response to our Provisional Findings Ofwat stated that the additional gains from the totex and outcomes framework would be realised not just in the current period but over future decades due to the long lived nature of many assets and might be higher in future periods.<sup>765</sup> It stated that the benefits of the totex and outcomes regime were demonstrated by the outperformance on WINEP in AMP6, with the Disputing Companies only spending 57% of their business plan request. Ofwat said the impact of Brexit and COVID-19 may lead to a greater benefit from totex and outcomes in future periods due to reductions in the cost of some input prices.<sup>766</sup> Ofwat provided a report from EE which also highlighted the reasons put forward by Ofwat for why the move to the totex and outcomes framework would continue to provide further opportunities for additional productivity growth.<sup>767</sup> EE stated that we could consider treating this issue as a qualitative reason for ‘aiming up’ when arriving at our preferred point estimate. It said this was true regardless of the robustness of the quantitative evidence available on the size of the additional gains.<sup>768</sup>
- 4.562 Bristol stated that the impact of COVID-19 and Brexit on gains from the totex and outcomes framework was speculation. It also said that COVID-19’s impact should be considered outside of the redeterminations and was not therefore relevant.<sup>769</sup>
- 4.563 Ofgem stated that it agreed with Ofwat in principle that frontier shift could be used to incorporate an adjustment component not adequately captured within the comparator sectors.<sup>770</sup>

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<sup>763</sup> [Ofwat’s response to common issues in companies’ SoCs: Cost efficiency](#), pp95–97

<sup>764</sup> [Ofwat’s response to common issues in companies’ SoC: Cost efficiency](#), p98

<sup>765</sup> [Ofwat’s response to the provisional findings – cost and outcomes](#), p18

<sup>766</sup> [Ofwat’s response to the provisional findings – cost and outcomes](#), p18

<sup>767</sup> Europe Economics (2020), [Additional Evidence on Some Points Relating to Frontier Shift](#), p3

<sup>768</sup> Europe Economics (2020), [Additional Evidence on Some Points Relating to Frontier Shift](#), p30

<sup>769</sup> [Bristol’s reply to responses to the provisional findings](#), p29

<sup>770</sup> [Ofgem submission](#), p 6

### *Our decision on totex and outcomes framework adjustment*

- 4.564 We found that the case studies presented in KPMG's analysis demonstrated the potential for additional productivity growth resulting from implementation of the totex and outcomes framework.<sup>771</sup> However, given the comparators used to inform our frontier shift estimate are sectors which already have flexibility in their approach to costs, we considered that there would only be productivity gains above the comparator estimate for a temporary period while the water sector catches up.
- 4.565 We accepted Ofwat's position that there are some reasons why the benefits of increased flexibility on productivity growth may continue into AMP7 including the long life of assets being replaced over time. However, we think the impacts would remain smaller than in AMP6, for which there was little robust evidence available of a substantial positive impact. We therefore decide there is some limited potential for additional productivity growth above our comparator estimate from the totex and outcomes framework and consider this as a qualitative factor together with other adjustments in the round.

### *Historical water sector productivity*

#### *Parties' views on historical water sector productivity growth*

- 4.566 Anglian said that the report by Frontier Economics for Water UK showed that since 2009, productivity growth had dwindled to 0.1% per year.<sup>772</sup> It suggested this could be a reason for a lower frontier shift estimate.
- 4.567 Thames Water said that it was a stretch to assume that the productivity improvements in the comparator sectors could be applied directly to the water sector and that the same incentives for technology improvements applied across both these sectors and the water sector.<sup>773</sup> The water sector was subject to strong cost efficiency incentives and so it appeared odd not to include the impact over time of cost changes in the water sector. Frontier shift should be estimated using econometrics techniques, for example through the use of a time trend in the base cost models.
- 4.568 Dŵr Cymru stated that Ofwat's view that the water sector could achieve relatively high productivity growth from 2018/19 through to 2024/25 because certain other sectors of the economy were able to achieve relatively high productivity growth in the period up to 2014 was an assertion and was not

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<sup>771</sup> KPMG (2018), *Innovation and efficiency gains from the totex and outcomes framework*, p39

<sup>772</sup> Anglian SoC, p186

<sup>773</sup> Thames Water submission, p7

evidence based.<sup>774</sup> Dŵr Cymru stated that this was despite Ofwat's observation that productivity growth in the water sector had shown little or no improvement over the last ten years.

- 4.569 Ofwat stated that the historical productivity growth in the water sector was lower than relevant comparator sectors and this was one of the reasons it wanted a step change.<sup>775</sup>

#### *Our decision on historical water sector productivity growth*

- 4.570 Frontier Economics conducted detailed analysis on productivity growth in the water sector in a 2017 report for Water UK.<sup>776</sup> It found that productivity growth over the full period examined from 1994 to 2017 was 2.1% per year adjusting for quality. However, it found that from 2009 to 2017 productivity growth was only 0.1%. We decide not to place weight on these historical estimates of productivity growth in the water industry. This is because these estimates are unlikely to be reliable for the purposes of projecting future productivity gains. The high productivity growth in the early years may at least partially be explained by efficiency catch-up after privatisation meaning the estimates will be biased upwards. Similarly, for the more recent data the Frontier Economics report noted that quality improvements had not been fully accounted for. This means that the more recent data should be viewed more cautiously due to downwards bias.<sup>777</sup> Even if we assume these data issues are immaterial, benchmarking to a competitive benchmark is more appropriate to prevent any potential periods of underperformance being established as a future target.

### **COVID-19**

#### *Parties' views on COVID-19*

- 4.571 The COVID-19 pandemic did not start until after Ofwat's FD and the Disputing Companies suggested we should consider reducing our frontier shift estimates to account for the impact of COVID-19.
- 4.572 Yorkshire stated that while the water sector might be less exposed to COVID-19 compared to other sectors, it was unclear why EE and Ofwat had not at least reconsidered their recommendation to focus on the upper end of their

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<sup>774</sup> Dŵr Cymru (Welsh Water) submission, p2

<sup>775</sup> Ofwat's response to common issues in companies' SoCs: Introduction and overall stretch on costs and outcomes, p15

<sup>776</sup> Frontier Economics (2017), *Productivity improvement in the water and sewerage industry in England since privatisation*, p2

<sup>777</sup> Frontier Economics (2017), *Productivity improvement in the water and sewerage industry in England since privatisation*, p2

range of frontier shift estimates.<sup>778</sup> Yorkshire stated that the net impact of COVID-19 has been an increase in overall costs as well as an expected increase in bad debt. Yorkshire stated that the impact of COVID-19 on the company was ongoing and there were important elements that remained subject to uncertainty. As such, Yorkshire remained of the view that the impacts of COVID-19 should be assessed by Ofwat at the end of the financial year.<sup>779</sup>

4.573 Anglian stated that its business plan assumption of 1% productivity growth per year looked excessive given the COVID-19 pandemic. To safeguard the health of employees and customers it had applied restrictions which had reduced operational efficiency. It acknowledged that there would also likely be some benefits in the longer term as it took forward learnings from the pandemic for example, increased use of video conferencing. It stated that even in the most optimistic scenario it was essential to assume a reduced level of productivity growth in year one, while more pessimistic scenarios assumed that UK output would not return to 2019 levels until the end of 2024. Anglian also submitted the Strategic Review of Charges by the Water Industry Commission for Scotland. The report noted that there were significant uncertainties related to the pandemic's impact on Scottish Water's supply chain and the associated cost of future capital works.<sup>780</sup> It said it appeared likely in the short term that the additional measures associated with COVID-19 would lead to higher costs and lower levels of productivity.

4.574 Northumbrian stated that the economic data supported the view that productivity levels had been negatively impacted by COVID-19.<sup>781</sup> It said GDP had dropped 19.1% in the three months to May 2020 and a deep recession was anticipated in the first two years of the price control. It stated that given the anticipated deep recession and the emerging impacts on its productivity levels, it no longer seemed prudent to employ more aggressive frontier shift estimates. Northumbrian stated that the Office for Budget Responsibility's (OBR) November Economic and Fiscal Outlook showed that the OBR did not expect there to be a catch-up in economy wide productivity by the end of AMP7 as it was projecting a 2% negative impact for 2025 compared to its pre pandemic forecasts.<sup>782</sup> It said it could see no reason why similar impacts would not be seen in water company operations and supply chains. Northumbrian said that comparisons with past recessions only partially captured the impact of COVID-19 which also impacted working conditions.<sup>783</sup>

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<sup>778</sup> Yorkshire's reply to Ofwat's response, p90

<sup>779</sup> Yorkshire's submission following the second main party hearings, p42

<sup>780</sup> Water Industry Commission for Scotland (2020), *Strategic review of charges 2021-27, draft determination*, p20

<sup>781</sup> Northumbrian's final submission, p8

<sup>782</sup> Northumbrian's submission following the second main party hearings, pp4-5

<sup>783</sup> Northumbrian's response to the provisional findings, paragraph 57

It said that the productivity impact had been replicated in comparable sectors in the ONS flash productivity figures with four of the six sectors showing substantial falls in output per hour.<sup>784</sup>

- 4.575 Northumbrian stated that COVID-19 had a clear impact on its own productivity levels for 2020/21.<sup>785</sup> It said this impact was driven by social distancing requirements, additional safety/welfare requirements and supply chain disruption.<sup>786</sup> Northumbrian said that in order to catchup it would mean it would have to become more efficient in future years to cover the loss. It said there might be a gradual move to a higher level of productivity, but it was hard to see itself getting ahead of that level very quickly.
- 4.576 Northumbrian stated that the Ofwat/Water UK examination of COVID-19 was focussed primarily on ODIs and there was not an equivalent process or mechanism to consider the impact on frontier shift and totex.<sup>787</sup> In that context, it requested a reduction in frontier shift to 0.6% for the first year of the determination. This was based on its estimate of the increased costs of capital delivery multiplied by the share of capex based on its total PAYG rate.<sup>788</sup>
- 4.577 Bristol stated that COVID-19 impacted a number of its costs in different ways. It said some costs dropped off as items like travel were reduced but that there was a negative impact on productivity levels in customer call centres for example. It said some transformation programmes were delayed and that it was trying hard to catchup but there was still quite a long way to go.
- 4.578 ENA stated that there was growing evidence the effects of COVID-19 were considerable and adverse.<sup>789</sup> It highlighted First Economics' statement that it was not unreasonable to think COVID-19 could impact network costs in an unfavourable way.<sup>790</sup> ENA also pointed to flash productivity data from the ONS covering Q1 to Q3 which showed substantial falls in labour productivity in most sectors and a Bank of England (BOE) report stating GDP growth was expected to fall 14%.<sup>791</sup>

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<sup>784</sup> [Northumbrian's response to the provisional findings](#), paragraph 60

<sup>785</sup> [Northumbrian's response to the provisional findings](#), paragraph 61

<sup>786</sup> [Northumbrian's response to the provisional findings](#), paragraph 58

<sup>787</sup> [Northumbrian's response to the provisional findings](#), paragraph 57

<sup>788</sup> [Northumbrian's response to the provisional findings](#), paragraph 63

<sup>789</sup> [ENA's response to the provisional findings](#), p32

<sup>790</sup> First Economics (2020), *Frontier Productivity Growth A report prepared for the Energy Networks Association*, Section 2.4

<sup>791</sup> [ENA's response to the provisional findings](#) p33, Office for National Statistics (2020), *Flash Productivity by Section*, HM Treasury (2020), *Forecasts for the UK economy: a comparison of independent forecasts*, No. 399, October 2020

- 4.579 Ofwat stated that it was appropriate to have reasonable certainty around the impact of COVID-19 before making any adjustments.<sup>792</sup> Ofwat stated that it supported the view (see paragraph 3.85) that the best mechanism for taking the impacts of COVID-19 into account was for Ofwat to consider these as part of an industry wide process.<sup>793</sup> It said this would allow cross company comparisons over a longer time period to be considered.<sup>794</sup> Ofwat said that it did not consider that a COVID-19 related recession should necessarily reduce productivity growth in the water sector. It said that the 2008 to 2009 recession did not reduce productivity growth in the water sector and COVID-19 had not created large amounts of unused capacity in the water sector, which would normally lead to reductions in productivity growth.
- 4.580 Ofwat stated that the impacts of COVID-19 remained highly uncertain and companies expected a range of positive and negative impacts.<sup>795</sup> It said that the six monthly results of listed water companies suggested that their totex was either in line or expected to outperform Ofwat's FD which also suggested limited impact from COVID-19. It stated that while some companies may have increased costs as a result of COVID-19 they have not evidenced that these were efficiently incurred.
- 4.581 EE (acting for Ofwat) said that the information asymmetry that existed between the CMA and the regulated companies resulted in incentives for the companies to inflate cost estimates to obtain higher revenue allowances. It stated that this could lead to companies only reporting to us costs which had increased due to COVID-19 but not those which had decreased.<sup>796</sup>
- 4.582 Thames Water stated that the pandemic had had an adverse impact on companies overall. It said it agreed it was sensible for Ofwat to consider the impact of COVID-19 as part of an industry wide approach.<sup>797</sup> It said it remained supportive of the joint Ofwat, Water UK and water industry work and that considerable further work was going to be required to understand and manage the challenges of COVID-19 both in the short and longer term.
- 4.583 Ofwat said that the OBR's productivity and wage forecasts, which took account of COVID-19, showed an initial increase in average productivity levels as the lowest productivity workers were furloughed or lost their jobs,

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<sup>792</sup> [Ofwat's response to common issues in companies' SoCs: Introduction and overall stretch on costs and outcomes](#), p5

<sup>793</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), paragraph 4.2 see also [Ofwat's reply to responses to the provisional findings – costs and outcomes](#) p5

<sup>794</sup> [Ofwat's submission following the second main party hearings – costs and outcomes](#), p13

<sup>795</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p73. See also [Ofwat's submission following the second main party hearings – costs and outcomes](#), p12

<sup>796</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), p5

<sup>797</sup> [Thames Water's response to the provisional findings](#), p3



followed by a reduction in average productivity levels as the effect was reversed when the furlough scheme ended. Given the limited furloughing of workers in the water sector it did not consider these adjustments relevant.<sup>798</sup> Ofwat said that the water sector tended to be relatively unaffected by recessions as demand remained stable.

- 4.584 Citizens Advice highlighted the relative outperformance of listed water companies. It stated that from January to November 2, the FTSE had fallen 16%, whereas the listed water companies were up 2%. It said from the start of the year to mid-March, which showed the steepest drops as a result of COVID-19, the FTSE fell 32% compared to the water companies falling 8%.
- 4.585 Ofwat said that productivity growth in the OBR's November upside scenario was unchanged from its March forecast (prior to the pandemic) and was now higher than in the July forecasts.<sup>799</sup> It said the OBR's central and downside scenarios did show a decline in productivity growth due to economic scarring but that it did not consider that this economic scarring was relevant to the water sector.<sup>800</sup> For example, around a quarter of economic scarring was driven by reduced capital per worker, which was not relevant to the water sector. EE's analysis, commissioned by Ofwat also found that while the crisis might reduce economy wide TFP growth, it expected productivity growth in the water sector to be less affected.<sup>801</sup>
- 4.586 Ofwat said that productivity growth was based on the performance of comparators over a full economic cycle and it would not be appropriate to adjust it to reflect the short term impacts of COVID-19.<sup>802</sup> Ofwat stated that if a downward adjustment was made in year one this would lead to the need to make corresponding positive adjustments in other years of the price control and that this would move away from the normal regulatory approach of setting long term rates.<sup>803</sup>
- 4.587 Ofwat said that after a detailed review of the evidence on the impact of COVID-19 Ofgem had not adjusted its productivity assumptions in its final determinations.<sup>804</sup> It highlighted a statement from Ofgem's consultants which

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<sup>798</sup> [Ofwat's final submission](#), p15

<sup>799</sup> [Ofwat's submission following the second main party hearings – costs and outcomes](#), p11

<sup>800</sup> [Ofwat's submission following the second main party hearings – costs and outcomes](#), p11

<sup>801</sup> Europe Economics (2020) *Impact of COVID-19 Crisis on Real Price Effects (RPEs) and Frontier Shift*, p47. See also: Europe Economics (2020), *Response to Some Key Points on Real Price Effects (RPEs) and Frontier Shift*, pp3–11

<sup>802</sup> [Ofwat's submission following the second main party hearings – costs and outcomes](#), p11

<sup>803</sup> [Ofwat's submission following the second main party hearings – costs and outcomes](#), p11

<sup>804</sup> [Ofwat's submission following the second main party hearings – costs and outcomes](#), p13

said that little if any weight should be put on economy wide productivity forecasts given the scale and unevenness of the impact of COVID-19.

- 4.588 We also requested recent internal documents from the Disputing Companies to investigate whether the water companies' business plan productivity assumptions for the five year period had changed as a result of COVID-19.<sup>805</sup> We sent Ofwat a similar request seeking similar information it had on non-disputing companies for completeness. The documents submitted highlighted various impacts of COVID-19 on costs but typically did not directly assess the overall impact on productivity assumptions over the five years. Ofwat highlighted that companies would not submit full 2020/21 performance information until the summer of 2021. It said that the information it had on the impact of COVID-19 and productivity was based on the companies' submissions to Frontier Economics as part of the joint work on COVID-19. Ofwat stated that based on the evidence received to date Frontier Economics found no consistent evidence of an impact of COVID-19 on the productivity of water companies. It stated that the reports showed that a number of companies expected to catch-up on their delayed capital programmes before the end of the year. Ofwat further highlighted the difficulty of separating out productivity from other impacts and stated any COVID-19 adjustments would be better considered by Ofwat as part of its own sector wide review.

#### *Our decision on COVID-19 and frontier shift*

- 4.589 In section 3 (paragraphs 3.85 to 3.87) we set out our general approach to our determination and COVID-19, here we consider whether there is particular relevant evidence or arguments that mean we should adjust our approach to frontier shift. We looked at a range of sources to consider whether the evidence justified a change in frontier shift as a result of the COVID-19 pandemic. This included expert macro-economic forecasts, internal firm documentation, the submissions of interested parties and analysis of comparator performance in historical recessionary periods.
- 4.590 With regard to the ONS flash productivity data highlighted by ENA showing large productivity falls in most sectors we decide not to place reliance on this. This is because it was strongly impacted by short term changes in demand which are unlikely to impact the water industry due to the nature of the sector. We accepted that the wider economic forecasts suggested a large GDP reduction and considered the most recent productivity growth forecasts for the wider economy. The OBR in November continued to forecast productivity

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<sup>805</sup> Request for information sent in December 2020, initially requested any documents before narrowing the request to most recent.



growth for the UK economy over the five year period after an initial fall in productivity in 2020.<sup>806</sup> The OBR's central forecast indicated the UK economy would overall have lower productivity growth compared to its pre-COVID-19 forecasts. The report also highlighted that there would be some positive impacts on productivity growth as a result of COVID-19 but suggested these were unlikely to outweigh the adverse impacts. As highlighted by Ofwat the water sector is typically less impacted by recessions than other sectors due to stable demand and so we might expect the water sector to have relatively better productivity growth in recessionary years relative to the wider economy. This limited the weight we placed on this evidence.

- 4.591 We considered that the documentary evidence confirmed that there were both positive and negative impacts from COVID-19 on water companies' productivity in 2020. These impacts appeared to impact companies differently, but the detrimental impacts appeared limited to time periods where more stringent COVID-19 impacts were in place.
- 4.592 We also took into account the fact that the analysis of comparator sectors was based over a long time period. Over the periods examined the comparators also experienced periods of lower or even negative productivity. This means that even if the water sector has productivity growth lower than the benchmark term average for a temporary period, this is not inconsistent with the water industry still achieving the benchmark on average across the five year period. This was demonstrated by the analysis of recessions submitted by EE. The report showed that two periods in the 1970s and 1980s which experienced supply side restrictions the comparator sectors achieved productivity growth similar to our unadjusted 0.7% estimate.<sup>807</sup>
- 4.593 Having considered the evidence we decide that a reduction in frontier shift to account for COVID-19 is not currently justified.
- 4.594 With regards to Northumbrian's point that specific cost impacts were not being considered by Ofwat, both Ofwat's response and the responses from other water companies suggested Ofwat will consider this. For example, Ofwat stated that it thought it was more appropriate for individual cost and outcome impacts to be considered by Ofwat when it considered other impacts of COVID-19. We agree and consider Ofwat best placed to consider any company specific adjustments once further data is available and it is possible

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<sup>806</sup> Office for Budget Responsibility (2020), [Economic and fiscal outlook, November 2020](#), downloaded on 23/02/2021, chart 2.21

<sup>807</sup> Adjusted for scale affects Europe Economics found the 1973 recessionary period had productivity growth of 0.6% per year and 0.9% in the 1980 recession. Europe Economics (2020) [Impact of COVID-19 Crisis on Real Price Effects \(RPEs\) and Frontier Shift](#), table 4.4, table 4.6

for robust cross sector comparisons to be made to ensure any costs have been incurred efficiently.

4.595 We discuss other potential impacts of COVID-19 in paragraphs 3.69 to 3.87.

### *Comparator catch-up*

#### *Parties' views on comparator catch-up*

4.596 Northumbrian stated that the TFP estimates for other sectors used by EE included both catch-up and frontier shift improvements in those sectors. Northumbrian stated that while Ofwat's frontier shift challenge of 1.1% on its own represented a challenge that was potentially achievable, the totality of the catch-up and frontier shift challenges was unachievable.<sup>808</sup>

4.597 Ofwat stated that the comparator analysis was only based on competitive sectors.<sup>809</sup> This limited the effect of catch-up because inefficient companies in the long run will not survive, meaning that surviving companies will only have small catch-up effects.

#### *Our decision on comparator catch-up*

4.598 We considered whether there should be any adjustment to the comparator estimate to account for potential catch-up efficiencies. We decide that there should not be any adjustment. This is because, by using competitive sectors as comparators over a reasonably long time period, the TFP measures primarily relate to frontier shift and include little catch-up efficiency.

### *Outcomes and frontier shift*

#### *Parties' views on outcomes and frontier shift*

4.599 Yorkshire stated that if a regulator allocated all the frontier shift to its cost challenge it could not also expect companies to achieve improved outcome performance.<sup>810</sup>

4.600 Ofwat stated that it had accounted for the fact that some companies currently achieved good performance on both outcomes and cost efficiency and that most companies achieved their PR14 upper quartile common performance commitments as well as outperforming on their upper quartile based cost

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<sup>808</sup> [Northumbrian SoC](#), p71

<sup>809</sup> [Ofwat's response to Northumbrian's SoC](#), p37

<sup>810</sup> [Yorkshire SoC](#), p50

allowances.<sup>811</sup> Improvements in service quality and outcome performance were not fully captured in frontier shift estimates, and it expected some improvement in quality over time without cost increases.

*Our decision on outcomes and frontier shift*

- 4.601 In our determination we sought to ensure that outcomes are appropriately funded in cost allowances. We therefore decide to not reduce our frontier shift estimate to allow for productivity gains to be spent on improving outcomes.

**Overall level of frontier shift**

*Parties' views on overall level of frontier shift*

- 4.602 Anglian said the water companies could not achieve a frontier shift of 1.1% during the 2020 to 2025 period. Its own 1% per year figure was already very challenging in light of the low productivity growth observed in the wider economy.<sup>812</sup> It stated that the Utility Regulator in Northern Ireland recently set frontier shift estimates at 0.8% for opex and 0.6% for capex and said this represented a substantial challenge.<sup>813</sup> It also noted that in its draft determination WICS set a compound annual efficiency target of 1% which it said was very challenging. This efficiency challenge was retained in WICS' final determination.<sup>814</sup>
- 4.603 Bristol stated that 1% was at the top end of what was achievable and most of the evidence pointed to a lower frontier shift figure. It highlighted historical evidence from the Bank of England, OBR and Office for National Statistics which showed productivity growth between 0.3% and 0.9%.<sup>815</sup>
- 4.604 Yorkshire said that 1.1% was towards the top end of a range which was already biased upwards.<sup>816</sup>
- 4.605 Northumbrian stated that while the 1.1% frontier shift on its own was achievable the combined challenge including catchup was excessive.<sup>817</sup>
- 4.606 Ofwat stated that its frontier shift estimate was consistent with recent and longer term productivity growth in comparator sectors, was consistent with

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<sup>811</sup> [Ofwat's response to common issues in companies' SoCs: Introduction and overall stretch on costs and outcomes](#), p13

<sup>812</sup> [Anglian SoC](#), p189

<sup>813</sup> [Anglian response to the provisional findings](#), p23

<sup>814</sup> Water Industry Commission for Scotland (2020), [Strategic review of charges 2021-27, draft determination](#), WICS notes it applies a demanding 1% real efficiency challenge year-on-year.

<sup>815</sup> [Bristol SoC](#), pp105–106, and [Bristol's response to the provisional findings](#), p46

<sup>816</sup> [Yorkshire SoC](#), p66

<sup>817</sup> [Northumbrian SoC](#), p71

previous regulatory decisions and took account of detailed evidence of the impact of the totex and outcomes framework.<sup>818</sup> It said that the Utility Regulator's draft frontier shift decision for Northern Ireland was not a useful precedent as it used an inappropriate comparator sector and failed to consider embodied technical change.<sup>819</sup> Ofwat noted that Ofgem had a much higher estimate of 1.2% to 1.4% in its RIIO-2 draft determination, even without an uplift for embodied technical change. Ofgem has since published its final determination with an ongoing efficiency challenge of 1.15% per year for capex and 1.25% for opex.<sup>820</sup>

4.607 Ofwat stated that its 1.1% frontier shift estimate was slightly lower than that put forward by Northumbrian and slightly higher than that applied by the other three Disputing Companies.<sup>821</sup> Ofwat provided data on the four Disputing Companies' frontier shift assumptions.

**Table 4-17: Company assumptions regarding frontier shift on totex**

%	
<i>Company</i>	<i>Frontier shift (per year)</i>
Anglian	1
Bristol	1
Northumbrian	1 to 1.5
Yorkshire	0.75 to 0.8

Source: Ofwat table 7.1 [response to common issues](#)

4.608 Ofwat stated that the key reasons for the differences between the company frontier shift assumptions and its own estimate were the weight placed on value added measures, embodied technical change and the uplift to account for the impact of the totex and outcomes regime.<sup>822</sup>

4.609 In response to our Provisional Findings Bristol stated that our 1% estimate was within the range that was implied by the evidence albeit at the top end.<sup>823</sup> Anglian stated that the 1% level matched the figure it applied. It said it had previously stated that this figure was very challenging and it remained of this view.<sup>824</sup> Yorkshire submitted an Oxera report which included estimates ranging from 0.34% to 0.8% for wastewater and 0.16% to 1.03% for water.

4.610 ENA also submitted analysis from Oxera and stated that it showed our provisional estimate of 1% was too high. It stated that the evidence suggested a more robust approach would lead to a materially lower comparator estimate

<sup>818</sup> Ofwat's response to Bristol's SoC, p42

<sup>819</sup> Ofwat's response to the provisional findings – cost and outcomes, p7

<sup>820</sup> Ofgem (2020), *RIIO-2 Final Determinations: Core Document*, p48

<sup>821</sup> Ofwat's response to common issues in companies' SoCs: Cost efficiency, p81

<sup>822</sup> Ofwat's response to common issues in companies' SoCs: Cost efficiency, p82

<sup>823</sup> Bristol's response to the provisional findings, p38.

<sup>824</sup> Anglian's response to the provisional findings, p23

of 0.2% to 0.3% and that even giving equal weight to the value added metric would lead to an estimate of 0.5%. It said that the CMA should avoid setting an unachievable target through the combination of the efficiency challenge and the frontier shift.<sup>825</sup>

- 4.611 Northumbrian stated that ordinarily it would support the 1% level but that the exceptional circumstances of the COVID-19 pandemic meant that there should be a downwards adjustment for the first year.<sup>826</sup>
- 4.612 Northumbrian stated that its 1.5% business plan frontier shift figure was not comparable to the figure in the CMA's Provisional Findings because Northumbrian did not apply frontier shift to 2019/20 and did not apply frontier shift to unmodelled costs.<sup>827</sup> It stated the same issue applied to other companies' estimates. Northumbrian stated that this meant that the equivalent figure in its business plan was lower than that proposed in our Provisional Findings and so it was not accurate to say the majority of company business plan estimates were in line with or above 1%. It also said that the companies' estimates were applied to their proposed costs and not the CMA's lower estimates of costs. Northumbrian suggested if adjustments were made the estimates would range from 0.4% to 0.9%.
- 4.613 Wessex Water included its response to Ofwat's Draft Determination as part of its submission to the CMA. In this, it said that a 1.5% productivity assumption could be acceptable as part of an in the round assessment. However, it stated that it would expect higher offsetting RPEs if the productivity assumption was set at this level.<sup>828</sup>
- 4.614 Water UK stated that its members recognised that the regulatory regime should spur greater efficiencies and incentivise innovation to deliver those efficiencies.<sup>829</sup> It said overly aggressive assumptions on the scale of the achievable sector-wide frontier shift and efficiency gains resulted in the erosion of resilience in the sector to manage shocks such as the current COVID-19 pandemic.<sup>830</sup> In that context, it welcomed the degree of moderation in the Provisional Findings but noted that the required stretch remained challenging.
- 4.615 Scottish & Southern Electricity Networks stated that it was supportive of the decision to reduce the efficiency challenge to no more than 1%. It said 1%

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<sup>825</sup> [ENA's response to the provisional findings](#), paragraph 12.2

<sup>826</sup> [Northumbrian's response to the provisional findings](#), p16

<sup>827</sup> [Northumbrian's response to the provisional findings](#), p14

<sup>828</sup> [Wessex Water submission](#), p54

<sup>829</sup> [Water UK's response to the provisional findings](#), p3, see also [Water UK submission](#), p3

<sup>830</sup> [Water UK's response to the provisional findings](#), p3, see also [Water UK submission](#), p3

was still at the top end of a plausible range with substantial evidence that this should be substantially lower.<sup>831</sup>

#### *Our decision on the overall level of frontier shift*

4.616 We decide to apply a frontier shift of 1% per year. We arrived at this figure by considering a number of factors in the round, including:

- Companies in competitive sectors with similar activities to the water companies achieved between 0.3% and 1.2% average annual TFP growth per year. With an average across relevant sectors of 0.7% per year, based on the gross output measure.
- There were reasons which suggested the water companies would be able to achieve productivity gains greater than the 0.7% average comparator estimate:
  - The 0.7% average comparator estimate did not fully capture productivity growth driven by embodied technical change (input quality improvements). Illustrative academic evidence in other geographies suggested embodied technical change in some cases could be equal to or higher than the disembodied estimate. Although we noted there was also substantial uncertainty as to how much of this may have already been captured within the EU KLEMS data.<sup>832</sup>
  - The equivalent value-added measure of productivity growth was higher than the average gross output comparator measure of 0.7% estimate and although the gross output metric appeared the most relevant metric there were reasons to suggest at least some weight should be placed on the higher value-added metric.
  - It was plausible that water companies might be able to achieve some additional productivity growth due to the increased flexibility in the totex and outcomes framework.
- On the other hand, we noted that the more recent TFP comparator data (2008 to 2014) appeared lower than our 0.7% comparator estimate, and that more broadly wider UK productivity growth had slowed. There is substantial uncertainty as to whether the UK's productivity growth will rebound but we decide that the water sector will be less affected by many of the factors which led more recent UK-wide productivity growth to be

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<sup>831</sup> [Scottish and Southern Electricity Networks' response to the provisional findings](#), p2

<sup>832</sup> Europe Economics (2020), [Additional Evidence on Some Points Relating to Frontier Shift](#), p27

lower than the long-term average. Overall, this led us to consider there should be some offsetting downwards adjustment to our estimate, but it should be limited.

4.617 We also considered the frontier shift assumptions put forwards by water companies to ensure our estimate remained achievable but stretching. We decide these are consistent with a level of 1%, with the majority of Disputing Companies setting a similar objective.<sup>833</sup>

4.618 We disagreed with Northumbrian that any differences in the start year for companies' frontier shift assumptions meant that an adjustment to the productivity assumption needed to be made. The application of frontier shift to the additional year was an adjustment of the estimated cost base at the beginning of the period and did not change the forecasts in business plans which look at the annual productivity growth over the price control period. We discuss the application of frontier shift to unmodelled costs in paragraphs 4.620 to 4.630.

4.619 We decide frontier shift should be set independently of the catchup efficiency challenge as the catchup challenge does not account for future productivity improvements for the industry as a whole. The catchup component (see paragraphs 4.405 to 4.495) instead provides a challenge to companies based on the historical performance of higher performing companies.

### ***The application of frontier shift***

4.620 Ofwat's application of frontier shift to cost areas other than modelled base costs was raised as a concern by the Disputing Companies. We considered whether frontier shift should be applied to unmodelled costs and enhancement costs, as well as the appropriate start year for applying frontier shift.

### ***Unmodelled base costs***

#### ***Parties' views on application of frontier shift to unmodelled costs***

4.621 Ofwat stated that frontier shift should be applied to unmodelled costs because the frontier shift figure was based on comparator sectors which also faced costs such as business rates.<sup>834</sup> It said it considered that there was some scope for companies to reduce these costs, in particular Traffic Management

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<sup>833</sup> As shown in Table 4-14 Anglian and Bristol applied a 1% frontier shift assumption and Northumbrian a frontier shift of 1% to 1.5%.

<sup>834</sup> Ofwat (2020), [PR19 final determinations: Securing cost efficiency technical appendix](#), p189



Act (TMA) costs, for example through the use of innovative or non-invasive ways to make repairs.<sup>835</sup>

- 4.622 Bristol and Northumbrian stated that it was incorrect to apply frontier shift to unmodelled costs because these were outside management control.<sup>836</sup> Northumbrian said these costs were driven by policy decisions rather than inefficiencies. For example, it said that during AMP7 the Environment Agency would undertake a review of its calculation of abstraction charges across the sector. It said the consultation might result in increased abstraction charges across the sector, particularly given the increased demand for water.<sup>837</sup> It said that Bristol said it was recognised by regulatory precedent that frontier shift was not applied to uncontrollable costs including previous Ofwat decisions and the CMA's approach in PR14.<sup>838</sup>
- 4.623 Bristol stated that for TMA costs the innovative or non-invasive ways suggested by Ofwat made no difference to the permit schemes in its region. It said TMA costs were new to Bristol and already reflected substantial efficiencies compared to costs in previous years.<sup>839</sup> Northumbrian said that it did not contest that there was some scope for management to make productivity improvements with respect to TMA costs.<sup>840</sup>
- 4.624 Anglian and Yorkshire stated that there was double counting of the productivity assumption as an efficiency challenge had already applied to the costs before the frontier shift was applied.<sup>841</sup>
- 4.625 Yorkshire said that in principle the application of frontier shift to unmodelled costs made sense but that Ofwat's decision rested on the assumption that uncontrollable costs formed a similar proportion of expenditure in wholesale activities as they did in comparator sectors.<sup>842</sup>
- 4.626 Ofgem stated that for some unmodelled costs network companies may have a lower degree of control, however appropriate productivity gains may still apply.<sup>843</sup>
- 4.627 In response to our Provisional Findings Northumbrian stated that it disagreed with the application of frontier shift to business rates and abstraction charges. It stated that inputs were not synonymous with costs and abstraction charges

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<sup>835</sup> [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), p101

<sup>836</sup> [Northumbrian SoC](#), p108 and [Bristol SoC](#), p6

<sup>837</sup> [Northumbrian SoC](#), p95

<sup>838</sup> [Bristol SoC](#), p111

<sup>839</sup> [Bristol's reply to Ofwat's response](#), p59

<sup>840</sup> [Northumbrian's reply to Ofwat's response](#), p74

<sup>841</sup> [Anglian SoC](#), p96, and [Yorkshire's Reply to Ofwat's Response](#), pp86–87

<sup>842</sup> [Yorkshire SoC](#), p67

<sup>843</sup> [Ofgem submission](#), p6



and business rates were not inputs.<sup>844</sup> Northumbrian stated that applying frontier shift to unmodelled costs was a novel approach and that in previous regulatory decisions including CMA NATS (2020)<sup>845</sup> CMA Bristol Water (2015),<sup>846</sup> Ofwat PR14 and CMA NIE (2014)<sup>847</sup> frontier shift was not applied to uncontrollable costs.<sup>848</sup>

*Our decision on application of frontier shift to unmodelled costs*

- 4.628 We further explored Northumbrian's point that items equivalent to business rates and abstraction charges were not reflected as inputs in the EU KLEMS dataset used for our calculations. After consulting with the ONS we accepted that these specific charges are not in practice considered as inputs in the EU KLEMS dataset.<sup>849</sup> This meant that our reasoning for applying frontier shift to business rates and abstraction charges, as set out in our Provisional Findings, was no longer appropriate.<sup>850</sup>
- 4.629 This does not necessarily imply it is inappropriate to apply a frontier shift to costs which are not regarded as inputs in the KLEMS dataset. If these non-input costs are positively correlated with inputs or we considered that there were reasons to expect productivity growth in these costs, then it may be appropriate to apply a frontier shift. However, we concluded that business rates and abstraction charges costs were in the most part outside of company control and therefore we decide it not to apply frontier shift to these costs.
- 4.630 We decide to continue to apply frontier shift to other unmodelled costs such as TMA costs as we considered that there is more scope for productivity growth in these costs as highlighted by Ofwat and Northumbrian.<sup>851</sup> We note that Northumbrian's concerns, that applying a frontier shift to uncontrollable costs is a departure from precedent, (paragraph 4.627) are not relevant for costs such as TMA costs. This is because we concluded that there was more scope for management to drive efficiencies for these costs.

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<sup>844</sup> [Northumbrian's response to the provisional findings](#), p17; see also [Northumbrian's reply to Ofwat's response](#), p75 and [Northumbrian's final submission](#), p9

<sup>845</sup> CMA (2020), [NATS \(En Route\) Plc/CAA Regulatory Appeal – Final Report \(NATS/CAA\)](#)

<sup>846</sup> [Bristol PR14 Determination](#)

<sup>847</sup> CC (2014), [Northern Ireland Electricity Limited price determination](#)

<sup>848</sup> [Northumbrian's reply to responses to the provisional findings](#), Annex 3, p37

<sup>849</sup> We checked with the ONS which advised us that business rates are treated as 'other taxes on production' and that taxes and subsidies on production are taken into account after the measure used to calculate the output measure in productivity calculations. The ONS also indicated that licenses as an asset class were not typically reflected in productivity data. The EU KLEMS methodology note also suggests capital taxes are not included. EU KLEMS (2007), [EU KLEMS Growth and productivity accounts part 1 methodology](#), p41

<sup>850</sup> CMA (2020), [Provisional findings](#), Paragraph 4.386

<sup>851</sup> Ofwat highlighted that there is scope for companies to reduce these costs through the use of innovative or non-invasive ways to make repairs see [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), p101.

## *Enhancement costs*

### *Parties' views on application of frontier shift to enhancement costs*

- 4.631 Ofwat stated that it applied frontier shift to some enhancement spend, including the wastewater WINEP and metering costs. It said that the potential gains from productivity growth were likely to be more substantial for these large, relatively homogenous programmes of work. Ofwat said that it had found, in general, that the frontier shift assumptions applied to enhancement expenditure in the water companies' business plans tended to be limited and were often offset by real price increases.<sup>852</sup> Ofwat said that there was no evidence provided by water companies to show that they had included a net frontier shift challenge in their estimates.<sup>853</sup>
- 4.632 Anglian stated that it disagreed with the application of frontier shift adjustments to cost allowances which already included such adjustments. It said that applying a further adjustment constituted a double count.<sup>854</sup> Anglian stated that analysis from Oxera supported its view that there was already substantial scope for frontier shift to have been applied.<sup>855</sup> Anglian stated that there was a strong risk of double counting frontier shift due to a lack of certainty in frontier shift assumptions. It suggested that the framework in the next determination evolved to clearly expose companies' assumptions.<sup>856</sup>
- 4.633 Northumbrian stated that it already included a 1% per year adjustment to enhancement cases and therefore Ofwat's approach was double counting this challenge. In addition, where the adjustments were set relative to upper quartile companies' forecasts, consideration should be given to the level of adjustments made by the upper quartile companies.<sup>857</sup> In response to our Provisional Findings Northumbrian stated that it agreed that frontier shift should be applied to enhancement costs but remained concerned that the adjustment might represent a double-count given its inclusion of frontier shift within its BP19 enhancement costs.<sup>858</sup>
- 4.634 Yorkshire stated that Ofwat's use of a forward-looking benchmark for the WINEP enhancement programme would double-count the impact of frontier

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<sup>852</sup> Ofwat (2019), *PR19 final determinations: Securing cost efficiency technical appendix*, p189

<sup>853</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, p5

<sup>854</sup> Anglian SoC, p163, see also Anglian's response to the provisional findings, p23

<sup>855</sup> Anglian's response to the provisional findings, p24

<sup>856</sup> Anglian's response to the provisional findings, p101

<sup>857</sup> Northumbrian SoC, p94

<sup>858</sup> Northumbrian's response to the provisional findings, p17

shift on the companies' cost allowances.<sup>859</sup> It said the efficiencies it applied in its business plan net of catchup still exceeded the RPE adjustment.<sup>860</sup>

- 4.635 Ofwat stated that while it only applied frontier shift to some enhancement costs, it understood the CMA's provisional approach extended frontier shift to all enhancement costs.<sup>861</sup> It said that frontier shift and real price effect estimates were based on data on all expenditure in comparator sectors and so agreed that frontier shift and real price effects applied to enhancement costs as they did to base expenditure. Ofwat said there was no double counting as Northumbrian and Bristol offset their frontier shift adjustment with real price adjustments.<sup>862</sup> It said that it considered that there was a case to go further for Anglian and Yorkshire and provide a downwards adjustment to back out the net increase in costs from their real price effect adjustments outweighing frontier shift.

*Our decision on the application of frontier shift to enhancement costs*

- 4.636 We decide to apply the frontier shift to the wholesale cost base including enhancement costs. This is because our frontier shift estimate is based on TFP estimates in comparator sectors. TFP is a measure of productivity which is based on all inputs (capital, labour and intermediate goods). As such it is appropriate to apply frontier shift to enhancement costs which are primarily formed of capital expenditure.
- 4.637 The extent of any possible double counting is discussed in the enhancement efficiencies section in paragraphs 5.722 to 5.742. We apply frontier shift where there is not strong evidence that an equivalent frontier shift of 1% has already been included in the company's own projections.

*Start year of frontier shift application*

*Parties' views on start year of frontier shift*

- 4.638 One area all four Disputing Water companies proposed in response to our Provisional Findings was for our cost models to take into account 2019/20 cost data. As part of this the companies suggested that this would mean the

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<sup>859</sup> [Yorkshire SoC](#), p67

<sup>860</sup> [Yorkshire's reply to responses to the provisional findings](#), p30

<sup>861</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p19

<sup>862</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p19 see also [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), p4

application of frontier shift should start one year later as any productivity growth would then be included in the previous year's actuals.<sup>863</sup>

- 4.639 Bristol said that the CMA should also consider applying the frontier shift from 2020/21 even if deciding not to include the 2019/20 costs in the model as the increase in expenditure suggested that delivering net efficiency was not deliverable in that year.<sup>864</sup>
- 4.640 Ofwat suggested that whilst including the additional data implied the frontier shift should be applied from 2020/21, this led to a much less challenging frontier shift.<sup>865</sup> It said if frontier shift was applied from 2020/21 the CMA should revisit the overall scale of the efficiency challenge.<sup>866</sup> It said that one option if allowances looked high due to the inclusion of the new data would be to increase the level of frontier shift. Ofwat said alternatively continuing to apply frontier shift from 2019/20 would have benefits in terms of simplicity as all companies would have the same adjustment and this would apply to all costs.<sup>867</sup> It said the benefit of this would be that the challenge was then consistent with the challenge placed on other companies that accepted the determination.<sup>868</sup>

#### *Our decision on start year of frontier shift*

- 4.641 The decision whether to include the additional year's data is discussed in the in paragraphs 4.39 to 4.44.
- 4.642 We did not change Ofwat's approach to the time period of application of frontier shift in our Provisional Findings as this was not an area in dispute.<sup>869</sup>
- 4.643 As we have decided to include 2019/20 data in our base cost model, we decide to apply frontier shift to our base modelled data from 2020/21. We decide that the change in the start date of frontier shift application to modelled

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<sup>863</sup> Anglian (2020), [PR19 CMA Redetermination Response to Provisional Findings Submitted 27 October 2020](#), p24. Bristol (2020), [PR19 Redetermination Bristol Water: Response to CMA Provisional Findings](#), p6, Northumbrian (2020), [PR19 CMA redetermination - response to provisional findings](#) p6, Yorkshire (2020), [Response to the CMA's provisional findings of 29 September 2020](#), p49. See also:

Anglian (2021), [Anglian's response to the 2019/20 data for base cost models working paper](#), p13; Bristol (2021), [Bristol's response to the 2019/20 data for base cost models working paper](#), p10; Northumbrian (2021), [Northumbrian's response to the 2019/20 data for base cost models working paper](#), p11; Yorkshire (2021), [Yorkshire's response to the 2019/20 data for base cost models working paper](#), p6; and Ofwat's response to the 2019/20 data for base cost models working paper, p5

<sup>864</sup> Bristol's response to the 2019/20 data for base cost models working paper, p10

<sup>865</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, p4 see also Ofwat's response to the 2019/20 data for base cost models working paper, p5

<sup>866</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, p4 see also Ofwat's response to the 2019/20 data for base cost models working paper, p5

<sup>867</sup> Ofwat (2020) [Costs and Outcomes – response to provisional findings responses](#), p4

<sup>868</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, p4 see Ofwat (2020), Ofwat [Response to 19-20 data working paper](#), p5

<sup>869</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#)

costs is not an appropriate justification to change the level of frontier shift. The removal of application of frontier 2019/20 reflects the use of actual data for this period and therefore does not justify increasing frontier shift in the remaining years. We continue to apply frontier shift from 2019/20 in other cost areas where the data has not been updated.

### ***True-up and link to real price effects (RPEs)***

#### ***Parties' views on true-up and link to RPEs***

- 4.644 Anglian said that if a true-up for labour costs was applied there should also be a true-up for frontier shift (productivity growth).<sup>870</sup> It said that a true-up for RPEs would undermine the theoretical link between labour RPEs and frontier shift unless the frontier shift also had a true-up.<sup>871</sup>
- 4.645 Northumbrian stated that it was not practical or necessary to introduce a true-up for frontier shift.<sup>872</sup>
- 4.646 Ofwat stated that EE had found no theoretical reason why high productivity growth in the water sector necessarily had to be associated with high input price growth.<sup>873</sup> It said that a true-up for productivity growth was not required because the price review offered other mechanisms to manage the risks around productivity growth and efficiency, including the substantial effects clause, interim determinations and cost sharing.<sup>874</sup> The frontier shift estimate was a productivity challenge, based on historical evidence of productivity growth, and should not wholly depend on productivity growth in the wider economy.

#### ***Our decision on true-up and link between RPEs and frontier shift***

- 4.647 Our considerations as to whether to apply RPEs for any cost items are considered in more detail in the RPE section (see paragraphs 4.653 to 4.740).
- 4.648 We decide it is not appropriate to apply a true-up for productivity growth. Practically applying such a true-up would be problematic given the lack of appropriate and robust contemporaneous productivity growth estimates at a

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<sup>870</sup> See paragraph 4.657 for an explanation of true-up mechanisms. [Anglian's reply to Ofwat's response](#), Part G, p61 and [Anglian's response to the provisional findings](#), p101

<sup>871</sup> [Anglian's reply to Ofwat's response](#), Part G, p61 and [Anglian's response to the provisional findings](#), p101

<sup>872</sup> [Northumbrian's response to the provisional findings](#), p18

<sup>873</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p185

<sup>874</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p186

sector level.<sup>875</sup> We also agreed with Ofwat that the ability of the water sector to achieve its productivity targets were not wholly dependent on the measured performance of the wider economy. For example, other sectors' productivity growth may be impacted more in recessionary periods due to demand side factors.<sup>876</sup> We decide that other existing mechanisms to manage risks around productivity growth and efficiency challenges such as cost-sharing are more appropriate.

4.649 We considered that in some cases labour productivity growth could be a causal factor in increasing real labour costs. However, we concluded that it was possible for real labour costs in the water sector to change, driven by wider economic factors, but for productivity growth in the water sector to be unaffected. We did not therefore have concerns about not applying a true-up to frontier shift whilst applying one to RPEs.

### ***Summary of our decision on frontier shift***

4.650 Having considered the evidence, we decide to apply a frontier shift of 1% per year. This is slightly lower than the frontier shift estimate in Ofwat's FD and increases the cost allowances for the Disputing Companies. The resulting changes to modelled base cost allowances for the four companies are summarised in Table 4-18.

**Table 4-18: Impact on PR19 modelled base cost allowances of changing frontier shift level from 1.1% to 1% (water and wastewater)**

	£m
<i>Impact of frontier shift changing from 1.1% to 1%</i>	
Anglian	10
Bristol	1
Northumbrian	6
Yorkshire	9

Source: CMA analysis.

4.651 The application of frontier shift from 2020/21 rather than 2019/20 due to the inclusion of more recent data in the base models also increases cost allowances for the Disputing Companies. The impact of this change is set out in Table 4-10.

4.652 We decide to apply this to the wholesale cost base, including enhancement costs but excluding business rates and abstraction charges. The impact of the application of our frontier shift to other cost areas is discussed in the relevant

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<sup>875</sup> The most recent EU KLEMS data using the gross output approach was 2014, for example. There are more up to date statistics produced by the ONS, but these are labelled as experimental estimates and are only produced on a value-added basis.

<sup>876</sup> As discussed in paragraphs 4.589 to 4.595 'Our decision on COVID-19 and frontier shift'

sections (see paragraphs 4.1131 and 5.743). We address the wider issue of whether our allowances are sufficient to ensure the companies can provide the required service levels in section 7.

## **Real price effects**

4.653 In this section we discuss our consideration of whether to make adjustments to companies' allowed revenues to account for expected changes in the price of inputs such as labour, energy and chemicals above or below the level of inflation during the price control period (RPEs).<sup>877</sup> We then consider the need for a true-up mechanism to reconcile expected changes allowed for in RPEs with out-turn changes in input prices. The section is structured as follows.

- We first summarise the assessment of potential RPEs carried out in Ofwat's FD.
- We discuss the Disputing Companies' criticisms of Ofwat's assessment and provide our own analysis.
- We summarise our approach to RPEs.

### ***Ofwat's FD approach to RPEs***

4.654 Ofwat commissioned EE to identify whether there was a need to introduce RPEs to account for expected changes in the price of inputs. As part of this work EE considered the water companies' evidence in their responses to its assessment.

4.655 Ofwat, based on EE's analysis, allowed an RPE adjustment to account for the changes in labour costs above the CPIH but did not make an adjustment for any other costs. The labour RPE adjustment calculates the proportion of the cost base arising from labour across the industry (39%) and adds an uplift to part of companies' cost allowances that are subject to RPEs based on this proportion and the expected average yearly wedge (1.2%) between the Office of Budget Responsibility (OBR) forecasts of labour costs and CPIH.<sup>878</sup> Ofwat applied labour RPE to all wholesale base costs (modelled and unmodelled), to metering and WINEP enhancement costs, but not to retail and other enhancement costs – consistent with its approach to the application of frontier shift.<sup>879</sup>

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<sup>877</sup> CPIH indexation is applied to all allowed revenues.

<sup>878</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency: Technical Appendix](#), p212, table A3.10

<sup>879</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency: Technical Appendix](#), p122

4.656 Ofwat also introduced an end-of-period true-up mechanism for labour RPEs to capture any differences between the actual labour costs and the forecast that was made during the price determination.<sup>880</sup> This mechanism will increase or decrease companies' revenue during the next price control period to offset any differences during this price control period.

### ***Issues raised***

4.657 Our analysis focused on answering two questions.

- What are the correct criteria to determine whether an RPE adjustment should be made?
- For which cost items should we make an RPE adjustment?

*What are the correct criteria to determine whether an RPE adjustment should be made?*

4.658 In order to assess the eligibility for RPEs in PR19, EE used the criteria below.<sup>881</sup> For Criterion 1 to be passed, only one of the 1A or 1B sub-criteria needed to be passed.<sup>882</sup>

- Criterion 1A – Is the expected value of the wedge between the changes in the input price and the level of inflation significantly different from zero during the price control period? EE assessed the statistical significance of the wedge based on historical values, as well as considering forecast data where it was available.
- Criterion 1B – Does the wedge exhibit high volatility over time? This criterion may also justify RPEs, particularly true-ups to address cost volatility. To determine whether volatility was high, EE considered the effect of the volatility relative to overall totex. EE used a threshold of 1% of totex.
- Criterion 2 – Are there sufficient and convincing reasons to think that CPIH does not adequately capture the input price? To determine this EE compared the share of the input cost in the companies' totex to the share of the input in the CPIH basket.

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<sup>880</sup> Ofwat (2019), *PR19 final determinations: Securing cost efficiency: Technical Appendix*, p121

<sup>881</sup> Europe Economics (2019), *Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations*, p11

<sup>882</sup> Europe Economics (2019), *Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations*, p22



- Criterion 3 – Is the input price and exposure to that input price outside management control for the duration of the price control? For example, can management reduce the volume of the input or reduce exposure by signing long-term contracts?

4.659 Anglian and Northumbrian disagreed with this assessment framework.<sup>883, 884</sup>

4.660 Anglian and Northumbrian referred to John Earwaker's report which questioned the need for the criteria and favoured the line by line approach used in other price controls where all input prices were automatically considered for an RPE adjustment.<sup>885</sup> Earwaker said that CPIH indexation was not a reasonable proxy for non-labour water industry input price inflation and that EE's new approach was complicated.

4.661 Earwaker questioned Criterion 2. He said that it was not clear how comparable shares would ensure that companies were accurately compensated for their efficiently incurred costs without an RPE adjustment. He said it was unlikely that input price inflation across the remainder of companies' costs exactly matched inflation in the rest of the CPIH basket.

4.662 Ofwat said that the logic of Criterion 2 was that if the share of a cost item in companies' totex was comparable to the share of that cost item in CPIH, then CPIH indexation should already capture those cost changes and therefore no RPE adjustment was required.<sup>886</sup> EE said that it was true that input price inflation across the remainder of companies' costs might not exactly match inflation in the rest of the CPIH basket, however any difference between the two might be in either direction.<sup>887</sup>

4.663 Earwaker said that it was not satisfactory to justify an erroneous methodology by assuming that the error was no more likely to be in one direction than another.

4.664 Earwaker said that it was not appropriate to consider management control (Criterion 3) because it was impossible to envisage how input price increases or reductions could not impact water companies' costs over the price control period.

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<sup>883</sup> [Anglian SoC](#), Chapter E.4: Frontier shift p206 paragraph 845

<sup>884</sup> [Northumbrian SoC](#), Section 5.5, p74, paragraph 347

<sup>885</sup> [Anglian's reply to Ofwat's response](#), Part G, p59, paragraph 213; [Northumbrian SoC](#), Section 5.5, p74, paragraph 348

<sup>886</sup> [Ofwat's Response to common issues in companies' SoCs: Cost efficiency](#), p112, paragraph 8.17

<sup>887</sup> Europe Economics (2020), [Response to Some Key Points on Real Price Effects \(RPEs\) and Frontier Shift](#), p17

4.665 Ofwat said that management control could mitigate the impact of the changes in real input prices by several ways. Management could reduce:<sup>888</sup>

- input prices by leveraging buyer power, and volatility through long-term contracts with fixed prices; and
- the volume of inputs through greater efficiency and substituting alternatives.

4.666 In its work EE also considered, but rejected, using the materiality of cost items as an additional criterion in the assessment of RPEs.<sup>889</sup> This additional criterion would have led to EE not using RPEs for cost items that accounted for less than 10% of companies' totex. EE decided to remove this additional criterion in response to the companies' concerns:<sup>890</sup>

- John Earwaker, Economic Insight on behalf of Yorkshire, and NERA on behalf of Bristol, said that the 10% threshold was arbitrary, prohibitively high, sensitive to the choice of aggregation used, and limited the analysis to only two categories i) labour and ii) materials, plant and equipment (MPE).<sup>891</sup>
- Economic Insight, on behalf of Yorkshire, said it was an incorrect test of materiality as a small cost item with a large wedge could have the same effect as large cost item with small wedge.<sup>892</sup>

4.667 Ofgem's consultant, CEPA, suggested a materiality criterion in its assessment of RPEs in Ofgem's RIIO-2 determination.<sup>893</sup> CEPA used a two-stage materiality test.<sup>894</sup> Stage 1 identified cost items that represented more than 10% of totex. Stage 2 identified cost items where the effect of volatility (ie the cost share times the wedge) was greater than 0.5% of totex. An RPE was used if a cost category passed Stage 1. If a cost category fell between 10% and 5% of totex it was assessed in Stage 2.

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<sup>888</sup> Ofwat's Response to common issues in companies' SoCs: Cost efficiency, pp113–114, paragraph 8.23

<sup>889</sup> Europe Economics (2019), *Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations*, pp10–11

<sup>890</sup> Europe Economics (2019), *Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations*, p105

<sup>891</sup> Europe Economics (2019), *Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations*, p105

<sup>892</sup> Europe Economics (2019), *Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations*, p105

<sup>893</sup> Ofgem (2020), *RIIO-2 Final Determinations: Core Document*, pp67–68, paragraphs 7.51–7.54

<sup>894</sup> CEPA (2020), RIIO-GD2 and T2: Cost Assessment – Frontier shift methodology paper, pp42–43 (see Ofgem (2020), *RIIO-2 Draft Determinations – Technical Annexes – 2*, Draft Determinations - Frontier Shift Annex)

- 4.668 In response to Provisional Findings, Ofwat said it supported our approach to use EE's criteria to assess eligibility for RPEs.<sup>895</sup>
- 4.669 Bristol and Yorkshire made no further submissions on the criteria following our Provisional Findings.
- 4.670 Anglian said we should consider whether the extension of RPEs and true-up mechanisms would improve the regulatory framework.<sup>896</sup>
- 4.671 Northumbrian said that the criteria placed too high a bar and risked undermining the ability of companies to recover efficiently incurred costs, and that Criteria 2 and 3 were not relevant.<sup>897</sup> It said that RPEs did not undermine incentives to manage costs efficiently as these were defined in advance with reference to indices outside management control.<sup>898</sup>

### *Decision*

- 4.672 In our view, there are clear reasons and merits behind EE's approach of using criteria to assess eligibility for RPEs:
- The companies have an information advantage and they are more likely to highlight examples that show that costs will go up rather than down.
  - This approach helps to keep the RPEs simpler as line by line adjustments would involve potentially several RPE adjustments based on forecasts and related true-ups.
  - It helps to preserve management incentives to control costs.
- 4.673 EE's criteria captured the cost items where there were sufficient and convincing reasons to think that an RPE adjustment was necessary while reducing the risk of overcompensating companies. More specifically:
- Criterion 1A captured any significant difference in the expected value of the wedge between the input price and CPIH.
  - Criterion 1B captured any substantial uncertainty around the level of input prices.

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<sup>895</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p20

<sup>896</sup> [Anglian's response to the provisional findings](#), p101, paragraph 501

<sup>897</sup> [Northumbrian's response to the provisional findings](#), pp18–19, paragraphs 70–74

<sup>898</sup> [Northumbrian's response to the provisional findings](#), p19, paragraph 76

- Criteria 2 and 3 were necessary as CPIH and management control could mitigate the need for RPEs by providing protection against input cost changes.

4.674 We decide that EE's approach provides a reasonable balance between using RPEs when the evidence clearly demonstrates that it is necessary without over complicating the assessment, and therefore we use the same approach in our redetermination. We discuss at paragraphs 4.675 to 4.679 whether we can further improve this approach.

4.675 We considered whether we should use materiality as an additional criterion as a possible improvement on the EE approach. If a cost item is judged to be immaterial because it is below a certain percentage of totex, the companies arguably should bear this limited risk. This materiality criterion could simplify the assessment of RPEs as determining materiality is a relatively straightforward task and once an item is deemed immaterial no further RPE assessment is required.

4.676 CEPA's materiality assessment appeared to be able to address companies' concerns discussed in paragraph 4.6674.668 related to this criterion. CEPA's Stage 2 criterion was similar to EE's 1B criterion because both were based on volatility. However, EE used a 1% of totex threshold while CEPA used 0.5%. In Table 4-19 we apply the CEPA criteria to labour, energy, chemicals and MPE.

**Table 4-19: Materiality criterion assessment**

	<i>Labour</i>	<i>Energy</i>	<i>Chemicals</i>	<i>MPE</i>
Stage 1: Share of totex (10% of totex)	Pass. (39% of totex)	Sensitive to threshold (9% of totex)	Fail. (2%)	Pass. (20% of totex)
Stage 2: Volatility (0.5% of totex)	Not assessed in Stage 2	Depends on whether weight is placed on pre-2011 data	Not assessed in Stage 2	Not assessed in Stage 2
Overall	Pass	Depends on whether weight is placed on pre-2011 data	Fail	Pass

Source: Europe Economics (2019), [Real Price Effects and Frontier Shift – Final Assessment and Response to Company Representations](#), pp25-50.

4.677 Labour and MPE passed the materiality criterion in Stage 1. As energy fell between 10% and 5% of totex it was assessed in Stage 2. Whether it passed the materiality criterion depended on whether weight was placed on pre-2011 data.

4.678 We decide not to use materiality as an additional criterion in this redetermination because it would not change our decisions. This is because (i) labour is in any event considered for RPE, (ii) the materiality criterion is not decisive for energy and (iii) we decide in any event not to use RPEs for

chemicals, MPE and other costs because of our consideration of the other criteria.

4.679 However, we do not rule out the usefulness of materiality criteria as a possible improvement on the EE approach.

*For which cost items should we make an RPE adjustment?*

4.680 In this section we assess whether RPEs should be used for labour, energy, chemicals, MPE, and ‘other costs’ categories.

#### *Labour*

4.681 We reviewed EE’s assessment for labour.<sup>899</sup>

- Criterion 1A – wedge value. Pass or failure depended on whether reliance was placed on the OBR forecasts for wage inflation over the period of the price control. EE’s analysis showed that the OBR had systematically overestimated average earnings growth.<sup>900, 901</sup>
- Criterion 1B – wedge volatility. This was failed as the overall wedge was below 1% of wholesale totex.
- Criterion 2 – alignment with CPIH. This was passed as there was no separate item for labour costs in the CPIH basket.
- Criterion 3 – management control. This was partially passed. While there was no evidence that water companies have buyer power in labour markets, there are some ways they can reduce their exposure to labour costs. For example, installing telemetry can reduce the need for workers to be present at a site.<sup>902</sup>

4.682 EE recommended that Ofwat should decide how much weight to put on the OBR wage inflation forecasts and then decide whether to implement an RPE for labour.<sup>903</sup> Ofwat decided to use an RPE adjustment based on an OBR wage inflation forecast.<sup>904</sup> In addition, given the uncertainty around wage

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<sup>899</sup> Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), pp25–32

<sup>900</sup> Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), p29

<sup>901</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p196

<sup>902</sup> Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), p31

<sup>903</sup> Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), p32

<sup>904</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p196

inflation forecasts, Ofwat introduced a true-up mechanism to capture any differences between the actual labour wage inflation and the forecasts that were used in PR19.<sup>905</sup>

4.683 Ofwat decided to use the Annual Survey of Hours and Earnings (ASHE) manufacturing index for out-turn wages in the labour true-up mechanism. This index measures average hourly wages. Ofwat used it in order not to weaken management incentives. This is because manufacturing sector wages are outside water company management control.<sup>906</sup> EE said that manufacturing was an appropriate benchmark sector for the true-up as the manufacturing and water sector labour markets were similar and often involved similar skills and expertise.<sup>907</sup> EE said manufacturing wages also showed a close correlation with water sector wage inflation and so should reflect similar cost pressure.

4.684 EE also discussed the links between the labour RPE and the assumed frontier shift. EE said that there was a theoretical linkage between wages and labour productivity. This raised the issue of consistency between the labour RPE and the frontier shift, because the frontier shift was based on productivity increases, including labour productivity increases.<sup>908</sup> It could be inconsistent to assume zero real wage inflation in the water sector but 1.1% productivity growth.<sup>909</sup> EE said that across the economy as a whole, real wages would be expected to reflect changes in labour productivity, but this may not hold for any specific sector.<sup>910</sup>

4.685 The Disputing Companies did not disagree with Ofwat's decision to allow labour RPEs.<sup>911, 912, 913, 914</sup> In a later submission, Northumbrian said that COVID-19 had impacted wages and it was concerned that the index used by Ofwat was no longer fit for purpose.<sup>915</sup> It said that the relationship between wage pressures in the water sector and the ASHE manufacturing index used in the true-up had, at least temporarily, broken down (see paragraph 4.695 for further information).

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<sup>905</sup> Ofwat (2019), *PR19 final determinations: Securing cost efficiency technical appendix*, p121

<sup>906</sup> Ofwat (2019), *PR19 final determinations: Securing cost efficiency technical appendix*, p209

<sup>907</sup> Europe Economics (2019), *Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations*, pp91–92

<sup>908</sup> Europe Economics (2019), *Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations*, p40

<sup>909</sup> We decide to assume 1% productivity growth. See paragraph 4.616.

<sup>910</sup> Europe Economics (2019), *Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations*, p103

<sup>911</sup> *Anglian SoC*, Chapter E.4: Frontier shift, p206

<sup>912</sup> *Bristol SoC*, 14. Input price error p113

<sup>913</sup> *Northumbrian SoC*, Section 5.5 pp73–75

<sup>914</sup> *Yorkshire SoC*, p67 paragraph 202

<sup>915</sup> *Northumbrian's submission following the main party hearings*, pp15-16

4.686 EE said that COVID-19 put a downward pressure on wage growth.<sup>916</sup>

4.687 In addition to the information provided by the Main Parties and their advisers, we looked at the most recent OBR forecasts published in March 2020. Table 4-20 compares the 2019 data used by EE and the March 2020 forecasts.

**Table 4-20: Real wage inflation forecasts relative to general consumer price inflation from OBR**

Forecast Year	%	
	Date of OBR forecasts	
	March 2019	March 2020
2019/20	1.0	1.3
2020/21	1.1	2.3
2021/22	1.1	1.3
2022/23	1.2	1.5
2023/24	1.3	1.1
2024/25	1.4	1.2
Average	1.2	1.4

Source: Ofwat (2019), [PR19 final determinations: Securing cost efficiency: technical appendix](#), p212. Office for Budget Responsibility (2020), [Economic and fiscal outlook, March 2020](#), downloaded on 23 July 2020.

4.688 OBR forecasted positive and material real wage inflation both in March 2019 and in March 2020. We note that the March 2020 OBR forecasts do not reflect the impact of the COVID-19 crisis.

4.689 Anglian, Bristol and Yorkshire made no further submissions on labour RPEs following our Provisional Findings.

4.690 Ofwat supported the use of labour RPE and the use of the March 2019 OBR wage inflation forecasts.<sup>917</sup> Ofwat said that while March 2020 OBR forecasts were more up to date, they were also higher than March 2019 forecasts. However, the real wages growth rates had fallen since then. Therefore, if we used the March 2020 forecasts, they could increase revenue allowances unnecessarily as they would need to be reconciled at PR24.

4.691 EE recommended using OBR's November 2020 forecast for labour RPE. This would decrease the real wage inflation forecasts on average from 1.2% (March 2019) to 0.9% (November 2020).

4.692 Ofwat recommended not using the November 2020 OBR forecasts as these did not produce plausible results for the water sector for 2020/21 and 2021/22 due to the different treatment of furloughed workers. Ofwat recommended either using the March 2019 OBR forecasts or using the average of the

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<sup>916</sup> Ofwat's response to common issues in companies' SoCs: Cost efficiency, p126 and Europe Economics (2020), [Impact of COVID-19 Crisis on Real Price Effects \(RPEs\) and Frontier Shift](#), pp16–17

<sup>917</sup> Ofwat's response to the provisional findings – cost and outcomes, pp20–21



November 2020 OBR real wage inflation forecasts across the 2019-25 period for each year.

- 4.693 Anglian said that it did not furlough any workers and saw larger number of applications for new positions recently whilst noting recruitment of engineers and scientists remained tricky. It said that recruitment challenges would be exacerbated by Brexit.
- 4.694 Northumbrian said that it faced some recruitment challenges.<sup>918</sup> It said that it recruited more staff than in the year prior and paid higher salaries.
- 4.695 Northumbrian said that the ASHE manufacturing index used for the labour true-up was not a good proxy for water sector wages in the context of Brexit and COVID-19.<sup>919</sup> It said that it gave rise to substantial under-recovery of efficient costs.<sup>920</sup> It said the following:
- Manufacturing output was hit by COVID-19 more than water output and the manufacturing sector experienced a higher furlough rate than the water sector.<sup>921</sup>
  - The value of the ASHE manufacturing index was based on wages earned during the Mar-May 2020 period, where the fall in output and wages was highest.<sup>922</sup>
- 4.696 Northumbrian suggested using the Average Weekly Earnings (AWE) electricity, gas and water supply index for the labour true-up.<sup>923</sup> It said the following.
- The electricity, gas and water supply sectors were a better proxy for the water sector than the manufacturing sector. The AWE Manufacturing and the AWE Electricity, gas and water supply indices had a material wedge in the December 2020 ONS data.<sup>924</sup>

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<sup>918</sup> [Northumbrian's submission following the second main party hearings](#), pp6–7, paragraph 22

<sup>919</sup> [Northumbrian's response to the provisional findings](#), p22, paragraph 92

<sup>920</sup> Northumbrian said that the short-term fluctuations of the value of the ASHE manufacturing index could cause around £39 million under-recovery. Northumbrian estimated the effect of fluctuations using an alternative manufacturing index and assuming that from 2021 manufacturing wages would grow at the same level as energy, gas and water sector wages. [Northumbrian's response to the provisional findings](#), pp22–24, paragraphs 92–97 and p85, paragraphs 422–424

<sup>921</sup> [Northumbrian's response to the provisional findings](#), pp22–23, paragraphs 92–93, see also [Northumbrian's final submission](#), p8, paragraph 27

<sup>922</sup> [Northumbrian's response to the provisional findings](#), p22, paragraph 92

<sup>923</sup> Northumbrian also considered but did not recommend the use of the AWE Manufacturing and the ASHE Water supply, sewerage, waste management indices. See [Northumbrian's response to the provisional findings](#), pp26–27, paragraphs 99–102

<sup>924</sup> [Northumbrian's final submission](#), p8, paragraph 27



- The index included electricity and gas sectors, so it did not weaken management incentives.<sup>925</sup>
- The values of the AWE indices were based on data across the full year therefore they were less exposed to specific lockdown periods.<sup>926</sup>
- Northumbrian did not consider that the point that the AWE indices measured weekly and not hourly wages was material.<sup>927</sup>

4.697 Ofwat said the labour true-up should be based on the ASHE manufacturing index. It said the following.

- The aim of this index was to track water sector wage inflation. If there were falls in wages in manufacturing sector, then this would reduce pressure for wage increases in the water sector.<sup>928</sup>
- The ASHE manufacturing index was published on 3 November 2020. It showed broadly flat wage inflation (-0.3%).

4.698 Ofwat and EE said that the AWE electricity, gas and water supply index was not a good proxy. EE said the following.

- Unlike the ASHE index, this index was affected by changes in hours worked as it measured weekly and not hourly wages.<sup>929</sup>
- It was subject to higher sampling variability as there would be fewer datapoints for these specific sectors than for the wider manufacturing sector.<sup>930</sup>
- It was not independent of water companies' wages thus it could harm incentives to control costs.<sup>931</sup>

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<sup>925</sup> The water sector is around 47% of the utilities sector based on value added. See [Northumbrian's response to the provisional findings](#), p25, paragraph 101, [Northumbrian's submission following the second main party hearings](#), p6, paragraph 21

<sup>926</sup> [Northumbrian's response to the provisional findings](#), p22, paragraph 92

<sup>927</sup> [Northumbrian's submission following the second main party hearings](#), p6, paragraph 21

<sup>928</sup> [Ofwat's submission following the second main party hearings – costs and outcomes](#), p7 and p14, paragraph 6.2

<sup>929</sup> Europe Economics (2020), [Response to New Points on Frontier Shift and Real Price Effects \(RPEs\) made by Companies and their Consultants following CMAs Provisional Findings](#), p13. See also [Ofwat's submission following the second main party hearings – costs and outcomes](#), p14, paragraph 6.2

<sup>930</sup> Europe Economics (2020), [Response to New Points on Frontier Shift and Real Price Effects \(RPEs\) made by Companies and their Consultants following CMAs Provisional Findings](#), p14

<sup>931</sup> Europe Economics (2020), [Response to New Points on Frontier Shift and Real Price Effects \(RPEs\) made by Companies and their Consultants following CMAs Provisional Findings](#), p14

- Like the ASHE index, it included furloughed workers, therefore its use would not be an improvement in this respect.<sup>932</sup>

4.699 Ofwat said that unlike the ASHE index, the AWE index could be affected by the number of people joining or leaving an organisation.<sup>933</sup>

- *Decision*

4.700 Based on the evidence in paragraphs 4.681 to 4.699, we decide to use a labour RPE adjustment based on March 2019 OBR forecasts for the following reasons.

- The most recent OBR forecasts show a positive and material real wage inflation.
- Criteria 2 and 3 show that wages are not captured in CPIH, although they are partially under management control.
- The theoretical link between wages and labour productivity means including a labour RPE is consistent with requiring a frontier shift in cost efficiency.

4.701 We decide to use the March 2019 OBR forecasts to minimise the scale of the true-up adjustment and to avoid the risk of making potentially implausible assumptions.

4.702 We also decide to use a true-up mechanism for labour costs for the following reasons.

- First, there is considerable forecasting uncertainty due to macroeconomic factors, including Brexit and COVID-19.
- Second, the OBR has tended to overestimate wage inflation and the implementation of a true-up mechanism will protect customers against any overestimation and companies against any underestimation.

4.703 In line with the frontier shift, we apply labour RPE from 2020/21 rather than 2019/20 and apply it to the same cost areas (see paragraphs 4.620 and 4.643).

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<sup>932</sup> Europe Economics (2020), [Response to New Points on Frontier Shift and Real Price Effects \(RPE\)s made by Companies and their Consultants following CMAs Provisional Findings](#), p13. See also Ofwat's submission following the second main party hearings – costs and outcomes, p15, paragraph 6.5

<sup>933</sup> Ofwat's submission following the second main party hearings – costs and outcomes, p14, paragraph 6.2

4.704 We decide that the ASHE manufacturing index is the most appropriate index to use in the true-up mechanism. We note that the recently published ASHE manufacturing index shows broadly flat wage inflation which indicates that this index was not considerably impacted by COVID-19 and furlough in 2020. We are concerned that the alternative AWE index is more exposed to Brexit and COVID-19 than the ASHE index due to, for example, changes in working hours. The AWE index is less robust to changes in working hours than the ASHE index as the former measures weekly wages while the latter measures hourly wages.

### *Energy*

4.705 We reviewed EE's assessment for energy:<sup>934</sup>

- Criterion 1A – wedge value. Pass or failure depended on whether reliance was placed on the Department for Business, Energy & Industrial Strategy (BEIS) energy forecasts and whether weight was placed on pre-2010 data. EE found that energy prices have had a significant historical wedge over CPIH in various time periods (pre-2011 and in 2018/19).<sup>935</sup> In addition, BEIS forecasts showed a material wedge (0.7% per annum) for 2020-2025. However, EE's analysis showed that historical BEIS energy forecasts have often failed to estimate energy prices accurately.
- Criterion 1B – wedge volatility. Pass or failure depended on whether weight was placed on the pre-2011 data. The wedge was above 1% of totex based on pre-2011 data but below 1% based on post-2011 data.
- Criterion 2 – alignment with CPIH. This was deemed a partial pass. Electricity costs, which account for most of the companies' energy use, is 1.3% of CPIH. Energy costs, including other fuels, are 5.2% of CPIH. Energy costs are 9% of water companies' costs. Therefore, CPIH partially captures changes in energy input prices.
- Criterion 3 – management control. This was deemed a partial pass. There are a few mechanisms for companies to reduce exposure to changes in energy costs, including hedging strategies. Although a material element remains outside management control.

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<sup>934</sup> Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), pp33–39

<sup>935</sup> Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), pp34–35. Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p205

4.706 EE recommended Ofwat should decide how much weight to put on the BEIS forecasts and the pre-2011 data and then decide whether to implement an RPE for energy costs.<sup>936</sup>

4.707 Ofwat decided not to use an energy RPE. Ofwat acknowledged that there was some evidence to suggest that it should allow RPEs for energy, however, on balance, no adjustment was required.<sup>937</sup> Ofwat said the reasons for this were:<sup>938</sup>

- There was mixed evidence of a historical wedge between energy prices and CPIH.
- Energy costs were partially within management control. Companies could use fixed energy tariffs to minimise their exposure to price fluctuations. Companies could also reduce their energy costs through increased energy generation, production of biofuels, using energy during off-peak times and improving efficiency.
- BEIS had often failed to provide accurate energy forecasts in the past.
- Some energy costs were reflected in CPIH.
- There was no clear theoretical link between energy costs and productivity growth, unlike with labour costs.
- Some water companies did not assume an RPE adjustment for energy in their Business Plans.
- There were several measures within the price control such as cost sharing which provided additional protections to companies.
- The potential wedge was much smaller than labour, equivalent to less than 0.1% of costs over the period based on BEIS's energy forecasts.
- Companies were moving towards targets of net zero carbon emissions which could have a substantial impact on energy usage in the sector and therefore mitigate RPEs.

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<sup>936</sup> Europe Economics (2019), *Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations*, pp40–41

<sup>937</sup> Ofwat's response to common issues in companies' SoCs: Cost efficiency, p117

<sup>938</sup> Ofwat's response to common issues in companies' SoCs: Cost efficiency, pp118–119

4.708 Anglian said that there was a need for an energy RPE.<sup>939</sup> Anglian did not provide specific reasons in its Statement of Case in relation to an energy RPE.

4.709 Bristol said that there were multiple reasons which justified an energy RPE.<sup>940</sup>

- BEIS energy forecasts showed a positive, statistically significant wedge for the duration of the price control period between energy and CPIH.<sup>941</sup> There were also historical wedges between energy prices and the CPIH.<sup>942</sup>
- Electricity accounted for only 1.3% of the CPIH basket, compared to 9.4% of companies' totex and therefore the PR19 indexation insufficiently accounted for energy prices.<sup>943</sup>
- While management had possibilities to protect against short-term fluctuations, companies were not protected against the long-term trend of rising energy prices.<sup>944</sup>
- Ofwat's energy RPE assessment was inconsistent with its labour RPE as both featured in the CPIH index.<sup>945</sup>
- Ofwat's claim that some water companies assumed a small or non-existent energy RPE was incorrect as on average companies proposed positive RPEs for energy costs of between 0.4% and 3.9% per year.<sup>946</sup>

4.710 Northumbrian said that there were multiple reasons which justified an energy RPE.<sup>947</sup>

- BEIS forecasts showed a positive, statistically significant wedge for the duration of the price control period between energy and CPIH.<sup>948</sup> There were historical wedges between energy prices and the CPIH.<sup>949</sup>

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<sup>939</sup> [Anglian SoC](#), paragraph 822

<sup>940</sup> [Bristol SoC](#), p113

<sup>941</sup> [Bristol SoC](#), paragraph 460

<sup>942</sup> [Bristol SoC](#), paragraph 470

<sup>943</sup> [Bristol SoC](#), paragraph 463

<sup>944</sup> [Bristol SoC](#), paragraph 462

<sup>945</sup> [Bristol SoC](#), paragraph 463

<sup>946</sup> [Bristol SoC](#), paragraph 466

<sup>947</sup> [Northumbrian SoC](#), paragraph 339

<sup>948</sup> [Northumbrian SoC](#), paragraph 349

<sup>949</sup> [Northumbrian SoC](#), p76 and [Northumbrian's final submission](#), paragraph 25

- Electricity accounted for only 1.3% of the CPIH basket, compared to 9.4% of companies' totex and therefore the PR19 indexation insufficiently accounted for energy prices.<sup>950</sup>
- Recent data from BEIS showed industrial energy prices had increased 8.6% in real terms from 2018 to 2019. These rising prices were consistent with renewable costs.<sup>951</sup>
- Regulators had previously used RPEs for energy.<sup>952</sup>
- Northumbrian had the industry leading approach to demand flexibility, energy production from sludge and procurement of energy so it had less scope for further improvements.<sup>953</sup>
- The extension of RPEs to cost items other than labour would not change Northumbrian's incentives.<sup>954</sup>

4.711 Yorkshire said that there were multiple reasons which justified an energy RPE.<sup>955</sup>

- An energy RPE did not weaken management incentives to minimise costs.<sup>956</sup>
- The adjustment should be based on evidence and Ofwat should not assume energy RPEs away 'on principle'.<sup>957</sup>
- Ofwat should base its adjustment on the highest quality available evidence.<sup>958</sup>
- Yorkshire's evidence was based on an Economic Insight report, which used credible BEIS energy forecasts.<sup>959</sup>

4.712 The CCWater response to Bristol's SoC said that no RPE adjustment should be used for energy unless it was well evidenced.<sup>960</sup>

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<sup>950</sup> [Northumbrian's submission following the main party hearings](#), p16, section 3.2.1

<sup>951</sup> [Northumbrian's submission following the main party hearings](#), p17, section 3.2.2

<sup>952</sup> [Northumbrian SoC](#), paragraph 354

<sup>953</sup> [Northumbrian's reply to Ofwat's response](#), paragraphs 266, 269–270 and [Northumbrian's final submission](#), paragraph 25

<sup>954</sup> [Northumbrian's submission following the main party Hearings](#), p18, section 3.2.5

<sup>955</sup> [Yorkshire SoC](#), paragraph 202

<sup>956</sup> [Yorkshire's reply to Ofwat's response](#), paragraph 3.51.1 (a)

<sup>957</sup> [Yorkshire's reply to Ofwat's response](#), paragraph 3.51.1 (b)

<sup>958</sup> [Yorkshire's reply to Ofwat's response](#), paragraph 3.51.1 (c)

<sup>959</sup> [Yorkshire's reply to Ofwat's response](#), paragraph 3.51.1 (d)

<sup>960</sup> [CCW response to Bristol's SoC](#), paragraph 5.6

- 4.713 EE said that energy prices would likely be negatively affected by the COVID-19 crisis.<sup>961</sup> Ofwat said that the falling oil prices were likely to feed through into other energy prices as well.<sup>962</sup>
- 4.714 Northumbrian said that there was no clear basis to assume that falling oil prices would affect the energy prices that it had to pay and there was weak correlation between oil and electricity prices.<sup>963</sup>
- 4.715 Anglian, Bristol and Yorkshire made no further submissions on energy RPE following our Provisional Findings.
- 4.716 Ofwat supported the decision not to use an energy RPE and true-up:<sup>964</sup>
- Energy costs were partially under management control and Ofwat understood that some companies had already taken advantage of low prices in April to hedge.<sup>965</sup>
  - Energy costs were included in CPIH, therefore, any true-up could overcompensate for changes in energy prices. In addition, a true-up would increase complexity.
  - The latest data suggested wholesale prices were expected to be relatively flat out to winter 2023/24 and the forward rates were still below the level in September 2018 when the companies submitted their business plans.<sup>966</sup>
- 4.717 Northumbrian said that there was a need for an energy RPE and true-up:
- Criteria 2 and 3 and the theoretical link between input prices and productivity growth were not relevant when trying to determine the need for energy RPEs.<sup>967</sup>
  - Criterion 3, management control, was inconsistently applied as we identified that both labour and energy were partially under management control, but we used RPEs only for labour.<sup>968</sup>

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<sup>961</sup> [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), p127; Europe Economics (2020), *Impact of COVID-19 Crisis on Real Price Effects (RPEs) and Frontier Shift*, pp18–19; Europe Economics (2020), *Response to Some Key Points on Real Price Effects (RPEs) and Frontier Shift*, p18

<sup>962</sup> [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), p127

<sup>963</sup> [Northumbrian's reply to Ofwat's response](#), pp61–62; [Northumbrian's reply to Ofwat's further submission](#), pp5–6; [Northumbrian's submission following the main party hearings](#), p18, section 3.2.2

<sup>964</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), pp21–23

<sup>965</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), p8. Frontier Economics said that four companies were able to hedge prices during the lockdown.

<sup>966</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p22

<sup>967</sup> [Northumbrian's response to the provisional findings](#), paragraphs 79–82

<sup>968</sup> [Northumbrian's response to the provisional findings](#), paragraphs 73–74

- It had commissioned Cornwall Insight to forecast energy prices for a customer with Northumbrian's energy consumption profile.<sup>969</sup> Cornwall Insight said that in real terms Northumbrian's energy cost would increase by an average of approximately 4% on a CPIH-real basis over the price control.<sup>970</sup>

4.718 EE said that Northumbrian's consultant, Cornwall Insight, had not taken the effect of Ofgem's RIIO-2 on network charges into account.<sup>971</sup>

- *Decision*

4.719 Based on the evidence at paragraphs 4.705 to 4.718, we decide to implement neither an energy RPE adjustment nor a true-up for the following reasons.

- Criteria 2 and 3 show that energy costs are partially under management control and partially captured in CPIH.
- There is no theoretical link between energy prices and productivity to provide an additional rationale for including an energy RPE adjustment.

4.720 We note that we assess the eligibility for energy RPEs and true-up based on the combination of criteria. Management control is one of these. Partial pass of this criterion may necessitate energy RPEs only in combination with other criteria. Therefore, our decision on energy RPEs should be viewed as a decision based on assessing all the criteria in the round. In our view, the CPIH indexation and management control provide enough protection for companies against changes in the price of energy, for example if Cornwall Insight's forecast materialises.

### *Chemicals*

4.721 We reviewed EE's assessment for chemicals:<sup>972</sup>

- Criterion 1A – wedge value. This was failed as an assessment of the ONS 'Chemicals and Chemical Products' Producer Price Inflation (PPI) showed there was no historical statistically significant wedge. In addition, there was a wide variation in company forecasts with estimates of the wedge

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<sup>969</sup> [Northumbrian's response to the provisional findings](#), paragraphs 84–85 and [Northumbrian's final submission](#), paragraph 25

<sup>970</sup> 3% on an RPI-real basis, 4% on a CPIH-real basis.

<sup>971</sup> Europe Economics (2020), [Response to New Points on Frontier shift and RPEs following Provisional Findings](#), p12

<sup>972</sup> Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), pp41–44



ranging between -1.2% and +1.2%. EE said that companies did not specifically report chemical costs.<sup>973</sup>

- Criterion 1B – wedge volatility. This was failed due to the lack of volatility. The overall wedge ranged from -0.1% to +0.1% of wholesale totex, which was less than the 1% criterion.
- Criterion 2 – alignment with CPIH. This was passed as there is no explicit category for chemicals in the CPIH basket. The closest categories that are included (cleaning equipment and cleaning and maintenance products) are unlikely to be close matches for the products purchased by the water companies.
- Criterion 3 – management control. This was passed as chemical pricing is largely outside management control and there is little ability to substitute specific chemicals with other products.

4.722 Based on this assessment, EE recommended Ofwat should not adopt an RPE for chemicals.<sup>974</sup>

4.723 Anglian, Northumbrian and Yorkshire said that there should be a chemical RPE.<sup>975, 976, 977</sup> For chemicals, Anglian used the chemical and chemical products component of the ONS producer input prices index. Anglian's choice of sources was based on the advice of First Economics.<sup>978</sup>

4.724 Northumbrian and Yorkshire said that the chemicals price index used in the EE report did not adequately capture the relevant changes in chemical costs.<sup>979</sup> Northumbrian's consultant, Economic Insight, carried out analysis covering 63% of Northumbrian's chemical expenditure and this analysis showed historic price increases.<sup>980</sup>

4.725 Northumbrian said that COVID-19 had put some upward price pressure on some of the chemicals that it purchased due to supply-side shocks.<sup>981</sup>

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<sup>973</sup> Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), p43

<sup>974</sup> Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), p44

<sup>975</sup> [Anglian SoC](#), paragraph 822

<sup>976</sup> [Northumbrian SoC](#), paragraph 376

<sup>977</sup> [Yorkshire SoC](#), paragraph 202

<sup>978</sup> [Anglian SoC](#), paragraph 823

<sup>979</sup> Northumbrian said that 63% of their chemical expenditure was focused on the following chemicals: aluminium and ferric sulphate, phosphoric acid, lime and polyelectrolyte. Source: [Northumbrian SoC](#), paragraph 381. [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), p125.

<sup>980</sup> [Northumbrian SoC](#), Section 5.5, pp80–81

<sup>981</sup> [Northumbrian's reply to Ofwat's Response](#), paragraph 280

- 4.726 Responding to the Disputing Companies, EE said that a key drawback of forecasting prices from historical data could be the significant rise in crude oil prices in 2017/18.<sup>982</sup> EE also said that the COVID-19 crisis would likely reduce input prices for chemical costs.<sup>983</sup>
- 4.727 Ofwat, Anglian, Bristol and Yorkshire made no further submissions on chemicals RPE following our Provisional Findings.
- 4.728 Northumbrian said that it no longer requested a chemicals RPE.<sup>984</sup> Northumbrian said we should provide guidance for the future as the independent chemicals price indices poorly represented the chemicals it bought.<sup>985</sup>

- *Decision*

- 4.729 Having considered the arguments and information at paragraphs 4.721 to 4.728, we decide to implement neither an RPE adjustment nor a true-up for chemicals. The expected value of the wedge is not materially different from zero. We placed little weight on the results of Northumbrian's analysis of their own historical procurement data as this was likely distorted by the substantial rise in crude oil prices in 2017/18. We placed more weight on EE's analysis of the historical ONS index, as an independent source, which showed that it was unlikely that the value of the wedge between the chemicals input price and CPIH would differ substantially from zero over the period of the price control. Finally, using the companies' own historical procurement data to set RPE adjustments could distort management incentives in future price reviews.

*Materials, plant and equipment (MPE)*

- 4.730 We reviewed EE's assessment for MPE:<sup>986</sup>
- Criterion 1A – wedge value. This was failed as, while some indices showed a positive real price effect, others showed no evidence of a statistically significant wedge. Some water sector input costs showed a negative wedge and some companies proposed a zero or negative wedge for this cost item.

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<sup>982</sup> Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), p18

<sup>983</sup> Europe Economics (2020), [Response to Some Key Points on Real Price Effects \(RPEs\) and Frontier Shift](#), p19

<sup>984</sup> Northumbrian's response to the provisional findings, paragraph 29

<sup>985</sup> Northumbrian's response to the provisional findings, paragraph 109

<sup>986</sup> Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), pp45–48

- Criterion 1B – wedge volatility. This was failed as the most volatile price index was construction, which had a volatility below 1%.
- Criterion 2 – alignment with CPIH. This was partially passed as CPIH included categories such as housing and DIY equipment, purchase of vehicles, relevant spare parts and the maintenance and repair of those vehicles. These items have a CPIH basket weight of 16%. However, the products bought by consumers are unlikely to be close matches for the products purchased by the water companies.
- Criterion 3 – management control. This was partially passed because companies can sign long-term contracts that cover multiple regulatory control periods and therefore insulate themselves from price volatility within the price control period. In addition, there is limited evidence that companies can respond to an increase in the prices of MPE by substituting between different materials and equipment.<sup>987</sup>

4.731 Based on this assessment, EE recommended Ofwat should not adopt an RPE for MPE.<sup>988</sup>

4.732 Anglian and Yorkshire said that there was a need for an RPE for MPE.<sup>989, 990</sup>

4.733 EE said that the net effect of COVID-19 on MPE was indeterminate because this sector was likely to be facing both reduced demand and restrictions in supply.<sup>991</sup>

4.734 No further submissions were made on MPE RPE following our Provisional Findings.

### • *Decision*

4.735 We decide to implement neither an RPE adjustment nor a true-up for MPE. The results from the assessment of Criterion 1A and Criterion 1B show that there is not a substantial likelihood that the value of the wedge between the costs of MPE and CPIH will differ significantly from zero over 2020-2025. In addition, MPE is partially under management control and partially captured in CPIH.

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<sup>987</sup> Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), pp47–48

<sup>988</sup> Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), p48

<sup>989</sup> Anglian SoC, paragraphs 822–823

<sup>990</sup> Yorkshire SoC, paragraph 202

<sup>991</sup> Ofwat's response to common issues in companies' SoCs: Cost efficiency, p127 and Europe Economics (2020), [Impact of COVID-19 Crisis on Real Price Effects \(RPEs\) and Frontier Shift](#), pp20–21

## *Other costs*

- 4.736 Other costs covered 31% of the companies' totex.<sup>992</sup> EE in its assessment did not analyse these costs in detail and Ofwat did not make any RPE adjustments for them. However, the companies receive some protection against input price pressure for other costs as we use uncertainty mechanisms for abstraction charges (2% share of totex) and business rates (6% share of totex).<sup>993</sup>
- 4.737 Anglian said that there was a need for RPE for other costs.<sup>994</sup> Anglian referred to the analysis in its September 2018 plan, which showed that it forecast other costs to increase at a nominal rate of 2% per year.<sup>995</sup>
- 4.738 No further submissions were made on the other costs RPE following our Provisional Findings.

- *Decision*

- 4.739 Anglian forecast that costs in the other category would increase at 2% per year, which is the same as the Bank of England inflation target. The evidence we have reviewed does not support the view that companies should receive protection against this price increase. For this reason, we decide not to include an RPE adjustment for the other cost category.

## ***Our decision on RPEs***

- 4.740 We decide to provide an RPE adjustment based on March 2019 OBR forecasts for labour, but not for energy, chemicals, MPE nor other costs. We decide to use a true-up for labour costs based on the ASHE manufacturing wages out-turn index, but not use a true-up for energy, chemicals, MPE nor other costs.

## **Growth**

- 4.741 Growth expenditures are the costs driven by population growth such as connecting newly constructed houses to the network or increasing the capacity of the existing network. In this section we:

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<sup>992</sup> Europe Economics (2019), [Real Price Effects and Frontier Shift, Final Assessment and Response to Company Representations](#), p14, Table 2.1

<sup>993</sup> See paragraph 4.981

<sup>994</sup> [Anglian SoC](#), paragraphs 822–823

<sup>995</sup> Anglian (2018), [Our plan 2020-2025](#), p102, Table 10

- summarise Ofwat's PR19 approach to growth;
- discuss the methodological issues raised; and
- summarise the CMA approach to growth and the implications this has for the Disputing Companies' base cost allowances.

### ***Ofwat PR19 approach to growth***

4.742 Ofwat estimated growth expenditure in four steps.<sup>996</sup>

- Step A – Ofwat allowed for growth expenditure in its base models by not separating growth costs from other modelled base costs. These base models fund the costs of an efficient company serving the average historical number of new connections.
- Step B – Ofwat used the growth unit rate adjustment to account for the growth costs not captured by the base models if there was a difference between the forecast new connections and the average historical number of new connections in the sector. Ofwat used ONS forecasts to forecast connection numbers.
- Step C – Ofwat assessed growth cost adjustment claims related to atypical factors which affected individual companies' growth expenditure and were not captured by steps A and B.
- Step D – Ofwat decided to apply a true-up mechanism to adjust companies' allowed revenue at the end of the regulatory period. This will correct for differences between the out-turn and forecasted number of connections.

### ***Methodological issues raised***

4.743 When analysing growth, we focused on answering five questions.

- Are integrated or stand-alone growth models more appropriate?
- Is the growth unit rate adjustment set correctly?
- Which are the most appropriate forecasts for the number of connections?
- Should a growth true-up mechanism be used?

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<sup>996</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), pp19–22

- Should Anglian's growth cost adjustment be accepted?

*Are integrated or stand-alone growth models more appropriate?*

4.744 In this section we review the arguments about integrated and stand-alone growth modelling approaches. At the end of the section we set out our decision.

*Integrated growth models*

4.745 Ofwat allowed for growth expenditure in its base models; it modelled growth expenditure as part of the modelled base costs together with opex and capital maintenance expenditure. Ofwat said that its integrated base models were appropriate for three reasons.<sup>997</sup> First, growth expenditure was a routine part of business as companies experienced these costs on a year-on-year basis. Second, growth expenditure could be explained by similar cost drivers to opex and capital maintenance. Third, the integrated approach mitigated reporting inconsistencies across companies by modelling growth together with opex and capital maintenance. For example, some companies reported zero costs under historical new connections capex because they reported the costs as opex instead. In addition, Regulatory Accounting Guidelines allowed companies to apply a level of discretion when apportioning costs between growth related expenditure and capital maintenance.<sup>998</sup>

4.746 Anglian and Bristol had concerns over the inclusion of growth expenditure in the base models.<sup>999,1000</sup> Northumbrian and Yorkshire supported Ofwat's approach of including growth expenditure in the base models.<sup>1001,1002</sup>

4.747 Anglian said the following.

- Ofwat did not properly consult on its integrated approach.<sup>1003</sup>
- The drivers of growth expenditure were not similar to those of opex and capital maintenance and the relationship was more complex than the Ofwat models suggested.<sup>1004,1005</sup>

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<sup>997</sup> [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), p28, paragraph 4.2

<sup>998</sup> [Ofwat's further submission on Anglian](#), p12, paragraph 2.18

<sup>999</sup> [Anglian SoC](#), Chapter E.2: Growth, pp160–165

<sup>1000</sup> [Bristol SoC](#), 15. Growth and developer services error, pp119–120

<sup>1001</sup> [Northumbrian's reply to Ofwat's Response](#), pp63–64

<sup>1002</sup> [Yorkshire's reply to Ofwat's Response](#), pp92–94

<sup>1003</sup> [Anglian's reply to Ofwat's Response](#), Part A: Review of Cost arguments, pp32–33

<sup>1004</sup> [Anglian SoC](#), Chapter E.2: Growth, pp160–161

<sup>1005</sup> [Anglian's reply to Ofwat's response](#), Part G: Reply to Ofwat's response on cost issues, p37 paragraphs 130–131

- The integrated approach failed to recognise the ‘lumpy’ nature of parts of the growth expenditure (such as enhancing sewage treatment works (STWs)).<sup>1006,1007</sup>
- The base models were inflexible and did not adjust allowances in response to changes in forecasts of the number of connections.<sup>1008</sup>
- Not only growth expenditure, but also the costs of reducing sewer flooding risk and addressing low pressure should be assessed separately from base models. Sewer flooding risk expenditure was driven by cost drivers which differed from those in the base models.<sup>1009</sup>
- Step A led to wide variations between the growth cost allowances companies requested and the cost allowances received.<sup>1010</sup>

4.748 Bristol said that the £722 growth unit rate implied in Step A was well below its own estimate of £1,014.<sup>1011</sup>

4.749 Ofwat said the following.

- It complemented its Step A approach with Step B and Step C to estimate the growth costs and these should be viewed together.<sup>1012</sup>
- It was appropriate to include cost allowances for reducing sewer flooding risk and addressing low pressure in the base models. The costs of reducing sewer flooding risk were largely driven by population growth. As new properties were connected to the network, the risk of sewer flooding increased unless companies invested more.<sup>1013</sup>
- Its estimation of Step A growth allowance unit rates was only indicative as there were multiple estimation approaches. Any estimate was likely to be imprecise due to historical differences between companies when reporting growth expenditure.<sup>1014</sup> Nevertheless, Ofwat noted that its estimated unit rates in both water and wastewater were above the historical unit rates for most companies.<sup>1015</sup> Bristol’s growth allowance unit rate from Step A

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<sup>1006</sup> [Anglian SoC](#), Chapter E.2: Growth, p161 paragraph 675

<sup>1007</sup> [Anglian’s reply to Ofwat’s response](#), Part G: Reply to Ofwat’s response on cost issues, p37 paragraph 129

<sup>1008</sup> [Anglian SoC](#), Chapter E.2: Growth, p163

<sup>1009</sup> [Anglian SoC](#), Chapter E.2: Growth, pp164–165

<sup>1010</sup> [Anglian SoC](#), Chapter E.2: Growth, pp162–163 Anglian’s adviser, Vivid Economics said that the Step A growth cost allowances could be calculated in a robust manner by making opex adjustments and reasonable assumptions based on engineering knowledge.

<sup>1011</sup> [Bristol SoC](#), 15. Growth and developer services error, p120, paragraph 486

<sup>1012</sup> [Ofwat’s response to common issues in companies’ SoCs: Cost efficiency](#), p32, paragraph 4.22

<sup>1013</sup> [Ofwat’s response to Anglian’s SoC](#), p77, paragraph 3.124

<sup>1014</sup> [Ofwat’s response to Bristol’s SoC](#), p53, paragraphs 3.114–115

<sup>1015</sup> [Ofwat’s response to common issues in companies’ SoC: Cost efficiency](#), p37, paragraph 4.45



combined with the additional allowance from Step B was in line with the company requested unit rate.<sup>1016</sup>

4.750 Third Parties also made submissions on this topic.<sup>1017</sup>

- Severn Trent Water supported integrating growth into the base models.<sup>1018</sup>
- South East Water said that the base models did not capture the real drivers of growth such as existing network capacity and the size of new developments.<sup>1019</sup> It said that the historical growth expenditure data was low quality and inconsistent.<sup>1020</sup> It said Ofwat should use the growth investment proposed by the company and then apply the base efficiency challenge.<sup>1021</sup>

4.751 In response to our Provisional Findings, Ofwat and Northumbrian supported the use of integrated growth models.<sup>1022, 1023</sup> Ofwat said that its approach provided sufficient allowance to fund growth expenditure over the long term and incentivised companies to manage the impact of growth through long term planning.<sup>1024</sup>

4.752 Anglian said that the CMA should recommend that Ofwat should address the data reporting inconsistencies and use a robust approach to deal with the uncertainties of growth in PR24.<sup>1025</sup> It said that the approach to growth in the Provisional Findings did not reflect Anglian's region-specific challenges.<sup>1026</sup> In addition, it said that this approach encouraged excessive use of strategic assets rather than long-term planning.<sup>1027</sup>

4.753 Yorkshire said that the CMA should provide its view on the treatment of growth expenditure for PR24.<sup>1028</sup> It said that lumpy growth costs, such as

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<sup>1016</sup> [Ofwat's response to Bristol's SoC](#), p53, paragraphs 3.114–115

<sup>1017</sup> Waterlevel said that a level playing field should be established for New Appointments and Variations (NAV) for local treatment facilities. [Waterlevel submission](#), pp1–3. We continued to deprioritise the area as it would not have any implications on the growth allowance that companies receive in our determination. [CMA approach to water redeterminations](#), p18, paragraph 81

<sup>1018</sup> [Severn Trent submission](#), p5

<sup>1019</sup> [South East Water submission](#), p12–17

<sup>1020</sup> [South East Water submission](#), p18

<sup>1021</sup> [South East Water submission](#), p7

<sup>1022</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p24

<sup>1023</sup> [Northumbrian's response to the provisional findings](#), p28, paragraph 111

<sup>1024</sup> [Ofwat's submission following the second main party hearings – costs and outcomes](#), p18 paragraph 7.4

<sup>1025</sup> [Anglian's response to the provisional findings](#), p103, paragraph 513, [Anglian's final submission: Annex 1](#), p6, paragraph 25

<sup>1026</sup> [Anglian's response to the provisional findings](#), p103, paragraph 509

<sup>1027</sup> [Anglian's response to the provisional findings](#), p103, paragraph 510

<sup>1028</sup> [Yorkshire's response to the provisional findings](#), p48, paragraph 5.3.6



enhancing STWs, should have been assessed separately from base models.<sup>1029</sup>

- 4.754 South East Water said that the CMA should be more prescriptive in its recommendations to Ofwat on the treatment of growth expenditure for PR24.<sup>1030</sup>

#### *Stand-alone growth models*

- 4.755 Anglian's consultant, Vivid Economics estimated stand-alone growth models. Anglian said that the reporting inconsistencies could be addressed without compromising the robustness of standalone models.<sup>1031</sup> Anglian said that Vivid Economics' models performed well in terms of statistical and engineering logic.<sup>1032</sup> The efficiency score ranges also tended to be narrower than Ofwat's models. Vivid Economics said that Ofwat's variables did not account for growth intensity and remoteness (see paragraphs 4.870 and 4.874).
- 4.756 Disagreeing with Anglian, Northumbrian said that the intensity variable in Vivid Economics' preferred water model was insignificant which suggested that this variable was not a good predictor of growth expenditure.
- 4.757 Ofwat said that Vivid Economics did not accept the significance of the cost allocation issues. It said that other companies accepted that these issues were likely to distort model results if growth was modelled separately from opex and capital maintenance.<sup>1033</sup> Ofwat said that Steps A, B and C took account of the variables in Vivid Economics' preferred models.<sup>1034</sup>

#### *Decision*

- 4.758 We agree with Vivid Economics' analysis that Ofwat's integrated approach (Step A) is imperfect. However, we decide that the data inconsistencies invalidate the use of stand-alone models and in consequence Vivid Economics' models should not replace Ofwat's approach. In particular, we are concerned about inconsistencies in the reporting of growth costs between opex and capex expenditure, and the allocation of costs between growth

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<sup>1029</sup> [Yorkshire's submission following the second main party hearings](#), p21 paragraph 3.1.7

<sup>1030</sup> [South East Water's response to the provisional findings](#), p7

<sup>1031</sup> [Anglian's reply to Ofwat's response](#), Part A: Review of Cost arguments, pp39–40

<sup>1032</sup> [Anglian SoC](#), Chapter E.2: Growth, p169, paragraph 731

<sup>1033</sup> [Ofwat's further submission on Anglian](#), pp11–12

<sup>1034</sup> [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), p36, paragraph 4.39

expenditure and capital maintenance. These reporting inconsistencies could distort the results of stand-alone growth models.

- 4.759 We decide to use Ofwat's base cost models which are integrated with growth costs and the four steps described at paragraph 4.742, because no superior approaches were suggested to us and we have not found any better alternatives. In our view, the integrated models and the four steps are a pragmatic approach for estimating growth expenditure in the context of the data problems referred to in the preceding paragraph. We could not address these data problems in the time available to attempt to develop a modelling approach to growth that removes the need for separate adjustments. We agree with Ofwat that growth costs are a routine cost incurred by the companies and growth costs will be related to the cost drivers included in the base cost models. We recognise this approach has some limitations, for example the treatment of differing growth rates between companies. However, the additional steps - the growth unit rate adjustment, the deep dive assessments and the true-up mechanism – help address these limitations.

*Is the growth unit rate adjustment set correctly?*

- 4.760 In this section we discuss Step B, the growth unit rate adjustment that adjusts for differing growth rates between the areas served by different water companies.
- 4.761 Ofwat introduced the growth unit rate adjustment in its FD in response to the companies' representations that the base models would not adequately fund different growth rates.<sup>1035</sup> To calculate the adjustment for each company, Ofwat looked at how the number of total connections was expected to grow compared to the average historical growth in the number of total connections in the sector. Ofwat applied positive adjustments to companies in higher growth areas (Anglian and Bristol) and negative adjustments to companies in lower growth areas (Northumbrian and Yorkshire).
- 4.762 To decide on the value of the adjustment, Ofwat multiplied the positive or negative number of connections by the upper quartile historical growth unit rates (£783 per connection for water and £1,715 per connection for wastewater). For example, if in a company's area there are expected to be 50 more new connections than the historical average, the company would be allowed the unit rate per connection for each of the 50 new connections. For downwards adjustments, Ofwat took a 'conservative' approach and halved the amount obtained by multiplying the negative number of connections by the

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<sup>1035</sup> [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), p45, paragraph 4.63

upper quartile historical growth unit rates, thereby making an asymmetric adjustment.<sup>1036</sup>

- 4.763 Anglian said that the historical upper quartile unit rates applied in the growth unit rate adjustment were too low and left it underfunded.<sup>1037</sup> It said that the base models implied higher unit rates than the unit rates used in this adjustment.
- 4.764 Bristol said that the growth unit rate adjustment was introduced at Ofwat's FD and this reinforced its position that the modelling approach had not resulted in appropriate allowances.<sup>1038</sup>
- 4.765 Northumbrian said that there was no need for the growth unit rate adjustment because the base models captured growth costs adequately.<sup>1039</sup> It said that the adjustment undermined the use of the base models. In addition, it said that growth in the number of connections in its area was not forecast to be below historical levels.<sup>1040</sup>
- 4.766 Ofwat said there were two reasons for applying an asymmetric (lower downward) adjustment. First, Ofwat recognised this was a top down approach and therefore probably not accurate, and second, it was applied late in the process, so companies had fewer opportunities to make representations. In a Main Party hearing, Ofwat said that a symmetric adjustment, rather than an asymmetric one, may be appropriate.
- 4.767 Yorkshire said that if its own growth forecast had been used in the growth unit rate adjustment, it would have been entitled to an additional allowance.<sup>1041,1042</sup> Yorkshire said that Ofwat made an asymmetric adjustment because its models did not contain growth-rate cost drivers and because of the uncertainty inherent in the approach.<sup>1043</sup>
- 4.768 South East Water said that the growth unit adjustment was too small and left the companies with ongoing growth underfunded.<sup>1044</sup>
- 4.769 Wessex Water said that the different growth rates were not accounted for in the models. It said that either the models should be adjusted or there was a

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<sup>1036</sup> [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), p46, paragraph 4.65

<sup>1037</sup> [Anglian SoC](#) Chapter E.2: Growth, p164, paragraph 689

<sup>1038</sup> [Bristol's reply to Ofwat's response](#), p61, paragraph 289

<sup>1039</sup> [Northumbrian SoC](#), 5.6 Ofwat's approach to setting allowance for growth, pp85–86

<sup>1040</sup> [Northumbrian SoC](#), 5.6 Ofwat's approach to setting allowance for growth, p86

<sup>1041</sup> [Yorkshire SoC](#), pp65–66, paragraph 198

<sup>1042</sup> [Yorkshire's reply to Ofwat's Response](#), p93, paragraph 3.56.2

<sup>1043</sup> [Yorkshire's submission following the Main Party Hearings](#), p8, paragraph 43

<sup>1044</sup> [South East Water submission](#), p11

need for adjustments. It said that the adjustments should be applied symmetrically.

4.770 The Main Parties' responses on the growth unit rate adjustment following our Provisional Findings were related to 1) the symmetric application of the growth unit rate adjustment and 2) the unit rates used in the growth unit rate adjustment.

*The issue of symmetry in the growth unit rate adjustment*

4.771 In response to our Provisional Findings, Ofwat supported applying a symmetric growth unit rate adjustment and not halving the downward adjustments.<sup>1045</sup> It said that this was an area where Ofwat could have gone further.

4.772 Northumbrian said that the growth unit rate adjustment should be removed.<sup>1046</sup> It said the following.

- Companies were assessed against a high evidential bar for post modelling adjustments, but this was not the case for the growth unit rate adjustment.<sup>1047</sup>
- There was no need for an adjustment as the total number of connections variable used in the base models closely correlated with the number of new connections therefore it captured the different growth rates.<sup>1048</sup>
- A symmetric growth unit rate adjustment would double count growth costs related to different growth rates.<sup>1049</sup> The base models already removed £3.2 million in wholesale water and £2.8 million in wholesale wastewater from Northumbrian's allowance.<sup>1050</sup> In wholesale water, these costs were removed by the base models through the use of the total number of connections explanatory variable to reflect lower costs of a smaller company (including lower growth costs). For Northumbrian, the total number of connections was based on ONS forecasts which was lower than the number of total connections based on the average growth rate.

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<sup>1045</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p24

<sup>1046</sup> [Northumbrian's response to the provisional findings](#), p28, paragraph 115

<sup>1047</sup> [Northumbrian's response to the provisional findings](#), p29, paragraph 117

<sup>1048</sup> [Northumbrian's response to the provisional findings](#), p29, paragraph 117, [Northumbrian's submission following the second main party hearings](#), p7, paragraph 23, [Northumbrian's final submission](#), p8, paragraph 26

<sup>1049</sup> [Northumbrian's final submission](#), p8, paragraph 26

<sup>1050</sup> [Northumbrian's response to the provisional findings](#), p29, paragraphs 121–122

4.773 Yorkshire said that the CMA should apply an asymmetric growth unit rate adjustment by halving the downward adjustments.<sup>1051</sup> It said the following.

- Some of the growth costs resulting from Yorkshire operating in a lower growth area were already removed by the base models (by the explanatory variables for the number of connections and load at STWs).<sup>1052</sup> Therefore, these costs would be removed twice by using a full downward growth unit rate adjustment.<sup>1053</sup>
- There was uncertainty from using an adjustment based on unit rates to adjust for lumpy growth costs.
- The expanded developer services revenue adjustment (DSRA) could not fully address the issue that growth costs were not estimated accurately.<sup>1054</sup>

*Unit rates of the growth unit rate adjustment*

4.774 In response to our Provisional Findings, Anglian suggested using higher unit rates.<sup>1055</sup> It suggested using historical average unit rates rather than historical upper quartile unit rates due to data reporting inconsistency issues.<sup>1056</sup> It said that in particular the lack of reliable growth opex data justified the use of these higher unit rates. In addition, it said that the variations in unit rates may be driven by inconsistent reporting.

4.775 Northumbrian suggested using lower unit rates.<sup>1057</sup> It said that the wastewater unit rate erroneously included the cost of reducing sewer flooding risk. It said that these costs were not linked to new connections as these connections were less likely to experience sewer flooding issues than existing properties as government planning requirements required new developments to separate surface water from foul flows and send the former to a nearby watercourse.<sup>1058</sup> Northumbrian said that the key drivers of sewer flooding were customer behaviour, hydrological capacity and asset failure, which did not

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<sup>1051</sup> [Yorkshire's response to the provisional findings](#), p47, paragraph 5.3.1, pp20–22

<sup>1052</sup> [Yorkshire's submission following the second main party hearings](#), p20 paragraph 3.1.2

<sup>1053</sup> [Yorkshire's response to the provisional findings](#), p47, paragraph 5.3.3

<sup>1054</sup> [Yorkshire's response to the provisional findings](#), p48, paragraph 5.3.4, [Yorkshire's submission following the second main party hearings](#), p20 paragraph 3.1.5

<sup>1055</sup> [Anglian's response to the provisional findings](#), p28, paragraph 158

<sup>1056</sup> [Anglian's response to the provisional findings](#), pp26–27, paragraphs 149–150

<sup>1057</sup> [Northumbrian's response to the provisional findings](#), p28, paragraph 112

<sup>1058</sup> [Northumbrian's response to the provisional findings](#), p30, paragraph 127, [Northumbrian's submission following the second main party hearings](#), p8, paragraph 23

correlate with growth.<sup>1059</sup> It said that there was a negative correlation between growth in new connections and sewer flooding capex in the sector.<sup>1060</sup>

- 4.776 In response to Anglian's suggestion of using average unit rates, Northumbrian said that upper quartile unit rates should be used for consistency as firstly the base models applied an upper quartile challenge and secondly WINEP costs also applied upper quartile challenge even though similar concerns were raised.<sup>1061</sup> It said that it capitalised almost all of its growth costs.<sup>1062</sup> It said that the proportion of growth opex reported in companies' business plans did not justify average unit rates.<sup>1063</sup> It said that the CMA should use historical unit rates rather than forward-looking unit rates for this adjustment.<sup>1064</sup>
- 4.777 Anglian said that the costs of reducing sewer flooding risks were driven by population growth and the number of new connections, but there were also other factors, such as commercial development, that drove these costs. The data reporting inconsistencies justified including reducing sewer flooding risk in the historical unit rates.
- 4.778 Ofwat said that there was a relationship between the number of new connections and the cost of reducing sewer flooding risks. It said that in many instances the separate foul and surface water drainage systems of the new housing estates were connected into older combined sewerage systems increasing the risk of sewer flooding across the network.

### *Decision*

- 4.779 The base models fund the costs of an efficient company growing at the average historical growth rate. If the growth unit rate adjustment were removed it would risk underfunding companies in high growth areas and overfunding companies in low growth areas. Therefore, we decide to use a growth unit rate adjustment.
- 4.780 We decide not to halve the downward growth unit rate adjustment, but rather apply this in full, making the adjustment symmetric.
- 4.781 We find there is no evidence that the base models fully account for the growth costs related to different growth rates as there is no explanatory variable in the models that specifically captures these differences. There is some

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<sup>1059</sup> [Northumbrian's submission following the second main party hearings](#), pp8–9

<sup>1060</sup> [Northumbrian's submission following the second main party hearings](#), p8 paragraph 32, [Northumbrian's final submission](#), p8, paragraph 26

<sup>1061</sup> [Northumbrian's reply to responses to the provisional findings](#), p17, paragraph 90

<sup>1062</sup> [Northumbrian's submission following the second main party hearings](#), p9 paragraph 35

<sup>1063</sup> [Northumbrian's submission following the second main party hearings](#), pp9–10 paragraphs 35–38

<sup>1064</sup> [Northumbrian's submission following the second main party hearings](#), p11 paragraph 48

evidence that the base models, through the scale variables, account for the costs related to different growth rates to a limited extent. However, the scale drivers also capture many non-growth related costs. Furthermore, there are no explanatory variables in the base models that specifically capture the marginal costs associated with different growth rates. Therefore, there is minimal risk of material double-counting of growth costs related to different growth rates.

- 4.782 We acknowledge the growth unit rate adjustment will not precisely reflect each company's growth costs, but this imprecision is insufficient to justify materially decreasing (such as halving) the downward (and upward) adjustments. We note that the companies will be partly protected by the cost-sharing mechanism and the expanded DSRA (see paragraph 4.848) against the potentially inaccurate growth unit rate adjustment.
- 4.783 We decide to apply the historical upper quartile unit rates including also the costs of reducing sewer flooding risk in the growth unit rate adjustment as they provide an appropriate efficiency challenge for the companies, balancing the need to set an appropriate efficiency challenge while acknowledging the limitations of the modelling.
- We use unit rates based on total growth costs including also the cost of reducing sewer flooding risk because sewer flooding risk is also influenced by the number of new connections. As new properties connect to the network, the risk of sewer flooding likely increases unless companies invest to ensure the sewer network has sufficient capacity. We agree with Ofwat that new connections with separate foul and surface water systems can also increase the risk of sewer flooding when connected into combined sewerage systems.
  - We use historical upper quartile unit rates rather than historical average unit rates. We find that the uncertainty around the historical growth cost data would not justify the average rates, which would be materially higher than the upper quartile rates. The share of growth opex in companies' business plan growth costs in wholesale water is only 7% and in wholesale wastewater is only 4% suggesting that the lack of reliable opex data by itself would not necessitate materially higher unit rates in this adjustment.<sup>1065</sup>

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<sup>1065</sup> August 2019 business plan submissions.

4.784 We decide to update the growth unit rate adjustment with 2019/20 data. This makes the approach consistent with our overall approach to base costs.<sup>1066</sup>

4.785 We expect companies to be able to make productivity improvements in this area as they do with other base costs. Therefore, in addition to the upper quartile efficiency challenge, we decide to add a frontier shift and an RPE to the growth unit rate adjustment from 2020/21.<sup>1067</sup> This makes the approach consistent with our overall approach to base costs.<sup>1068</sup>

4.786 The historical upper quartile growth unit rates are in Table 4-21. The table shows the water and the wastewater unit rates and the sum of them.

**Table 4-21: Historical upper quartile growth unit rates**

	£
Water	798
Wastewater	1,662

Source: Ofwat

Note: 2019/20 data is included in the calculation of the unit rates.

4.787 The level of the growth unit rate adjustment for the four companies are summarised in Table 4-22.

**Table 4-22: Changes in the adjustment for growth unit rate (water and wastewater)**

					£m	
	<i>Ofwat's FD growth unit rate adjustment</i>	<i>Effect of using 2019/20 data and updating ONS forecasts</i>	<i>Effect of full downward adjustment</i>	<i>Effect of frontier shift and RPEs applied from 2020/21</i>	<i>CMA growth unit rate adjustment</i>	<i>Changes relative to Ofwat's FD</i>
Anglian	40.6	-10.3	0.0	-0.5	29.7	-10.8
Bristol	3.6	0.1	0.0	-0.1	3.6	0.0
Northumbrian	-26.4	6.4	-20.0	0.7	-39.4	-13.0
Yorkshire	-34.7	11.0	-23.7	0.8	-46.6	-12.0

Source: CMA analysis.

Note: Bristol's adjustment is water only.

*Which are the most appropriate forecasts for the number of connections?*

4.788 In this section we discuss the forecasts for the number of total connections. The companies receive allowances based on the forecast for their area.

4.789 Ofwat based its growth allowance on forecasts of the number of total connections, derived from ONS forecasts based on 2016 data. Ofwat said that ONS was an independent source and the ONS forecasts protected customers from the risk of over-forecasting and did not expose companies to undue risk

<sup>1066</sup> See paragraph 4.40.

<sup>1067</sup> See paragraph 4.643.

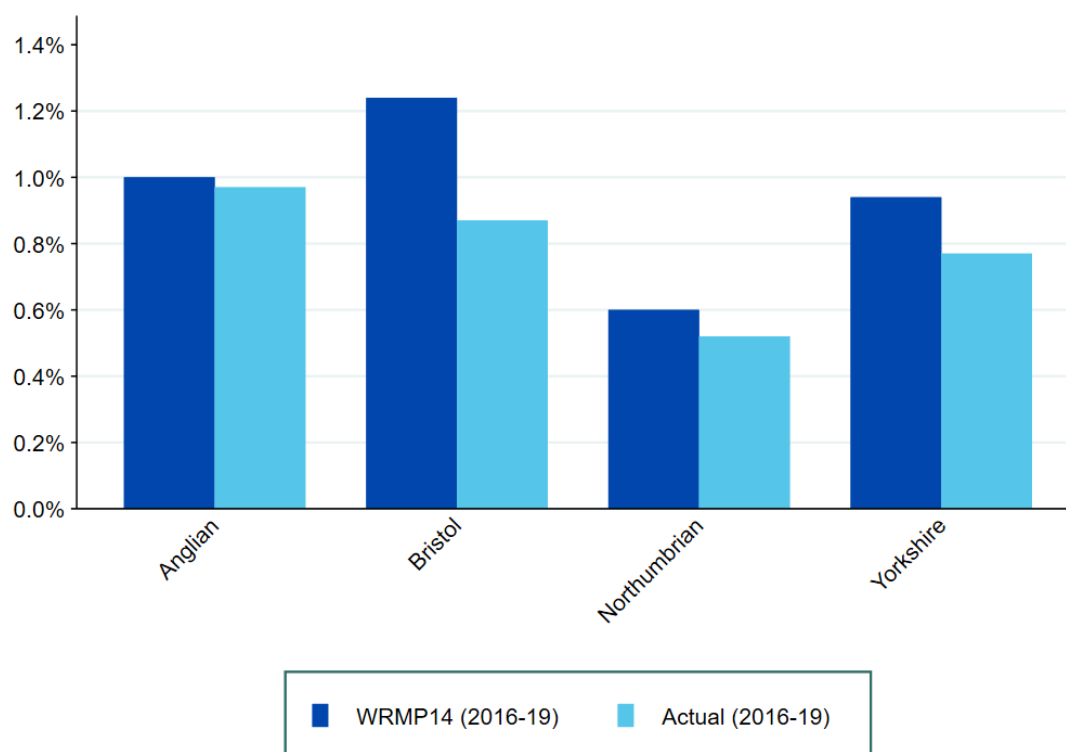
<sup>1068</sup> See paragraph 4.620.



over the regulatory period. It adopted the 2016-based dataset to reflect the latest information available on demographic trends.<sup>1069</sup>

4.790 Ofwat said that forecasts based on local authority data had historically over-estimated households' growth.<sup>1070</sup> Figure 4-5 shows the Disputing Companies' most recent WRMP forecasts and the actual household growth rates.

**Figure 4-5: Comparison of forecast (WRMP14) and actual household growth rates**



Source: Ofwat

4.791 Anglian, Bristol and Yorkshire challenged the use of the ONS forecasts and said that the CMA should use the companies' forecasts, which were based on local authority data.<sup>1071,1072,1073</sup>

4.792 Anglian said that Ofwat used ONS forecasts which were based on 2016 data, while the only version sanctioned for use by the Government was based on 2014 data and produced by Ministry of Housing, Communities and Local Government (MHCLG).<sup>1074</sup> Anglian said that in its own region 2019/20 outturn

<sup>1069</sup> Ofwat's response to common issues in companies' SoCs: Cost efficiency, p38

<sup>1070</sup> Ofwat's response to common issues in companies' SoCs: Cost efficiency, p38

<sup>1071</sup> Anglian SoC, Chapter E.2: Growth, pp158–160

<sup>1072</sup> Bristol SoC, section 15: Growth and developer services error, pp117–119, [Bristol's submission following the main party hearings](#), section 3

<sup>1073</sup> Yorkshire SoC, pp65–66, paragraph 198

<sup>1074</sup> Anglian SoC, Chapter E.2: Growth, p158, paragraph 661

growth data was inconsistent with ONS forecasts, and the ONS figures were too low.<sup>1075,1076</sup> Anglian said that it employed Edge Analytics and Jacobs to update and review its growth forecast<sup>1077</sup> and that Ofwat should review the growth costs using improved models or cost adjustment claims.<sup>1078</sup>

- 4.793 Dame Kate Barker, who was the lead author of the Review of UK Housing Supply, 2004, said that methodological changes made the ONS forecasts less suitable for use in local authority plans. For example, the ONS forecasts were not adjusted for affordability. As house prices increase, local authorities may allow more house building to improve affordability. Anglian was a relatively high price area, which tended to increase house building and thus the number of connections.<sup>1079</sup>
- 4.794 United Utilities said that the ONS forecasts were a net figure as they included both the new developments and reductions due to demolitions. Therefore, they underestimated the costs of connection (including laying down connecting mains) in areas where significant redevelopment and demolitions occurred. United Utilities recommended the CMA consider local authority forecasts sense-checked by alternative data sources.<sup>1080</sup>
- 4.795 WA Consultancy and TDS said that the use of ONS forecasts was inappropriate and it would create a considerable shortfall in infrastructure funding.<sup>1081</sup> For example, the forecasts did not account for the government policy to deliver 300,000 new homes each year and the impact of the HS2 and Northern Powerhouse decisions. It suggested that MHCLG forecasts based on 2014 data were more reliable and representative than the ONS forecasts.
- 4.796 Anglian (Great Ouse) RFCC,<sup>1082</sup> the East of England Local Government Association in Anglian's area<sup>1083</sup> and South East Water<sup>1084</sup> also criticised the use of ONS forecasts.
- 4.797 Some of the submissions discussed the potential impact of COVID-19 on growth.

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<sup>1075</sup> [Anglian's reply to Ofwat's response](#), p30, paragraph 1.2

<sup>1076</sup> [Anglian SoC](#), p159, paragraph 663

<sup>1077</sup> [Anglian SoC](#), p83

<sup>1078</sup> [Anglian SoC](#), p165 paragraph 701

<sup>1079</sup> [Dame Kate Barker submission](#), p2

<sup>1080</sup> [United Utilities submission](#), p12

<sup>1081</sup> [WA Consultancy Ltd, & TDS Ltd. submission](#), pp4–6

<sup>1082</sup> [Anglian \(Great Ouse\) Regional Flood and Coastal Committee submission](#), p1

<sup>1083</sup> [East of England Local Government Association submission](#), pp1–2

<sup>1084</sup> [South East Water submission](#), p17

- Ofwat said that COVID-19 may have a negative impact on housing demand and supply across the UK which increased the likelihood that out-turn total connections might be below the ONS forecasts.<sup>1085</sup>
- Anglian said that COVID-19 would have a short-term impact on growth, but construction activity had already begun to pick up.<sup>1086</sup>
- Bristol said that COVID-19 had created uncertainty but its forecast was still the best forecast.<sup>1087</sup>
- Northumbrian said that the ONS 2018 forecasts showed slightly higher growth in its regions, but the medium-term impact of COVID-19 was unclear.
- Dame Kate Barker and the East of England Local Government Association said that COVID-19 had created uncertainty around growth forecasts.<sup>1088,1089</sup>
- Vivid Economics said that the impact of COVID-19 on growth was highly uncertain.
- WA Consultancy and TDS said that house builders had already re-opened sites and the Government remained committed to its housing objectives.

4.798 The ONS released its 2018-based number of households' forecasts on 29 June 2020, after Ofwat's FD.<sup>1090</sup> These forecasts were similar to its 2016-based forecasts.

4.799 We compared the different forecasts. Figure 4-6 contains a comparison of:

- company forecasts for 2020 to 2025;
- historical trends using data from 2011 to 2020;
- 2016-based ONS forecasts for 2020 to 2025; and
- 2018-based ONS forecasts for 2020 to 2025.

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<sup>1085</sup> [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), p45, paragraph 4.62

<sup>1086</sup> [Anglian's reply to Ofwat's response](#), p15, paragraph 80

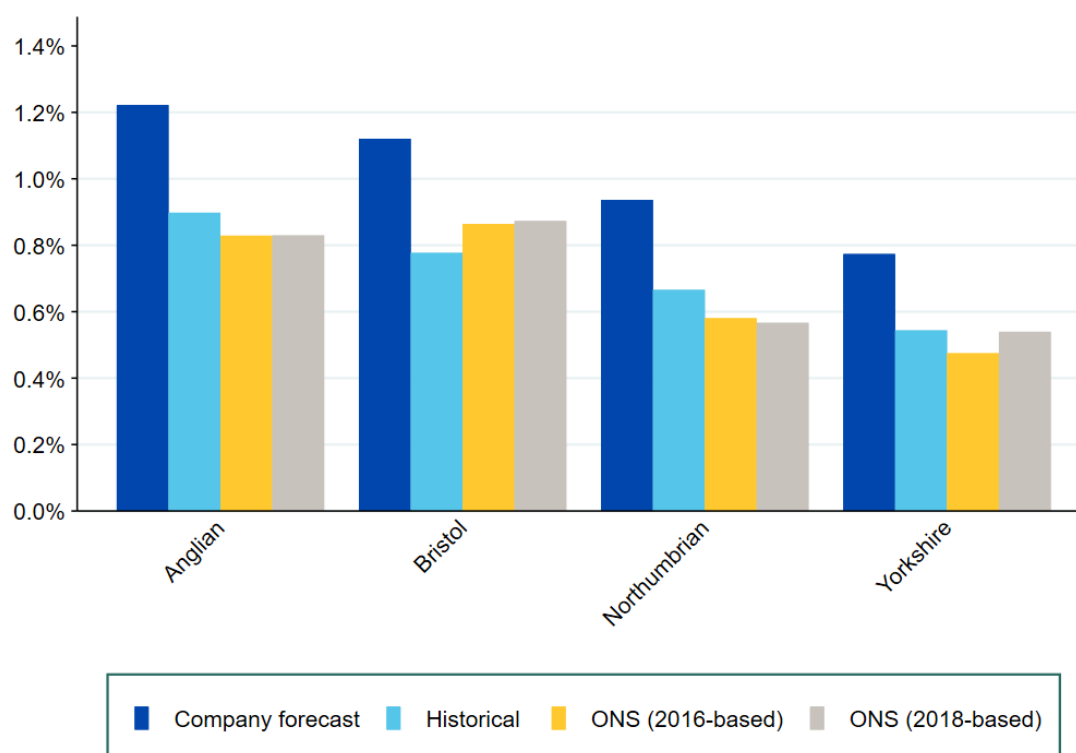
<sup>1087</sup> [Bristol's reply to Ofwat's response](#), p61, paragraph 293

<sup>1088</sup> [Dame Kate Barker submission](#), p2

<sup>1089</sup> [East of England Local Government Association submission](#), pp1–2

<sup>1090</sup> Office for National Statistics (2020), [Household projections for England: 2018-based](#), downloaded on 2 July 2020

**Figure 4-6: Growth rates for wholesale water: comparison of company forecasts, ONS forecasts, and historical growth rates**



Source: Ofwat (2019), [Base adjustment model](#) downloaded on 14 July 2020. [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), pp40-41.

4.800 In response to our Provisional Findings, Ofwat, Northumbrian and Yorkshire supported the use of ONS 2018-based forecasts.<sup>1091,1092,1093</sup>

4.801 Anglian said that we should recommend that Government guidance be more consistent on the use of forecasts.<sup>1094</sup> It said that MHCLG, the Environment Agency and Ofwat had all used different approaches for forecasts.<sup>1095</sup> Anglian said that if the recent trend continued then the outturn number of connections could be 50% above the ONS forecasts.

4.802 Third Parties, WA Consultancy and TDS, said that they had concerns with the use of ONS forecasts.<sup>1096</sup> They said the ONS forecasts fell short of MHCLG's net completions of 300,000 new homes.

<sup>1091</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p24

<sup>1092</sup> [Northumbrian's response to the provisional findings](#), p28, paragraph 111

<sup>1093</sup> [Yorkshire's response to the provisional findings](#), p47, paragraph 5.3.2

<sup>1094</sup> [Anglian's response to the provisional findings](#), p102, paragraph 507, [Anglian's final submission: Annex 1](#), p6, paragraph 25

<sup>1095</sup> [Anglian's response to the provisional findings](#), p102, paragraph 508

<sup>1096</sup> [WA Consultancy's response to the provisional findings](#), p1

4.803 Frontier Economics said that developer activities recovered by July 2020 and were close to pre-COVID-19 levels. The impact of COVID-19 on growth would depend on the future path of the pandemic.

#### *Decision*

4.804 We decide that we should use the ONS 2018-based forecasts for three main reasons:

- First, the comparison in Figure 4-5 of the companies' forecasts and the actual outcomes shows the companies' forecasts overestimated growth rates.
- Second, Figure 4-6 shows that the ONS 2016-based and 2018-based forecasts are similar to the actual historical figures for all the Disputing Companies.<sup>1097</sup> This increases our confidence that the ONS forecasts are a practical and suitable source for growth forecasts.
- Third, the CMA is not in a position to do a detailed review of the companies' forecasts and their adjustments to the local authority data. Any deep dives into companies' growth forecasts would be impractical due to the degree of information asymmetry and unjustified when a suitable independent forecast is available and a true-up mechanism is used.

#### *Should a growth true-up mechanism be used?*

4.805 In this section we discuss the growth true-up mechanism. First, we summarise the arguments we received before our Provisional Findings and our provisional decisions in order to provide the necessary context for the arguments we received in relation to this topic following our Provisional Findings. Second, we discuss the submissions we received in response to our Provisional Findings and present our final decision.

4.806 At PR19, Ofwat introduced the DSRA (Step D) true-up mechanism for the number of total connections.<sup>1098</sup> The DSRA adjusted companies' allowed revenues to reflect the difference between the forecasted and actual number of total connections.

4.807 Anglian said that the DSRA was inadequate as it did not capture broader related growth costs (enhancing STWs and reducing sewer flooding risk), only

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<sup>1097</sup> The 2016-based ONS forecasts were published too recently to allow us to carry out a comprehensive comparison of the ONS forecasts with the actual growth rates.

<sup>1098</sup> Developer Services Reconciliation Adjustment

closely related growth costs (connecting properties to the network and reinforcing the network).<sup>1099,1100</sup> Anglian said that this would risk underfunding growth.<sup>1101</sup>

4.808 Anglian proposed a separate uncertainty mechanism to capture sewage treatment costs as they were not covered by the DSRA. Anglian said that the proposed mechanism ensured that if additional capacity was needed and delivered, Anglian could recover the funding for it. Anglian said that its proposed mechanism could be paired with third party assurance requirements (similar to those proposed by Ofwat for the Internal Interconnector Programme ODI) where investment decisions were assured as being in relation to a specific need and that the best value option for the customer had been selected.<sup>1102</sup>

4.809 Anglian said that the company specific efficiency challenges applied on the DSRA unit rates were not based on sound evidence.<sup>1103</sup> Anglian said that the DSRA left cash flow risk with the companies.<sup>1104</sup>

4.810 Bristol said that the DSRA left cash flow risk with the companies and that the company specific efficiency challenge applied on the DSRA unit rates was outdated and Ofwat should have updated it.<sup>1105</sup>

4.811 Yorkshire did not agree with the DSRA as the DSRA could result in substantial bill fluctuation for future customers.<sup>1106</sup>

4.812 Ofwat said the following.

- Broadening the scope of the DSRA to include broader related growth costs would not better encourage timely and high-quality new connections as the mechanism already captured the closely related growth costs.<sup>1107</sup>
- Costs related to enhancing STWs did not vary one-to-one with changes in the number of new connections.<sup>1108</sup>
- The risk of incurring additional sewage treatment enhancement costs as a result of unexpected growth was lower than the risk of incurring closely

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<sup>1099</sup> [Anglian SoC](#), Chapter E.2: Growth, pp167–169

<sup>1100</sup> [Anglian's reply to Ofwat's response](#), Part G: Reply to Ofwat's Response on Cost Issues, p38, paragraph 138

<sup>1101</sup> [Anglian's reply to Ofwat's response](#), Part G: Reply to Ofwat's Response on Cost issues, p39, paragraph 142

<sup>1102</sup> [Anglian's reply to Ofwat's response](#), Part A: Review of Cost arguments, p43

<sup>1103</sup> [Anglian SoC](#), Chapter E.2: Growth, p168 paragraph 723

<sup>1104</sup> [Anglian's reply to Ofwat's response](#), Part A: Review of Cost arguments pp42–43

<sup>1105</sup> [Bristol's reply to Ofwat's response](#), pp61–62, paragraphs 295 & 298

<sup>1106</sup> [Yorkshire's reply to Ofwat's response](#), pp92–94

<sup>1107</sup> [Ofwat's response to Anglian's SoC](#), p81, paragraph 3.145

<sup>1108</sup> [Ofwat's response to Anglian's SoC](#), p82, paragraph 3.153

related growth costs and could be mitigated by effective long-term planning.<sup>1109</sup>

- Anglian's proposed uncertainty mechanism would lead to distortive incentives for the company and lead to sewage treatment capacity increases taking place during PR19 that were not originally planned.<sup>1110</sup>
- The uncertainty mechanism could be challenging to implement effectively as determining the baseline level of capacity could be difficult.<sup>1111</sup>
- It was appropriate to apply the base cost efficiency challenge to the DSRA unit rates as these were components of base costs.<sup>1112</sup> The company-specific efficiency challenge was calculated by taking the ratio of the modelled base allowances to the company's view of modelled base costs.
- All the companies' efficiency factors were based on their April 2019 business plans and it was clear that data submitted at a later stage would not be used for modelling purposes.<sup>1113</sup>

4.813 The CCWater said the CMA should view Anglian's growth claim in the light of the reconciliation mechanism.<sup>1114</sup>

4.814 We analysed the size of the costs not covered by the DSRA compared to the total growth costs. Based on all the 17 company business plans: enhancing STWs costs is 25% of companies' requested growth totex.<sup>1115</sup> In addition, reducing properties' flooding risks are not covered by the DSRA. This expenditure is 19% of all the 17 companies' requested growth totex.<sup>1116</sup>

#### *Summary of our provisional decision*

4.815 In this subsection, we summarise our provisional decision. This provides the context to understand the responses to our Provisional Findings.

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<sup>1109</sup> Ofwat's response to Anglian's SoC, p82, paragraph 3.153

<sup>1110</sup> Ofwat's response to Anglian's SoC, p83, paragraph 3.154

<sup>1111</sup> Ofwat's response to Anglian's SoC, p83, paragraph 3.155

<sup>1112</sup> Ofwat's response to Anglian's SoC, p81, paragraph 3.147

<sup>1113</sup> Ofwat's further Submission on Bristol, p17, paragraph 3.19

<sup>1114</sup> CCW Response to Anglian's SoC, p15, paragraph 8.6

<sup>1115</sup> Calculation is based on the sum of total totex requested (£4,551m) for the five growth expenditure items and growth at sewage treatment works (£1,150m) for all the 17 companies. Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p15, table 2 and 3

<sup>1116</sup> Reduce flooding risk for properties is £869m for all the 17 companies. Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p15, table 2 and 3

- 4.816 We provisionally decided to use a growth true-up mechanism because of the high degree of forecasting uncertainty and low degree of management control over the number of new connections.
- 4.817 We said that the degree of forecasting uncertainty and the level of management control were important factors when determining whether the use of true-up mechanisms was justified.
- Forecasting uncertainty - there were greater advantages from a true-up when there was substantial forecasting uncertainty. In the case of growth expenditure, there were concerns over the use of ONS forecasts. These concerns were further amplified by the forecasting uncertainty created by Brexit and COVID-19.
  - Management control - we should refrain from employing out-turn indices which were largely under management control as this could create incentive problems. The growth true-up mechanism could be applied without distorting incentives as the number of total connections was not under substantial management control.
- 4.818 We provisionally decided that the scope of the true-up mechanism for growth should be expanded to cover total growth costs given the materiality of the growth costs at STWs (around 25% of growth expenditure). We provisionally rejected Anglian's proposal for an alternative mechanism instead of an expanded DSRA because it could distort management incentives and increase implementation complexity.
- 4.819 We provisionally decided to change the unit rates of the DSRA and use the historical upper quartile growth unit rates (used also in Step B) to expand the DSRA to cover total growth costs.
- 4.820 To take account of future productivity gains and to keep the growth costs approach consistent with other base costs, we provisionally decided to apply a frontier shift and RPEs to the historical growth costs.
- 4.821 We provisionally considered applying an asymmetric true-up mechanism. Asymmetry would mean that lower unit rates would apply to negative than to positive true-up adjustments. This asymmetry would be on the basis that the majority of growth costs at sewage treatment work is not avoided when growth falls below forecast due to longer-term planning commitments. In our Provisional Findings we consulted Main and Third Parties seeking further information to understand whether we could implement it without overfunding companies.



## *Responses to our Provisional Findings*

4.822 In this part we discuss the responses to our Provisional Findings, covering:

- the reasons for expanding the protection (increased (reduced) allowance for the companies if the actual growth rate is underestimated (overestimated)), either by using a DSRA or an alternative mechanism;
- the issues raised in relation to how we expanded the DSRA in our Provisional Findings;
- whether to use an alternative mechanism to expand protection instead of the DSRA; and
- whether to apply an asymmetric DSRA.

### *Reasons for using and expanding the protection (either by using a DSRA or an alternative mechanism)*

4.823 In response to our Provisional Findings, Ofwat disagreed with our decision to expand the DSRA.<sup>1117</sup> It said the following.

- The expanded DSRA would lead to an inappropriate transfer of risk from companies to customers.<sup>1118</sup>
- Only Anglian had asked the CMA to expand the protection.<sup>1119</sup> Northumbrian did not forecast any STWs capacity enhancement in its PR19 business plan. Yorkshire's requested expenditure was considerably less than Ofwat's growth implicit allowance estimate for the company.

4.824 Anglian said that it supported the expansion of the DSRA.<sup>1120</sup> It said that the expansion of the DSRA provided some additional assurance, however it would only materialise at the end of PR19, therefore it left its financeability at risk.<sup>1121</sup>

4.825 Northumbrian supported the expansion of the DSRA and said that it was not justified to expand the DSRA for Anglian only.<sup>1122,1123</sup> It said it forecasted STWs capacity enhancement (albeit as resilience expenditure).

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<sup>1117</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p92, paragraph A2.44

<sup>1118</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p86, paragraph A2.19

<sup>1119</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p92, paragraphs A2.42–43

<sup>1120</sup> [Anglian's response to the provisional findings](#), p28, paragraph 154

<sup>1121</sup> [Anglian's response to the provisional findings](#), p25

<sup>1122</sup> [Northumbrian's reply to responses to the provisional findings](#), p17, paragraphs 88–89

<sup>1123</sup> [Northumbrian's submission following the second main party hearings](#), p10, paragraph 41

4.826 Yorkshire supported the expansion of the DSRA and said that given the impact of COVID-19, it was unlikely that adjustments under the expanded DSRA would be substantial.<sup>1124</sup>

*Issues raised in relation to the expanded DSRA*

4.827 In response to our Provisional Findings, Ofwat said the following in relation to how we expanded the DSRA.

- There was no guarantee for investments. Enhancing STWs costs were non-linear, meaning that it was not necessary to enhance capacity every time a new connection was added to the network.<sup>1125</sup> Even if it was necessary to enhance capacity, there was no guarantee that the expanded DSRA would lead to additional capacity being delivered.<sup>1126</sup> A company could decide to ‘eat’ into its headroom, earn the additional revenue adjustments in the expanded DSRA as profit, and then propose a cost adjustment claim in the next price control review. When outputs were not clearly defined it could be difficult to determine the extent to which the company had previously been funded.
- Expanded DSRA interaction with cost sharing mechanism. The cost sharing mechanism would share companies’ out- and underperformance relative to their allowance with their customers.<sup>1127</sup> Ofwat excluded from the cost sharing mechanism all of those cost items that had bespoke cost sharing rates (eg abstraction charges) or were covered by a true-up (eg closely related growth costs in DSRA).<sup>1128</sup> If these cost items were not excluded, they would be covered partly twice (by a true-up and by the cost sharing mechanism).<sup>1129</sup> If the CMA expanded the DSRA, broader related growth costs should be also excluded from the cost sharing mechanism to avoid partial double counting of over/underspends.<sup>1130</sup> However, these costs could not be excluded as the allowance for these costs were estimated by the base models together with other costs.<sup>1131</sup>
- Expanded DSRA deviation from the regulatory framework. The price controls provided a fixed allowance for the companies, meaning that costs and revenues did not fluctuate with changes in actual volumes (except the

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<sup>1124</sup> Yorkshire’s reply to responses to the provisional findings, p30, paragraph 4.2.9

<sup>1125</sup> Ofwat’s response to the provisional findings – cost and outcomes, p87, paragraph A2.22

<sup>1126</sup> Ofwat’s response to the provisional findings – cost and outcomes, p88, paragraph A2.24

<sup>1127</sup> Ofwat (2019), *PR19 final determination Securing cost efficiency: Technical Appendix*, p137

<sup>1128</sup> Ofwat (2019), *Anglian final determination*, p47

<sup>1129</sup> Provisional findings report, p237, paragraph 4.586

<sup>1130</sup> Ofwat’s response to the provisional findings – cost and outcomes, p88, paragraph A2.25

<sup>1131</sup> Ofwat’s response to the provisional findings – cost and outcomes, p88, paragraph A2.25

closely related growth costs in its FD DSRA).<sup>1132</sup> A fixed allowance encouraged companies to manage demand and provided the right environment for companies to plan efficiently over the long term. Expanding the DSRA would reduce these incentives.<sup>1133</sup>

- Uniform unit rates rewarded or penalised companies. By using historical upper quartile rates the CMA set uniform unit rates for all the Disputing Companies. These uniform unit rates risked distorting incentives to provide connections and disproportionately rewarded or penalised companies.<sup>1134</sup> Uniform rates, that were higher (lower) than actual company costs, would reward (penalise) the companies with a higher (lower) number of connections relative to the ONS forecasts.<sup>1135</sup> Ofwat's FD DSRA used company specific unit rates to better reflect differences across companies and future trends such as the proportion of self-laid connections.<sup>1136</sup> The use of these unit rates would maintain the balance between the developer services revenues and customer revenues assumed at PR19.<sup>1137</sup>
- The DSRA was applied as a revenue adjustment. It said that a combination of revenue and RCV adjustment was more appropriate for enhancing STWs costs to ensure that costs were remunerated over the asset life.<sup>1138</sup>

4.828 Anglian said that expanding the DSRA was a pragmatic approach.<sup>1139</sup> It said that the expanded DSRA did not provide total protection as population growth could occur without an increased number of connections.<sup>1140</sup> It suggested using higher unit rates both in Step B and in the expanded DSRA (see paragraph 4.774).

4.829 In response to Ofwat, Anglian said that Ofwat's concerns were overstated.<sup>1141</sup> It disagreed that the expanded DSRA would overcompensate Anglian.

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<sup>1132</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p85, paragraph A2.12

<sup>1133</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p86, paragraph A2.17

<sup>1134</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p90, paragraph A2.31

<sup>1135</sup> For example, using these rates and company forecasts of connections, Yorkshire would receive 56% above its estimate of growth costs. [Ofwat's response to the provisional findings – cost and outcomes](#), p90, paragraph A2.32

<sup>1136</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p89, paragraph A2.30

<sup>1137</sup> As developer services revenue is included within the price control, any changes in developer services revenue would need to be offset by a change in customer revenue (for example, if the former increases the latter would need to decrease). [Ofwat's response to the provisional findings – cost and outcomes](#), p85, paragraph A2.13

<sup>1138</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p86, paragraph A2.18

<sup>1139</sup> [Anglian's response to the provisional findings](#), p28, paragraph 154

<sup>1140</sup> [Anglian's response to the provisional findings](#), p25

<sup>1141</sup> [Anglian's reply to responses to the provisional findings](#), p11, paragraph 44

- Anglian faced a £111 million shortfall even with the expanded DSRA using the historical upper quartile unit rates with frontier shift and RPEs.<sup>1142</sup>
- Enhancing STWs costs were non-linear and the key driver of investment was population growth and its location rather than the number of connections.<sup>1143</sup>
- Pollution incidents, fines and reputational damage would incentivise companies to invest in STWs to address growth.

4.830 Anglian provided its updated view of grants and contributions to be used in our Final Determination.<sup>1144</sup> It said that it forecasted higher wastewater network reinforcement expenditure due to 1% higher population growth, more certainty around the nature and location of growth and changes in developer charges.<sup>1145</sup>

4.831 In response to Anglian, Ofwat said that it had concerns in relation to the explanation that Anglian provided why its updated view of grants and contributions increased. It said that Anglian's updated view would substantially increase the company's revenue exposure under the DSRA.<sup>1146</sup> It said that if population growth caused STWs to exceed their capacity then related investment should be captured within enhancing STWs costs.<sup>1147</sup> It said that it was unclear how a 6% increase in Anglian's view of wastewater 'new development and growth' expenditure led to a 24% increase in Anglian's view of wastewater gross grants and contributions while the company forecasted a 13% lower number of connections in wastewater.

4.832 Northumbrian suggested using lower unit rates both in Step B and in the expanded DSRA. In response to Ofwat, Northumbrian said the following.

- As both Step B and the DSRA would adjust allowances based on the number of connections, they should be consistent and use the same approach to calculate the unit rates.<sup>1148,1149</sup> It said that the DSRA should not incorporate the costs of reducing sewer flooding risk.<sup>1150</sup>

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<sup>1142</sup> [Anglian's reply to responses to the provisional findings](#), p11, paragraph 49

<sup>1143</sup> [Anglian's reply to responses to the provisional findings](#), p11, paragraph 49

<sup>1144</sup> Anglian said that its approach to developing its May 2020 growth forecast and the associated investments were assured by Jacobs.

<sup>1145</sup> Anglian also provided its updated view of grants and contributions based on the latest ONS forecasts. It said that these values were similar to Ofwat's FD but there was some variation in the profiling. [Anglian's response to the provisional findings](#), p29

<sup>1146</sup> [Ofwat's final submission](#), p83, paragraph 7.2

<sup>1147</sup> [Ofwat's final submission](#), p83, paragraph 7.3

<sup>1148</sup> [Northumbrian's reply to responses to the provisional findings](#), p16, paragraph 84

<sup>1149</sup> [Northumbrian's submission following the second main party hearings](#), p10 paragraph 41

<sup>1150</sup> [Northumbrian's submission following the second main party hearings](#), p10 paragraph 42

- The enhancing STWs costs should be excluded from the cost sharing mechanism.<sup>1151</sup>

4.833 Yorkshire said that all the growth costs should be included in the expanded DSRA.<sup>1152</sup>

*Alternative mechanism to expand protection*

4.834 In response to our Provisional Findings, Ofwat suggested the CMA used an alternative mechanism to fund enhancing STWs costs, rather than expanding the DSRA.<sup>1153</sup> The alternative mechanism would expand protection to cover the costs associated with enhancing STWs, but not those for reducing sewer flooding risk.

4.835 This alternative mechanism would adjust the companies' allowed revenues to correct for the difference between the baseline STWs capacity level that was funded by the base models and Step B and the capacity delivered by the end of PR19.<sup>1154,1155</sup> The capacity would be measured in population equivalent (PE) treatment capacity.<sup>1156,1157</sup> The PE treatment capacity describes how much waste can be treated by an STW.

4.836 Ofwat said that this alternative mechanism:

- Would minimise the potential unintended consequences of changing the DSRA. For example, there would be no cost sharing concern and any adjustment would be split between revenue and RCV.<sup>1158</sup>
- Would use upper quartile unit rates, based on the wastewater companies' historical investments to increase PE treatment capacity. Ofwat would apply a cost sharing rate on these unit rates.
- Could distort incentives as companies may not be incentivised to choose the best value option for customers. For example, a company could decide to invest in new STWs capacity, rather than pump waste to an existing site with spare capacity.
- Could be challenging to implement effectively and could lead to unintended consequences as determining the baseline capacity level

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<sup>1151</sup> [Northumbrian's reply to responses to the provisional findings](#), p17, paragraph 87

<sup>1152</sup> [Yorkshire's submission following the second main party hearings](#), p21 paragraph 3.1.8

<sup>1153</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p92, paragraph A2.45

<sup>1154</sup> [Anglian SoC](#), p168, paragraph 721

<sup>1155</sup> [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), p50, paragraph 4.82

<sup>1156</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), 92, paragraph A2.45

<sup>1157</sup> [Anglian SoC](#), p168, paragraph 721

<sup>1158</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p92, paragraph A2.45

funded by the base models and Step B may be difficult. An inaccurate baseline capacity level could over- or undercompensate investments.<sup>1159</sup> To set the baseline capacity level Ofwat suggested using companies' forecasted PE capacity and adjusting it by the ratio of ONS forecasts and companies' forecast of new properties.

- Should only apply to Anglian, however, could be implemented for Northumbrian and Yorkshire, too.

4.837 Ofwat proposed three additional specifications to this alternative mechanism to address these concerns.

- The alternative mechanism would be linked to the number of connections. Ofwat calculated the additional capacity linked to one additional connection. A cost allowance would only be paid if firstly the out-turn number of connections was above the ONS forecast and secondly the companies delivered more PE capacity than the baseline capacity level. Ofwat suggested deadbands so adjustments could be only made if the number of connections was substantially lower or higher than the ONS forecasts.
- The alternative mechanism could be paired with assurance requirements where investment decisions were assured that the best value option for the customer had been selected.
- Cap the maximum upward adjustments at the companies' forecast of the number of new connected properties. Ofwat also recommended collars to ensure that the companies were not subject to large downward adjustments.

4.838 Ofwat said that its alternative mechanism would provide companies greater certainty as they would be subject to negative adjustment only if baseline capacity has not been delivered.<sup>1160</sup> It would also provide customers greater certainty as they would fund investment only if it was delivered. Ofwat said that this alternative mechanism would facilitate efficient investments if the outturn number of connections was higher than the ONS forecasts.

4.839 Anglian said that it had proposed a similar alternative mechanism to Ofwat. Anglian said the following.

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<sup>1159</sup> [Ofwat's response to the provisional findings - costs and outcomes](#), p92, paragraph A2.45

<sup>1160</sup> [Ofwat's submission following the second main party hearings – costs and outcomes](#), p19 paragraph 7.8

- It preferred its own alternative mechanism, but also saw our Provisional Findings expanded DSRA as a viable option.<sup>1161</sup>
- Anglian's alternative mechanism ensured that if additional capacity was delivered, Anglian could recover the funding for it.<sup>1162</sup> This was similar to the Internal Interconnector Programme and Smart Metering ODIs.
- Unlike Ofwat, Anglian suggested using the relevant baseline capacity level and unit rates outlined in its updated growth calculation submitted to us in May.<sup>1163</sup> It said that the CMA should also use its outturn PR14 data and business plan data when setting the baseline capacity level. It said that due to data reliability issues historical upper quartile unit rates should not be used.

4.840 Unlike Ofwat, Anglian proposed one additional protection to this alternative mechanism.

- The alternative mechanism could be paired with third party assurance requirements (similar to those for the Internal Interconnector Programme ODI) where investment decisions were assured as being in relation to a specific need and that the best value option for the customer had been selected.<sup>1164</sup>

4.841 Anglian said the following about Ofwat's proposed two additional protections to this alternative mechanism.

- Linking the alternative mechanism to the number of connections would not provide sufficient certainty to incentivise investments due to its complexity. Anglian said that it would also make the mechanism less transparent.
- Caps and collars would not be justified due to forecasting uncertainty.

4.842 Northumbrian said that it was concerned over the use of an alternative mechanism based on PE capacity.<sup>1165</sup> It said that it should be based on the number of connections.

4.843 Yorkshire said that using PE capacity was an unnecessary complication and inappropriate in the alternative mechanism. It said that it would expect the PE

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<sup>1161</sup> [Anglian's reply to responses to the provisional findings](#), p11, paragraph 48

<sup>1162</sup> [Anglian SoC](#), p168, paragraph 721

<sup>1163</sup> Anglian said that the population growth forecasts, its geographic mapping to its catchments and assets, and the associated expenditure requirements were assured by Jacobs. [Anglian's reply to responses to the provisional findings](#), p11, paragraph 46, [Anglian's submission following the second main party hearings – Annex 2](#), pp15–16  
Anglian said that it had concerns with Ofwat's analysis of business plan growth water unit rates.

<sup>1164</sup> [Anglian's reply to Ofwat's response](#), Part A: Review of Cost arguments, p43

<sup>1165</sup> [Northumbrian's submission following the second main party hearings](#), p10 paragraph 44



capacity increase to be approximately proportional to the population growth. It said that the base models did not use PE capacity as a cost driver, therefore it should not be used in the alternative mechanism.<sup>1166</sup> In addition, it said that PE capacity was under management control.

### *Asymmetric DSRA*

- 4.844 In response to our Provisional Findings, Ofwat disagreed with using an asymmetric DSRA.<sup>1167</sup> Companies would not face symmetrical risk when making investment decisions as the asymmetric DSRA would not decrease companies' allowances for broader related growth costs if the outturn number of connections was below the ONS forecasts. This could distort optimal decision making and reduce the incentives to manage capacity risk as part of long-term planning.<sup>1168</sup>
- 4.845 Anglian supported using an asymmetric DSRA.<sup>1169</sup> Given the higher proportion of unavoidable investments in wastewater than in water, Anglian proposed 50% and 10% lower unit rates for the downward adjustment than for the upward adjustment for wastewater and water, respectively.
- 4.846 Yorkshire supported using an asymmetric DSRA. It said that it was justified because of the uncertainty around the location of growth.

### *Decision*

- 4.847 In this section we provide our final decision.
- 4.848 We decide to expand the DSRA given the high degree of forecasting uncertainty and the materiality of broader related growth costs (enhancing STWs and reducing sewer flooding risk). We expand the DSRA for all the three Disputing Companies with wastewater operations as they forecasted a substantially larger number of connections than the ONS forecasted. In addition, all three are affected by Brexit and COVID-19. We expand the DSRA to include both the costs of enhancing STWs and reducing sewer flooding risk. This ensures that we cover the same costs in the growth unit rate adjustment and the DSRA. Expanding the DSRA is a practical way to address the uncertainty around broader related growth costs without materially distorting incentives and without materially risking that we over or undercompensate companies.

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<sup>1166</sup> [Yorkshire's submission following the second main party hearings](#), p21 paragraph 3.1.8

<sup>1167</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p91, paragraph A2.38

<sup>1168</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p91, paragraph A2.37

<sup>1169</sup> [Anglian's response to the provisional findings](#), p28, paragraph 159



4.849 We find the following in relation to the expanded DSRA:

- The number of connections cost driver has some inaccuracies, but it is a suitable driver. It positively correlates with other drivers of broader related growth costs such as population growth.
- We agree with Ofwat and Northumbrian that broader related growth costs are included in the cost sharing mechanism and therefore there is a risk of partially double counting over- or underspends. We decide to adjust the DSRA unit rates by applying a cost sharing rate on the enhancing STWs and reducing sewer flooding risk unit rate to address this concern. The adjusted DSRA unit rates ensure that there is no material risk of double remunerating investments. The cost sharing rate represent the percentage of the benefit/cost that is borne by the company when it underspends/overspends compared to its totex allowance. For example, when the number of outturn connections is above the ONS projections, the company needs to spend more to serve the higher number of households by enhancing STWs and reducing sewer flooding risk. The company receives the allowance for part of this overspend from the cost sharing mechanism and the other part of the overspend from the expanded DSRA unit rates. We discuss the exact unit rates in the Unit rates of the DSRA section at paragraphs 4.852 to 4.859.
- Ofwat will be aware of the additional allowances we provided to Disputing Companies in the expanded DSRA to cover enhancing STWs costs when it evaluates any enhancing STWs cost adjustment claims in PR24. This decreases the risk of overcompensating companies.
- We find that the expanded DSRA would not materially depart from Ofwat's regulatory approach. Part of the growth costs are already included in Ofwat's FD DSRA. Expanding the scope of this true-up mechanism to cover total growth costs would not materially alter the regulatory framework in PR19. In addition, the expanded DSRA would not materially alter companies' incentives. First, the unit rates are fixed at the time of our Final Determinations. Second, the companies cannot connect more properties to the network than properties built in their area. We note that expanding the DSRA in these Determinations is necessitated by the concerns over the use of the ONS forecasts and amplified by Brexit and COVID-19. We recognise Ofwat's reasons for using a total revenue control but in this context we find that expanding the DSRA is a practical way to address the uncertainty around the growth forecasts.
- Companies are incentivised to provide timely and high-quality new connections given that we use similar or higher unit rates than Ofwat.

- Since the DSRA adjustments are already deferred, given that DSRA is an end of period true-up, this makes Ofwat's concern around the timing of the adjustment less material.
- The base models and the growth unit rate adjustment fund an efficient company serving the number of connections based on ONS forecasts. The expanded DSRA provides additional allowance for the company in case the out-turn number of connections are higher than the ONS forecasts, therefore it improves the companies' financeability and does not result in unmanageable cash flow risk.

4.850 We decide not to implement any alternative mechanism and instead to expand the DSRA. We acknowledge that the alternative mechanism is also a reasonable way to address the uncertainty around enhancing STW costs as it ensures that additional capacity is delivered. However, we are concerned about the inaccurate baseline capacity levels and implementation complexity of the alternative mechanism:

- The baseline capacity levels would likely be inaccurate as the STWs capacity funded by the base models cannot be easily defined. Therefore, the alternative mechanism could overcompensate or undercompensate companies.
- The alternative mechanism would increase the complexity of the regulatory framework. It would be complex as it would be linked not only to the PE treatment capacity but also to the number of connections. It would create an additional burden both for Ofwat and the companies relative to the expanded DSRA. Therefore, there is a risk of unintended consequences.

4.851 We decide not to implement an asymmetric DSRA. We are concerned that an asymmetric DSRA would risk overcompensating companies. This is because companies may be able to observe, in advance, when actual connections will be below the ONS forecasts. In these scenarios they will be able to avoid investing but would still receive a proportion of the growth cost allowance. Therefore, an asymmetric DSRA could overcompensate companies. The degree of forecasting uncertainty created by Brexit and COVID-19 and the related amount of potential unavoidable investments are not material enough to outweigh the potential customer harm of such a mechanism.

- *Unit rates of the DSRA*

4.852 We decide to start with Ofwat's FD DSRA unit rates and then expand the wastewater unit rates to cover also broader related growth costs. When we

expand the unit rates, we accounted for the interaction with the cost sharing mechanism. This approach ensures that:

- we provide more protection for all the three Disputing Companies with wastewater operations to cover total growth costs;
- we address the cost sharing concern;
- we do not change the water unit rates in order to avoid intervening unnecessarily into the DSRA; and
- we use business plan unit rates as we find that these are more likely to support cost recovery where additional connections arise and the DSRA is triggered.

4.853 Ofwat's FD DSRA unit rates capture the closely related growth costs (connecting houses to the network costs and reinforcing the network costs). We decide to use these unit rates because we agree with Ofwat that the business plan company-specific unit rates better maintain the balance between the developer services revenue and end-user customer revenues. Table 4-23 shows Ofwat's FD DSRA unit rates.

**Table 4-23: Average of Ofwat's FD DSRA unit rates across 2020 to 2025**

Sector	£			
	Anglian	Bristol	Northumbrian	Yorkshire
Water	1,039	1,199	1,050	487
Wastewater	848	-	360	355

Source: Ofwat (2019), [Our approach to regulating developer services](#), pp38–41

Note: The company-specific efficiency challenge was updated to reflect changes in our view of modelled base costs.

4.854 We decide not to update Anglian's DSRA unit rates and grants and contributions using Anglian's recent view of grants and contributions and new connected properties (see paragraphs 4.830 and 4.831). We have concerns over the changes in the company's view of grants and contributions. For example, its wastewater grants and contribution are substantially higher while its forecasts of number of connections materially lower. We found that the company's reasoning was insufficient to justify these changes.

4.855 Ofwat applied company-specific efficiency challenges on its FD DSRA unit rates and we decide that it is appropriate to apply these company-specific efficiency challenges on these unit rates (see paragraphs 4.809 to 4.812) as these are components of the base costs. These efficiency challenges are set using the base models and the use of them is justified to more closely reflect the level of efficient costs.

4.856 We expand Ofwat's FD DSRA unit rates by adding a unit rate which includes the costs of enhancing STWs and reducing sewer flooding risk.

4.857 We decide to use an upper quartile business plan unit rate which includes the costs of enhancing STWs and reducing sewer flooding risk. This is £1,020 and we apply a 50% cost sharing rate on this rate, giving a figure of £510.<sup>1170</sup>

- We decide to use an upper quartile unit rate to provide an appropriate efficiency challenge. We find that it is not justified to use company-specific enhancing STWs and reducing sewer flooding risk unit rate as there is no need to maintain the balance between the developer services and end-user customer revenues for these costs.
- We decide to use a business plan unit rate to ensure consistency with Ofwat's FD DSRA unit rates as those are also based on business plan unit rates.
- We decide to apply a cost sharing rate on the enhancing STWs and reducing sewer flooding risk unit rate to address the cost sharing concern related to these costs. We decide to apply a 50% cost sharing rate to keep the unit rates symmetric and minimise implementation complexity. This cost sharing rate ensures that there is no material risk of double remunerating investments.
- To take account of future productivity gains and to keep the growth costs approach consistent with other base costs, we decide to apply a frontier shift and RPEs to the enhancing STWs and reducing sewer flooding risk unit rate, giving an average figure, across 2020 to 2025, of £502.<sup>1171</sup>

4.858 Table 4-24 shows the expanded DSRA unit rate (Ofwat's FD unit rates plus enhancing STWs and reducing sewer flooding risk unit rate for the three wastewater Disputing Companies).

**Table 4-24: Average of the expanded DSRA unit rates across 2020 to 2025**

	£			
Sector	Anglian	Bristol	Northumbrian	Yorkshire
Water	1,039	1,199	1,050	487
Wastewater	848+ <b>502</b>	-	360+ <b>502</b>	355+ <b>502</b>

Source: CMA Analysis

<sup>1170</sup> The enhancing STWs and reducing sewer flooding unit rates are based on August 2019 data submissions.

<sup>1171</sup> Frontier shift and RPEs are applied from 2020/21.

4.859 Table 4-25 shows the expanded DSRA unit rates in each year. Table 4-24 showed the average of these unit rates across years.

**Table 4-25: Expanded DSRA unit rates with frontier shift and RPEs in each year**

							£
Sector	Company	2020/21	2021/22	2022/23	2023/24	2024/25	
Water	Anglian	1,123	1,057	1,011	990	1,016	
	Bristol	1,126	1,191	1,207	1,224	1,249	
	Northumbrian	1,057	1,048	1,044	1,052	1,049	
	Yorkshire	454	504	506	484	488	
Wastewater	Anglian	1,214	1,227	1,186	1,364	1,759	
	Northumbrian	873	850	851	863	868	
	Yorkshire	835	866	863	861	857	

Source: CMA analysis.

### *Should Anglian's growth cost adjustment be accepted?*

4.860 As part of its work assessing growth costs, Ofwat considered whether it should allow Anglian additional funding because there were atypical cost factors which were not captured by Ofwat's modelling approach.

4.861 Anglian said there were three factors which justified an additional cost adjustment:

- length of communication pipe;
- growth intensity; and
- growth remoteness.<sup>1172</sup>

4.862 Anglian submitted case studies to support its claim.

### *Length of communication pipe*

4.863 Anglian said that detached houses required longer communication pipes (ie the pipe between the house and the main), which increased the cost of connection relative to flats which required shorter length pipes to connect.<sup>1173</sup>

4.864 Anglian said that it had a high proportion of detached housing and a low proportion of flats. Anglian's share of detached houses relative to other companies was third highest out of 18 for water and fourth highest out of ten

<sup>1172</sup> Anglian (2019), *PR19 Draft Determination: Deep dive on growth expenditure*, pp10–17. We note that Anglian mentioned development site ground surface types and self-lay penetration as other factors that drive costs. For development site ground surface type, Anglian said that there was no information that this cost driver varied substantially between companies. For self-lay penetration, Anglian said that the nature of causation as a cost driver was unclear, so it did not provide further information on it in its submission.

<sup>1173</sup> Anglian (2019), *PR19 Draft Determination: Deep dive on growth expenditure*, p11

for wastewater.<sup>1174</sup> For water, its share of detached houses was 36% of total connections, compared to the industry average of 26%.<sup>1175</sup> For wastewater, its share of detached houses was 35% of total connections, compared to the industry average of 29%. Anglian's share of flats relative to other companies was the lowest from 18 for water and ninth lowest from ten for wastewater.<sup>1176</sup>

- 4.865 Anglian estimated it was 36% more expensive to connect a detached house than a flat.<sup>1177</sup> Overall, around 10% of Anglian's growth expenditure (around £60 million) was related to site-specific mains and 30% of its expenditure was related to onsite costs.<sup>1178</sup>
- 4.866 Anglian's consultant, Vivid Economics, did not use property type in its preferred stand-alone growth models.
- 4.867 Ofwat said that it was not convinced that a relatively high proportion of detached houses as a percentage of total new connections was a material factor that required an adjustment.<sup>1179</sup> Ofwat said that Anglian did not provide quantitative evidence to show its modelled allowance did not capture this specific factor.

- *Decision*

- 4.868 There is some evidence that Anglian has a higher proportion of detached houses which is associated with higher growth costs. However, we find it is not a material factor because:
- The length of communication pipe is partly captured by the base models, for example, through the population density variable. Based on Anglian's figures, companies operating in less densely populated areas have a higher proportion of detached houses.<sup>1180</sup>
  - Anglian is not a clear outlier in its rankings – other regulated companies have a higher proportion of detached houses, although they do not have lower proportion of flats.

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<sup>1174</sup> Anglian (2019), [PR19 Draft Determination: Deep dive on growth expenditure](#), pp12–13

<sup>1175</sup> Anglian (2019), [PR19 Draft Determination: Deep dive on growth expenditure](#), pp12–13

<sup>1176</sup> Anglian (2019), [PR19 Draft Determination: Deep dive on growth expenditure](#), pp12–13

<sup>1177</sup> Anglian (2019), [PR19 Draft Determination: Deep dive on growth expenditure](#), p26

<sup>1178</sup> Site-specific mains. [Anglian's reply to Ofwat's Response](#), Part G: Reply on Cost arguments, p36, Table 7, Site-specific mains costs is £60 million, total costs is £624 million. Anglian (2019), [PR19 Draft Determination: Deep dive on growth expenditure](#), p23. £168.9m Draft Determination response costs and £179.6m bottom up approach.

<sup>1179</sup> Ofwat (2019), [Anglian Water – Cost efficiency additional information appendix](#), pp21–22

<sup>1180</sup> Anglian (2019), [PR19 Draft Determination: Deep dive on growth expenditure](#), pp12–13

- These costs only relate to a subset of the growth expenditure.

4.869 Therefore, we decide not to provide a cost adjustment to Anglian for the length of its communication pipes.

#### *Growth intensity*

4.870 Growth intensity refers to the quantity of growth relative to the pre-existing asset base. Intense growth is more likely to cause the design capacity of existing assets to be exceeded. Anglian said that its ranking relative to other water companies in growth intensity was fourth highest out of 18 for water and third highest out of ten for wastewater.<sup>1181</sup>

4.871 Anglian's adviser, Vivid Economics said that growth intensity and growth unit rate adjustment captured different factors. Vivid Economics said that growth intensity referred to the quantity of growth relative to the pre-existing local asset base and not simply to the volume of growth.

4.872 Ofwat said that it made an upward adjustment at its FD to address this issue and compensated companies with high population growth forecasts.<sup>1182</sup> Ofwat said that the DSRA true-up mechanism substantially reduced Anglian's risk exposure by allowing it to recover additional revenues if its out-turn growth was higher than forecast.

#### • *Decision*

4.873 We find that growth intensity will be captured by the growth unit rate adjustment (Step B) and the DSRA true-up mechanism (Step D) that we decide to use. We decide that Anglian should receive additional allowance in Step B (see paragraph 4.779). We also decide to expand the DSRA true-up mechanism to adjust companies' allowed revenues for growth costs including enhancing STWs. Therefore, we decide not to provide a cost adjustment for growth intensity.

#### *Growth remoteness*

4.874 Anglian said that its growth was occurring in more remote areas, increasing offsite reinforcement costs, including pumping stations, water mains and water treatment. Anglian's remoteness variable showed the average distance between growth sites and the nearest towns and its relative ranking in growth

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<sup>1181</sup> Anglian (2019), *PR19 Draft Determination: Deep dive on growth expenditure*, pp16–17

<sup>1182</sup> Ofwat (2019), *PR19 final determinations: Anglian Water – Cost efficiency additional information appendix*, pp21–22

remoteness compared to other water companies was highest out of 18 for water and highest out of ten for wastewater.<sup>1183</sup>

4.875 Vivid Economics said that Ofwat's models did not capture growth remoteness and Ofwat's density variables were only weakly correlated with Vivid Economics' remoteness variable. Vivid Economics used a sparsity variable (concentration of growth in sparsely populated areas) in its preferred wastewater model. Vivid Economics said that this variable captured the effect of remoteness.

4.876 Ofwat said that Anglian failed to consider whether this factor was already captured in the econometric base models.<sup>1184</sup> It said that Anglian did not test its remoteness variable in its base model to assess whether these factors were already captured.<sup>1185</sup> Ofwat said that Anglian failed to quantify the economies of scale associated with working on large developments, which might mitigate any increase in costs for distance from existing assets.<sup>1186</sup>

- *Decision*

4.877 We find that the range of density variables in the base models adequately capture the fact that Anglian operates predominantly in rural and agricultural areas and compensate Anglian for higher growth expenditure. We are not convinced that we should consider either sparsity or distance from towns as additional factors that capture remoteness on top of what is already captured by the density variables we use in the base modelling. Therefore, we decide not to provide an additional allowance for growth remoteness.

### ***CMA approach to growth***

4.878 We decide to take a similar approach to that adopted by Ofwat as no superior approaches have been suggested to us and we have not found any better alternatives.

- We allow for growth expenditure in the base models by not separating growth costs from other modelled base costs. We use the updated 2018 release of the ONS forecasts to forecast connection numbers.

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<sup>1183</sup> Anglian (2019), [PR19 Draft Determination: Deep dive on growth expenditure](#), p15

<sup>1184</sup> Ofwat (2019), [PR19 final determinations: Anglian Water – Cost efficiency additional information appendix](#), pp21–22.

<sup>1185</sup> [Ofwat's further submission on Anglian](#), p12, paragraph 2.23

<sup>1186</sup> Ofwat (2019), [PR19 final determinations: Anglian Water – Cost efficiency additional information appendix](#), p22



- We use a growth unit rate adjustment to account for the growth costs related to different growth rates that were not captured by the base models. The levels of the adjustment for growth unit rate for the four companies are summarised in Table 4-22.
  - We use historical upper quartile unit rates including also the cost of reducing sewer flooding risk in the growth unit rate adjustment.
  - We calculate the downward growth unit rate adjustment in the same way as the upward growth unit rate adjustment.
  - We decide to update the growth unit rate adjustment with 2019/20 data.
  - We apply a frontier shift and RPEs from 2020/21 to the growth unit rate adjustment.
- We reject Anglian’s request for a growth cost adjustment.
- We expand the DSRA true-up mechanism (Step D) to capture total growth costs to address the forecasting uncertainty of the number of connections. When setting the DSRA unit rates we take into account the interaction with the cost-sharing mechanism. We do not implement an asymmetric DSRA.

## Adjustment for enhancement opex

### Introduction

4.879 Ofwat’s approach to setting prices for the water industry in PR19 relied on appropriately setting a total expenditure (totex) allowance for companies for the period 2020 to 2025.<sup>1187</sup> In assessing the totex allowance Ofwat sought to assess enhancement cost allowances and base cost allowances separately.

4.880 Ofwat’s historical data collection approach contained no distinction between base operating expenditure (opex) and enhancement opex.<sup>1188</sup> This meant that the opex included in historical costs, which Ofwat used to model base costs, included both base opex and enhancement opex. Ofwat’s allowance for modelled base costs therefore implicitly included an allowance for enhancement opex, taking it beyond base costs.<sup>1189</sup> Since Ofwat set separate

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<sup>1187</sup> See Ofwat (2019), *PR19 final determinations: Securing cost efficiency technical appendix*, p11 for details of the overall approach.

<sup>1188</sup> Ofwat (2019), *PR19 final determinations: Securing cost efficiency technical appendix*, p38

<sup>1189</sup> Base costs include opex and capex as well as some enhancements which can be modelled appropriately.

allowances for base costs and enhancement activities, Ofwat's cost allowance could double count the enhancement opex if an adjustment was not applied.

- 4.881 In reaching our decision on the approach to the opex enhancement adjustment we have assessed Ofwat's approach to making an adjustment to the implicit opex enhancement allowance, and the concerns with this approach raised by Bristol. The other Disputing Companies did not raise this as an issue.

### ***Ofwat's FD approach to enhancement opex***

- 4.882 With a view to avoid double counting enhancement opex, Ofwat estimated the implicit enhancement opex allowance in its base models and subtracted this estimate from companies' base allowance.<sup>1190</sup> In this section we summarise Ofwat's approach.
- 4.883 Ofwat relied on an estimate for its adjustment rather than using actual historical costs for each company because of limitations in the available cost data. Ofwat did not collect data for opex enhancements before 2017/18 and it also stated that it did not have fully comparable data from all companies even for the period it did collect data. Ofwat stated that the responses it received from companies confirmed its concerns regarding data comparability for some companies.
- 4.884 To calculate its estimate, Ofwat took a top down approach by using six companies' data (five WASCs and one WOC) that it said reported enhancement opex on the same clear and comprehensive basis for 2017/18.<sup>1191</sup>
- 4.885 Ofwat stated that it was reasonable to use 2017/18 as an 'average' year for enhancement opex because it was halfway through the 2015 to 2020 period and therefore a reasonable proxy for the average of the period. Ofwat stated that this was because enhancement opex would typically increase year on year after the base year at the beginning of the period and data for the full period was not available.<sup>1192</sup>

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<sup>1190</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p42, and for full details of Ofwat's calculations see Ofwat (2019), [Enhancement opex implicit allowance feeder model](#)

<sup>1191</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p38

<sup>1192</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p38

- 4.886 Ofwat estimated the enhancement opex allowance separately for water and wastewater by taking the enhancement opex reported by six (five for wastewater) companies.<sup>1193</sup>
- 4.887 Ofwat aggregated the relevant historical enhancement opex cost categories for 2017/18 for the companies in its sample.<sup>1194</sup> Ofwat then added the 2017/18 costs for the same six companies for all categories of totex that went into the modelled base costs. Using these figures, it calculated the proportion of enhancement opex in modelled base costs. This is therefore a weighted average of the six companies' costs.
- 4.888 Ofwat broke down the enhancement opex further by looking at data for the spend for the sub-categories in both water and wastewater. For example, calculating the percentage of wholesale water enhancement opex attributable to water resources. These final proportions are shown in Table 4-26.

**Table 4-26: Final AMP7 assumptions of enhancement opex implicit allowance as % of wholesale modelled base costs (plus growth)**

<i>Company</i>	<i>Water Resources</i>	<i>Water network plus</i>	<i>Bioresources</i>	<i>% Waste N+</i>
Estimated implicit allowance	0.3	0.8	0.0	0.3

Source: Ofwat (2019), [Enhancement opex implicit allowance Feeder Model](#) (rounded to 1dp)

- 4.889 Ofwat calculated the enhancement opex implicit allowance by applying the historical opex proportion calculated for each of the water and wastewater controls to each company's 2020 to 2025 base allowances for each control. It subtracted this implicit allowance from each company's base cost allowances.<sup>1195</sup>

### ***Methodological issues raised***

- 4.890 In this section we set out the concerns raised by Bristol in relation to the enhancement opex adjustment, Ofwat's response to the concerns and then discuss our own review and assessment of the issue.

#### ***Bristol's Concerns***

- 4.891 Bristol said that Ofwat deducted more enhancement opex from its base cost allowance than it proposed in its business plan and that Ofwat's approach

<sup>1193</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p42

<sup>1194</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p39. Ofwat excluded some cost categories which were included in the base modelling such as 'new connections'.

<sup>1195</sup> See Ofwat (2019), feeder model 4 for [Wholesale water calculation of totex allowances](#) and [Wholesale wastewater calculation of totex allowances](#)

gave rise to a material reduction in its base cost allowance. It stated that this was not a reasonable outcome.<sup>1196</sup>

4.892 Bristol also stated that a possible reason Ofwat had deducted more enhancement opex from its base allowance than was in its business plan was because Ofwat's approach only considered gross enhancement opex. Bristol stated that some investments gave rise to opex costs, while others reduced opex costs. It said that by only considering the cost increases, Ofwat overstated the reduction in base cost allowances.<sup>1197</sup>

4.893 Bristol said that to resolve this issue the adjustment should be capped at the level of enhancement opex included in its business plan for PR19.<sup>1198</sup>

### *Ofwat's response*

4.894 Ofwat said that the value of the enhancement opex implicit allowance was a reflection of the proportion of enhancement opex included in the historical period of its wholesale base models.<sup>1199</sup> Ofwat said that it did not represent an assessment of the enhancement opex the company included in its 2020 to 2025 plan (which it assessed separately). It stated that it would therefore be inappropriate to apply such a cap.<sup>1200</sup>

### **Decision**

4.895 We decide that the adjustment should not be linked to PR19 business plans and capping on this basis would be inappropriate. This is in line with our wider approach on base costs, where we have relied on benchmarking costs against other companies rather than conducting a bottom up assessment of each companies' business plans.

4.896 Having decided to rely on benchmarking via econometric modelling to set base costs, we decide making an adjustment based on forward looking costs would not be appropriate. This is because the adjustment is unrelated to the forward assessment of enhancement costs.<sup>1201</sup> The adjustment is designed to remove from the modelled allowance the impact of historical enhancement expenditure. This impact leads to firms' modelled cost allowances being greater than they would be if only base costs were used as data inputs.

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<sup>1196</sup> Bristol SoC, p133–134

<sup>1197</sup> Bristol SoC, p133

<sup>1198</sup> Bristol SoC, p133–136

<sup>1199</sup> Ofwat's Response to Bristol's SoC, p13, p28 and p62

<sup>1200</sup> Ofwat's Response to Bristol's SoC, p13, p28 and p62

<sup>1201</sup> See Section 5 for further discussion of enhancement costs.

- 4.897 We investigated whether a cap using each company's historical enhancement spend would be appropriate. We decide this would not be appropriate as the modelled cost allowance is based on averages across all companies. Examining individual historical expenditure and applying this level as an adjustment would not capture the impact of other companies' historical expenditure in the model. For example, even if a company itself historically had low or zero enhancement expenditure its cost allowance would likely be increased by the historical enhancement opex of other companies included in the base cost modelling.
- 4.898 In relation to Bristol's point on net/gross opex we have reviewed Ofwat's methodology queries and responses document, and the underlying clarifying responses from the six water companies used in the historical cost allowances. Having reviewed this evidence we have concluded that company submissions used by Ofwat were submitted on a net basis in line with the approach requested by Bristol.<sup>1202</sup> Therefore it does not appear that the issue raised by Bristol occurs in practice.
- 4.899 As part of our assessment we also explored whether using an alternative estimate based on the data available would be appropriate and considered whether it would be more appropriate to:
- use the data submitted by all companies;
  - include a further year of data in the calculation of the estimate covering 2018/19; and
  - uplift Ofwat's estimate based on the data Ofwat put forward in its FD for the period 2005 to 2010 (for which data was available).
- 4.900 Given the relatively small scale of this adjustment we decide it would not be proportionate to require new historical cost data to be produced to ensure consistency. We decide that Ofwat's approach of using only the six companies with fully comparable data is appropriate due to the inconsistency of the data in the other submissions.
- 4.901 We also decide that it is appropriate to retain 2017/18 as the benchmark year, given that the central year in the period is more likely to provide an unbiased estimate. This is because the evidence suggests that enhancement opex increased in a relatively linear way over the control period. We do not have data showing how enhancement opex changed over AMP6, however Ofwat provided a chart which showed water companies' forecasts for enhancement

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<sup>1202</sup> Ofwat (2018), [PR19 methodology queries and answers](#), p52, Ref No 206

opex over AMP7. This showed that across almost all the 12 companies there was a relatively constant increase over the control period.

- 4.902 Ofwat also stated that the available data for 2005 to 2010 suggested an estimate for enhancement opex between 1.5 and 2.3% for the period.<sup>1203</sup> This could suggest that the implicit opex enhancement could be substantially higher than the estimates Ofwat used in PR19.<sup>1204</sup> The extent to which the proportion of enhancement opex varies between control periods is unclear and therefore we decide not to uplift the adjustment based on this evidence.
- 4.903 Our decision on opex enhancement adjustment is to apply an adjustment to cost allowances using the same approach as that used in Ofwat's FD.
- 4.904 We acknowledge that given the data limitations for our determinations the estimate of the adjustment is imprecise and due to the different correlations in the model there might be Disputing Companies which benefit or are worse off due to the adjustment. However, given the relatively small scale of the adjustment,<sup>1205</sup> the gains or losses are likely to be relatively small and further mitigated by the cost sharing mechanism.
- 4.905 Our view is that collecting the full data across all water companies retrospectively for our determinations would not be proportionate as it would impose a substantial burden on the water companies. We encourage Ofwat to collect data for its next determination which allows it to separate base costs from enhancement costs and remove the need for any such adjustment in future reviews.

## **Cost adjustment claims**

- 4.906 In this section we discuss four Anglian cost adjustment claims and one Yorkshire cost adjustment claim. We discuss Anglian's other cost adjustment claims in paragraphs 4.860 to 4.877, 5.558 to 5.564 and paragraphs 8.48 to 8.82.

### ***Anglian capital maintenance claim***

- 4.907 In this section we discuss Anglian's cost adjustment claim for capital maintenance. We first present the Main Parties' arguments and then present our decision.

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<sup>1203</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p42

<sup>1204</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p42

<sup>1205</sup> Impact is less than 1% of totex for all disputing companies.

## *Main Parties' arguments*

- 4.908 In its submissions to the CMA, Anglian made various arguments on capital maintenance and base cost modelling, with some arguments focused on Anglian's specific circumstances.<sup>1206</sup> Anglian said that it should receive additional base funding to, amongst other things, reflect drivers of increased expenditure, such as new service obligations and higher capital maintenance needs.<sup>1207</sup> We have interpreted this to include a request that the CMA consider whether Anglian should receive a cost adjustment to account for higher capital maintenance costs.
- 4.909 Anglian submitted a cost adjustment claim of £187 million to Ofwat based on its business plan forecasts.<sup>1208</sup> It said that it needed to maintain service levels while assets deteriorated, operate and maintain a larger asset base and maintain and raise service standards. Anglian said that these costs were not addressed by the backward-looking econometric model.
- 4.910 Ofwat said it rejected Anglian's capital maintenance cost adjustment claim for the following reasons:
- It was appropriate to focus on forward looking risk assessments to account for the long-term nature of maintenance investments. Ofwat's econometric model accounted for future cost drivers (eg through increases in the length of mains).<sup>1209</sup>
  - Anglian's claim referred to relatively young assets, eg plastic pipes installed in the 1960s and 1970s.<sup>1210</sup>
  - Anglian's claim that changes to accounting standards, specifically relating to IT equipment moving from capex to opex, led to it being underfunded, were not substantiated.<sup>1211</sup>
  - Anglian's claim of increased capital maintenance costs to maintain high performance levels was unfounded. The evidence suggested that companies were able to achieve good performance on outcomes and

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<sup>1206</sup> This section focuses on arguments in relation to the Anglian specific arguments on capital maintenance. Arguments relating to the econometric modelling are dealt with in paragraphs 4.258 to 4.293.

<sup>1207</sup> Specifically, Anglian states that there is a gap in its base funding and that the CMA should adjust Ofwat's base models to include drivers of base including capital maintenance. [Anglian SoC](#), p126

<sup>1208</sup> Ofwat (2019), [PR19 final determinations: Anglian Water Cost efficiency additional information appendix](#), p5

<sup>1209</sup> Ofwat (2019), [PR19 final determinations: Anglian Water Cost efficiency additional information appendix](#), p22

<sup>1210</sup> In the CMA's Bristol PR14 Determination the CMA decided not use an age of main cost-driver because of uncertainty around the argument (older sewers may be higher quality) and concerns about the quality of the data (see CMA (2015), [Bristol Redetermination Appendices](#), 1.1–4.3).

<sup>1211</sup> Ofwat (2019), [PR19 final determinations: Anglian Water Cost efficiency additional information appendix](#), p7



costs efficiency and therefore Ofwat did not provide an extra cost allowance.<sup>1212</sup>

4.911 Anglian said that its capital maintenance costs had increased during AMP6 and would increase further going forward. In 2011 Anglian was required by the Water Industry Regulations 2011 to take over 1,200 wastewater pumping stations as well as 31,200km of private sewers. This led to an increase in base and enhancement capex in the first four years of AMP6.<sup>1213</sup> In addition, Anglian planned £19 million of capital maintenance, which it included in base capex.

4.912 Ofwat said that Anglian's cost-adjustment claim was insufficiently evidenced and that Anglian had sufficient allowance to maintain and secure the resilience of its assets.<sup>1214</sup> Ofwat also said that Anglian forecasted it would reduce its capital maintenance spend for the 2015-2020 period.<sup>1215</sup>

4.913 Ofwat said it recognised there had been recent changes in accounting rules that allowed companies to report certain maintenance costs as operating costs rather than capital costs. Ofwat said that Anglian had not provided convincing evidence that the requested increase in cost allowance could be attributed to increasing capital maintenance needs.<sup>1216</sup> Ofwat said that its approach provided an allowance for the adoption of private sewers and pumping stations because those assets were included in the base cost model.<sup>1217</sup>

4.914 Anglian said that, in contrast to Ofwat's statement, Anglian had forecast higher capital expenditure than historical levels, with base forecast to increase by 1.9%.<sup>1218</sup> Anglian also said that Ofwat's rejection of this evidence was based on a misunderstanding of two particular lines within its capital maintenance expenditure business plan. Taking those two lines into account, the planned capital maintenance expenditure would increase by £86 million between AMP6 and AMP7.<sup>1219</sup>

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<sup>1212</sup> Ofwat (2019), [PR19 final determinations: Anglian Water Cost efficiency additional information appendix](#), p7

<sup>1213</sup> [Anglian SoC](#), p72

<sup>1214</sup> [Ofwat's Response to Anglian's SoC](#), paragraph 1.28

<sup>1215</sup> [Ofwat's Response to Anglian's SoC](#), paragraph 1.30

<sup>1216</sup> [Ofwat's Response to Anglian's SoC](#), paragraph 1.31

<sup>1217</sup> [Ofwat's Response to Anglian's SoC](#), p43

<sup>1218</sup> [Anglian's reply to Ofwat's Response](#), Part G, p16

<sup>1219</sup> The first cost line was shifting costs from capex to opex solutions, however the maintenance of the activity is the same. The second was Anglian moving IT costs from capex to opex. In the past Anglian had owned its IT infrastructure. However, with the move to cloud computing this was no longer the case.

[Anglian's reply to Ofwat's Response](#), Part G, pp16–17



4.915 Anglian said that companies' long-term capital maintenance requirements were not constant over time.<sup>1220</sup>

- Statutory standards had increased and Ofwat did not include quality of service in its base modelling, which meant it failed to account for future spend.<sup>1221</sup>
- Increased investment, including service reliance and flood barriers, meant higher maintenance costs.<sup>1222</sup>

4.916 Anglian said that due to past enhancement spending capital maintenance requirements were increasing.

- The industry asset base was growing over time, and therefore its capital maintenance costs were growing. It provided evidence that there was an upward trend in capital maintenance spend.<sup>1223</sup>
- There was an increasing reliance on high-tech short-lived assets, which had higher maintenance costs. For example, Anglian had replaced a concrete water tank-based water treatment system with an ultrafiltration membrane system. The new system increased water quality but needed more frequent maintenance.<sup>1224</sup>
- Its modelling work showed capital maintenance spend would increase.<sup>1225</sup>

4.917 Anglian said that it was reasonable to conclude that historical levels of capital maintenance would not be sufficient in future AMPs to ensure the continued serviceability of Anglian's asset base.<sup>1226</sup> In addition, Anglian said that Ofwat failed to engage with Anglian's evidence provided on the impact of resilience.<sup>1227</sup>

4.918 In response Ofwat said that Anglian was not uniquely affected by technological change relative to other companies.<sup>1228</sup> On the move to shorter asset lives, Ofwat said that this indicator was under management control and was also driven by other factors, including the smaller site footprints.<sup>1229</sup> Ofwat said that it had engaged with the evidence provided by Anglian on

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<sup>1220</sup> Anglian also made arguments relating to growing asset age and health, which we covered paragraphs 4.258 to 4.293.

<sup>1221</sup> [Anglian's reply to Ofwat's response](#), Part G, p21

<sup>1222</sup> [Anglian's reply to Ofwat's response](#), Part G, p22

<sup>1223</sup> [Anglian's reply to Ofwat's response](#), Part G, p21

<sup>1224</sup> [Anglian's reply to Ofwat's response](#), Part G, p23

<sup>1225</sup> [Anglian's reply to Ofwat's response](#), Part G, pp24–26

<sup>1226</sup> [Anglian's reply to Ofwat's response](#), Part G, paragraph 102

<sup>1227</sup> [Anglian's Reply to Ofwat's response](#), paragraph 114

<sup>1228</sup> Ofwat also said that the approach to capital maintenance had improved compared to historical approaches.

<sup>1229</sup> [Ofwat's Further Submission on Anglian](#), p16

capital maintenance requirements and concluded that the evidence provided was insufficient.

- 4.919 In response to our Provisional Findings, Anglian said that it respected the CMA's decision, but noted that this would leave a 13.6% shortfall in capital maintenance requirements.<sup>1230</sup>
- 4.920 In response to our Provisional Findings, Ofwat supported our provisional decision. It said it considered that Ofwat's allowances provided adequate funding for companies overall. Ofwat said it would review how the framework for setting cost allowances incentivised companies to actively seek efficiencies and optimally manage their assets over the longer term. It said it would engage with the industry on this issue during the development of the PR24 methodology.<sup>1231</sup>

### *Decision*

- 4.921 We found that the majority of Anglian's capital maintenance arguments related to industry-wide considerations. For example, Anglian provided evidence of increasing industry capital maintenance spend. We have addressed these issues in paragraphs 4.258 to 4.293.
- 4.922 We considered Anglian's argument that its asset base had increased, partly due to taking over additional assets. This would be reflected in an increase in the scale variables in the econometric model and therefore Anglian's cost allowances would increase as its asset base increased.
- 4.923 Anglian may have a different capital maintenance profile to other companies and its evidence suggested an increase in capital maintenance costs since AMP6. However, this does not necessitate an increase in Anglian's base totex. For instance, Anglian's IT platform example demonstrates that the level of capital maintenance is closely linked to other aspects of expenditure, such as opex. While levels of capital maintenance may increase, there could also be a corresponding decrease in base opex. This is what we would expect if a company is seeking to reduce its overall costs. In fact, we would expect that, if companies are seeking to operate efficiently, the overall effect would be a reduction in whole life totex from the use of these shorter-life assets, and so there would be no justification for making an adjustment for higher capital maintenance.

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<sup>1230</sup> [Anglian's response to the provisional findings](#), paragraph 74

<sup>1231</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p.25

4.924 We therefore decide not to allow Anglian a cost adjustment for capital maintenance. In our view Anglian's projected increase in its capital maintenance costs is allowed for by the base cost model.

### ***Anglian sludge transport claim***

4.925 In this section we discuss Anglian's cost adjustment claim for sludge transport. We first present the Main Parties' arguments and then present our decision.

#### ***Main parties' arguments***

4.926 Anglian requested that the CMA adjust Ofwat's base models to reflect factors such as quality and topography or overlay cost adjustments to account for these factors.<sup>1232</sup> We therefore considered whether Anglian's cost adjustment for sludge transport should be allowed.

4.927 Anglian said that this investment was needed because it cost Anglian more than other companies to move raw sludge because it covered a large, sparsely populated area and it needed to move sludge to advanced anaerobic digestion sites.<sup>1233</sup> Anglian requested £41.6 million at Ofwat's draft determination.<sup>1234</sup>

4.928 At draft determination, Ofwat rejected this claim for three reasons.

- First, since the initial assessment of plans, Ofwat had reviewed the bioresources models and included a new variable: the proportion of load treated in size bands one to three. This variable controlled for the size of the treatment works and higher sludge transport costs were associated with smaller treatment works.
- Second, Anglian had easier access than all other companies to arable land because of its geography. Ofwat did not find any evidence that Anglian had accounted for the benefits of its geography to offset its claim.
- Third, Anglian's business plan demonstrated a lack of engagement with trading bioresources. Bioresource trading had the capacity to reduce sludge transport costs, and Ofwat did not see evidence that Anglian had taken any initiatives to maximise efficiency savings in this area.<sup>1235</sup>

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<sup>1232</sup> Anglian SoC, p108, paragraph vii

<sup>1233</sup> Anglian (2019), *PR19 Draft determination: Sludge transport cost adjustment claim*, table 1

<sup>1234</sup> Ofwat (2019), *Cost adjustment claims feeder model*, sheet: BIO\_sludge

<sup>1235</sup> Ofwat (2019), *Cost adjustment claims feeder model*, sheet BIO\_sludge

4.929 Following this, Anglian reduced the request to £17.6 million to reflect improved efficiency and allowances included in the base models. In Ofwat's FD it rejected the Anglian claim of £17.6 million because it now fell below Ofwat's materiality thresholds.<sup>1236</sup>

4.930 None of the Main Parties in their responses to the Provisional Findings provided any additional arguments or evidence on this topic. Ofwat said it supported the CMA's provisional decision to reject the claim.<sup>1237</sup>

### *Decision*

4.931 Anglian did not submit additional information to the CMA to support its case on sludge transport. The application of materiality thresholds here is sensible, consistent with Ofwat's approach and pragmatic, given that companies are more likely to raise complaints about specific circumstances than to report where they benefit from specific circumstances. Therefore, we decide to reject the Anglian claim.

### ***Anglian Average Pumping Head (APH) claim***

4.932 In this section we discuss Anglian's cost adjustment claim for APH. We first present the Main Parties' arguments and then present our decision.

#### *Main Parties' arguments*

4.933 Anglian said that if the CMA did not include APH in the base cost models a cost adjustment claim should be added to Anglian's cost allowance to cover Anglian's higher power costs.<sup>1238</sup> Oxera had calculated a cost adjustment claim of £31.7m.<sup>1239</sup>

4.934 Anglian said that topography was a material driver of cost differences for all companies, but had not been accounted for adequately in the base cost models.<sup>1240</sup> Anglian said that its requested cost adjustment was similar to Ofwat's accepted allowance for Sutton & East Surrey Water.

4.935 Oxera, Anglian's advisors, said that Anglian's topography, population sparsity, and percentage of distribution input derived from boreholes was different to other companies.

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<sup>1236</sup> Ofwat (2019), [Cost adjustment claims feeder model](#), sheet BIO\_sludge

<sup>1237</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p.25

<sup>1238</sup> [Anglian's response to the provisional findings](#), paragraph 81

<sup>1239</sup> [Anglian's response to the provisional findings](#), paragraph 97

<sup>1240</sup> See also [Anglian's final submission: Annex 1](#), paragraph 2

- 4.936 Professor Kumbhakar, Anglian's advisor, said that Anglian's APH was relatively high given its number of booster pumping stations per kilometre.
- 4.937 Oxera said it had estimated the cost adjustment claim as follows. First, it had run two econometric models to estimate separately power and non-power costs. Power costs were estimated at the aggregate level using APH and the number of properties as explanatory variables. Non-power costs were estimated using CMA models with the dependent variable replaced with cost minus power costs. Second, Oxera had combined the predictions from the power and non-power models to estimate total base costs. Third, Oxera compared the estimate of total base costs with actual costs to estimate the efficiency benchmark. Fourth, the efficiency challenge and frontier shift were applied to the combined power costs and non-power costs. These calculations resulted in an Anglian allowance that was £31.7m higher than the CMA's allowance. Anglian claimed £31.7m as a cost adjustment.
- 4.938 Ofwat said that Anglian did not have relatively high energy consumption per length of main, as might be expected if this was a uniquely important cost driver for the company.<sup>1241</sup>
- 4.939 Ofwat said that the APH data was substantially more unreliable than booster pumping stations data, Anglian was not special in relation to pumping costs and booster pumping stations was a good driver of power costs.<sup>1242</sup> Ofwat also said that the econometric models used by Oxera were selective, had not been through the same level of scrutiny as Ofwat's base cost models and that including APH in the wholesale water base costs models had not produced robust results.<sup>1243</sup>
- 4.940 In response to our Provisional Findings, Ofwat said that Anglian was not exceptional in terms of APH, ranking sixth out of 17 companies.<sup>1244</sup> Ofwat said that Anglian's evidence was selective. Operating in a flat region would require water to be pumped across relatively longer distances, but other factors were not considered by Anglian, including proximity of demand centres to water sources and the depth of boreholes.<sup>1245</sup>

### *Sutton & East Surrey Water cost adjustment claim*

- 4.941 We investigated Ofwat's decision on Sutton & East Surrey Water's cost adjustment claim for £10.4m for wholesale electricity usage to understand the

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<sup>1241</sup> [Ofwat's submission following the main party hearings](#), p20

<sup>1242</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), appendix A4

<sup>1243</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), paragraph A4.15 to A4.17

<sup>1244</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), paragraph A.4.10

<sup>1245</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), paragraph A.4.9

approach Ofwat took. This claim was rejected by Ofwat at draft determination for the following reasons.

- Although Sutton & East Surrey Water's APH was high, it was not an outlier in the industry.
- Sutton & East Surrey Water forecasted a substantial reduction in energy consumption for the period 2020 to 2025.
- Ofwat's econometric models included booster pumping stations, which partially controlled for energy consumption.<sup>1246</sup>

4.942 After the draft determination, Sutton & East Surrey Water submitted a NERA report supporting its claim. This report said that Sutton & East Surrey Water had high power costs relative to the industry because of its need to pump water. This was beyond the control of Sutton & East Surrey Water and was not captured by Ofwat's benchmarking models. The report also found that the booster per length of main variable was weakly correlated with power requirements across the industry and did not capture Sutton & East Surrey Water's high energy costs.

4.943 Ofwat changed its decision in its FD, giving Sutton & East Surrey Water a cost adjustment of £10.4m. Ofwat said that the company had submitted sufficient and convincing evidence following the draft determination.<sup>1247</sup>

### *Decision*

4.944 We considered whether Anglian was an outlier in relation to its APH and other potential related factors.

4.945 First, Anglian is not a substantial outlier in terms of APH. Figure 4-7 shows Anglian (ANH) is ranked fifth out of 17 on this measure and Anglian's figure of 162.4 m.hd is not substantially different from the industry mean of 144.0 m.hd.<sup>1248</sup> We note that Sutton & East Surrey Water (SES) is ranked third highest in the industry on this measure with a figure of 185.7 m.hd.

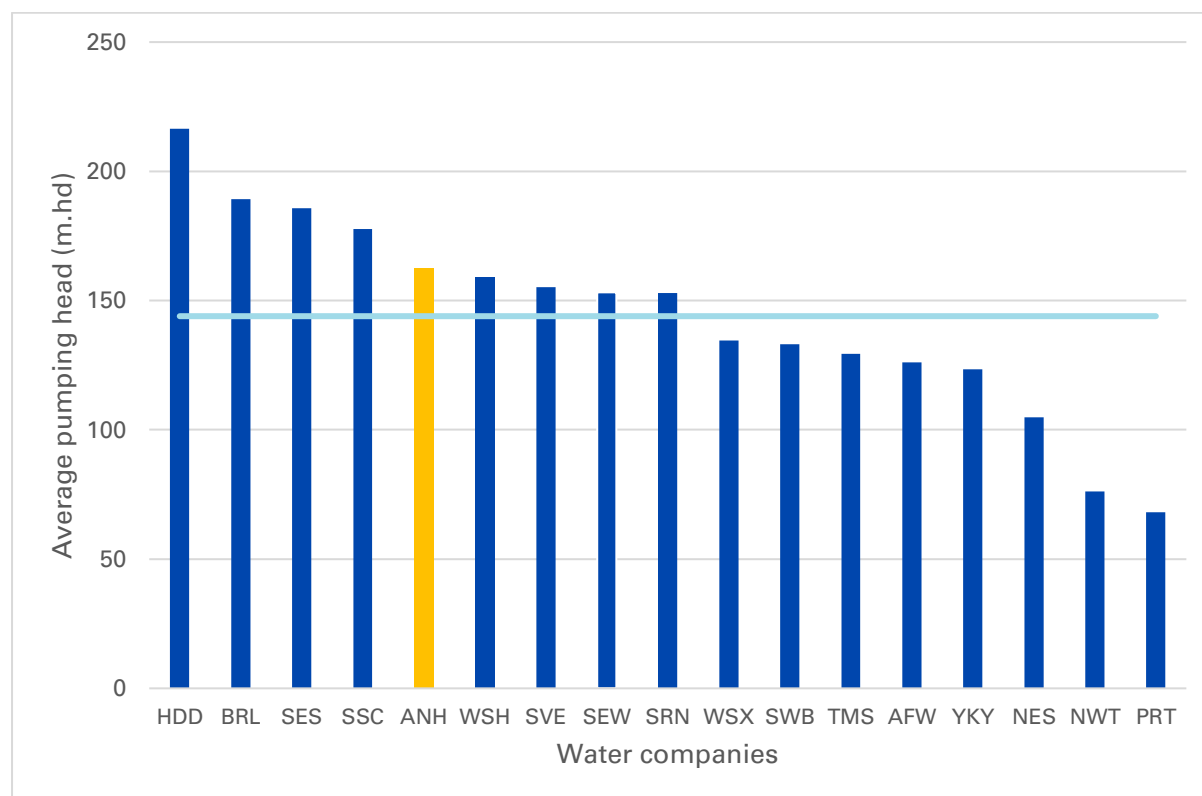
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<sup>1246</sup> Ofwat (2019), [PR19 draft determinations: SES Water – Cost efficiency draft determination appendix](#), p7

<sup>1247</sup> Ofwat (2019), [PR19 final determinations: SES Water final determination](#), p31

<sup>1248</sup> We note that in this diagram Anglian ranks fifth, while Ofwat said Anglian ranked sixth. Ofwat ranked Anglian sixth because they calculated the APH for South West Bournemouth (SWB) as the sum of APHs of South West Water (SWT) and Bournemouth Water (BWH) (the pre-merger entities), leading to Anglian ranking sixth. Ofwat said on reflection, it would be more appropriate to calculate the APH for South West Bournemouth as a weighted average of the individual APHs, with weights based on population or distributed input. This revised calculation upgrades Anglian's ranking to fifth.

**Figure 4-7: Water companies' APH**

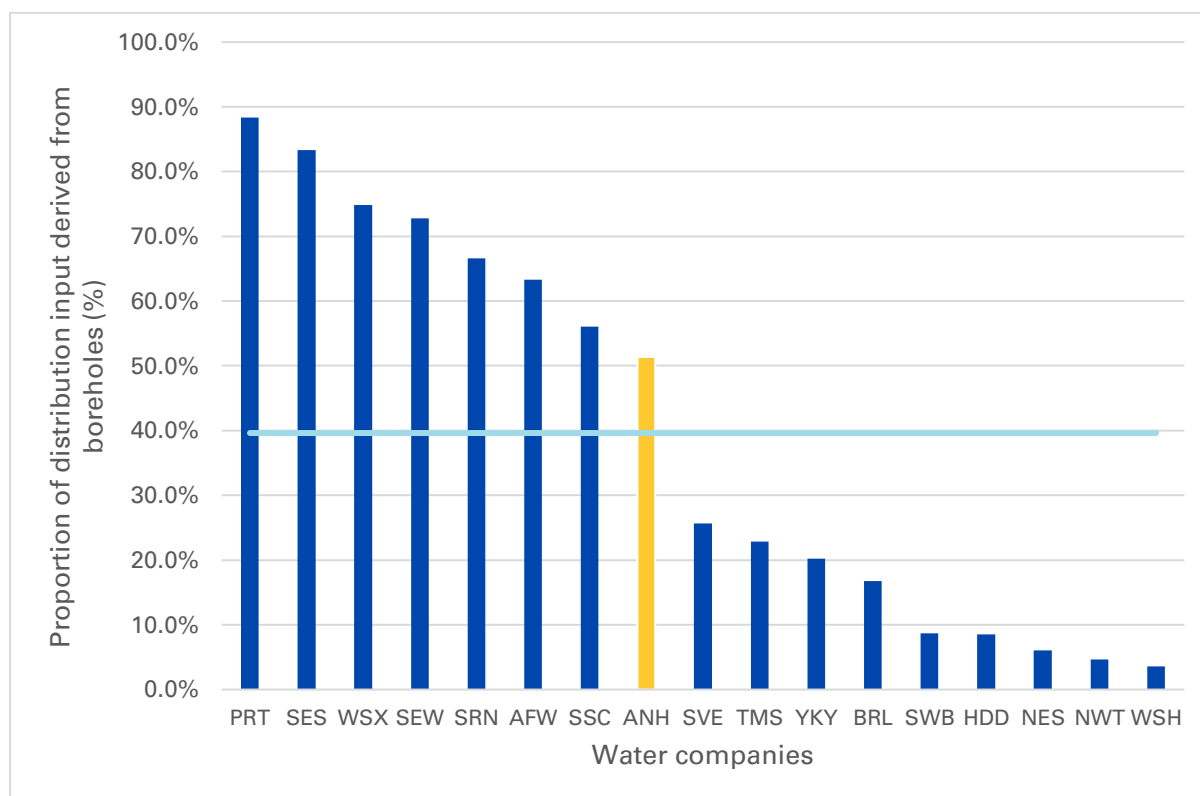


Source: CMA Analysis.

Note: APH is averaged across nine years between 2011/12 and 2019/20. For the purpose of this chart, we have assumed that post-merger Severn Trent Water (SVE) is a continuation of pre-merger Severn Trent Water, and Hafren Dyfrdwy (HDD) is a continuation of Dee Valley Water.

4.946 Second, Anglian is not a substantial outlier in terms of proportion of distribution input derived from boreholes. Figure 4-8 shows Anglian is ranked eighth out of 17 on this measure and Anglian's proportion is 51.4%, which is the closest of all companies to the industry mean of 39.6%. We note that Sutton & East Surrey Water is ranked second highest in the industry on this measure with a proportion of 83.4%, so we might consider Sutton & East Surrey Water to be a substantial outlier.

**Figure 4-8: Water companies' proportion of distribution input derived from boreholes**



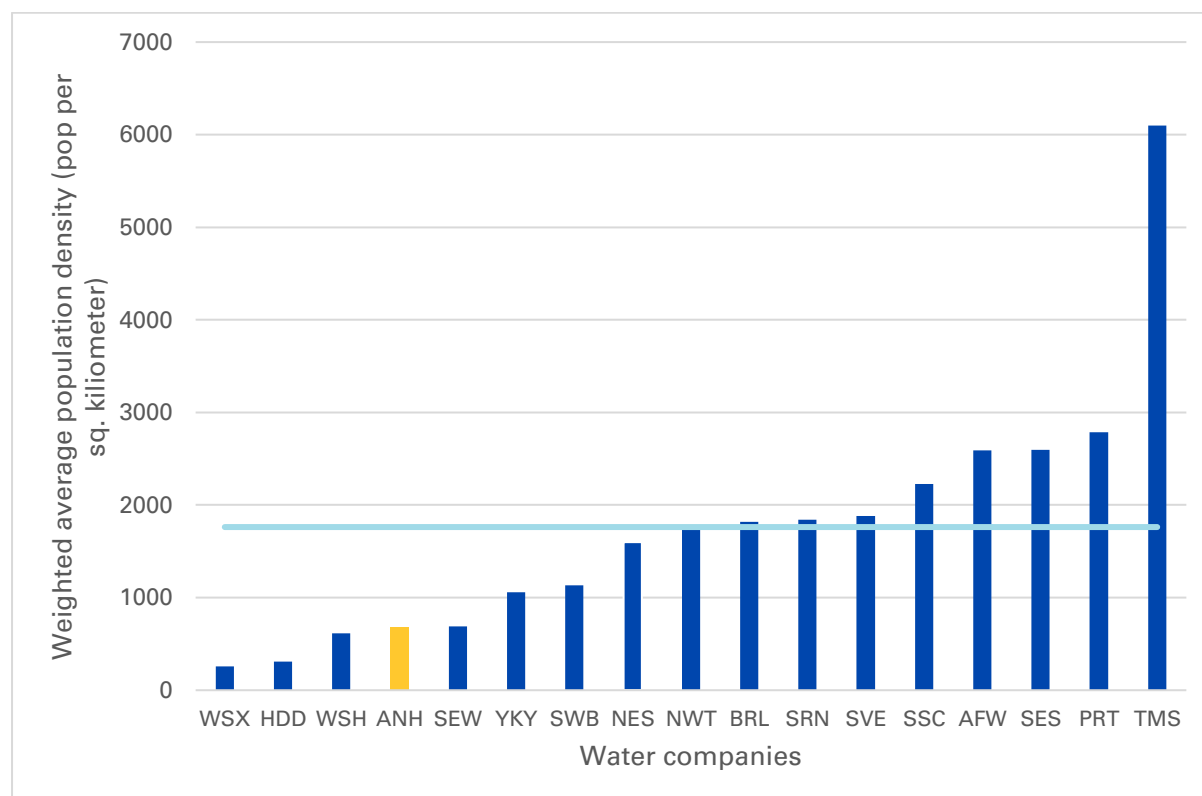
Source: CMA Analysis.

Note: Proportion of distribution input derived from boreholes is averaged across nine years between 2011/12 and 2019/20. For the purpose of this chart, we have assumed that post-merger Severn Trent Water (SVE) is a continuation of pre-merger Severn Trent Water, and Hafren Dyfrdwy (HDD) is a continuation of Dee Valley Water.

4.947 Third, while Anglian provided evidence that it had relatively low population density, our base cost model uses population density as an explanatory variable. Figure 4-9 shows Anglian is ranked fourth out of 17 on this measure and Anglian's weighted average population density for wholesale water is 676 per square kilometre, compared to an industry average of 1,762 per square kilometre. We note that Sutton & East Surrey Water had not argued that it operated in a sparsely populated region, so this measure was not relevant for Sutton & East Surrey Water.



**Figure 4-9: Water companies' weighted average population densities**

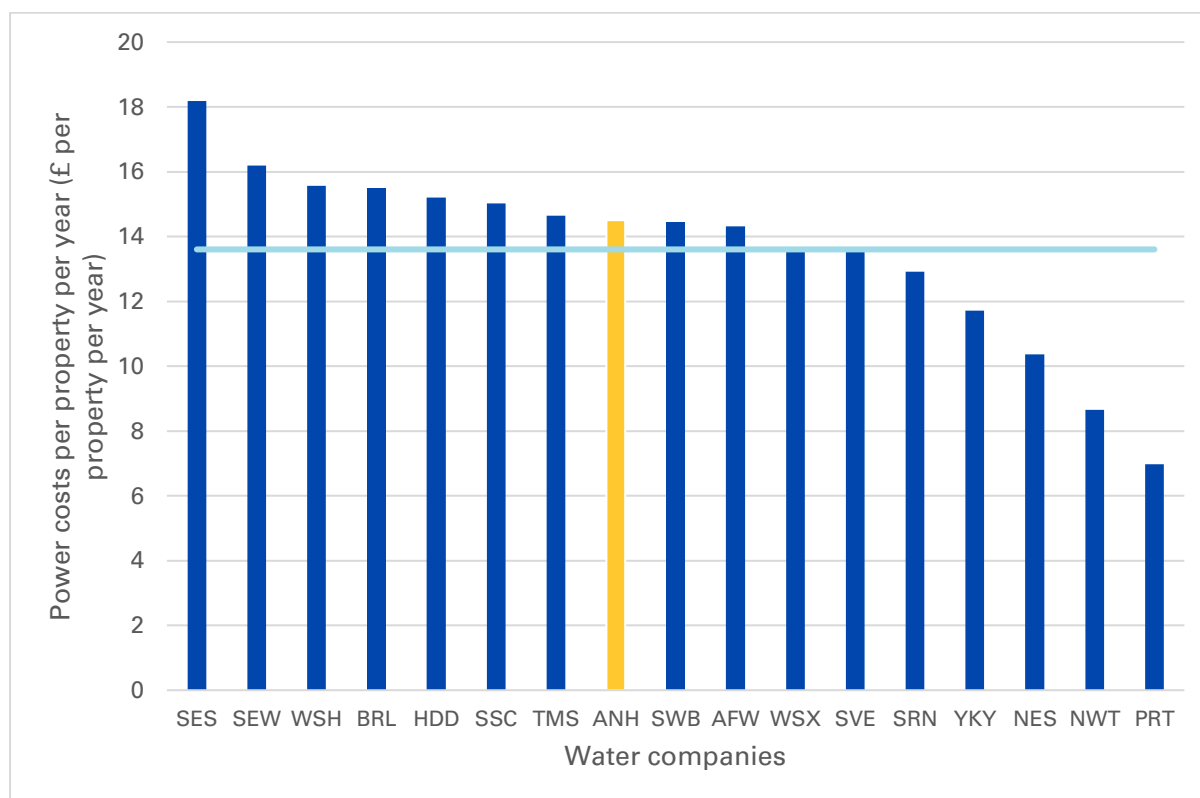


Source: CMA Analysis.

Note: Weighted average density is averaged across nine years between 2011/12 and 2019/20. For the purpose of this chart, we have assumed that post-merger Severn Trent Water (SVE) is a continuation of pre-merger Severn Trent Water, and Hafren Dyfrdwy (HDD) is a continuation of Dee Valley Water.

4.948 Fourth, Figure 4-10 shows that Anglian is ranked tenth out of 17 water companies on power costs per property per year. Anglian's power costs of £14.5 per property per year was not substantially different to the industry mean of £13.6 per property per year. We note that Sutton & East Surrey Water has the highest power costs in the industry at £18.2 per property per year, so we would consider Sutton & East Surrey Water a substantial outlier.

**Figure 4-10: Water companies' power costs per property per year**



Source: CMA Analysis.

Note: Power cost per property is averaged across nine years between 2011/12 and 2019/20. For the purpose of this chart, we have assumed that post-merger Severn Trent Water (SVE) is a continuation of pre-merger Severn Trent Water, and Hafren Dyfrdwy (HDD) is a continuation of Dee Valley Water.

4.949 As the Disputing Companies are more likely to make cost adjustment claims where their characteristics lead to an underestimation of costs (and not an overestimation of costs), we consider it is reasonable to expect the Disputing Companies to provide compelling evidence for these cost adjustments to ensure we do not overstate the overall cost allowance. Figure 4-7 to Figure 4-10 do not show that Anglian was a substantial outlier in regard to any of these characteristics, whereas Sutton & East Surrey Water did display some outlier features. We also note that our base modelling includes population density as an explanatory variable.

4.950 Therefore, we decide to reject Anglian's request for a cost adjustment for APH.

### ***Anglian proportion of load treated claim***

#### ***Main Parties' arguments***

4.951 In its response to the Provisional Findings Anglian sought a cost adjustment of £53 million due to the additional costs it incurred as a result of its distribution of load across sewage treatment works (STWs). Anglian said its

costs were higher because it had a lower proportion of load treated at larger STWs and therefore was not able to obtain the economies of scale other water companies benefitted from.<sup>1249</sup>

4.952 Ofwat said that it had already accommodated for economies of scale by controlling for the size of STWs in its econometric modelling. It split STWs into bands according to their size, with band one being the smallest STW and larger numbers denoting larger STWs. Ofwat included explanatory variables to account for the proportion of load treated in STWs that were in bands one to three in SWT1, and the proportion treated in band six and above in SWT2. It said that there was not convincing evidence behind the claim.<sup>1250</sup> In particular, Ofwat said that Anglian's situation was not unique. Using the Anglian definition of size bands, Ofwat noted that there were other companies without any load treated in either bands nine and ten and that those companies also had less access to economies of scale at higher size bands.<sup>1251</sup>

4.953 Ofwat also said that, in relation to Anglian's evidence that size bands nine to ten offered lower unit costs (hence providing economies of scale), there were very few sites to obtain reliable statistics from in these bands. Furthermore, for three of the seven companies that had load treated at band nine, the unit cost was higher than their unit cost at band eight.<sup>1252</sup>

### *Decision*

4.954 We considered whether Anglian was atypical relative to the rest of the industry.

4.955 First, Figure 4-11, prepared by Anglian shows 2019/20 STW unit costs by size band. The observations in the first column, marked '6-10', show unit costs according to Ofwat's definition of size band six, whereas the other observations follow Anglian's definition for size bands six to ten. The latter are a disaggregate measure of the former.

4.956 From this figure, Anglian does not appear to have atypical unit costs relative to the rest of the industry.

(a) According to Ofwat's definition, Anglian does not appear to be an outlier.

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<sup>1249</sup> [Anglian's response to the provisional findings](#), Chapter C, paragraph 103. See also [Anglian's final submission: Annex 1](#), paragraph 22

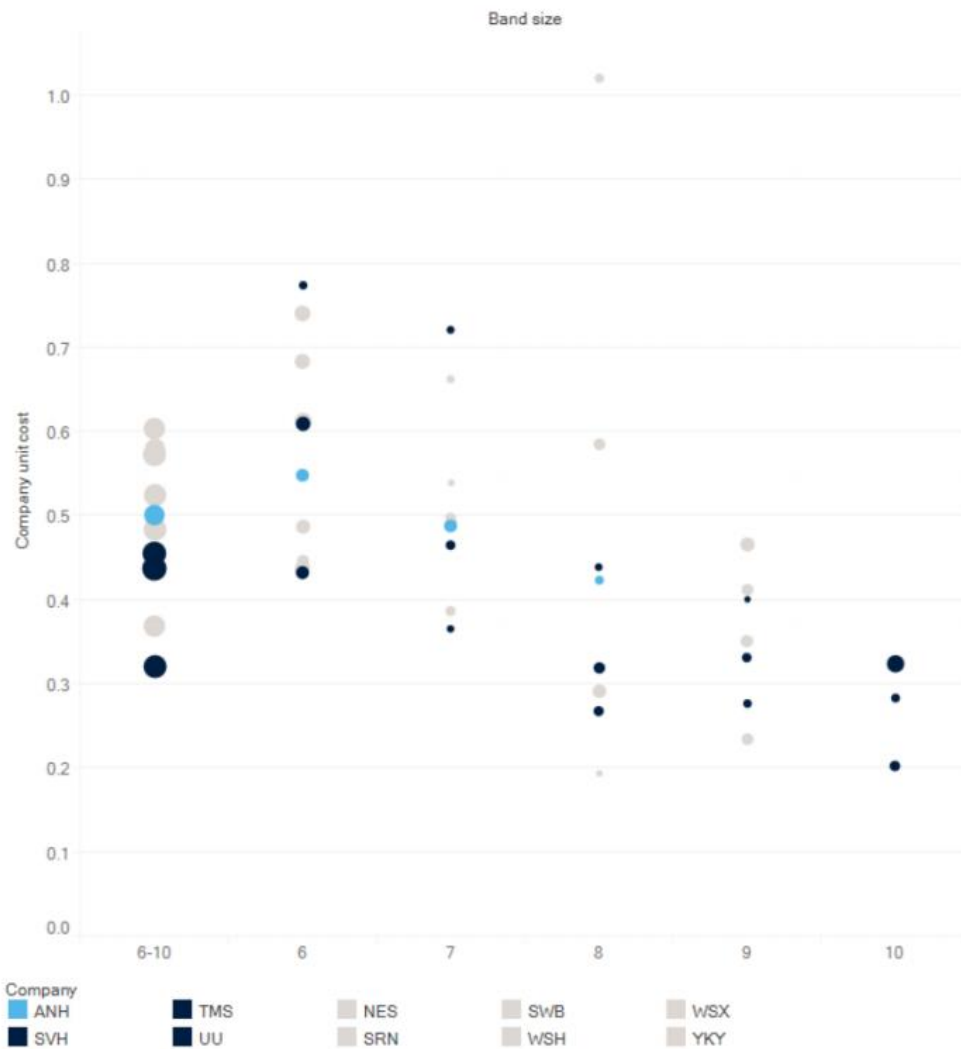
<sup>1250</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p10

<sup>1251</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), pp10-11

<sup>1252</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p11

- (b) Similarly, in size bands six, seven and eight, Anglian is not an outlier.
- (c) Anglian does not have STWs in size bands nine and ten, but this could be driven by the definition of the size band and is not unique to Anglian. Moreover, the lack of STWs in size bands nine or ten does not lead Anglian to have particularly high unit costs when aggregated under Ofwat's definition of size band six.

**Figure 4-11: Unit costs and size bands**



Source: Anglian

4.957 Second, Anglian's unit cost, shown in the first column, is not substantially different from the industry average.<sup>1253</sup>

<sup>1253</sup> We corroborated using a t-test against the null hypothesis that Anglian's average unit cost is equal to the industry average unit cost. The test could not reject the null hypothesis at a 95% significance level.

4.958 As the Disputing Companies have an incentive to make cost adjustment claims where their characteristics lead to an underestimation of costs (and not an overestimation of costs), we consider it is reasonable to expect the Disputing Companies to provide compelling evidence for these cost adjustments to ensure we do not overstate the overall cost allowance. This, combined with the evidence showing Anglian was not a substantial outlier, led us to decide to reject Anglian's request for a cost adjustment for load treated.

### ***Yorkshire treatment complexity claim***

4.959 In this section we discuss Yorkshire's cost adjustment claim for changes in its treatment complexity. We first present the Main Parties' arguments and then present our decision.

#### ***Main Parties' arguments***

4.960 In its submissions to the CMA, Yorkshire said it was expecting an increase in the required level of treatment complexity in AMP7 due to raw water deterioration and that this was not reflected in Ofwat's costs.<sup>1254</sup> Oxera, as adviser to Yorkshire, said if the proportion of water treated in complexity bands three to six was used in models WRP1 and WW1, we should apply an upward adjustment to Yorkshire's cost allowance. Given the company-specific forecasts on water complexity, Oxera also said that this issue was specific to Yorkshire among the appellants. We have interpreted this as a request that the CMA should consider a cost adjustment for Yorkshire.

4.961 Ofwat used companies' forecasts for water treatment complexity. Ofwat recognised that the companies' programmes of work would lead to a 'step change in treatment complexity in line with what they forecast' and that using historical data would not sufficiently capture this change.<sup>1255</sup>

4.962 Ofwat addressed similar arguments made by Anglian. We addressed these arguments in relation to base cost models in paragraphs 4.85 to 4.103.

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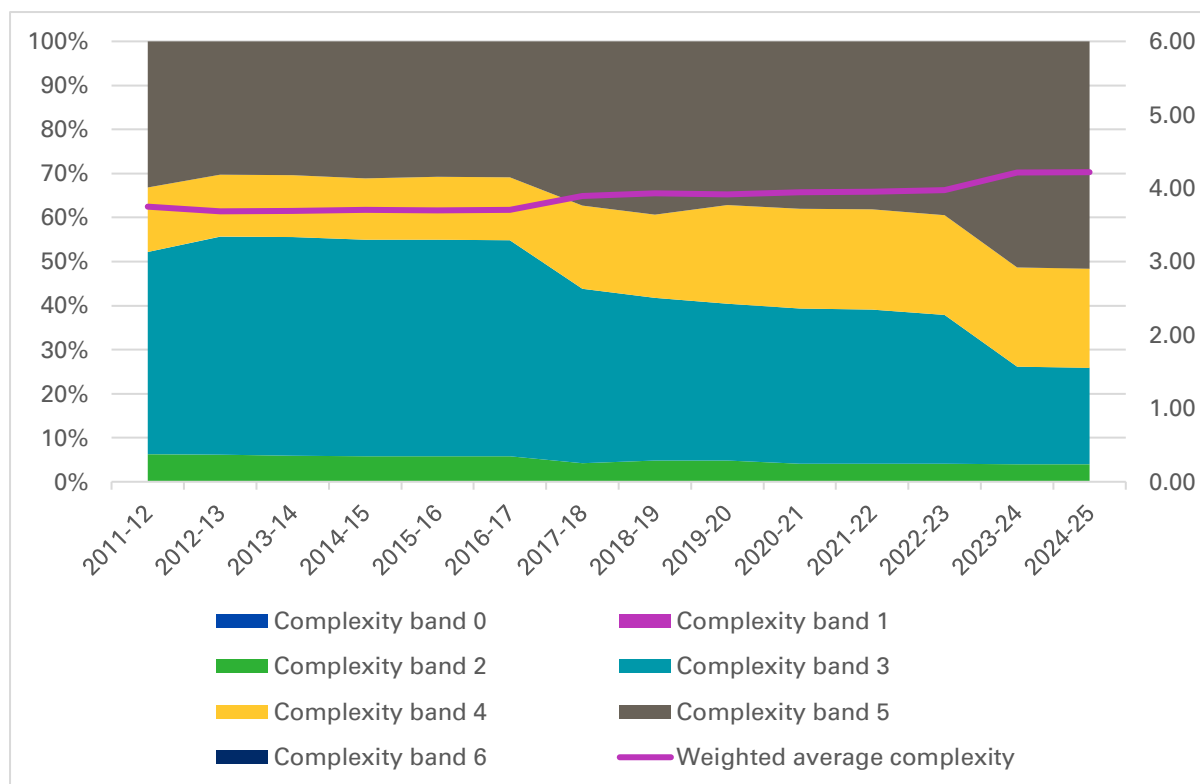
<sup>1254</sup> [Yorkshire SoC](#), paragraph 197 (b). See also [Yorkshire's Reply to Ofwat's Response](#), paragraph 3.54.1;

<sup>1255</sup> Ofwat [Feeder Model 3, Wholesale Water](#)

## Decision

4.963 Figure 4-12 shows the proportion of Yorkshire's water treated at different complexity bands and its weighted average complexity.<sup>1256</sup> Both these measures are based on historical data and company-specific forecasts.<sup>1257</sup>

**Figure 4-12: Yorkshire's proportion of water in different complexity bands (left hand side) and Yorkshire's weighted average complexity over time**



Source: CMA analysis of data in feeder model 1.

Note: For the purposes of this graph, we renamed the bands zero to six (as in Ofwat's econometric models) to bands one to seven, then calculated the weighted average complexity, then subtracted 1. This is simply to adjust the weighted average complexity to the names of the bands.

4.964 We have considered Yorkshire's outturn and forecasts related to water complexity. Between 2022/23 and 2023/24, Yorkshire will require more water to be treated in complexity band five and less in band three such that the magnitude of the water being treated in complexity bands three to six is roughly unchanged.

4.965 We acknowledge that the proportion of water treated at complexity bands three to six used in model specifications WRP1 and WW1 would not capture the additional costs that the change in complexity for Yorkshire implies. However, these additional costs will be reflected by changes in the weighted

<sup>1256</sup> For the purposes of this graph, we calculated the weighted average complexity starting from what Ofwat calculated for its econometric models and then subtracted one. This is simply to adjust the weighted average complexity to the names of the bands.

<sup>1257</sup> Ofwat [Feeder Model 3, Wholesale Water](#).

average complexity explanatory variable used in WRP2 and WW2. From Figure 4-12, it is clear that the weighted average complexity increases between 2022/23 and 2023/24. Our final allowances will reflect this increase through the triangulation of model specifications that use this variable.

4.966 The increase in weighted average complexity may not fully capture the increase in costs that Yorkshire will have to face. This is due to two factors:

- (a) The weighted average complexity also takes into account changes in complexity bands other than three and five. The larger these variations, the less the weighted average complexity will be able to capture Yorkshire's additional costs.
- (b) The model specifications that account for this change (WPR2 and WW2) are triangulated with models that do not (WRP1 and WW1). The overall effect will therefore be dampened.

4.967 In relation to the first point, we note that bands other than three and five are relatively stable during AMP7. This suggests that the influence of bands other than three and five on the variation of weighted average complexity over time is limited.

4.968 The second point is valid, but we note that the Disputing Companies are more likely to make cost adjustment claims where their characteristics lead to an underestimation of costs (and not an overestimation of costs). Therefore, it is reasonable to expect the Disputing Companies to provide compelling evidence for these cost adjustments.

4.969 Furthermore:

- Ofwat found a step change between treatment bands zero to two and bands three to six. This supports the economic and engineering rationale for the use of bands three to six.
- The change in average complexity is relatively small, increasing from around 3.75 to 4.22, an increase of around 12.6%.
- Yorkshire provided no evidence on the costs of treating different complexity bands and therefore no evidence on the cost change resulting from this relatively small percentage increase.

4.970 For these reasons, we decide to reject Yorkshire's cost adjustment claim.

## Unmodelled costs

4.971 In this section we discuss our consideration of the base costs that were not covered in Ofwat's base models, which it refers to as 'unmodelled costs'. The wholesale services costs which Ofwat excluded from its econometric models and which we consider below are water abstraction charges (water only), business rates, Traffic Management Act costs and Wastewater Industrial Emissions Directive costs (wastewater only).<sup>1258</sup> The section is structured as follows:

- (a) We summarise Ofwat's general approach in PR19.
- (b) We discuss cross-cutting issues which apply across the range of these cost categories and set some general principles we will apply.
- (c) We explore the approach taken to specific categories of unmodelled costs, review the disputed areas and arguments advanced by the parties, and set out the CMA's determination on these issues.

### ***Ofwat's PR19 approach***

4.972 Ofwat's base cost modelling approach covers most but not all of the base costs a WOC or WASC may incur. As set out above, the base costs which are not included in the base cost models are referred to as 'unmodelled costs'. Ofwat described these as 'a small number of items whose particular characteristics make them more suitable for a separate assessment'.<sup>1259</sup>

4.973 For PR19, Ofwat considered that unmodelled costs included, inter alia, abstraction and discharge service charges (water service only), business rates; costs associated with the Traffic Management Act 2004 (TMA) and wastewater Industrial Emissions Directive (IED) compliance costs (wastewater service only). For most of these items, Ofwat scrutinised the costs water companies submitted by reference to historic costs, before applying a frontier shift efficiency factor.<sup>1260</sup> On business rates, Ofwat then provided a reconciliation mechanism to allow a company to recover 75% of any costs in excess of its PR19 cost allowance, or allow customers to recover 75% of the amount by which a company's costs are lower than PR19 allowances.<sup>1261</sup>

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<sup>1258</sup> Ofwat (2019), *PR19 final determinations: Securing cost efficiency technical appendix*, p10

<sup>1259</sup> Ofwat (2019), *PR19 final determinations: Securing cost efficiency technical appendix*, p13

<sup>1260</sup> Ofwat (2019), *PR19 final determinations: Securing cost efficiency technical appendix*, p43

<sup>1261</sup> Ofwat (2019), *PR19 final determinations: Securing cost efficiency technical appendix*, p46



## ***Disputing Companies***

4.974 The Disputing Companies' initial statements of case raised a series of concerns, both general and company-specific, about how unmodelled costs had been treated. They asked the CMA to look again at these costs and ensure they were they were adequately reflected in the determination.

## ***Part A: Cross-cutting issues***

### ***Application of frontier shift to unmodelled costs***

4.975 All four Disputing Companies objected to the application of the frontier shift productivity challenge to unmodelled costs. This issue was addressed at paragraphs 4.621 to 4.630.

### ***Risk exposure***

4.976 Where a company exceeds its unmodelled costs allowances in AMP7, Ofwat's FD included a 75/25 cost-sharing approach for the recovery of these costs – that is, 25% of the cost overrun is funded by the company, 75% of the cost is passed through to customers. Conversely, if the company underspends, it passes 75% of the savings to customers, but 25% of the underspend is retained by the company. Ofwat's rationale for this approach was that this leaves relatively small exposures to the risk of variation in charges, while keeping companies incentivised to manage costs and ensure they are efficient.

### ***Company arguments***

4.977 Both Northumbrian<sup>1262</sup> and Yorkshire<sup>1263</sup> submitted that this arrangement exposed them to unjustified downside risk and was not a fair approach, since management was not able to influence the level of unmodelled costs.

4.978 Both companies submitted that the 75/25 cost sharing reconciliation mechanism was unjust and inappropriate because:

- (a) management had either limited or no control over unmodelled costs so incentivisation was not required;

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<sup>1262</sup> [Northumbrian SoC](#), paragraph 454

<sup>1263</sup> [Yorkshire's reply to Ofwat's response](#), paragraph 3.68.3

- (b) there was no need for a built-in incentive for them to reduce these costs, since keeping customer bills low was already sufficient incentive; and
- (c) Yorkshire argued a cost-sharing mechanism would be appropriate where costs could either rise or fall, giving management the prospect of commensurate upside to balance the risk exposure, but in these instances costs were much more likely to rise than fall (for example in relation to business rates and abstraction costs). As a result, the uncertainty mechanism was asymmetric and represented an inefficient approach because it placed risks on the companies which they could not control.<sup>1264</sup>

### *CMA decisions*

- 4.979 We recognise the importance of looking at subsets of unmodelled costs (where sufficiently material) individually, since the merits of the above arguments will vary depending on the nature of the cost drivers (for example, the degree of management control may differ). However, as a general approach, we observe that management will almost always have some degree of influence over costs in the longer term and therefore it is appropriate to maintain some financial incentivisation to reduce those costs for customers.
- 4.980 The degree of management influence over cost items like business rates and road excavation will vary not just between cost categories but also between individual items, so that any cost-sharing rule will necessarily be generous to water companies in some instances and less generous in others.
- 4.981 As a general approach, we decide that 75/25 is a reasonable default cost split for unmodelled costs. We agree with Ofwat that this leaves a relatively small exposure to the risk of variation in charges, while keeping companies incentivised to manage and negotiate their costs effectively.<sup>1265</sup> Exceptions can be made in our decisions where there is evidence that management has no (or virtually no) ability to influence cost levels and where the item is material to the overall determination.

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<sup>1264</sup> [Northumbrian SoC](#), paragraph 461-467

<sup>1265</sup> [Ofwat's response to Northumbrian's SoC](#), paragraph 1.47, p12

## **Part B: Specific issues**

### **Abstraction costs**

- 4.982 The largest and most frequently raised issue on unmodelled costs related to the cost of abstraction – namely the costs related to taking or extracting water from a natural source (rivers, lakes, groundwater aquifers, etc).
- 4.983 In terms of how abstraction charges were handled by Ofwat at PR19, it provided:
- (a) cost allowances which had been challenged by reference to companies' historical costs, with an efficiency challenge applied where Ofwat did not consider companies' explanations of material increases adequate;<sup>1266</sup>
  - (b) an end of AMP true-up mechanism (75/25 sharing rate) for abstraction charges, due to the uncertainty around rates given the Environment Agency's consultation, and the lower controllability; and
  - (c) an additional provision that companies could, on a case by case basis claim for an additional adjustment, if they could demonstrate material changes outside of prudent management control.

### ***Bristol abstraction from Gloucester and Sharpness canal***

- 4.984 Bristol abstracts 46% of its raw water from the G&S Canal.<sup>1267</sup> The G&S canal is owned and operated by the Canal & River Trust (CRT), and supplied by the River Severn, the Cam, and the Frome.<sup>1268</sup> Bristol makes annual payments to the CRT, pursuant to a long-term bulk supply agreement, which covers supply of water, maintenance of the canal system to facilitate abstraction, and the costs of any emergency situations preventing abstraction.<sup>1269</sup>
- 4.985 Before Ofwat's FD, Bristol submitted a cost adjustment claim for £8.6 million in relation to payments to CRT. Bristol said this cost adjustment was necessary to cover costs incurs due to having an atypical arrangement which increased its costs relative to other water companies who could source more raw water from within their areas of appointment.<sup>1270</sup> It should be noted that this claim was smaller than it requested at draft determination (£9.42 million),

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<sup>1266</sup> Ofwat (2019), *PR19 final determinations: Securing cost efficiency technical appendix*, p44

<sup>1267</sup> Bristol SoC, paragraph 500

<sup>1268</sup> Bristol PR14 Determination, p17

<sup>1269</sup> Bristol SoC, paragraph 500

<sup>1270</sup> Bristol SoC, paragraph 502

because Bristol subtracted £0.4 million for water sales not in the price control, and a further £0.4 million for its estimate of the implicit cost allowance already in Ofwat's base cost modelling. <sup>1271</sup>

4.986 In Bristol's final determination, Ofwat rejected £2.7 million of this cost adjustment. <sup>1272</sup> It justified this deduction as representing savings which it argued Bristol made compared to other water companies because of the G&S Canal arrangement – these were costs associated with capture, storage and transportation of water which are reflected in the base cost models, but which Ofwat stated that Bristol did not incur. <sup>1273</sup>

4.987 In its SoC and at its first main party hearing, Bristol submitted that: <sup>1274</sup>

- (a) it had atypically high costs and was an outlier in the water sector in England and Wales in terms of the proportion of raw water that is provided by a third party;
- (b) the payments to the CRT (a charge over and above its payments to the Environment Agency) increased its costs relative to other water companies that can obtain water from their own 'areas of appointment' (that is, within their own operating geographies);
- (c) because of its reliance on the G&S Canal, it had a higher proportion of water treated at higher levels of complexity (level five compared with the rest of the industry, also increasing costs;
- (d) the complexity and costs of treating the water at Purton and Littleton were much higher than for a typical level five treatment works due to the condition of the water; and
- (e) it had no alternative source of supply: it cannot mitigate any costs arising from its supply arrangement with the CRT by obtaining water from alternative sources of supply, because all of these potential alternative sources were not financially viable.

4.988 In its response, Ofwat submitted that: <sup>1275</sup>

- (a) Bristol's costs were not atypical due to savings elsewhere in operations: other water companies had higher costs associated with capture, storage and transportation of water and these costs were reflected in the

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<sup>1271</sup> Bristol SoC, paragraph 505

<sup>1272</sup> Ofwat (2019), *PR19 Final determinations: Bristol Water Final Determination*, p10

<sup>1273</sup> Ofwat (2019), *PR19 Final Determinations: Bristol Water Cost efficiency additional information appendix*

<sup>1274</sup> Bristol SoC, paragraphs 497-507

<sup>1275</sup> Ofwat's response to Bristol's SoC, paragraphs 3.128-3.14

econometric models that produce base cost allocations, Bristol's base cost allowances in effect already compensated it for some of its abstraction costs;

- (b) two measures of treatment complexity are used as cost drivers in the PR19 methodology, hence higher costs for treatment are already factored into base allowances; and
- (c) the company's costs claim is highly sensitive to assumptions made on the allocation of overheads, which Ofwat considers to be made on an unusual basis; and costs may be inefficient and are hard to verify because the company does not have a good understanding of its maintenance and asset operational costs.<sup>1276</sup>

*Our initial assessment and subsequent further representations*

- 4.989 In our Provisional Findings, we were not persuaded that Bristol could make compensatory savings compared with another notional water company which is less reliant on this form of agreement for its abstraction. At this stage, it was not clear where in the supply chain these savings would arise; our preliminary view was that Bristol would still need to abstract, store and transport the water it had taken from the G&S Canal, and that, as in the Bristol PR14,<sup>1277</sup> whilst we were not persuaded by the evidence that Bristol's G&S canal water treatment costs were atypically high, we could not identify significant factors that were likely to offset the additional costs relating to CRT payments. We also noted that Bristol's management had limited influence over the scale of the CRT charges and that Bristol had a structurally embedded heavy reliance on this supply source because other sources were not commercially viable.
- 4.990 Bristol agreed with our Provisional Findings, stating that this was 'in line with established CMA precedent that these costs are unique to Bristol Water, are in addition to the costs incurred in abstracting and treating the water, and are outside of reasonable management control'.<sup>1278</sup> It reiterated that Ofwat's models were not a good way of estimating Bristol's efficient costs for sourcing water from the G&S canal.
- 4.991 Ofwat disagreed, stating that the £2.7m increase to the cost adjustment was not justified. It argued that its own final determination base cost allowance for the company's water resources price control was already higher than

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<sup>1276</sup> Ofwat's response to Bristol's SoC, paragraphs 3.121-3.146

<sup>1277</sup> Bristol's response to the provisional findings, p46, table 18

<sup>1278</sup> Bristol PR14 Determination

requested, and that the CMA provisional decision was based on incorrect information.<sup>1279</sup>

- 4.992 Ofwat told us that other companies incur bulk supply charges that are equivalent to Bristol's Canal & River Trust payments. It said the costs of bulk supply are part of base costs and covered in its FD base allowances and that it estimated that the implicit allowance for Bristol 'far exceeds any remaining funding gap between the £8.6 million it requested and the £5.9 million we allowed'.<sup>1280</sup>
- 4.993 In our Provisional Findings we indicated that we were not persuaded by Ofwat's evidence on its view that Bristol made commensurate savings elsewhere in its business as a result of its abstraction arrangements and/or that there was already a significant allowance within base costs. In Appendix A6 of its Costs and Outcomes response to the Provisional Findings, Ofwat developed its evidence beyond that provided previously.<sup>1281</sup>
- 4.994 In terms of offsetting storage savings, Ofwat pointed out that the G&S canal in effect acts as a pumped storage reservoir for Bristol which it does not have to pay for. Therefore, while Bristol pays charges for the cost of sourcing the water from the Canal (abstraction, transport), it avoids the cost of owning, operating, maintaining and making safe a storage reservoir. Such costs are material, it claimed: two companies put forward additional cost adjustment claims for the cost of keeping their reservoirs safe during PR 19 (United Utilities requested £51.2 million and Dŵr Cymru requested £69.5 million). Further, it noted that other companies such as Wessex Water abstract water into their own reservoirs, thus incurring costs in owning, operating and maintaining a reservoir – and that 'Wessex Water did not request a separate cost adjustment, despite not benefitting from the same offsetting savings that Bristol Water benefits from'.<sup>1282</sup>
- 4.995 Ofwat also provided further detail to support its claims that the implicit allowance that Bristol receives is at least equal to the £2.7m deduction it had made from the Bristol cost adjustment claim.<sup>1283</sup>
- 4.996 In response to Ofwat's responses, Bristol further stated that:
- (a) It had already adjusted for the implicit allowance for Bristol which Ofwat claims is within base models, by removing £0.4m from the total value of

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<sup>1279</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), Section A6

<sup>1280</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), paragraph A6.3

<sup>1281</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), Appendix A6, pp125-129

<sup>1282</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), paragraphs A6.9-A6.12

<sup>1283</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), paragraphs A6.13-A6.20

the claim compared to the total costs it incurs (this figure representing its own estimate of the implicit allowance).

- (b) It did not recognise the savings Ofwat claims and had already provided extensive evidence of the canal increasing costs due to the high level of required treatment complexity.
- (c) There is 'strong regulatory precedent for allowing the Canal and River Trust claim' – the CMA looked at the claim in detail in the 2015 redetermination and allowed the claim in full.
- (d) It rejected the Ofwat argument about not having to abstract, store and transport the water: this is not the case as bankside storage exists at Purton and in raw water reservoirs for Littleton; and
- (e) It had already evidenced the additional treatment costs it incurred to CMA.

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4.997 Specifically in relation to Ofwat's estimation of the implicit allowance within base costs, Bristol stated that it did not find Ofwat's evidence clear, understandable or novel.

#### *CMA view on further arguments*

4.998 Turning first to the arguments on water treatment complexity, the CMA observes that base costs models control for water treatment complexity through the use of two variables (share of water complexity at levels 3-6, and weighted average complexity) and that a review of the analysis Bristol submitted which was provided by economic consultants NERA indicates Bristol is not an outlier compared to the rest of the industry.

4.999 Looking at the issue more broadly, both parties agree that any cost adjustment allowed for Bristol for its additional costs in relation to CRT payments should be net of the implicit allowance provided to the company within the base models. In the absence of convincing evidence that Bristol either makes savings or bears other costs which are atypical and unfunded, the central issue of the right cost adjustment then hinges on the level of that implicit allowance Bristol already receives from base costs.

4.1000 To help establish a reasonable estimate of the implicit allowance provided to Bristol within modelled base costs, we issued a request for information to both parties. This both Bristol and Ofwat the opportunity to

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<sup>1284</sup> [Bristol's reply to responses to the provisional findings](#), Note 1, p27

provide full details on their own workings and further to comment on the methodology advocated by the other party. We consider these responses within the next section.

#### *Bristol's arguments on the implicit allowance*

- 4.1001 Bristol estimated the £0.4 million implicit allowance based on Severn Trent Water's agreement for the use of Elan Valley. Bristol said that this agreement was the only observable comparator in volume terms for Bristol's CRT water sourcing. Bristol said that it was not aware of any other comparator agreements.
- 4.1002 Bristol estimated the implicit allowance based on only part of the costs of this Severn Trent Water agreement to reflect its own circumstances as this agreement included other charges.
- 4.1003 Bristol used two different approaches to estimate the implicit allowance it received for CRT costs.
- 4.1004 In Approach A, Bristol removed this part of the costs from Severn Trent Water's historical base costs (part of the dependent variable of the base models) and re-calculated Bristol's modelled base costs allowance by re-running the base models with Severn Trent Water's reduced historical base costs. The difference between Bristol's modelled base costs allowance with and without the costs of the Severn Trent Water agreement was the implicit allowance. The result of this was a £0.5 million implicit allowance for Bristol using also 2019/20 data.
- 4.1005 In Approach B, Bristol used this part of the costs of this Severn Trent Water agreement (as in paragraph 4.1002) to calculate the unit costs across the industry. Bristol then multiplied this unit costs by Bristol's volume. The result of this was a £0.4 million implicit allowance for Bristol.

#### *Ofwat's arguments on the implicit allowance*

- 4.1006 Ofwat also offered two different approaches to estimate Bristol's implicit allowance for CRT costs.<sup>1285</sup> In Approach One, it removed all of the bulk supply of water costs from historical costs. This resulted in an implicit allowance of £2.8 million. In Approach Two, it netted off the costs of in-house sourcing of water from Bristol's CRT costs. This resulted in an implicit allowance of £7.7 million.

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<sup>1285</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p128 paragraph A6.15



4.1007 In Approach One, Ofwat removed all of the bulk supply costs from the historical modelled base costs (dependent variable of the base models) and re-calculated the modelled base costs allowance for Bristol by re-running the base models. The difference between Bristol's modelled base costs allowance with and without including all of the bulk supply costs in the base models was the £2.8 million implicit allowance.

4.1008 Ofwat said that Approach One would understate the implicit allowance as all companies incur costs for sourcing their water, whether that was through a bulk purchase from a third party or from operating their in-house sources.<sup>1286</sup> For example, other companies incurred water sourcing in-house costs associated with owning reservoirs, which meant that the allowance for these costs were reflected in the base costs allowance.<sup>1287</sup> In addition, Ofwat said that Approach One would understate the level of implicit allowance as it did not account for equivalent costs of companies that do have bulk supply agreements, as these agreements are substantially smaller than Bristol's.

4.1009 In Approach Two, Ofwat considered in-house sources of water costs. Ofwat analysed Bristol's sourcing of water costs based on 2017/18 data. It found that Bristol's unit costs for sourcing water in-house was at least 90% of the unit cost of the CRT source. Ofwat said that this suggested an implicit allowance of 90% of the cost adjustment claim for sourcing water from CRT.<sup>1288</sup>

4.1010 In response to Bristol's approaches, Ofwat said that Bristol considerably underestimated its implicit allowance for CRT costs.<sup>1289</sup> Ofwat had the following two concerns with Bristol's estimation of the implicit allowance:

- (a) Bristol's estimation was based on one bulk supply agreement. Ofwat said that other water companies also faced bulk supply costs however none of them requested an adjustment to their base allowance.<sup>1290</sup>
- (b) Bristol removed a considerable share of costs from its implicit allowance estimation based on its assumption that it related to other charges.

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<sup>1286</sup> Ofwat (2019), *PR19 Final Determination Bristol Water – Cost efficiency additional appendix*, p4

<sup>1287</sup> Ofwat's response to the provisional findings – cost and outcomes, p128 paragraph A6.17

<sup>1288</sup> Ofwat's response to the provisional findings – cost and outcomes, p129 paragraph A6.18

<sup>1289</sup> Ofwat's response to the provisional findings – cost and outcomes, p129 paragraph A6.20

<sup>1290</sup> Ofwat's response to the provisional findings – cost and outcomes, p128 paragraph A6.16

### *Bristol's response to Ofwat's arguments on the implicit allowance*

- 4.1011 In response to Ofwat's Approach One, Bristol said that CRT payments were 'over and above' the costs of standard bulk-supply. It said that bulk supply contracts generally remunerated the costs of abstracting, storing and transporting water. It said that CRT payments did not result in Bristol avoiding these costs and hence it still had to bear them. Bristol said that its estimation was based on the only comparator it could find in the sector.
- 4.1012 In response to Ofwat's Approach Two, Bristol said that this approach was not an implicit allowance calculation as it compared its CRT costs to unit costs that included further costs. It said that due to lack of audit trail it was difficult for Bristol to critique Ofwat's Approach Two.
- 4.1013 Bristol said that Ofwat did not challenge its estimation of the level of implicit allowance in PR19.
- 4.1014 Bristol said that in PR14 Ofwat assessed the need for the claim by comparing CRT costs to other charges and not bulk supply costs. It said that the CMA did not make any reduction for an implicit allowance in Bristol PR14 Determination.

### *Our assessment of the estimation of the implicit allowance*

- 4.1015 Bristol and Ofwat had different views on the appropriate comparators for the calculation of the implicit allowance. Bristol based its approaches only on one agreement while Ofwat based its Approach One on all of the bulk supply agreements and based its Approach Two on in-house sourcing costs.
- 4.1016 Bristol's Approach A and Ofwat's Approach One relied on subtracting costs from the historical base costs (dependent variable of the base models) and re-estimating the models to estimate an allowance. Subtracting a larger amount from the dependent variable will result in a higher implicit allowance. If we remove all bulk supply agreement costs from the historical base costs, the modelled base costs without these costs will be lower, and therefore the implicit allowance will be higher than if we remove only the costs of one bulk supply agreement.
- 4.1017 We are concerned that Bristol's approaches are based on too narrow set of costs and could risk overfunding the company.
- 4.1018 We consider that Ofwat's Approach One can address the concerns around Bristol's approaches. It is based on a wider but similar set of costs to CRT costs to produce an estimate. However, we understand that not all the bulk supply agreements may be good comparators to Bristol's costs.

4.1019 We are concerned that Ofwat's Approach Two produces an inaccurate estimate as it is based on only one year of data and on only Bristol's costs. The comparison of Bristol's historical unit costs from one year does not measure the implicit allowance the company receives.

4.1020 We decide that Ofwat's Approach One is the most reasonable method to estimate the implicit allowance. We find that Ofwat's Approach Two and Bristol's approaches could risk materially under or overfunding the company. We note that we are not aware of any superior method to calculate the implicit allowance. We re-estimated Ofwat's Approach 1 including also 2019/20 data and using our final base model specifications. We found that Bristol receives a £0.78 million implicit allowance.

*Our final determination*

4.1021 It is clear that Bristol bears additional costs in relation to purchasing water from the G&S canal and that management has limited influence over the level of these costs. We are not persuaded on the one hand that Bristol makes offsetting savings elsewhere from this arrangement, nor on the other hand that Bristol's costs for treatment of water from the G&S canal are atypical and not adequately provided for by base costs. In considering the cost adjustment claim, the key issue is then the level of implicit allowance Bristol already receives from base costs and deduct this from the allowance provided.

4.1022 Calculating implicit allowances within base costs is problematic due to the aggregated nature of how modelled costs are produced. However, whilst none of the methods either party has provided is without flaws, we conclude that Ofwat's Approach One is reasonable. This method implies, after we reflect adjustments for using also 2019/20 data and our final base model specifications, that Bristol received a £0.78 million implicit allowance.

4.1023 Bristol removed £0.4m of costs from its cost adjustment claim to reflect its own estimate of the implicit allowance. This meant that it had claimed less than the total costs it expects to incur (claiming £8.6m when its costs, net of water sales not within the price control, were £9m). Further, since the Ofwat Final determination, it has been confirmed that the costs Bristol will pay CRT have increased by £300k per annum, effective from 1 April 2018.

4.1024 Consequently, we make the following adjustments to Bristol's cost adjustment claim of £8.6m:

- (a) We add back £0.4 million of costs which Bristol had already removed from its cost adjustment claim to reflect its own estimate of the implicit allowance;
- (b) We deduct £0.78m for our view of the value of the implicit allowance; and
- (c) We add £1.4m to reflect a CRT cost increase (£300k over 5 years less 5% for third party water sales).

4.1025 This results in a £9.66m cost adjustment. Any over or underspends on this amount will be subject to the standard totex costs sharing rate of 55:45 (customer: company).

#### *Northumbrian abstraction at Kielder*

4.1026 Northumbrian raised two issues related to increases in its abstraction costs in its statement of case. The first and more significant was increases to the costs for water from the KTS, where the Environment Agency had made an increase to abstraction costs which was not known at the time of final determination and amounted to approximately £61m of costs over the AMP.

4.1027 Northumbrian submitted that it had an atypical exposure to abstraction costs compared with the sector average,<sup>1291</sup> in particular because of its agreement with the Environment Agency to manage the KTS. It argued these costs were set to rise, that management could not mitigate these costs and hence that Ofwat's FD was skewed in this regard toward downside risks.

4.1028 Pursuant to an agreement which dates from privatisation, Northumbrian operates the KTS on behalf of the Environment Agency. The KTS is a regional water grid constructed in the late 1970s which transfers water across Tyneside, Wearside, and Teeside. The Kielder Operating Agreement, which sets out the Environment Agency's obligations for the grid, require it to deliver a return on the original investment and the costs of operating, maintaining, and repairing the KTS. The Environment Agency consequently recovers these costs through abstraction charges levied on the water extracted from the grid, which Northumbrian is required to pay, creating a circular flow of money (in other words, the abstraction charges paid by Northumbrian include Northumbrian's costs of operating the scheme, as well as the charges to provide for a return on the original investment).

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<sup>1291</sup> [Northumbrian's reply to Ofwat's Response](#), paragraph 44

4.1029 In January 2020, the Environment Agency undertook a consultation on abstraction charges for the KTS, proposing to increase charges to prevent over-abstraction and secure a higher return on the investment. Because of the timing, this proposed increase in abstraction charges was not known to Northumbrian at the time of Ofwat's FD and so was not taken into account by Ofwat in setting the allowance.

4.1030 In its SoC, Northumbrian raised two main increases in abstraction charges relating to the KTS, costing a total of £60.88 million:

- (a) a £28.31 million (corrected from £33 million in earlier submissions) one-off charge to be paid in 2020-21 for backdated business rate charges for Kielder transfer scheme and for costs of capital for works to the Riding Mill pumping station; and
- (b) an increase to annual charges of £8.14 million from April 2021 onwards to reflect higher business rate charges.

4.1031 Northumbrian also reported an additional increase to its abstraction charges of £2.5 million (£0.5 million per annum) as a result of its bulk supply agreement with Thames Water. We deal with this at paragraph 4.1038.

4.1032 Northumbrian proposed a direct pass-through for these costs or, if the uncertainty mechanism is to remain unchanged, that the frontier shift efficiency factor should not be applied to these costs and that it should receive compensation through a capital buffer or adjustment in WACC.

4.1033 In support of this proposed approach, Northumbrian argued that its circumstances are unique because:

- (a) its exposure is atypically high (as stated previously, its abstraction costs are 8% of base totex, compared to an industry average of 3%);<sup>1292</sup> and
- (b) It is unable to control the risk associated with a change in abstraction charges, or to drive reductions in these costs through efficiency, because these costs are outside its control. It argues the Kielder costs are not volume related and hence charges cannot be reduced by encouraging customers to reduce consumption or by increasing supply from other sources.

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<sup>1292</sup> [Northumbrian's reply to Ofwat's response](#), paragraph 44

4.1034 Northumbrian further stated that Ofwat had assumed abstraction charges would remain constant in real terms at draft determination, before the application of a frontier shift efficiency factor at PR19.<sup>1293</sup>

*CMA determination*

4.1035 Due to the timing of Ofwat's FD (December 2019) and the proposals from the Environment Agency for changes to the KTS arrangements (January 2020) the information on the proposed increases in costs was not available to Ofwat at the time of issuing PR19.

4.1036 However, we are able to take this information into account in setting our determination. Having reviewed the KTS arrangements, we consider there is a justification for treating this specific case differently from other unmodelled costs. The arrangements place Northumbrian in a situation in which it has a significant and known cost rise and limited scope to reduce costs or mitigate any increase in the costs during AMP7.

4.1037 We therefore determine that the full £60.88m cost Northumbrian faces as a result Environment Agency charge increases for the KTS can be recovered from customers via pass through. Any over or underspend at the end of AMP7 should be trued up at the end of the AMP via a PR24 reconciliation, such that customers only pay the costs incurred.

*Northumbrian abstraction from Thames Water*

4.1038 Northumbrian also submitted that an increase in the costs it pays to Thames Water under the bulk supply agreement for supply of water in Chigwell, Essex was not reflected in Ofwat's FD because Thames Water raised the additional liability in November 2019. Under the Chigwell Agreement for bulk supply, it told us it is compelled to pay an additional c.£0.5m a year from April 2020 to reflect its share of increases to Environment Agency abstraction charges.<sup>1294</sup>

4.1039 In our Provisional Findings, we observed that the increases in these costs are subject to a 75/25 (customer/company) split and that there is a degree of management influence over these costs. We therefore provisionally concluded the costs sharing approach was appropriate.

4.1040 In response to this provisional decision, Ofwat was supportive, stating that it did not consider that the company's new evidence warranted an

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<sup>1293</sup> [Northumbrian SoC](#), paragraph 20

<sup>1294</sup> [Northumbrian SoC](#), section 9.7

adjustment to our final determination allowance, but that any additional cost not included in our allowance will be dealt with under the cost sharing arrangement.<sup>1295</sup>

4.1041 Northumbrian's reply to Provisional Findings argued that our conclusion differs from the approach both we and Ofwat have taken for 'in-area' abstraction charges, where it says a central forecast for cost is taken and cost sharing is applied for variations to this level. Whilst Northumbrian's costs are recharged via a third party (Thames Water), it argued that the principle ought to apply and that the effect of treating these costs differently would be to 'disincentivise companies from making cross border trading agreements', something which it said would be contrary to Ofwat and Government policy aims.<sup>1296</sup>

4.1042 Northumbrian went on to state that as shown in its regulatory accounting separation report, these costs are distinct from bulk supply costs and so are not provided for within its modelled base costs. It pointed out that Thames Water has confirmed there will be a 12.5% cost increase<sup>1297</sup> for Northumbrian as a consequence of Thames Water's costs increasing<sup>1298</sup> and argued that since these costs are outside of management control, 'if the desire is to ensure we are incentivised to try to minimise the costs we suggest making an allowance for the central case (a £0.5m pa adjustment) but retaining the 75/25 customer/company cost sharing split for any variations from that.'<sup>1299</sup>

#### *CMA determination*

4.1043 We have explored Northumbrian's arguments about management control of these costs by undertaking a review of the Thames Water Bulk Supply agreement. The 1963 agreement which governs the supply of water from what is now Thames Water, to what is now Northumbrian, broadly can be read as enabling the supplier to recover the reasonable costs of providing that supply to the recipient. Some of the costs within the agreement which Northumbrian had to pay or continues to pay are those related to recovery of initial capital costs to create the necessary infrastructure. These costs appear fixed and not influenceable by management. However, some of the charging structure also relates to costs which would increase or decrease with volume – for example, the costs of pumping the water and for 'the protection,

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<sup>1295</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), p26

<sup>1296</sup> [Northumbrian's response to the provisional findings](#), section 3.7.1, paragraph 133

<sup>1297</sup> [Northumbrian's response to the provisional findings](#), paragraph 135

<sup>1298</sup> These are set out in the British Transport Commission Act 1949 The River Lee (Increase of Payments) Order 2020

<sup>1299</sup> [Northumbrian's response to the provisional findings](#), paragraph 137

abstraction, storage and special treatment of wholly or insubstantially treated water'. These costs are charged per thousand gallons of water, which suggests to us that Northumbrian management does have some ability to reduce costs it incurs under this arrangement by reducing the volume of water it takes. Demonstrating this point, we also noted that under the 2014 agreement it reached with Thames Water, Northumbrian required less water and was given a rebate by Thames Water for abstracting less.

4.1044 On the appropriateness of cost sharing, we remain of the view that the cost sharing rate is an appropriate method to incentivise management to reduce costs where possible.

4.1045 Northumbrian also raised the point that the CMA and Ofwat may be taking an approach which is inconsistent with 'in-area' abstraction charges, where it observed that a central forecast for cost is taken and cost sharing is applied for variations to this level. On further review we agree with Northumbrian on this point.

4.1046 We therefore determine that the Northumbrian allowance for abstraction under the Thames Bulk Supply agreement be increased by £0.5m per annum from April 2020 and that the 75/25 abstraction charge cost sharing rate should apply for cost increases (or decreases) from this level.

### ***Traffic Management Act costs***

4.1047 The TMA requires utility companies either to issue a notice or apply for a permit when conducting street works. Permits require a fee to be paid by the water company, whereas notices do not. The decision whether to use notices or permits lies with the relevant highway authority (ie Highways England or the local authority for the jurisdiction).

4.1048 Yorkshire submitted that the costs associated with permits under the TMA are not adequately covered in the modelled allowance provided in Ofwat's FD and give rise to a £21.6 million gap. It observed that these costs are likely to rise sharply in AMP7 due to the widespread changeover from notice to permit systems in Yorkshire's region. It noted that a 20% challenge was usually applied to unmodelled costs and considered that Ofwat was unjust in applying a 50% efficiency challenge to the costs it presented. Further, it submitted that because the use and cost of permits are decided by the relevant highway authority, it is difficult for Yorkshire to reduce costs for this area. It estimated 29% of the TMA costs could be influenced by the



company. It also stated that Ofwat had been unclear what costs to include in estimates.<sup>1300</sup>

4.1049 Ofwat did not include TMA costs in its econometric cost models because it considered that they were not well correlated with cost drivers in PR19.<sup>1301</sup> Instead, it treated them as unmodelled costs, taking the costs included in company business plans, scrutinising them with reference to historic costs and applying an efficiency challenge to them.<sup>1302</sup>

4.1050 In the case of Yorkshire, Ofwat considered that Yorkshire's estimates were high and not well evidenced and hence it applied a 50% efficiency challenge to those costs. Ofwat submitted that:

- (a) Yorkshire's forecast was high mainly due to its inclusion of implementation costs, the majority of which Ofwat considered were already included in Yorkshire's base cost allowances. For example, the implementation costs claimed included the cost of activities such as implementing manned traffic lights and out-of-hours working, which Ofwat considered were already substantially included in the base allowance as these costs would be incurred for roadworks whether or not there was a permit scheme in place;
- (b) implementation costs cannot be assumed for all roadworks and that Yorkshire's forecast was substantially higher than historical and current costs and significantly higher than other comparable companies; and
- (c) even after challenge, the determined TMA allowance for Yorkshire is the second highest in the sector, and significantly higher than other comparable companies.

### *CMA determination*

4.1051 In considering this issue, we observe that while management has limited control over the direct costs of each permit (this being set by the relevant highway authority), management has substantial control over implementation costs. Even where a highway authority has specified requirements, these are not fixed and are subject to some management control; we anticipate efficiency gains are possible. We also agree with Ofwat that many implementation costs are already included in the modelled base allowance, as Yorkshire (and other water companies) will have been

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<sup>1300</sup> Yorkshire (2019), *Cost efficiency – Yorkshire Water Draft Determination Representation REDACTED*, p61

<sup>1301</sup> Ofwat's response to Yorkshire's SoC, p65

<sup>1302</sup> Ofwat (2019), *PR19 final determinations: Securing cost efficiency technical appendix*, p48

experiencing these already when conducting road works, regardless of the permit/notice status.

4.1052 Water companies also have a degree of management control over the volume of work, as they can choose to invest in approaches which would reduce the need to dig up roads, or to plan and execute works in a way which would speed up or simplify the process. We also note that Yorkshire had assumed that all highway authorities would implement permit schemes quickly – it estimated by April 2020 due to Department for Transport requirements around the introduction of the new StreetManager IT system - but we have not seen evidence this has actually occurred.

4.1053 Table 4-27 shows the amounts incurred for TMA funding by all water companies in AMP6, and the amounts requested for AMP7. Given that Yorkshire's costs provide for a four-fold increase in costs since AMP6 and are the second highest in the sector, we agree with Ofwat that a 20% efficiency challenge would be insufficient. As Yorkshire's costs are substantially higher than for any company other than Thames Water (which has a largely urban geography and so much higher than average costs might be expected), we conclude that a 50% reduction to Yorkshire's estimated costs is reasonable, resulting in an allowance of £21.6 million. Ofwat agreed with this approach<sup>1303</sup> and we received no further representations from Yorkshire on the matter, hence we decide to leave this as is it was in Provisional Findings.

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<sup>1303</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), p27

**Table 4-27: TMA Funding Requested by Company and Actually Incurred in AMP6 (£m)**

	AMP6	AMP7 BP
Thames	64.8	76.3
Yorkshire	11.1	43.2
United Utilities	16.6	20.9
Severn Trent	3.4	18.5
Southern	8.9	11.1
South East	7.2	10.8
Affinity	9.5	9.7
Anglian	5.3	6.4
Northumbrian	1.5	6.0
Bristol	0.0	4.1
South Staffs	0.6	3.6
Portsmouth	0.7	1.8
SES	0.8	1.6
Hafren Dyfrdwy	0.0	0.2
Dŵr Cymru	0.1	0.1
South West Bournemouth	0.0	0.0
Wessex	0.0	0.0
<b>Total</b>	<b>130.5</b>	<b>214.4</b>

Source: Ofwat (2019), [Calculation of efficient view of Traffic Management Act \(TMA\) costs](#), (excluded from wholesale base models)

## **Business rates**

4.1054 Business rates are based on a property's 'rateable value' which is its open market rental value based on an estimate by the Valuation Office Agency (VOA). The rateable value is then multiplied by the relevant 'multiplier' set by central government. The rateable values of properties in England and Wales are revalued periodically and revaluations come into effect 2 years later. The most recent one occurred on 1 April 2015 and came into effect in 1 April 2017. Multipliers are revised at the same time. The next two revaluations are due during AMP7, in 2021 and 2024.<sup>1304</sup>

4.1055 It is possible to request changes to property valuations if businesses think they are wrong, to view the valuation details of other properties, and to challenge the rateable value.

4.1056 Business rates were treated as unmodelled costs and not set using Ofwat's econometric models. Ofwat's forecast of expected rates incurred does not reflect any changes as a result of revaluations which are expected to take place during AMP7.<sup>1305</sup>

4.1057 Ofwat's approach in PR19 included a 75/25 (customer/company) sharing rate on business rates. The rationale for this was that it leaves companies with a relatively small exposure to the risk of variation in charges,

<sup>1304</sup> Gov.uk webpage: [Business rates: how your rates are calculated](#)

<sup>1305</sup> [Northumbrian's SoC](#), paragraphs. 453 & 460

whilst keeping them incentivised to manage and negotiate their business rates costs efficiently.

4.1058 Ofwat's proposed approach at PR19 has been disputed by Northumbrian and Yorkshire.

(a) Northumbrian stated that the 75/25 cost sharing rate is inappropriate because business rate levels are not within management control. It argued there should be full pass-through.<sup>1306</sup>

(b) Yorkshire raised concerns with Ofwat's calculation of the rateable base, which does not take into account that revaluations of rateable assets will occur in the period.<sup>1307</sup>

4.1059 Northumbrian stated that business rates may increase during the AMP7 period, as the VOA determinations are strongly influenced by central government policy. Ofwat had stated that the 75% sharing rate will incentivise the water companies to engage with the VOA during the rate setting process. However, there is only a small opportunity for companies to influence revaluation proceedings, mostly focused on amending errors or misunderstandings in the derivation of charges. The main policy is set externally and cannot be influenced.

4.1060 Northumbrian also cited the regulatory approaches in sectors other than water which have generally been to allow a 100% pass-through of business rates, including Ofgem in its RIIO-T1 price determination, the Office of Rail and Road and the Civil Aviation Authority. Northumbrian has outlined regulatory precedent concerning cost pass-throughs in Table 4-28.<sup>1308</sup>

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<sup>1306</sup> Northumbrian SoC, paragraphs 453-455 & 460-461

<sup>1307</sup> Yorkshire SoC, paragraph 197(d)

<sup>1308</sup> Northumbrian SoC, table 29

**Table 4-28: Northumbrian claimed precedent on treatment of business rates in regulated sectors**

<i>Price control</i>	<i>Approach to cost pass through</i>
<i>Energy sector</i>	
Ofgem RIIO-GD1	An uncertainty mechanism was included to pass through costs for business rates. Other pass through costs were licence fees, pension deficit costs and other sector specific charges.
Ofgem RIIO-T1	An uncertainty mechanism was included to pass through costs for business rates, licence fees and other sector specific charges.
Ofgem RIIO-ED1	An uncertainty mechanism was included to pass through costs for business rates, Ofgem licence fees and Smart DCC fixed costs.
<i>Transport sector</i>	
Office of Rail Regulation (ORR) – CP5	An uncertainty mechanism was included to pass through business rates (with the requirement that Network Rail can satisfy the regulator it negotiated them efficiently). Licence fees and other industry levies were also included as pass through.
ORR – HS1 PR19	An uncertainty mechanism was included to pass through business rates, insurance and electricity network service costs.
Civil Aviation Authority (CAA) – Q6 Heathrow	Business rates had cost pass through with an 80% sharing mechanism.

Source: [Northumbrian's SoC](#), table 29, page 97.

4.1061 Northumbrian also submitted that a cost sharing incentive is not necessary to ensure it reduces its costs because it already has an incentive to keep customer bills low. It said that, given the limited degree of control it has over business rates costs, the real effect of the uncertainty mechanism is to expose Northumbrian to an uncontrollable risk of a windfall loss arising from a significant increase in business rates costs.<sup>1309</sup>

4.1062 Yorkshire stated that Ofwat's modelling of business rates underestimated the asset base on which business rates are applied and ignored the impact of asset revaluations. This resulted in a £34.3 million reduction in allowed costs for Yorkshire with a further £7.4 million reduction attributable to the frontier shift challenge Ofwat had applied.<sup>1310</sup> In its April 2019 revised business plan, Yorkshire stated that the existing estimate for asset extensions equated to a business rates liability of £3.2 million per year. The company had included that liability from 2021-2025.

4.1063 Yorkshire stated that due to Ofwat's choice of data source, Ofwat had underestimated the rateable values of its water and wastewater assets. It also argued that Ofwat has assumed business rates are within management control, placing all the revaluation risk on companies.

4.1064 Yorkshire also referred to regulatory precedent, submitting that Ofwat deviates from its own precedent at PR14 where it noted that business rates

<sup>1309</sup> [Northumbrian SoC](#), paragraphs 481 & 485

<sup>1310</sup> [Yorkshire SoC](#), p38, paragraph 120(d)

are largely outside companies' control and the material risks associated with revaluation are placed on companies.<sup>1311</sup>

- 4.1065 Ofwat calculated the companies' expected 2017-2018 business rates using the 2017 values provided by the companies and the 2017 multiplier set by central government. For wholesale water, Ofwat based its calculations on the 2017 rateable values provided by the VOA and the 2017 multiplier set by central government.<sup>1312</sup>
- 4.1066 Ofwat said it did not take the revaluations due in 2021 and 2024 into account in its allowances, nor did it take into account increases in business rates due to changes in wastewater asset stock in the period 2020-2021.
- 4.1067 Ofwat laid out its approach in its response to Yorkshire's SoC. It considered both the impacts of revaluations and the liability arising from asset additions had a degree of uncertainty, and that this is the reason behind its 75/25 cost uncertainty sharing mechanism.
- 4.1068 Ofwat further cited Yorkshire's response to the draft determinations where Yorkshire stated that a full pass-through to customers would not create an incentive for companies to manage business rates effectively, but that since business rates are a form of taxation, a true-up based on 50/50 sharing would suffice as long as the baseline were corrected.<sup>1313</sup> Ofwat considered that both impacts of revaluations and the liability arising from asset additions had a degree of uncertainty. It therefore provided an uncertainty mechanism to reconcile business rates based on 75/25 (customer/company) sharing rates.<sup>1314</sup> This would have resulted in customers funding 75% of any cost increases, but benefitting from 75% of any cost savings.
- 4.1069 Ofwat cited Northumbrian's outperformance of its cost allowances in three out of four control periods as a basis for considering it able to continue to deliver its commitments and obligations to customers within the allowances set if it is efficient. Ofwat also cited Northumbrian's successful challenge of the rateable value set by the VOA in 2017,<sup>1315</sup> when its rateable value was reduced from £85 million to £77.5 million.<sup>1316</sup> Ofwat therefore submitted that the 75/25 mechanism provides companies with appropriate protection in

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<sup>1311</sup> Ofwat (2014), *Final price control determination notice: company-specific appendix – Bristol Water*, p35

<sup>1312</sup> Ofwat's response to Yorkshire's SoC, p41

<sup>1313</sup> Ofwat's response to Yorkshire SoC, paragraphs 3.59-3.60

<sup>1314</sup> Ofwat's response to Yorkshire SoC paragraphs 3.56-3.57

<sup>1315</sup> Ofwat's Response to Northumbrian SoC, paragraphs 1.29, 1.52 & 3.151

<sup>1316</sup> Northumbrian SoC, paragraph 937

respect of business rates while retaining some incentive for companies to fully engage with the VOA to minimise the change in business rates.<sup>1317</sup>

### *Our provisional assessment*

4.1070 In considering our approach, we looked at the treatment of business rates in other regulated sectors. Both Ofgem and the Office of Rail and Road have previously concluded that management has little or no influence over the rates set. Hence business rates were treated as full pass-through in various price controls in those sectors, sometimes with a condition that companies must demonstrate that they had taken reasonable actions to minimise costs. We also noted that telecoms is regulated in a slightly different way (and hence not a good comparator), whereas with Heathrow Airport, the Civil Aviation Authority's Q6 control noted that the business had 'relatively little control' over business rate costs, but did have some ability to influence rates revaluation, hence an 80% pass through was set.<sup>1318</sup>

4.1071 We further observed that whereas water companies might not be able to do much to change the business rates they pay on network assets, they may have some ability to make decisions in relation to administrative buildings if business rates represent a significant cost consideration. We believe (and were presented with some evidence) that submissions to the VOA can be effective.

4.1072 Having reviewed all the arguments above, in our Provisional Findings we indicated that a 90/10 (customer/company) cost sharing arrangement on business rates was appropriate.

### *Further arguments and consideration*

4.1073 The disputing companies did not challenge our conclusion in their responses to our Provisional Findings: it was welcomed by Northumbrian and Yorkshire, whilst Anglian and Bristol chose not to comment.

4.1074 Ofwat disagreed with our Provisional Findings position.<sup>1319</sup> Its submission made several arguments:

- (a) Rates are influenceable: 'Since 2011-12 seven companies have reported business rates' rebates, primarily as a consequence of challenging the

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<sup>1317</sup> Ofwat's response to Northumbrian's SoC, paragraph 3.155

<sup>1318</sup> Civil Aviation Authority (2014), *Economic regulation at Heathrow from April 2014: Notice granting the licence*, paragraphs A45 & E85

<sup>1319</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, p27

VOA. This shows the importance of keeping a meaningful incentive on companies to negotiate with the VOA on behalf of their customers'.<sup>1320</sup>

- (b) These costs are insignificant for companies: 'At PR14 we included a Notified Item for water service business rates. Under the Notified Item companies would be compensated for 75% of any additional expenditure on business rates (80% for South West Water). If the Notified Item was not triggered any overspend on business rates would be shared with customers at the totex menu rate of between 44% and 54%. The Notified Item was not triggered during AMP6'.<sup>1321</sup>
- (c) The CMA has not intervened previously: 'In Bristol Water's PR14 redetermination the CMA 'identified no grounds to change the uncertainty mechanism for business rates set out in Ofwat's final determinations for Bristol Water'.<sup>1322</sup>
- (d) Ofwat's FD was already more generous than previous settlements: 'Under our final determinations companies are more protected against changes in business rates at PR19 than they were at PR14'.<sup>1323</sup>
- (e) Its cost share rate had sector support: 'Severn Trent Water agreed that a 75/25 sharing arrangement retained an incentive to control business rates where companies can'.<sup>1324</sup>
- (f) The CMA change adds to complexity: 'The CMA's provisional decision increases the complexity of reconciliations at PR24 and creates a two-tier pass-through mechanism which may not be proportionate for similar cost items with marginal differences'.<sup>1325</sup>

4.1075 At its main party response hearing, Ofwat said the 90/10 cost share we had provisionally indicated was potentially a 'no man's land'; in other words it was neither pass through nor much of an incentive for companies to try and reduce rates. It observed that companies do invest time in trying to reduce rates, and that where pass through was used, Northern Ireland regulators had found that it was very difficult to confirm after the fact that the companies had engaged to try and reduce rates. Ofwat also stated that the 75/25 position in its FD was an improvement on the 50/50 position at the initial assessment of

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<sup>1320</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, pp 27-28

<sup>1321</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, p.28

<sup>1322</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, p.28

<sup>1323</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, p.28

<sup>1324</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, p.28

<sup>1325</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, p.28



plans and that this change was made because companies indicated there was an element of controllability.

### *Final determination*

4.1076 We did not consider the further arguments Ofwat presented to be sufficiently compelling to alter our initial view. Whilst there are some examples of companies successfully influencing their business rates, these instances are not frequent and we were not presented evidence to suggest the savings were large in percentage terms. We remain of the view that management has limited scope to reduce business rate charges and hence companies' exposure to them should be limited. Further, we observe that they are treated as pass-through in some other regulated sectors.

4.1077 We determine that a 90/10 (customer : company) cost-sharing arrangement is reasonable both as a means to incentivise management to minimise costs to the extent it can, whilst also limiting the companies' exposure to a cost which is largely beyond their influence.

### *Business rates overstatement*

4.1078 Northumbrian stated that Ofwat made an over allowance of £11.74 million per year for business rates. This was taken following the 2017 revaluations, however, Northumbrian did not alter its business rates forecast following its implementation. Ofwat<sup>1326</sup> agree that the CMA should use the revised amount in its final determination, resulting in a lower allowance.<sup>1327</sup> This we have done.

### ***Industrial Emissions Directive compliance costs***

4.1079 The IED is an EU instrument which regulates pollutant emissions from industrial installations, with the aim of preventing or reducing them. The requirements of the IED are implemented through the Environmental Permitting (England and Wales) Regulations 2016,<sup>1328</sup> which are enforced by the Environment Agency. These provisions are to continue to remain in force following the end of the EU Exit transition period (subject to any further change in legislation).

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<sup>1327</sup> [Ofwat's Response to Northumbrian's SoC](#), paragraph 3.165 and [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), P.28

<sup>1328</sup> [The Environmental Permitting \(England and Wales\) Regulations 2016](#)

4.1080 The IED requires permits to be held for in-scope operations. These are designed to achieve a high level of protection for the environment, based on the use of best available technologies (BAT). The requirement to adopt BAT may mean that existing systems which were installed relatively recently require upgrade or replacement.

4.1081 Both Northumbrian and Yorkshire are seeking a specific mechanism for recovery of their compliance costs. Northumbrian raised this in its initial SoC,<sup>1329</sup> where it requested that the CMA reflects new information since the Ofwat FD. Yorkshire first raised this issue in reply to Ofwat's Response to its SoC,<sup>1330</sup> where Yorkshire stated that delivering compliance at 11 facilities would have a totex impact of around £150 million in AMP7 (but did not request a totex uplift). Anglian has not raised IED compliance as an issue, although the Environment Agency indicates it has ten affected sites (see Table 4-24). Bristol, as a WOC, is unaffected.

4.1082 Northumbrian and Yorkshire both submitted they will incur costs complying with the IED which were not considered at PR19. They are seeking:

(a) Northumbrian: a totex uplift of £33 million (later reduced to £20 million) and an uncertainty mechanism to correct any over or under recovery through an adjustment to the RCV.<sup>1331</sup>

(b) Yorkshire: an uncertainty mechanism that would allow recovery of actual costs at the end of AMP7 through an adjustment to the Bioresource RCV.<sup>1332</sup>

4.1083 In July 2019, the Environment Agency confirmed to WASCs that the biological treatment of non-hazardous waste with a capacity exceeding 75 tonnes per day was an activity falling within the IED's scope. This activity was previously assumed to be covered by the UWWTD.

4.1084 We have confirmed with the Environment Agency that IED permits will be required for sites carrying out the following activities:

(a) The biological treatment of sewage sludge;

(b) The operation of biogas engines; and

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<sup>1329</sup> Northumbrian SoC, section 9.1, p166

<sup>1330</sup> Yorkshire's reply to Ofwat's response, paragraph 3.70.4, p107

<sup>1331</sup> Northumbrian SoC, section 9.4, paragraph 932

<sup>1332</sup> Yorkshire's reply to Ofwat's Response, paragraph 12.1.27

(c) The injection of biomethane gas into the grid.

4.1085 There is a requirement for operators to secure these permits by August 2022 and the Environment Agency will require companies to apply for permits between April 2021 and January 2022. Therefore, costs associated with IED compliance are likely to fall in AMP7. Both Northumbrian and Yorkshire stated that, due to the timing of this confirmation, it was not feasible for them to include a suitably robust estimate of their costs for complying with the IED in PR19.

4.1086 The Environment Agency considers that Northumbrian and Yorkshire's IED compliance costs will be comparable with other water and sewerage companies. Table 4-29 shows, in the 'Total IED Sites' column, the number of sites operated by each company. A number of these already have an IED permit and this is shown in the 'existing waste installations' column. The Environment Agency's view is that sites with an existing installation permit will experience the smallest step-up in regulation.

**Table 4-29: IED sites by company**

	<i>Total IED Sites</i>	<i>Existing Waste Installations</i>
Anglian	10	0
Dŵr Cymru	1	0
Northumbrian	1	1
Severn Trent	27	9
Southern	16	1
South West	5	0
Thames	25	0
United Utilities	31	24
Wessex	5	0
Yorkshire	14	1
Total	136	37

Source: Environment Agency

4.1087 In its SoC, Northumbrian included an IED compliance estimate of up to £99 million in capital costs across 16 sites<sup>1333</sup> and a £0.9 million per year opex increase, or £102.6 million in total.<sup>1334</sup> However, its SoC acknowledged this estimate requires further refinement and so requested a much lower totex uplift of £33 million, based on just two sites (Howdon and Bran Sands).<sup>1335</sup> It has subsequently been confirmed that work at the other 14 sites is not required.

4.1088 In its response to Northumbrian's SoC, Ofwat stated that it considers the company has 'exaggerated its potential costs significantly',<sup>1336</sup> based on

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<sup>1333</sup> [Northumbrian SoC](#), section 9.4, paragraph 925

<sup>1334</sup> [Northumbrian SoC](#), section 9.4, paragraph 926

<sup>1335</sup> [Northumbrian SoC](#), section 9.4, paragraph 932

<sup>1336</sup> [Ofwat's response to Northumbrian's SoC](#), paragraph 3.157

an Environment Agency estimate of around £5 million for the re-permitting requirements at Howdon and Bran Sands.

4.1089 Ofwat also noted that Northumbrian had indicated that much of its costs would be associated with acquiring, developing and securing permits for biosolid storage sites, for use as contingency storage when agricultural land is unavailable for sludge spreading. The Environment Agency has confirmed it considers the provision of contingency storage to be a long-term ongoing requirement rather than a cost that can be attributed solely to IED compliance.

4.1090 Northumbrian provided a more detailed compliance cost estimate (£31 million)<sup>1337</sup> for Howdon and Bran Sands. However, it acknowledged this is based on a scope which represents the 'highest foreseeable level of intervention'. It stated that engagement with the Environment Agency had indicated there may be opportunities to make cost savings. On this basis, it reduced its requested totex uplift to £20 million.<sup>1338</sup>

4.1091 The Environment Agency has confirmed that, following discussions with the company, the range of its assessed possible costs could be broadened to between £12 million and £20 million. It stated that the upper limit of £20 million is for the worst-case scenario and could reduce substantially if works are shown by risk-assessment to be unnecessary or if aspects are already compliant.

4.1092 Yorkshire did not mention IED compliance in its SoC. However, in its reply to Ofwat's Response to its SoC,<sup>1339</sup> Yorkshire stated that delivering compliance at 11 facilities<sup>1340</sup> would have a totex impact of around £150 million in AMP7, although it did not seek a totex uplift. This compliance estimate included £119 million in capital costs and a c.£34 million impact on opex. It stated a 25% efficiency reduction had been applied.

4.1093 Ofwat noted that these costs seemed high but did not provide any explanation for this view.<sup>1341</sup>

4.1094 Yorkshire acknowledged that there was uncertainty around the cost of IED compliance, that the cost was likely to be highly site specific and would depend on a variety of factors.<sup>1342</sup>

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<sup>1337</sup> [Northumbrian's reply to Ofwat's response](#), paragraph 607

<sup>1338</sup> [Northumbrian's reply to Ofwat's response](#), paragraph 611

<sup>1339</sup> [Yorkshire's reply to Ofwat's response](#), paragraph 3.70.5

<sup>1340</sup> The Environment Agency information at Table 1 shows Yorkshire as having 14 IED sites. The company has costed compliance at 11, stating that of the remaining three, one is too small to be covered by the IED, one will close during AMP7 and the other is being constructed to IED standards.

<sup>1341</sup> [Ofwat's Further Submission on cross-cutting issues](#), paragraph 2.36

<sup>1342</sup> [Yorkshire's reply to Ofwat's further submission](#), Annex A, pp1-2

4.1095 Given the disparity between the compliance cost estimates provided by Northumbrian and Yorkshire and the Environment Agency's assessment of the likely costs, we asked our engineering consultants, WRc, to review the scope, methodology and costs.

4.1096 WRc advised us that the scope of the works proposed are generally consistent with IED requirements however some elements require additional refinement and/or clarification.

(a) Secondary containment – it is not clear how the companies' assessment of the IED requirements has been affected by their existing provision; there is a possibility that risk assessment may show it is not required or partially mitigated by the previous standard.

(b) Contingency storage (Northumbrian only) – there is a conflict between Northumbrian's understanding of the requirement for on-site contingency storage within the Environment Agency's rules and a statement by the Environment Agency that such storage may be off-site.

(c) Individual items (Yorkshire only) – there is a possibility that some items, while consistent with the IED, may not be required solely due to IED compliance.

4.1097 WRc advised us that both companies approach to estimating capital costs seems reasonable, noting that Yorkshire provides only a limited level of detail.

#### *Our view in our Provisional Findings*

4.1098 WRc reviewed the costs for the types of work proposed. It stated that Northumbrian's estimates for secondary containment appeared reasonable, but WRc identified some cost categories where the estimates could be over- or under-stated depending on the site-specific circumstances. Yorkshire's estimates did not provide enough detail for a similar analysis of equipment capacity to be carried out but a comparison with the Northumbrian estimates for similar size works found Yorkshire's estimates to be higher.

4.1099 In general, we observed that IED compliance costs appear highly sensitive to the assessment of detailed requirements at specific sites. This accords with the Environment Agency's view that 'accurate estimates of the costs attributable to IED will only be available once all the site and company specific factors have been assessed and the review or issue of permits has been completed.' In addition, there are also some issues associated with judging whether particular items are required solely due to IED compliance or might in fact be implemented to fulfil other ongoing requirements, as the

Environment Agency noted. The uncertainty around IED compliance cost assessment was acknowledged by both Northumbrian and Yorkshire.

4.1100 At Provisional Findings, we observed that there remains a high level of uncertainty around the cost of IED compliance, arising from potential differences in needs, scope, and efficient costs for a large number of activities. This makes setting ex-ante allowances particularly problematic. Based on the evidence available, we therefore provisionally concluded that:

- (a) since Northumbrian had provided a detailed evidence base, supported by views from the Environment Agency, it should receive a cost allowance of £12 million (equal to Environment Agency best estimate) for IED compliance costs. This was to be subject to clawback at the end of the AMP if actual costs were less. To mitigate the risk that costs exceed this level, but to keep management motivated to reduce them where possible, we further provide a 75/25 (customer/business) cost-sharing mechanism for IED compliance costs that exceed £12 million; and
- (b) although Yorkshire had claimed IED compliance will result in a material increase to costs, it had supplied limited evidence. We were concerned that the level of detail Yorkshire supplied was insufficient for us to assess likely costs robustly. For Yorkshire, we therefore proposed a cost sharing mechanism on a 75/25 (customer/business) basis for it to recover costs incurred complying with the IED requirements at the end of the AMP.

#### *Further arguments and consideration*

4.1101 In Ofwat's response to PF's, it accepted Northumbrian's provisional allowance of £12 million on the basis of the CMA receiving detailed evidence from the company and supporting views from the Environment Agency, and that the allowance will be subject to a clawback. With regard to Yorkshire's costs, it recommended that the CMA sets a maximum expenditure limit alongside the mechanism of 75:25 cost sharing rate. Any amount above the maximum will be subject to the company's cost sharing rate.

4.1102 Ofwat additionally told us that it is not appropriate to treat these costs as unmodelled base cost allowance. It considered that capex costs to meet new IED requirements should be viewed as enhancement costs, with the consequence that they are 'not necessarily governed by the same cost sharing regimes as other unmodelled costs area' – the effect of this would have been to amend the cost sharing rate to the asymmetric rate of 45/55 which applies to other enhancement capex costs (in the event of overspend, the company bears 55% risk, in the event of underspend, the customer benefits by a 55% share).

- 4.1103 To try and explain why it had referred to these as unmodelled costs previously, Ofwat further explained that in its final determinations it did allow some companies unmodelled opex costs relating to the costs of administering existing IED permits – hence their earlier categorisation.
- 4.1104 Ofwat also noted, in support of its arguments, that 'Anglian Water does not require additional costs nor reconciliation mechanism even though it is under the same regulatory regime'. Ofwat observed that this behaviour 'is appropriate' and that 'it is necessarily the case that meeting the IED regulations requires additional investment'.
- 4.1105 In the company responses to PF's, Yorkshire stated that it was supportive of our approach. Subsequently, in its response to Ofwat's reply to the Provisional Findings responses, Yorkshire stated its view that Ofwat had provided no new evidence to support its argument that the sharing rates are inappropriate, and described its approach as potentially inconsistent with the one advocated for business rates and TMA costs'.<sup>1343</sup>
- 4.1106 In Northumbrian's reply to our Provisional Findings, it welcomed our provisional allowance and what it saw as recognition that this obligation should be funded in AMP 7. Commenting on the £12m allowance, it stated that whilst it considered 'that there is sufficient evidence to support a higher allowance', it was prepared to accept our provisional approach.
- 4.1107 Northumbrian told us it disagreed with Ofwat's suggestion that these costs should be treated as an enhancement allowance with consequent lower cost sharing rates. It pointed out that<sup>1344</sup>:
- (a) the £12m allowance in the Provisional Findings was significantly less than the efficient costs provided in detailed estimates, which predict costs in the range of c.£20m – c.£31m.
  - (b) Based on its current understanding of the compliance requirements, it still expected to need to spend c.£20m as a minimum to achieve IED compliance during AMP7 (and potentially much more).
  - (c) Under the cost sharing rates proposed in our Provisional Findings (75/25 customer/business) the anticipated loss (c.£2m) could be managed whilst providing adequate protection to customers, whereas a change to the totex sharing rates as proposed by Ofwat would more than double the efficient cost under-recovery that it would be exposed to in this area.

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<sup>1343</sup> Yorkshire's reply to responses to the provisional findings, paragraph 4.2.13, p37

<sup>1344</sup> Northumbrian's reply to responses to the provisional findings, Section 4.3, p11

- 4.1108        Given these considerations, Northumbrian stated that if the CMA was to apply standard enhancement capex cost sharing rates, it should also revisit the detailed cost information it had provided to sense-check the scale of the cost under-recovery risk.
- 4.1109        Northumbrian also pointed out that IED compliance costs are extremely site specific and that since all of its sludge handling occurred at just two sites (Howdon and Bran Sands), both of which are close to urban populations and to water courses, meant that it anticipated higher compliance costs relative to other companies.
- 4.1110        We asked Ofwat how we might go about setting a maximum cap on Yorkshire's spending, given the significant uncertainty around its cost exposure. Ofwat responded suggesting a rudimentary rule of thumb, extrapolating the Northumbrian approach, would be to assume £6m per site. However, Ofwat acknowledged these costs are likely to be very site specific. Yorkshire has 11 sites potentially affected so the systematic over or underestimation based on applying this rule could be significant.
- 4.1111        On the appropriate cost sharing rate, Ofwat was asked "whether the scale of the (cost) uncertainty is such that the normal kind of enhancement spending cost sharing rates are reasonable, as opposed to something that is a bit more generous towards the company reflecting the uncertainties being imposed on it that are not directly under their control.' Its response was to state that it appreciated this but would still expect an upper exposure limit for customers.
- 4.1112        At the Northumbrian hearing, whilst it was acknowledged that these costs are by their nature analogous to enhancement capex, Northumbrian explained that its concern with reducing the generosity of the cost sharing is that its costs 'might be £30 million and the allowance is £12 million'. We explored at length the reasons why estimates are uncertain at this stage; essentially, Northumbrian submitted that the Environment Agency is still to decide on the exact requirements and guidance on a number of aspects is overdue. The company pointed out that the £12m was at the bottom of the estimated cost range, it had not reviewed the Environment Agency estimate and further that, given compliance requirements are at the Environment Agency's discretion, site specific factors (in particular, Howdon being in immediate proximity to residential areas) mean it doubts the Environment Agency will opt for more relaxed requirements which would deliver the low end of the cost range. To that end, Northumbrian felt that £20m plus the 75/25 cost sharing rate would be a fair outcome.



4.1113 At Yorkshire's hearing, the company agreed that since these costs are responding to a legislative driver and delivering something new, they are technically enhancement costs. When questioned on why it had not been able to provide estimates, it stated that:

'The challenge that we have though is that we are not clear with regards to how the Environment Agency will expect us to discharge some of the aspects of the legislation, so particularly this would relate to their interpretation of 'best available techniques' and specifically to areas such as odour control and secondary containment. So, the challenge that we have got is that we have not got a clear scope of what to cost, if that makes sense. We can have confidence in the costing of a particular scope, but we are unclear, at this stage, whether that will be the given scope that is required when we apply for a permit. '

4.1114 Yorkshire went on to explain that the difference between it and Northumbrian, in terms of evidencing the requirements, might be that Northumbrian has a much smaller number of newer sites (two sites compared to 11) and that this process is very site specific. Yorkshire reported that it remains in dialogue with the Environment Agency and that as it applies for permits it is 'gaining increased clarity around some of the Environment Agency's expectations and its translation of 'best available techniques'. However, as the risk assessment is a key aspect of the process and is site specific, the process is slow.

4.1115 Ahead of our final decisions, we have checked again with the Environment Agency to confirm whether further progress has been made to estimate (or refine estimates) of the likely compliance costs the two companies face. The Environment Agency reports that there have been no further developments.

### *Final decision*

4.1116 The disputing parties have not challenged Ofwat's assertion that these costs are actually by nature enhancement capex costs. However, given the scale of uncertainty over the scale of expected compliance costs, we are not persuaded that the cost sharing rate we proposed in our Provisional Findings should be reduced. It is clear from the extensive evidence collected that the Environment Agency is still in the process of spelling out the compliance requirements and that these costs will be site specific in nature. We decide therefore that the degree of uncertainty justifies a 75/25 cost sharing rate.

4.1117 Further, we note that in terms of the allowances we set out at Provisional Findings, Northumbrian's allowance is at the low end of a reasonably wide range and based on an early view from the Environment Agency on Northumbrian's costs. This was done on the basis that company estimates could overstate the pure compliance costs and hence a third-party estimate seemed more reliable, coupled with the fact the cost sharing would be generous in the event of under-estimation. Northumbrian has accepted this allocation. Our decision is to make a £12m allocation in base costs for Northumbrian. As above, any over or underspends will be dealt with by a 75/25 (customer : company) cost sharing rate.

4.1118 In terms of Yorkshire's compliance costs, the fact it has more sites and that this process is very site specific does provide a reasonably persuasive justification for why it has not provided better costs estimates. Since the Environment Agency has not yet provided full clarity around the requirements, we must still make a judgement based on imperfect information. The company accepted a zero allocation within base costs and a 75/25 (customer : company) cost sharing rate for expenditure on IED compliance. We decide that this is reasonable in the circumstances.

### ***Licence fees costs***

4.1119 Ofwat is funded through licence fees paid by all water companies, which are calculated as a proportion of revenue. In December 2019, after Ofwat's FD was published, Ofwat notified water companies of its plan to consult on increasing the licence fee cap. While licence fees are not explicitly part of the price control (they are not specifically identified in the list of included activities funded), they are absorbed in companies' operating overheads and so form part of overall ongoing costs.

4.1120 Bristol sought a cost adjustment of £0.4 million to cover the projected increase in costs from an expected increase in the licence fee. Bristol stated that Ofwat made an error in setting the cost allowance in relation to licence fees and that the CMA should take this into consideration as new information in the redetermination.<sup>1345</sup> It further stated that as the licence fee cap is outside the control of management (Bristol is required to pay the fees determined by condition N of its licence),<sup>1346</sup> the full amount of this expected increase should be added to its allowance.

4.1121 Ofwat responded that the proposal to increase the licence fee cap does not mean an automatic increase in the licence fee, because the cap is a limit

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<sup>1345</sup> Bristol SoC, paragraph 586

<sup>1346</sup> Bristol SoC, paragraph 586

and is not a target Ofwat aims for in agreeing its budget with government.<sup>1347</sup> Further, it stated that, since the consultation on the proposed licence fee cap is due to take place in the second half of 2020, it is not appropriate for the CMA to address this issue in the PR19 redetermination process.<sup>1348</sup>

### *Our provisional assessment*

4.1122 At Provisional Findings, we observed that:

- (a) there was no decision yet on whether the licence fee cap and licence charges would increase;
- (b) Ofwat had confirmed it already planned to consult on this on an industry wide basis; and
- (c) Any resulting increase in costs for Bristol were likely to be modest.

4.1123 In the circumstances, we provisionally concluded to leave cost allowances as they were in this regard.

### *Further arguments and consideration*

4.1124 In its response to the Provisional Findings, Bristol remained of the view that 'a material increase is highly likely given the statements that Ofwat has made to date, historical trends, and the known cost increases that Ofwat will face going forward (ongoing RAPID work, pension costs and also the wider scope of activities Ofwat is now carrying out), and the cost in 2020/21 being around 39% higher than the same point of the regulatory cycle five years ago'.<sup>1349</sup>

4.1125 Recognising no final figure has yet been provided by Ofwat, Bristol suggested that 'an alternative approach to allowing an ex ante allowance could be for the CMA to specify that any cost increases associated with the Ofwat licence fee should be subject to a different cost sharing rate. This would reflect the fact that these costs are entirely outside of our control.'<sup>1350</sup>

4.1126 Ofwat did not comment on this issue in its response to the Provisional Findings. At its main party response hearing, it stated that this is 'a very small cost' and that it 'seems very odd' companies have raised it in the process. In terms of whether the companies have any influence over the costs, Ofwat

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<sup>1347</sup> [Ofwat's response to Bristol's SoC](#), paragraph 1.55

<sup>1348</sup> [Ofwat's response to Bristol's SoC](#), paragraphs 1.55 & 3.159

<sup>1349</sup> [Bristol's response to the provisional findings](#), p47

<sup>1350</sup> [Bristol's response to the provisional findings](#), p47

stated that ' (a change to the licence fee cap) does require consent from companies in terms of the process that we currently go through' – although it did state perhaps it ought not to.

#### *Final determination*

4.1127 Our view is that no substantively new evidence has been received since Provisional Findings which alters our viewpoint. This remains a small cost and an issue on which Ofwat will consult on an industry wide basis. Whilst we acknowledge that company influence over cost levels is likely in practice to be limited, we are not persuaded that a bespoke cost sharing arrangement should apply and feels this issue is better dealt with on an industry wide basis when the promised Ofwat consultation takes place.

#### **Overall effect on unmodelled costs**

4.1128 As a general approach, we conclude that in most instances applying a 75/25 (customer/business) cost split for variations in the actual outturn of unmodelled costs relative to the allowances provided is reasonable. This leaves customers with a relatively small exposure to the risk of variation in charges, while keeping companies incentivised to manage and negotiate their rates effectively. We consider making exceptions to this approach where there is evidence that management has no (or virtually no) ability to influence cost levels and where the item is material to the overall determination.

4.1129 The areas where our final determination differs from the Ofwat's FD approach are as follows:

- (a) On the basis that the evidence presented since Provisional Findings to adjust the Bristol cost adjustment for the charges it pays to CRT for abstraction from the G&S canal to £9.66m over the AMP. This amount reflects revised estimates of the implicit allowance within base costs (adjusted for the 19/20 data) and provides for the recent rise in CRT charges which took place since the Ofwat FD. The standard totex cost sharing arrangements will apply to any under or overspend.
- (b) Observing that there is new information to consider and a clear rise in charges which management cannot mitigate, to make a £60.88m increase to the Northumbrian base allowance to cover the increase specifically relating to the Kielder Transfer Scheme abstraction costs. Any over or underspend at the end of AMP7 should be trued up at the end, such that customers pay only the costs incurred.

- (c) Agreeing that the increase in Northumbrian abstraction charges for the Thames Bulk Supply agreement is also new information and would, if it were internally charged, result in a cost increase, to further provide an increase of £0.5m per annum from April 2020 to that allowance in its base costs. The 75/25 abstraction charge cost sharing rate should apply for cost increases (or decreases) from this level.
- (d) To provide a 90/10 (customer/company) cost-sharing arrangement for business rates, on the basis that while we agree with the Disputing Companies that management influence over costs is limited, equally we have seen evidence that representations to the VOA can be effective.
- (e) Reflecting a downward revaluation of Northumbrian's business rates, to reduce its allowance by £11.74 million per year.
- (f) With regard to IED compliance costs:
  - (i) reflecting detailed evidence from the company and substantiation from the Environment Agency, to provide Northumbrian with an upfront allowance of £12 million and then a reconciliation mechanism – on a 75/25 (customer/business) cost-sharing basis – for costs that exceed the allowance; and
  - (ii) in the case of Yorkshire, to provide a reconciliation mechanism on a 75/25 (customer/business) cost-sharing basis to recover IED-related compliance costs at the end of the AMP.

4.1130 In all other regards, our determination on unmodelled base costs is similar to the position at Ofwat's FD.

4.1131 Our decision to not apply the frontier shift productivity challenge to abstraction charges and business rates (see paragraphs 4.621 to 4.630) also increased unmodelled cost allowances compared with Ofwat's FD. Due to this change Anglian and Northumbrian's allowances both increased by £10m, Yorkshire's by £8m and Bristol's by £1m compared with Ofwat's FD.<sup>1351</sup>

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<sup>1351</sup> The increases to these allowances are included in the abstraction charges and business rates figures in tables 4-32 and 4-33

## Summary of final decisions on base totex allowances

### Modelled base costs

4.1132 The overall effect of our approach on modelled base costs is shown in Table 4-30.

**Table 4-30: Modelled base cost allowances for each Disputing Company**

£m				
	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
Raw base models	3,494	367	2,133	3,161
Catch-up	-66	-5	-37	-57
Frontier shift + RPEs	-56	-6	-34	-51
Growth unit rate adjustment	30	4	-39	-47
Enhancement Opex	-14	-3	-11	-14
Cost adjustment claims	43	10	5	16
<b>Total modelled base costs</b>	<b>3,430</b>	<b>367</b>	<b>2,016</b>	<b>3,008</b>

Source: CMA analysis

Note: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

4.1133 The comparison between Ofwat's FD and our final determination on modelled base costs is shown in Table 4-31.

**Table 4-31: Modelled base cost allowances for each Disputing Company compared with Ofwat's FD**

£m				
	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
<b>Ofwat FD allowance</b>	<b>3,368</b>	<b>340</b>	<b>1,955</b>	<b>2,896</b>
Raw base models	+7	+9	+17	+53
Catch-up	+40	+11	+37	+43
Frontier shift + RPEs	+33	+3	+20	+29
Alternative model specifications	-50	0	0	0
Growth unit rate adjustment	-11	0	-13	-12
Enhancement Opex	0	0	0	-1
Cost adjustment claims	+43	+4	0	0
<b>Total base cost allowance</b>	<b>3,430</b>	<b>367</b>	<b>2,016</b>	<b>3,008</b>
<i>Change vs Ofwat FD</i>	<i>+62</i>	<i>+27</i>	<i>+61</i>	<i>+112</i>

Source: CMA analysis

Note: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices. Numbers may not sum due to rounding.

### Unmodelled base costs

4.1134 The overall effect of our approach on unmodelled base costs is shown in Table 4-32.

**Table 4-32: Unmodelled base cost allowances for each Disputing Company**

£m	<i>Anglian</i>	<i>Bristol*</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
Abstraction	50	15	200	26
Traffic management	6	4	6	21
Business rates	311	24	185	280
IED compliance	0	0	12	0
<b>Total unmodelled base costs</b>	<b>367</b>	<b>43</b>	<b>402</b>	<b>327</b>

Source: CMA analysis.

\* Footnote: Adjustments for Bristol's CRT is included as a cost adjustment claim in the 'modelled base' figures above

Note: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices. Numbers may not sum due to rounding.

4.1135 The comparison between Ofwat's FD and our final determination on unmodelled base costs is shown in Table 4-33.

**Table 4-33: Unmodelled base cost allowances for each Disputing Company compared with Ofwat's FD**

£m	<i>Anglian</i>	<i>Bristol*</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
<b>Ofwat FD allowance</b>	<b>357</b>	<b>42</b>	<b>376</b>	<b>319</b>
Difference in abstraction	+1	0	+67	+1
Difference in traffic management	0	0	0	0
Difference in business rates	+8	+1	-52	+7
Difference in IED compliance	0	0	+12	0
<b>Total unmodelled base allowance</b>	<b>367</b>	<b>43</b>	<b>402</b>	<b>327</b>
<i>Change vs Ofwat FD</i>	<i>+10</i>	<i>+1</i>	<i>+26</i>	<i>+8</i>

Source: CMA analysis.

\* Footnote: Adjustments for Bristol's CRT is included as a cost adjustment claim in the 'modelled base' figures above

Note: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices. Numbers may not sum due to rounding.

## 5. Enhancement costs

### Introduction

- 5.1 In this section, we discuss our approach to assessing enhancement allowances for the Disputing Companies.
- 5.2 In doing so we set out:
- (a) how enhancement spend fits into the broader framework;
  - (b) Ofwat's overall approach to enhancement assessment in PR19;
  - (c) our approach to enhancement assessment;
  - (d) benchmark models for enhancement;
  - (e) wastewater WINEP cost efficiency challenges;
  - (f) shallow and deep dive efficiency challenges;
  - (g) the assessment of specific projects (deep dives);
  - (h) calibration of scheme-specific PCs and ODIs;
  - (i) costs for metaldehyde removal (Anglian);
  - (j) our approach to Direct Procurement for Customers (DPC): Elsham (Anglian); and
  - (k) the application of frontier shift on enhancement allowances.
- 5.3 We then provide a summary of how our determinations affect the Disputing Companies' totex allowances, and other associated changes (for example, on associated outputs).
- 5.4 As stated in our Approach document, our review covers the majority of enhancement spend. We have focused on areas where the Main Parties provided conflicting views and where we have needed to resolve these in coming to our determinations.<sup>1352</sup>

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<sup>1352</sup> [CMA approach to water redeterminations](#), paragraph 42



## How enhancement spend fits into the broader framework

- 5.5 Enhancement expenditure is one of the building blocks of Ofwat's methodology to reach a view of each company's totex allowance. Broadly speaking, enhancement expenditure relates to investment for the purpose of enhancing the capacity or quality of service beyond a base level. It may be driven by a number of factors including new statutory obligations and strategic priorities. Examples include building a new reservoir or treatment works, building strategic interconnectors to connect parts of the network, and introducing new measures to protect wildlife.<sup>1353</sup>
- 5.6 Enhancement costs are more irregular in nature than base costs, and may involve many possible solutions to the requirements driving the underlying need, which are sometimes new. At times these are company-specific and, as a result, there is less opportunity to compare the cost of required enhancement solutions between companies.<sup>1354</sup>
- 5.7 Enhancement costs in AMP7 have many different drivers, which vary widely from company to company depending on the company's specific circumstances, aims, and their customers' support for different priorities. However, the main drivers were:
- (a) **Environmental improvements:** Water companies have proposed numerous environmental projects whilst also facing increasing obligations to improve their environmental outcomes, including from the increased scope of the WINEP which is a set of statutory requirements overseen by the Environment Agency.
  - (b) **Supply-demand balance:** One of the responsibilities of a water company is to secure a balance of supply and demand including in the light of ongoing trends such as climate change and population growth. Water companies have a statutory requirement to develop a WRMP every five years, setting out how they intend to balance supply and demand over at least the next 25 years. Supply-demand balance can be influenced by investment in major new infrastructure (eg reservoirs) but also by measures to reduce leakage or reduce consumption.
  - (c) **Resilience:** Enhancement funding aims to provide improved operational resilience by funding schemes which address the risk of low-probability high-consequence events, such as ensuring properties are not reliant on a single source of supply or adding in additional support / back-up for critical

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<sup>1353</sup> Ofwat (2019) [PR19 final determinations: Securing cost efficiency technical appendix](#), p52

<sup>1354</sup> Ofwat (2019) [PR19 final determinations: Securing cost efficiency technical appendix](#), p57

infrastructure. These types of project are not generally well reflected in other aspects of the regime (eg the outcomes incentives may not be sufficient to ensure this type of work is undertaken as companies may simply rely on these low-probability events not occurring, at least during the tenure of current shareholders/management).

- 5.8 We note that some of the Disputing Companies have submitted that customer growth should be treated as part of enhancement expenditure rather than a part of base costs.<sup>1355</sup> We do not consider that the issue of whether growth should be considered as base or enhancement has particular significance to our assessment, as we are focused on setting the appropriate allowances for all activities, and the implications this has on companies and customers during AMP7. We have considered the allowances for growth in section 4, paragraphs 4.741 to 4.878.

## **Ofwat's overall approach to enhancement assessment in PR19**

- 5.9 Ofwat divided enhancement cost claims into 40 different categories, which it then used to conduct its assessment. Most of these categories were assessed separately, although Ofwat combined some where there was a potential for costs to be apportioned differently by companies and where there was some synergy between them.<sup>1356</sup> In particular, Ofwat made a judgement on the wastewater cost categories associated with delivery of the companies' WINEP 'in the round'. For these costs, Ofwat set its final allowance for each company based on an aggregated assessment. Ofwat stated that this was because there were interactions between many of the different categories of cost and its approach therefore took into account any differences in cost allocation in companies' proposals.<sup>1357</sup>
- 5.10 Ofwat's preferred method of assessment for enhancement was a benchmarking analysis of forecast costs. Where this was not possible, Ofwat followed a 'risk-based process' of having a lighter touch ('shallow dive') assessment for low-materiality costs and a more thorough assessment of the evidence ('deep dive') for high-materiality costs, each based on the company's business plans.<sup>1358</sup>
- 5.11 This resulted in Ofwat's starting point being one of two approaches:

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<sup>1355</sup> For example, [Anglian SoC](#), p125

<sup>1356</sup> Ofwat (2019) [PR19 final determinations: Securing cost efficiency technical appendix](#), p53

<sup>1357</sup> Ofwat (2019) [PR19 final determinations: Securing cost efficiency technical appendix](#), p57

<sup>1358</sup> Ofwat (2019) [PR19 final determinations: Securing cost efficiency technical appendix](#), p53

- (a) **Comparative benchmarking:** For categories where Ofwat considered it was able to identify appropriate cost drivers to support cross-company comparisons, it used the median figures from this benchmarking; or
- (b) **Own business plan:** For categories of spend for which Ofwat considered the investment area did not lend itself to statistical modelling, it relied more on the evidence provided by companies in their business plans.

5.12 Having established the starting point as described above, Ofwat generally applied challenges to areas where it was concerned about the costs and / or the quality of the supporting evidence provided to it. Broadly, these took the form of:<sup>1359</sup>

- (a) **WINEP ‘in the round’:** For categories associated with wastewater WINEP, Ofwat conducted a programme-level assessment. This consisted of aggregating these allowances together, and then applying an upper quartile efficiency challenge across the entire programme. Ofwat also applied a net frontier shift (as it did for base costs) to these allowances.<sup>1360</sup>
- (b) **Deep dives:** For other cost categories which were more material (worth around 0.5% of a company’s water or wastewater totex, or more), Ofwat undertook a deep dive, assessing the specific evidence provided by the company on the need for investment; options appraisal; robustness and efficiency of costs, and customer protection where appropriate (as well as affordability and board assurance for very material cases). Where Ofwat was concerned about aspects of the proposed scheme it adjusted its allowances accordingly (eg through applying a cost challenge).
- (c) **Shallow dives:** For other cost categories which were less material and did not qualify for a deep dive, Ofwat instead conducted a light-touch ‘shallow dive’ review. For non-wastewater WINEP categories, this generally consisted of applying a company-specific efficiency factor based on Ofwat’s estimated efficiency of the company’s base cost plan.

5.13 The details of the efficiency challenges which Ofwat applied are discussed more in paragraphs 5.164 to 5.203, and Appendix B includes a full list of the methodologies which Ofwat used to assess each enhancement cost category.

5.14 One category of enhancement cost which attracted particular attention in PR19 was labelled ‘resilience’. Ofwat stated that it included a resilience

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<sup>1359</sup> Ofwat (2019) *PR19 final determinations: Securing cost efficiency technical appendix*, Table 11, and pp54–58

<sup>1360</sup> We note that Ofwat also applied its net frontier shift to one element of metering costs.

category in its enhancement assessment which aimed to improve service resilience in the face of low-probability high-consequence events that are currently beyond management control. However, it stated that the resilience enhancement lines in business plan cost tables were not intended to cover all investment that contributes to furthering the resilience objective and it covered only a small part of such investment. For example, much of the funding to provide resilient systems and services is included in normal business ('base') operating costs.<sup>1361</sup> Where the primary driver of a resilience investment addressed a need covered by another enhancement line, it reallocated the expenditure to maintain consistency of scope across the different areas.<sup>1362</sup>

- 5.15 Ofwat's FD included an enhancement allowance of £8.8 billion across the industry, which it estimated as being around 40% higher than the actual spend in AMP6. For the Disputing Companies, as set out in Table 5-1, Ofwat's allowance comprised £2.7 billion, which it estimated as being around a 140% increase on actual spend in AMP6, but around 16% lower than that included in the companies' response to Ofwat's draft determinations.

**Table 5-1: Comparison of enhancement allowances (£ million)**

	<i>AMP6 actuals</i>	<i>Company DD reps</i>	<i>Ofwat FD</i>
Anglian	451	1,644	1,425
Bristol	74	35	30
Northumbrian	120	440	352
Yorkshire	480	1,119	905
<b>Total of Disputing Companies</b>	<b>1,125</b>	<b>3,238</b>	<b>2,712</b>

Source: Ofwat, CMA calculations

## Our approach to enhancement assessments

- 5.16 We have adopted the same broad approach as Ofwat to assess enhancement allowances, including a combination of benchmarking, deep dives and shallow dives. We have applied these approaches to categories of spend for the Disputing Companies, and considered any efficiency challenges which should be applied to these allowances. We have made use of comparative data (including econometric modelling, engineering comparisons and cost benchmarking comparisons) where available to develop our best estimate for efficient enhancement costs. Where a comparative approach was not appropriate, we have been more reliant on the evidence provided by the company proposing the enhancement. In these cases, we have, with the assistance of our independent engineering advisers where necessary, reviewed the evidence provided by the companies about the need for and

<sup>1361</sup> Ofwat (2019) [PR19 final determinations: Policy summary](#), p20

<sup>1362</sup> Ofwat (2019) [PR19 final determinations: Securing cost efficiency technical appendix](#), p64

costs of the more material schemes to assure ourselves that the proposed investment is both appropriate and efficiently delivered.

- 5.17 As stated in our Approach Document,<sup>1363</sup> our review has covered the majority of enhancement spend. For those parts of the assessment of company-specific projects where we have not been provided with any evidence that a further review is appropriate (including major schemes which met Ofwat's evidential threshold to receive additional enhancement funding), we have not conducted any further assessment and have adopted the same position as Ofwat's FD.
- 5.18 For some proposed schemes we have more information or evidence than was available to Ofwat when it made its final determination, for example where there is greater clarity due to the schemes being further progressed, or where companies have submitted additional documentation. Where this is the case, we use this additional evidence in order to reach our determinations.
- 5.19 When assessing enhancement proposals, we take account of the context and implications of our decisions, in particular:
- (a) **Information availability:** Enhancement is an area of spend where both the water companies and the regulator generally face higher levels of uncertainty over likely costs. However, the limited sources of specific evidence from anywhere other than the water company concerned makes this an area of particularly acute information asymmetry. Furthermore, the nature of this expenditure reduces the effectiveness of some aspects of an incentive-based regime, since any efficiency information revealed by outcomes achieved is of only limited application for future circumstances. It is therefore harder to incentivise continuous improvement across the industry in the same way as for base costs where future cost allowances can be determined having regard to benchmarking of historical achieved costs.<sup>1364</sup>
  - (b) **Discrete vs integrated schemes:** Some enhancement schemes are relatively discrete from other activities or involve specific identifiable assets (such as building a new reservoir or laying additional pipes). These types of scheme can be more easily tracked and audited both in terms of the activities being undertaken and the associated spend. Other enhancement schemes involve incremental additions or upgrades to existing work or assets (such as installing new equipment in existing water treatment plants to remove phosphorous). This latter type of project poses

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<sup>1363</sup> [CMA approach to water redeterminations](#), paragraph 42

<sup>1364</sup> See paragraph 2.10

greater difficulties for the regulatory regime, since: (i) ex-ante allocations between base costs<sup>1365</sup> and enhancement costs<sup>1366</sup> are important but difficult to conduct, and (ii) ex-post tracking of such costs is harder than for discrete schemes.

- (c) **Challenges in scope vs challenges on efficiency:** When determining the appropriate allowance for enhancement schemes, the type of regulatory intervention is relevant. For example, applying an efficiency challenge to the cost of a project typically results in a more challenging determination for the company, while reducing allowances due to scaling back the scope of a scheme would have less of an effect. Similarly, these distinctions are important when considering the implications for customers – where inefficiency is identifiable, this always represents a detriment for customers; on the other hand, alterations to the scope of an enhancement project may or may not be beneficial depending on the benefits lost compared with the associated reduction in costs.
- (d) **Customer protection:** When providing companies with specific funding to undertake additional activities, there is a risk that the company subsequently chooses not to proceed with the scheme. If the company was nevertheless to retain the allowance, this could represent a serious regulatory failure, since it may result in a transfer of money from customers to shareholders without any corresponding activities or benefits. Therefore, when providing additional enhancement funding, like Ofwat, we have sought to include strong protections for customers, usually in the form of scheme-specific PCs and ODIs which ‘claw back’ allowances if the companies do not deliver the relevant work.
- (e) **Use of judgement:** Given the complexity of, and potential tensions that can arise in, balancing the relevant duties, determining the efficient allowances for enhancement is an area which often requires the use of regulatory judgement. Limitations in data availability and analytical methodologies, together with the need to make complex trade-offs, mean that it is inevitable that regulatory judgements will often need to be made based not just on the available evidence and specific analysis, but also on relevant experience and appreciation of the wider context. We note Ofwat’s concerns over enhancement decisions being portrayed in terms of

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<sup>1365</sup> Comprising, for example, the direct replacement of existing assets as part of capital maintenance.

<sup>1366</sup> Comprising, for example, the cost of the incremental improvements.

a failure to meet statutory duties as opposed to disagreements on the merits of particular regulatory judgements.<sup>1367</sup>

- 5.20 We note that arguments about the extent to which certain activities are already funded through base allowances compared with where they should attract additional funds have occurred a number of times in our determinations. Often these decisions require detailed assessment, and the application of substantial levels of judgement particularly for schemes which are integrated with existing assets or activities. We make judgements on each of these cases where necessary. To the extent that similar circumstances arise in future Price Reviews, there may be benefit in Ofwat providing greater clarity upfront around the criteria for deciding that additional funding is appropriate. Similarly, the treatment of whole-life cost options (as discussed in section 6, paragraphs 6.94 to 6.97) requires the application of further regulatory judgement in the current assessment framework.
- 5.21 We also note the effect which enhancement allowances have on bills. In some circumstances, the Disputing Companies have referred to the bill impact of certain schemes.<sup>1368</sup> While the immediate impact on bills is a relevant consideration for customers, in particular in terms of affordability, we also need to take account of the long-term impact on bills of increased allowances, which result in elevated bills for future customers over numerous AMPs. This is particularly true for enhancement projects as these often involve a large element of capex which would generally be treated as ‘slow money’ and recovered through RCV run-off.
- 5.22 It also follows that if a regulator was seeking to reduce bills in the short-term, then reducing capex-heavy enhancement projects is unlikely to be particularly effective since the impact on current bills would be muted as a result of costs being spread across future generations of customers.
- 5.23 Finally, we note that some of the Disputing Companies have raised some concerns in relation to the effects of COVID-19 on their major infrastructure projects, and in particular the potential for introducing delays and/or deferrals of the schemes.<sup>1369</sup> We recognise these general concerns that the companies have raised, but given (i) the limited information available to the CMA during the redetermination period and substantial outstanding uncertainty from the evidence we have gathered, and (ii) our understanding that companies have

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<sup>1367</sup> [Ofwat's response to common issues in companies' SoCs: Introduction and overall stretch on costs and outcomes](#), p14 and paragraphs 3.10–3.21

<sup>1368</sup> For example, [Northumbrian's reply to Ofwat's Response](#), paragraph 11 stated ‘In our case two resilience schemes are rejected which together would increase bills by no more than £2.18 a year for customers (or an increase in bills of less than 1%)’.

<sup>1369</sup> For example, [Yorkshire's submission following the second main party hearings](#), paragraph 5.1.3(f).

been able to adapt to continue to deliver schemes under COVID-safe conditions including by reprofiling the programmes, we do not consider it is appropriate to make systematic changes to our determination on this basis. However, where specific concerns have been raised in the context of our detailed reviews, we have considered their individual implications in our decisions.

## Benchmark models for enhancement

- 5.24 Almost all Ofwat's benchmark modelling for enhancement was based only on company forecasts of required totex levels.<sup>1370</sup> While this raises some inevitable questions over the reliability of model results for the areas in which it was used, we did not identify a preferable alternative assessment method for determining AMP7 enhancement allowances, among those we considered, to the benchmarking of forecast costs (supplemented by cross-checks of the kind undertaken by Ofwat, where feasible).<sup>1371</sup> In line with this, our assessment focuses primarily on the extent to which Ofwat's benchmark modelling is likely to have given insufficient weight to material factors, and whether alternative approaches can be identified that are likely to provide a better means of taking such factors into account.
- 5.25 Given this approach, we have considered how limitations of the reliability of model results should be taken into account when determining modelled allowances, and the case for applying an upper quartile (or other form of) efficiency adjustment. As described below, the Disputing Companies often pointed to model reliability issues as implying that an upper quartile benchmark was not appropriate, and resulted in allowances that were unduly low. However, when assessing how model results (and their reliability) should be interpreted we consider it important to recognise underlying data reliability issues in a context where models are being calibrated on the basis of company forecasts, rather than historical actual costs (as is the case with the base models). In particular, it is important to consider that companies can face weak incentives to identify and reveal efficiencies in their forecasts; as revealing efficiencies in this way can result in lower allowances than may otherwise apply.

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<sup>1370</sup> Ofwat's 'first time sewerage' modelling also used actual cost data from AMP6.

<sup>1371</sup> The CMA is generally concerned if econometric approaches are used on small datasets due to issues relating to overfitting and resulting bias, and this is particularly so when causal questions (in particular treatment effects) are being analysed where the overall aim of the analysis is to arrive at a statistically unbiased estimate of an effect. An important consideration in our willingness to use, and build on, Ofwat's econometric models of enhancement totex in this regulatory appeal, notwithstanding the small available datasets, has been the scope for mechanisms to guard against, dampen and/or correct for potential sources of bias, for example through the use of deep dives or other cross-checks. Our use of econometric approaches in these circumstances does not alter the more general concern we have over the use of econometric approaches on small datasets.



- 5.26 The following sets out our assessment of modelled allowances for wastewater and water enhancement benchmark models. Our assessment of the case for the application of an upper quartile adjustment is set out in paragraphs 5.151 to 5.163.

### ***Wastewater models***

- 5.27 Our assessment of wastewater enhancement modelling focused primarily on 'P-removal'. Phosphorus is an essential nutrient for plant life, but high levels can lead to excessive growth of algae and other plants, and this can lead to a corresponding depletion of oxygen levels in water and a loss of biodiversity. Ofwat's FD included allowances for P-removal that totalled around £2.3 billion across all WASCs, and accounted for around 51% of overall wastewater enhancement totex allowances across all WASCs. For Yorkshire, P-removal accounted for a significantly higher share of the wastewater enhancement totex allowed for in Ofwat's FD; around 71%.
- 5.28 We took a proportionate approach to assessing other wastewater enhancement modelling and focused on the next three largest drivers of overall final determination totex allowances: schemes to increase flow to full treatment (FTFT) at sewage treatment works (STWs); schemes to increase storage at STWs; and schemes to increase storage in the wastewater network. When considered together with P-removal, these four categories accounts for around 93% of the final determination wastewater enhancement allowances (across all companies) that Ofwat determined using benchmark models.

### ***Ofwat's Final Determination***

#### ***P-removal***

- 5.29 For all WASCs except Yorkshire, Ofwat set the modelled allowance equal to the (unweighted) average of the results of applying two benchmarking models: Model 1 and Model 2. The explanatory variables used in these models are described in Table 5-2. Model coefficients were estimated using linear regressions of company forecast levels of P-removal costs, and the other relevant variables, in AMP7.
- 5.30 Population equivalent was used in both models as a measure of the overall capacity of treatment works being enhanced. Model 1 included the number of enhanced sites as a means of reflecting economies of scale.<sup>1372</sup> Model 2

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<sup>1372</sup> Ofwat (2019) [PR19 final determinations: Securing cost efficiency technical appendix](#), p93

included a variable to reflect the stringency of the new P-removal consents to be applied: the number of enhanced sites with a P-consent less than or equal to 0.5 mg/L. Ofwat said that companies had provided evidence that P-removal costs increased significantly when this threshold is passed.<sup>1373</sup>

- 5.31 Ofwat's FD introduced a third P-removal model (Model 3) that it applied only in its calculation of Yorkshire's modelled allowance, with that allowance set at the unweighted average of the results of Models 1, 2 and 3. Ofwat's Model 3 took account of the fact that P-consents can be required because of provisions in (one or both) of two different Directives - the WFD and the Urban Wastewater Treatment Directive (UWWTD) – and that WFD requirements may require an improvement with respect to P concentrations, or may be less onerous and require 'no deterioration'.<sup>1374</sup>

**Table 5-2: Summary description of Ofwat's FD P-removal models**

	<i>Explanatory variable 1</i>	<i>Explanatory variable 2</i>
Model 1	Population Equivalent of enhanced sites	Number of enhanced sites
Model 2	Population Equivalent of enhanced sites	Number of enhanced sites with P-consent <=0.5mg/L
Model 3 (Yorkshire only)	Population Equivalent of enhanced sites for which consent is driven by a WFD 'no deterioration' obligation	Population Equivalent of enhanced sites for which consent is not driven by a WFD 'no deterioration' obligation

Source: Ofwat (2019) [PR19 final determinations: Securing cost efficiency technical appendix](#), p93; Ofwat (2019) [Wholesale wastewater enhancement feeder model: P-removal](#), sheet: Further Analysis.

- 5.32 Ofwat said that its analysis had revealed that overall, companies whose programme was driven more by WFD 'no deterioration' drivers may appear more efficient, and that this supported the representation of Yorkshire in that it had a lower proportion of its programme in this area.<sup>1375</sup> Ofwat said that it had not applied Model 3 when determining the modelled P-removal allowances for other companies, because it was not fully confident in the quality of the model.<sup>1376</sup>
- 5.33 The totex levels implied by each model, and the resulting modelled allowances for P-removal used in Ofwat's FD, are shown in Table 5-3, compared to the company forecast levels of totex that Ofwat used in its final determination modelling. For Anglian, the table also shows the revised totex forecast that Anglian presented in its representation on Ofwat's draft determination, and on which it based its SoC.<sup>1377</sup>

<sup>1373</sup> Ofwat (2019) [PR19 final determinations: Securing cost efficiency technical appendix](#), p93

<sup>1374</sup> Ofwat (2019) [PR19 final determinations: Securing cost efficiency technical appendix](#), p104

<sup>1375</sup> Ofwat (2019) [PR19 final determinations: Securing cost efficiency technical appendix](#), p104

<sup>1376</sup> Ofwat (2019) [PR19 final determinations: Securing cost efficiency technical appendix](#), pp104–105

<sup>1377</sup> Our approach to taking Anglian's revised totex forecasts into account is set out in paragraph 5.71.

**Table 5-3: Final determination modelled allowances (before efficiency adjustment) compared with company requested allowances for P-removal**

	Anglian	Northumbrian	£m Yorkshire
Requested totex (post-reallocations):			
Data used in FD modelling	451	91	652
Revised Anglian forecast	435		
Model 1 output	430	69	578
Model 2 output	433	67	583
Model 3 output			629
FD Modelled Allowance	431	68	597
Difference from requested totex:			
Data used in FD modelling	-19	-23	-56
Revised Anglian view	-4		

Source: Ofwat (2019), [Wholesale wastewater enhancement feeder model: P-removal](#), sheet: Analysis; Anglian (2019), [PR19 Draft Determination representation](#), Sections 8.3.9; CMA Analysis.

### *Other modelled wastewater enhancement allowances*

5.34 Ofwat used benchmark modelling in seven wastewater enhancement areas in addition to P-removal:<sup>1378</sup>

- Schemes to increase FTFT at STWs
- Schemes to increase storage at STWs
- Schemes to increase storage in the wastewater network
- Chemical removal schemes
- Event duration monitors
- Flow monitors at STWs
- First time sewerage

5.35 As described above, we adopted a proportionate approach to considering these other areas in a context where submissions from the Disputing WASCs on Ofwat's approach focused primarily on P-removal models, and on the application of a wastewater 'WINEP in the round' upper quartile adjustment (which we consider in paragraphs 5.151 to 5.163). In line with this, we focus our attention here on the first three areas on the above list (paragraph 5.34), which – together with P-removal – account for around 93% of the wastewater enhancement modelled allowances in Ofwat's FD, and around 82% of wastewater 'WINEP in the round' modelled allowances.

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<sup>1378</sup> These areas all form part of the AMP7 WINEP wastewater programme except 'First time sewerage'.

- *Schemes to increase flow to full treatment*

5.36 This WINEP area includes schemes that increase the hydraulic capacity of a works (or FTFT) in order to reduce the risk of an untreated discharge resulting from a period of intense and/or persistent rainfall. Ofwat set modelled allowances by taking the average from log and linear regression models that predict totex using the number of schemes included in business plans and the shortfall in flow to treatment in litres per second as the cost drivers, subject to specific adjustments that were made to Wessex Water's costs to reflect two schemes that were shown to be atypical.<sup>1379</sup>

- *Schemes to increase storage at STWs*

5.37 This WINEP area includes schemes that increase the capacity of storage tanks at STWs in order to reduce the frequency of discharges of wastewater to receiving water. Ofwat set modelled costs equal to the weighted average of the results of two log models.<sup>1380</sup> The first model predicted required totex based only on the volume of storage to be commissioned, and the results from this model were given a 25% weighting. The second model included the number of schemes as an additional variable, and was given a 75% weighting.

- *Schemes to increase storage in the network*

5.38 This WINEP area includes actions aimed to reduce the risk of combined sewer overflows during high rainfall periods. For all WASCs except Anglian, Ofwat used a linear regression model which estimated expected totex based on the volume of storage each company was planning to construct or – for catchment management schemes – ‘effective storage’ they were planning to provide (ie the volume that would otherwise be provided should a conventional storage scheme be constructed).<sup>1381</sup> Ofwat included the costs and cost drivers for some ‘effective storage’ schemes in the modelling for Southern Water and Dŵr Cymru following ‘deep dives’.<sup>1382</sup> In response to representations showing results under different modelling approaches, Ofwat set Anglian's modelled allowance using a log model which predicted required

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<sup>1379</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p94

<sup>1380</sup> Ofwat (2019), [Wholesale wastewater enhancement feeder model: Storm tank capacity, Analysis sheet](#)

<sup>1381</sup> Ofwat (2019) [PR19 final determinations: Securing cost efficiency technical appendix](#), p95, and Ofwat (2019) [Wholesale wastewater enhancement feeder model: Spill frequency, Analysis sheet](#)

<sup>1382</sup> Ofwat (2019) [PR19 final determinations: Securing cost efficiency technical appendix](#), p95, and Ofwat (2019), [Wholesale wastewater enhancement feeder model: Spill frequency, Deep dive\\_SRN and Deep dive\\_WSH sheets](#)

totex based on the planned volume of storage capacity and the number of sites.<sup>1383</sup>

- *Final determination modelled allowances*

5.39 The modelled allowances determined by Ofwat for the above three WINEP areas are shown in Table 5-4, compared to the company forecast levels of totex that Ofwat used in its final determination modelling. For Anglian, the table also shows the revised totex forecasts that the company presented in its representation on Ofwat's draft determination, and on which it based its SoC, for the two areas shown in which Anglian revised its view (schemes to increase FTFT and to increase storage at STWs).<sup>1384</sup>

**Table 5-4: Final determination modelled allowances (before efficiency adjustment) compared with company requested allowances for selected WINEP areas**

	Anglian	Northumbrian	£m Yorkshire
<i>Schemes to increase FTFT</i>			
Requested totex (post reallocations):			
Data used in FD modelling	76	37	42
Revised Anglian view	67		
FD Modelled allowance	85	37	22
Difference from requested totex:			
Data used in FD modelling	+9	-0.6	-19
Revised Anglian view	+18		
<i>Increased storage at STWs</i>			
Requested totex - post reallocations:			
Data used in FD modelling	145	1	46
Revised Anglian view	127		
FD Modelled allowance	130	1	46
Difference from requested totex:			
Data used in FD modelling	-15	-0.1	-0.1
Revised Anglian view	+3		
<i>Increased storage in the network</i>			
Requested totex (post reallocations)	12	13	61
FD Modelled allowance	9	16	62
Difference from requested totex	-3	+4	+1

Source: Ofwat (2019), [Feeder model: Enhancement aggregator](#), sheet: WINEP in-the-round; Anglian (2019), [PR19 Draft Determination representation](#), Sections 8.3.8 and 8.3.11; CMA Analysis.

## Water companies' views

### Anglian

5.40 Anglian said that Ofwat's enhancement modelling failed to appropriately recognise the idiosyncratic nature of enhancement.<sup>1385</sup> It said that Ofwat's models were very simple (with only one or two cost drivers) and that there

<sup>1383</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p95, and Ofwat (2019), [Wholesale wastewater enhancement feeder model: Spill frequency](#)

<sup>1384</sup> Anglian (2019) [Anglian PR19 Draft Determination representation](#), Sections 8.3.8 and 8.3.11

<sup>1385</sup> [Anglian SoC](#), pp193–195

was bound to be omitted variable bias and a tendency for the models to over-estimate inefficiency.<sup>1386</sup> Anglian said that Ofwat had not cross-checked its simple benchmarking models with other evidence such that reasonable differences in costs had been incorrectly attributed to relative efficiency levels.<sup>1387</sup>

- 5.41 Anglian said that Ofwat's view that Anglian's forecast P-removal spend was inefficient was heavily reliant on the threshold it had used to take account of treatment complexity: sites with a P-consent less than or equal to 0.5 mg/L.<sup>1388</sup> Anglian said that higher cost approaches were needed when consents were less than 1 mg/L, and that it had provided assessments from Vivid Economics at the business planning and draft determination stages that demonstrated improved model fit from using that threshold.<sup>1389</sup> Anglian said that Ofwat had not undertaken any sensitivity analysis on this issue (or at least had not shared such analysis with Anglian).<sup>1390</sup>
- 5.42 Anglian said that Ofwat did not appear to have considered the different approaches adopted by WASCs and had failed to take into account long-term costs (as opposed to AMP7 costs). Anglian identified its proposed approach to P-removal as an example where, while AMP7 costs are higher, whole life costs are lower, than a more traditional alternative (chemical dosing) approach, and said that Ofwat incorrectly treated enhancement opex in the same way regardless of whether it was one-off or recurring expenditure.<sup>1391</sup>
- 5.43 In its response to our Provisional Findings, Anglian said that our provisional approach – which took account of the revised totex forecast it had presented in its representation on Ofwat's draft determination<sup>1392</sup> – would disincentivise constructive engagement during the price review process, as it implied that Anglian would have received a higher modelled allowance had it not proposed a lower level of totex in its representation on Ofwat's draft determination.<sup>1393</sup> Anglian suggested we address concerns related to the potential implications of using the different forecasts, by using its initial totex forecast to determine its modelled allowance, but capping that allowance at the level of its revised forecast (£435 million).<sup>1394</sup>

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<sup>1386</sup> [Anglian SoC](#), pp193–195

<sup>1387</sup> [Anglian SoC](#), pp193–195

<sup>1388</sup> [Anglian's reply to Ofwat's Response](#), Part G (REP08), paragraph 161

<sup>1389</sup> [Anglian's reply to Ofwat's Response](#), Part A.3 (REP02), No. 3.6

<sup>1390</sup> [Anglian's reply to Ofwat's Response](#), Part G (REP08), paragraph 161

<sup>1391</sup> [Anglian SoC](#), pp193–197

<sup>1392</sup> Our approach to determining Anglian's modelled allowance is set out in paragraphs 5.83 to 5.86, and is consistent with the approach adopted in our Provisional Findings.

<sup>1393</sup> [Anglian's response to the provisional findings](#), paragraph 255

<sup>1394</sup> [Anglian's response to the provisional findings](#), paragraph 256

5.44 Anglian made a number of comments on the proposal in our Provisional Findings that a mechanism be introduced to obtain the actual costs of the Disputing Companies for individual P-removal schemes, so that they could be compared to forecast and allowed sums to better understand the variances, including that:<sup>1395</sup>

- It may discourage companies from applying innovations which might reduce costs because of the reputational harm that may result from the mechanism.
- If the mechanism is intended to allow for model reliability to be tested, then outturn cost driver information should also be collected, and companies given the opportunity to identify exceptional circumstances which had a bearing on costs.
- The mechanism would need to be applied to all WASCs, not just the Disputing WASCs, in order to identify the efficiency frontier.
- Companies may achieve efficiencies by accepting higher levels of risk, and the future cost to the company of addressing those risks – if they materialised – would not be apparent to stakeholders when the findings of the mechanism were published.
- There would only be limited availability of data for PR24, given when most schemes were likely to be completed, and costs would need to be reported in a manner consistent with forecasts and allowances (eg in the treatment of overheads) to ensure like-for-like comparisons.

#### *Northumbrian*

5.45 Northumbrian said that the usefulness of regression models in this context was severely limited given the small sample size of ten data points, that Ofwat's models were simplistic, and that the confidence intervals of model coefficients implied a wide range of possible values.<sup>1396</sup> It said that Ofwat had been inconsistent in its approach to determining modelled allowances for P-removal, and that Ofwat's Model 3 should also be applied when calculating the P-removal modelled allowance for Northumbrian, as only a small proportion of its programme was driven by WFD no deterioration obligations.<sup>1397</sup>

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<sup>1395</sup> [Anglian's response to the provisional findings](#), paragraph 258

<sup>1396</sup> [Northumbrian SoC](#), Section 5.7.3

<sup>1397</sup> [Northumbrian SoC](#), Section 5.7.3



- 5.46 Northumbrian said that there are a number of factors that strongly affect P-removal costs, and that whilst Ofwat sought to take two of these into account (scale and treatment complexity), the legislative driver (and sub-driver), the new consent level, and whether the site has had previous investment for P-removal are significant considerations that influence costs. Northumbrian said that historically P-removal had been focused on larger sites, and that as the scope of the P-removal programme was widened permits are now required at smaller sites where scope for the use of different technologies can be limited, and costs can increase because additional activity is required at each site.
- 5.47 In its response to our Provisional Findings, Northumbrian said it agreed that using the range of models we had proposed had merit in explaining the different drivers of P-removal costs,<sup>1398</sup> but that it did not consider they should be given equal weighting when setting its cost allowances.<sup>1399</sup> Northumbrian proposed that we place less weight on Ofwat's original models, and more weight on new models which it stated were better able to capture the cost pressures in its P-removal programme.<sup>1400</sup>

### *Yorkshire*

- 5.48 Yorkshire said that Ofwat's enhancement models were relatively simple, and were highly likely to omit important cost drivers.<sup>1401</sup> It said that Ofwat's models were based on forecast data, which is inherently uncertain, and that a number of the models (including P-removal) are based on only 10 observations.<sup>1402</sup> Yorkshire said that Ofwat's estimated efficient cost predictions were inaccurate and had an implausibly large range of efficiency scores.<sup>1403</sup>
- 5.49 Yorkshire said that the key drivers of P-removal costs are: number and size of sites; consent level; change in consent level; and type of obligation. Yorkshire said it has the industry's largest set of P-removal requirements for AMP7, and has not had significant P-removal requirements previously. Yorkshire said that, as a result, the level of improvement required at its sites is greater than for companies that already have consents in place, where improvements may be achievable by minor modifications, optimising existing approaches or through catchment management.

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<sup>1398</sup> The models we use to set P-removal allowances are summarised in Table 5-5, and are the same as those that were used in our Provisional Findings.

<sup>1399</sup> [Northumbrian's response to the provisional findings](#), paragraph 197

<sup>1400</sup> [Northumbrian's response to the provisional findings](#), paragraph 199–200

<sup>1401</sup> [Yorkshire SoC](#), paragraphs 195–196

<sup>1402</sup> [Yorkshire SoC](#), paragraphs 195–196

<sup>1403</sup> [Yorkshire SoC](#), paragraphs 195–196



- 5.50 Yorkshire said that it is significantly more affected by new UWWTD-driven P-removal requirements than other companies, and that this requires the introduction of tertiary treatment at STWs which is significantly more expensive than catchment management solutions that prevent phosphorus entering water at all.<sup>1404</sup> Yorkshire said that the Environment Agency's approach to cost benefit analysis under the WFD is based on only the incremental cost between achieving the UWWTD and WFD driven limits (rather than the full cost of achieving compliance with both drivers), whereas the whole benefit is assumed.<sup>1405</sup> Yorkshire said that this resulted in its WFD programme being larger as a result of both UWWTD and WFD requirements being applied at the same time in relation to 88% of the population equivalent of its enhanced sites.<sup>1406</sup>
- 5.51 Yorkshire said that, whilst Ofwat had introduced a third P-removal model that took some account of this, it then averaged the outcome with that of its original two flawed models.<sup>1407</sup> Yorkshire said that one way to better account for the UWWTD impact would have been to use only Ofwat's Model 3.<sup>1408</sup> Alternatively, Yorkshire pointed to a different modelling approach that Oxera had developed (which adapted Ofwat's Model 3 in order to seek to take more direct account of UWWTD drivers) and presented results showing that Ofwat's FD had underestimated Yorkshire's predicted P-removal costs by £45 million.
- 5.52 In its response to our Provisional Findings, Yorkshire raised concerns about the effect that sites which can employ low cost catchment-based approaches (which Yorkshire sites could not) was having on the modelled results.<sup>1409</sup> Yorkshire encouraged us to make adjustments to reflect this, and submitted a report from Oxera which presented modified versions of the models we used that included the population equivalent of enhanced sites that are, and that are not, subject to a UWWTD driver, as variables.<sup>1410</sup>
- 5.53 Yorkshire said that the approach – adopted in our Provisional Findings – of giving each P-removal model equal weighting was not representative of its circumstances.<sup>1411</sup> In particular, Yorkshire pointed to the extent to which it is affected by the first time imposition of P-consents relative to other companies,

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<sup>1404</sup> [Yorkshire SoC](#), paragraph 197(c)

<sup>1405</sup> [Yorkshire's submission following the second main party hearings](#), paragraphs 3.2.2

<sup>1406</sup> [Yorkshire's submission following the second main party hearings](#), paragraphs 3.2.15–3.2.16

<sup>1407</sup> [Yorkshire SoC](#), paragraph 197(c)

<sup>1408</sup> [Yorkshire SoC](#), paragraph 197(c)

<sup>1409</sup> [Yorkshire's response to the provisional findings](#), paragraphs 5.2.5

<sup>1410</sup> [Yorkshire's response to the provisional findings](#), paragraphs 5.2.5, and Annex 02

<sup>1411</sup> [Yorkshire's response to the provisional findings](#), paragraphs 5.2.12

and suggested that this could be taken into account by setting its modelled allowance based on a single model which reflected this.<sup>1412</sup>

- 5.54 Yorkshire said that its proposed P-removal programme involved the use of a biological approach to P-reduction (at some sites) that was more sustainable, and had lower whole-life costs than adopting a chemical dosing approach.<sup>1413</sup> It said that Ofwat's FD would require it to adopt solutions that would have a worse environmental impact and would cost customers more in the long-term.<sup>1414</sup>

#### *Ofwat's views*

- 5.55 Ofwat said it was aware of the potential limitations of econometric models in this area and that, where feasible, it triangulated results from multiple models to arrive at a more considered view.<sup>1415</sup> Ofwat said it used benchmarking models for enhancement costs only where it considered that they were robust, and that where it was not satisfied with a model's reliability, adjustments were made that were frequently company-specific, or costs were allowed in full.<sup>1416</sup> By way of example, Ofwat noted that in setting the allowance for WINEP FTFT schemes, it had made a specific adjustment to the modelled allowance for Wessex Water's individual circumstances based on the company's compelling evidence.<sup>1417</sup>
- 5.56 Ofwat said that its use of 0.5mg/L threshold in its P-removal modelling was appropriate because meeting lower than a 0.5mg/L consent threshold requires a new process to be introduced, whereas consents of 0.5mg/L and above can be met with two-stage chemical dosing. Ofwat said that it does not mandate particular solutions that companies should implement, and that it did not accept that its efficiency challenge results in companies having to implement inappropriate solutions.<sup>1418</sup> Ofwat said that companies remain responsible for the choice of correct treatment and compliance with quality requirements, and are free to innovate, manage the resulting risks and take advantage of the rewards.<sup>1419</sup>
- 5.57 Ofwat said that Northumbrian had not raised concerns regarding the low level of WFD no deterioration obligations it faces in its representations on draft

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<sup>1412</sup> [Yorkshire's submission following the second main party hearings](#), paragraph 3.2.17, and [Yorkshire's response to the provisional findings](#), Annex 02, p8

<sup>1413</sup> [Yorkshire SoC](#), paragraph 303–304

<sup>1414</sup> [Yorkshire SoC](#), paragraph 306

<sup>1415</sup> For example: [Ofwat's Response to Anglian's SoC](#), paragraph 3.172

<sup>1416</sup> For example: [Ofwat's Response to Anglian's SoC](#), paragraph 3.170

<sup>1417</sup> For example: [Ofwat's Response to Anglian's SoC](#), paragraph 3.170

<sup>1418</sup> [Ofwat's Response to Anglian's SoC](#), paragraph 3.176

<sup>1419</sup> [Ofwat's Response to Anglian's SoC](#), paragraph 3.176

determinations.<sup>1420</sup> Ofwat said it had revisited the evidence on WFD no deterioration schemes being more likely to involve low or no cost solutions, and found none, casting significant doubt on the premise for the perceived need for the third model it had used for Yorkshire at final determination.<sup>1421</sup> Ofwat also said it had found Northumbrian's P-removal programme to include three low/no cost schemes that have the WFD 'Improvement' driver.<sup>1422</sup>

- 5.58 Ofwat said that sites with a new consent that had no existing consent might be expected to require higher levels of investment than those with an existing consent that was being tightened. However, Ofwat said that it had found a strong linear relationship between the total number of sites and the number of sites with existing consents. As a result, it had concluded that the small proportion of STWs in the AMP7 programme with an existing P-consent, and the small differences in this proportion between companies, meant that no company would be substantially disadvantaged by taking no account of whether or not there was an existing consent.
- 5.59 Ofwat said that it had found no evidence to support the contention that the UWWTD drives higher efficient P-removal costs than other legislative drivers, and that this was not surprising since WFD consent levels are usually significantly tighter than those required by the UWWTD.<sup>1423</sup> Ofwat said that Oxera's finding (on behalf of Yorkshire) that meeting UWWTD consents is more expensive lacked intuition, and that, prior to any statistical results, it is modelling best practice that a model's cost drivers should be supported by engineering and operational understanding.
- 5.60 Ofwat said that, in its representations on its draft determination, Yorkshire had not highlighted its intention to use biological nutrient removal approaches rather than chemical dosing as an issue it wanted Ofwat to address in the final determination. Ofwat said that there would be considerable sensitivity regarding opex assumptions (in particular the amount of chemical consumption), and that there was a risk that Yorkshire's cost benefit analysis, which did not consider the real value of options (in a context where consents may change in the future), may not provide the appropriate information.
- 5.61 Ofwat said that the March 2020 WINEP release required Yorkshire to deliver a significantly smaller P-removal programme in the 2020-25 period than Ofwat assumed in its final determination, because the Environment Agency had moved the completion dates for 26 schemes to early in AMP8.<sup>1424</sup> Ofwat said

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<sup>1420</sup> [Ofwat's Response to Northumbrian's SoC](#), paragraphs 3.80–3.93

<sup>1421</sup> [Ofwat's Response to Northumbrian's SoC](#), paragraphs 3.80–3.93

<sup>1422</sup> [Ofwat's Response to Northumbrian's SoC](#), paragraphs 3.80–3.93

<sup>1423</sup> [Ofwat's Response to Yorkshire's SoC](#), paragraph 3.135

<sup>1424</sup> [Ofwat's Response to Yorkshire's SoC](#), paragraph 3.125–3.126

that this implied that some reduction in the AMP7 totex allowance may be appropriate, although it said that the alternative option of ignoring this re-phasing (on the basis that Yorkshire was already aware that it had the Environment Agency's consent to re-phase but had chosen not to) also had advantages.<sup>1425</sup>

## *Our approach*

### *The scope for using other assessment methods*

- 5.62 We explored the use that might be made of approaches other than the benchmarking of company-level forecasts of enhancement costs in the setting of allowances and, in particular, considered:
- (a) evidence on the actual costs of providing for similar enhancements in AMP6;
  - (b) more disaggregated assessments of costs that used STW-level data; and
  - (c) bottom-up assessments of relevant enhancement costs.
- 5.63 In practice, however, we found there to be material constraints and limitations associated with the use of each of these approaches.
- 5.64 There are some significant differences between the wastewater enhancements that had been undertaken in AMP6 (and prior to that), and those that companies are required to deliver in AMP7. For P-removal, Ofwat highlighted that the consents companies had to meet in AMP7 could be significantly tighter than those that had to be met in AMP6, following a reduction in the assumed technically achievable level. Given this, Ofwat said it recognised it was modelling different activity and costs for AMP7 as compared with AMP6.
- 5.65 In Ofwat's FD the approach involved modelling aggregate totex requirements for each company. Using STW site-level, rather than company-level, data could potentially provide a useful additional or alternative basis for cost assessment. Such an approach could also allow some account to be taken of AMP6 actual cost data when assessing forecast costs for those sites in the AMP7 programme where the new P-removal requirements were broadly comparable to those that applied in AMP6.

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<sup>1425</sup> [Ofwat's Response to Yorkshire's SoC](#), paragraph 3.127–3.128

- 5.66 In its response to Northumbrian's SoC, Ofwat provided a comparison between Northumbrian's forecast AMP6 P-removal costs (as submitted at PR14), and its forecast AMP7 costs, for those sites at which it considered the stringency of the P-consent requirements overlapped.<sup>1426</sup> Ofwat also said that Northumbrian's actual AMP6 P-removal costs were on course to be significantly (12%) lower than its PR14 allowance.<sup>1427</sup> We note that in Northumbrian's view its actual 2019/20 spend is higher than assumed by Ofwat and implies that it was able to deliver its AMP6 plan around 5% (rather than 12%) lower than it had forecast at the PR14 draft determination stage (the basis upon which Ofwat's assessment was presented).<sup>1428</sup>
- 5.67 We asked for data that might allow this kind of comparison to be undertaken across all companies, however Ofwat told us that it does not hold comprehensive site-level forecast cost data for P-removal, or any other WINEP area, for AMP7 or AMP6. Ofwat said that, to limit the burden on companies, it had requested data in business plan enhancement cost data tables only at programme level, and that Northumbrian was the only company for which it held sufficient data to allow the analysis referred to above to be undertaken. While we considered STW site-level data that we requested from the Disputing Companies (only relevant to the WASCs), we were not satisfied that this provided a reliable basis for making systematic assessments across companies in a context where there has been limited regulatory attention at this level of disaggregation at PR14 and PR19, and there appeared to be significant scope for consistency issues to arise.
- 5.68 We considered whether bottom-up assessments of relevant enhancement costs might be appropriate, in particular for P-removal given the scale of proposed AMP7 spend. However, in the absence of robust STW site-level cost data that could be used as a cross-check on any particular bottom-up assessments that were undertaken, we considered this was unlikely to provide a better basis for seeking to determine P-removal allowances than high-level benchmarking of forecast costs of the kind undertaken by Ofwat. We note, in particular, the extent to which company forecasts of P-removal costs rely on a range of cost allocation decisions. This was evident from Yorkshire's reallocation of £134 million from capital maintenance base costs to P-removal enhancement costs that Ofwat allowed following Yorkshire's representations on its draft determination. We consider benchmarking to provide an important safeguard in a context where the adoption of different

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<sup>1426</sup> Ofwat's Response to Northumbrian's SoC, paragraph 3.93 and Table 3.3

<sup>1427</sup> Ofwat. Note: In Ofwat's response to Northumbrian's SoC, Ofwat had presented this figure as 18%, but it was corrected to 12% in a later RFI response.

<sup>1428</sup> Ofwat. Note: Northumbrian's view is that its AMP6 data shows that its costs were higher than it had forecast, but this view relies on using its AMP6 business plan forecast, and by DD in AMP6 Northumbrian had increased its forecast.

allocation approaches can have such a material impact on identified forecasts.

#### *Our assessment criteria*

5.69 Given the absence of a preferable alternative assessment method among those we considered, we have based our final determination of modelled allowances on benchmarking models of forecast totex of the kind used by Ofwat.<sup>1429</sup> The Disputing Companies all pointed to the simplistic nature of Ofwat's wastewater enhancement models, but we consider this to be an inevitable feature of adopting this kind of benchmarking approach when using forecast costs and only 10 observations.<sup>1430</sup> Given this context, we consider it appropriate to use Ofwat's assessment as a starting point and then to apply the following two criteria:

- (a) Is there evidence of insufficient weight having been given to a material factor?
- (b) Has an alternative approach been identified that can be expected to perform better?

5.70 This approach recognises that there is unlikely to be a single 'best' approach to modelling that should be applied – without adjustment – across all companies, and is consistent with other parts of the final determination where a range of company-specific adjustments in modelled allowances are included. In line with this, we have considered what different model results, and other relevant considerations, imply for the modelled allowances that should be determined for each of the Disputing WASCs.

#### *Anglian's updated totex forecasts*

5.71 As noted in paragraph 5.39, Anglian presented revised totex forecasts for P-removal and some other WINEP areas in its representations on Ofwat's draft determination, and it based its SoC on these revised (lower) totex figures. We take account of this revised view in our assessment of Anglian's modelled allowances in paragraphs 5.83 to 5.86, but do not consider it appropriate to use an updated forecast only for Anglian when assessing modelled allowances for other Disputing WASCs. In line with that, the model results we

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<sup>1429</sup> We note Thames Water's submission on the potential use of Dynamic Panel Data techniques when modelling enhancement costs, and regard it as meriting further consideration in the development of approaches to be used at PR24.

<sup>1430</sup> Or 11 where HD is treated as separate from Severn Trent.

calculate are based on the totex forecasts used in Ofwat's FD modelling other than where alternative data assumptions are identified.

### *The case for additional safeguards in future reviews*

- 5.72 Given the limitations of determining allowances on the basis of benchmarking forecast costs, we considered whether the introduction of any additional safeguards may be merited. As we set out in paragraphs 5.103 to 5.105, we recommend that Ofwat considers introducing a mechanism for PR24 to provide a more effective basis for ex post reporting on how actual P-removal costs compare to the levels companies had forecast and to the allowances that are set, and on what underpins the identified differences.

### *Our assessment and decision*

#### *P-removal*

- 5.73 The following sets out our approach to taking account of key cost drivers in the P-removal modelling, before setting out our assessment of modelled P-removal costs for each of the Disputing WASCs.

- *Key cost drivers and model selection*

- 5.74 Ofwat's first two P-removal models sought to directly take account of the following key drivers of P-removal costs:
- The volume of load to be treated: taken into account through the inclusion of a PE variable in both Models 1 and 2.
  - The extent to which economies of scale are likely to be achievable: through the inclusion of the number of enhanced sites in Model 1.
  - The tightness of the new consent level to be met through Ofwat's Model 2 including the number of sites with proposed consents at  $\leq 0.5\text{mg/L}$ .
- 5.75 As was noted above, Anglian has said that a tightness of consent threshold of  $1\text{mg/L}$  or less is more appropriate from an engineering perspective, and also provides for a better model fit.<sup>1431</sup> We consider Ofwat to have provided compelling evidence on why it is relevant to model costs using a  $\leq 0.5\text{mg/L}$  consent threshold, including because of the additional and/or more complex treatment processes that were likely to be necessary to meet requirements at or below this level. However, we consider Anglian's evidence on how its costs

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<sup>1431</sup> For example, [Anglian's reply to Ofwat's response](#), Part A: Review of Costs Arguments, No. 5.4–5.6, pp19–20



varied with consent level, and Ofwat's own assessment of this issue, to suggest that  $\leq 1\text{mg/L}$  is also a relevant consent threshold for cost assessment. We have taken this into account by reviewing the results of using a model that is equivalent to Ofwat's Model 2, but that includes  $\leq 1\text{mg/L}$  (rather than  $\leq 0.5\text{mg/L}$ ) threshold. We refer to this as Model 4.

5.76 Northumbrian and Yorkshire pointed to the following as key drivers of P-removal costs in addition to those shown above as reflected directly in Models 1 and 2:<sup>1432</sup>

- (a) **Change in consent level:** the costs of meeting a new consent of a given stringency can depend on the starting point, that is, the stringency of the existing P-consent (if any) that applies.
- (b) **Whether the enhanced sites have had previous investment for P-removal:** the costs of providing for P-removal can be affected by the extent to which infrastructure required to deliver the enhancement is already in place.
- (c) **The type of P-removal obligation:** the costs of meeting a new P-consent can be affected by whether that obligation arises because of the UWWTD, a WFD no deterioration requirement, or a WFD improvement requirement.

5.77 In practice, points (a) and (b) are closely related, as whether or not there has been previous P-removal investment at a site will depend on whether there has been a previous P-consent. We note that Ofwat's approach was consistent with this being considered a relevant factor (albeit one that was not directly included in Ofwat's modelling). We have taken this into account by reviewing the results of a variant on Ofwat's Model 1 that includes the number of enhanced sites at which there was no previous P-removal consent as a variable (in addition to the PE of enhanced sites). We refer to this as Model 5.

5.78 The relevance of the type of P-removal obligation ((c) above) has been presented in two main ways:

- Northumbrian said that the extent of WFD no deterioration driven requirements can affect costs, because such requirements may be relatively inexpensive to address.<sup>1433</sup> This line of reasoning underpinned Ofwat's use of Model 3 at final determination that was used only for Yorkshire.

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<sup>1432</sup> See paragraphs 5.46 and 5.49.

<sup>1433</sup> [Northumbrian SoC](#), Section 5.7.3



- Yorkshire said that UWWTD requirements can be higher cost to meet because they specify that consent levels must be achieved by treating wastewater before it is discharged, whereas WFD requirements do not apply this restriction.<sup>1434</sup> Yorkshire said this means that less costly approaches (for example, catchment-based solutions) can be used to meet WFD obligations relative to UWWTD requirements. Yorkshire also said that the Environment Agency's approach to cost benefit assessment when applying WFD requirements resulted in it having a larger WFD programme because of the extent to which its sites are subject to both UWWTD and WFD requirements.<sup>1435</sup>

5.79 We are not persuaded of the case for including a measure of the extent of either of these types of legislative-driven requirements within the P-removal modelling:

- We note Ofwat's revised assessment with respect to the relevance of including the extent of WFD no deterioration requirements in its Model 3,<sup>1436</sup> and that this measure focuses attention on the condition of the receiving watercourse (to which the no deterioration term relates) rather than on the discharge consent that the WASC will have to comply with. We would expect the costs of meeting a WFD no deterioration obligation to be heavily dependent on the stringency of the P-consent that is being put in place, and the extent to which that consent threshold is new/has increased. We consider it appropriate to seek to assess these factors more directly, and have considered them through our review of the results of Models 2, 4 and 5. We therefore place no weight on Model 3 in our assessment.
- We were not persuaded that including a variable in the modelling that reflected the extent to which companies were subject to UWWTD driven consents would provide a reliable basis for assessment, in a context where UWWTD driven consents are typically materially less stringent than WFD improvement driven consents. We note that Yorkshire has recognised that WFD consents are typically more stringent.<sup>1437</sup>

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<sup>1434</sup> Yorkshire SoC, paragraph 197(c)

<sup>1435</sup> Yorkshire's submission following the second main party hearings, paragraph 3.2.2

<sup>1436</sup> Ofwat's response to Northumbrian's SoC, paragraphs 3.80–3.93

<sup>1437</sup> Yorkshire's submission following the second main party hearings, paragraph 3.2.2 (a). We note that as part its response to our Provisional Findings, Yorkshire submitted a report from Oxera which argued that empirical evidence did not support the view that UWWTD driven consents are typically materially less stringent than WFD-improvement driven consents, pointing to sites with dual (ie UWWTD and WFD) drivers as having more stringent consents on average than sites with only WFD improvement drivers. We do not consider this observation to affect the accuracy of our statement, and note that information from Yorkshire showed that at sites where it faced dual drivers, the WFD driver typically resulted in a materially tighter consent being imposed on the site than required as a result of the UWWTD driver at that site.

- 5.80 We consider Yorkshire's comments on the constraints regarding how UWWTD driven obligations can be met further by considering below the implications on model results of removing three United Utilities sites from the dataset (where the use of catchment management approaches has been identified as underpinning relatively low unit P-removal costs).
- 5.81 We note Yorkshire's view that the Environment Agency's approach to cost benefit analysis when determining WFD requirements resulted in it having a larger WFD programme because of the high proportion of its sites that faced both UWWTD and WFD driven requirements. However, we do not consider Yorkshire to have demonstrated that this factor should be regarded as affecting the cost assessment process. We note, for example, that while Yorkshire's forecasts imply an average cost per PE at sites with both WFD and UWWTD requirements (around £123) that is higher than the average at sites where it faces only a UWWTD driven consent (around £108), a key driver of that difference is likely to be the tighter consent levels that are typically required by WFD-driven consents (the implied average cost per PE at sites where only a WFD-driven consent applies is much higher than both of these levels: around £1,037).<sup>1438</sup> The stringency of consents is taken into account in Models 2 and 4.
- 5.82 The P-removal models we use in our assessment are summarised in Table 5-5 in line with the above comments. All of these models are relatively simple, and have clear limitations, but considering them together aims to provide a reasonable means of taking some account of the key factors that have been identified as likely to affect P-removal costs.

**Table 5-5: Summary description of the P-removal models used in our assessments**

	<i>Explanatory variable 1</i>	<i>Explanatory variable 2</i>
Model 1	Population Equivalent of enhanced sites	Number of enhanced sites
Model 2	Population Equivalent of enhanced sites	Number of enhanced sites with P-consent ≤0.5mg/L
Model 4	Population Equivalent of enhanced sites	Number of enhanced sites with P-consent ≤1mg/L
Model 5	Population Equivalent of enhanced sites	Number of enhanced sites with no previous P-removal consent

Source: CMA Analysis; Ofwat (2019), [Wholesale wastewater enhancement feeder model: P-removal](#).

- *Anglian*

- 5.83 Table 5-6 shows that the unweighted average of the allowances implied for Anglian by Models 1, 2, 4 and 5 was around £8 million higher than the allowance Ofwat set in its final determination (which was based only on the results of Models 1 and 2). However, that result arises when the models have

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<sup>1438</sup> CMA calculations of cost per population equivalent based on [Yorkshire's response to the provisional findings](#), Table 2, p46

been calibrated using the forecast of its P-removal costs that Anglian had included in its initial business plan. In its representations on Ofwat's draft determination, Anglian presented a revised view of its P-removal totex requirements that was around £16 million lower than its initial forecast. Table 5-6 shows that if the models are recalibrated using this more up-to-date, lower Anglian forecast (and leaving all else equal), then the average implied allowance is £4 million lower than determined by Ofwat in its FD.

**Table 5-6: Implied allowances for Anglian under different modelling assumptions**

	£m	
	<i>Data used in FD</i>	<i>Using updated Anglian forecast</i>
Requested totex	451	435
Ofwat modelled allowance	431	
Model 1 (PE, No. of sites)	430	418*
Model 2 (PE, sites <=0.5mg/L)	433	422
Model 4 (PE, sites <=1mg/L)	449	435
Model 5 (PE, sites - no current consent)	446	432
Unweighted average	439	427
Difference from Ofwat's modelled allowance	+8	-4
%	+1.8%	-0.9%

Source: CMA Analysis

\* 'Number of sites' variable not significant at 95% level.

- 5.84 In summary, our view is that Anglian's modelled P-removal allowance should be set at the same level as in Ofwat's FD (£431 million): we are not persuaded that Ofwat's assessment involved insufficient weight being given to a material factor, or that an alternative approach has been identified that would be expected to perform better.
- 5.85 We note that Anglian's revised, lower totex forecast was submitted ahead of Ofwat's FD, and in our view it is appropriate to consider what that revised forecast implies in terms of model outputs, when evaluating whether Ofwat's assessment should be regarded as having involved insufficient weight being given to a material factor. We consider Anglian's revised forecast to cast material doubt on the case for increasing Anglian's allowance above the level in Ofwat's FD (to reflect the higher allowance levels implied by Models 4 and 5 when calibrated using Anglian's initial business plan data), and could be regarded as implying that a lower allowance is appropriate. We note, however, that Anglian's reduction in requested totex formed part of an effort to close the gap between Anglian's and Ofwat's views following Ofwat's draft determination. Given this, overall we consider the modelled allowance in Ofwat's FD to provide an appropriate assessment, and to be consistent with taking appropriate account of incentives for constructive engagement during the price review process.
- 5.86 We have not found Anglian's comments with respect to whole-life costs to have a material bearing on how AMP7 modelled allowances should be set.

We understand Anglian's comments to relate primarily to the fact that tertiary filtration systems – such as its planned use of a Mecana disk – involve higher up-front capex, and lower ongoing opex than more traditional chemical dosing approaches. We note, however, that this difference in cost structure looks likely to be closely related to the stringency of consent levels (already captured in the models), as the tightest consents are likely to require tertiary filtration to be provided for in addition to some chemical dosing. A broader issue here concerns the incentives companies face to adopt lower whole-life cost approaches given the totex allowance that is ultimately set. We consider this kind of broader incentive issue in our assessment of cost sharing rates in section 6, paragraphs 6.70 to 6.106.

- *Northumbrian*

- 5.87 The model results shown in Table 5-7 support the view that Ofwat's assessment of Northumbrian's allowance gave insufficient weight to a material factor, and we have not identified material countervailing factors that suggest otherwise. We consider that applying equal weight to the results of Models 1, 2, 4 and 5 can be expected to perform better than Ofwat's FD approach by reflecting additional factors that have been identified as likely to be material.

**Table 5-7: Implied allowances for Northumbrian under different modelling assumptions**

	£m
	<i>Using FD data</i>
Requested totex	91
Ofwat modelled allowance	68
Model 1 (PE, No. of sites)	69
Model 2 (PE, sites <=0.5mg/L)	67
Model 4 (PE, sites <=1mg/L)	74
Model 5 (PE, sites - no current consent)	77
Unweighted average	72
Difference from Ofwat's modelled allowance	+4
%	5.8%

Source: CMA Analysis

- 5.88 In its response to our Provisional Findings, Northumbrian proposed that we use weights of a sixth on each of Models 1 and 2, and of a third on each of Models 4 and 5, with the lower weighting on Models 1 and 2 reflecting Northumbrian's view that those models are less able to capture the cost pressures in its P-removal programme.<sup>1439</sup>
- 5.89 We do not consider Northumbrian to have identified a compelling reason to apply different weights to the results of the four models when determining its modelled allowance. Each of the models includes a different explanatory

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<sup>1439</sup> [Northumbrian's response to the provisional findings](#), paragraph 199–200

variable (in addition to PE), with that providing a way of taking account of the effect of different drivers that have been identified as a key factor likely to affect P-removal costs. The percentage of a company's sites captured by each of those different explanatory variables will affect the totex allowance levels implied under each model, but we do not consider it to provide a reliable basis for determining how much weight should be given to the different model outputs. All of Models 1, 2, 4 and 5 are relatively simple, with clear limitations, and we consider it appropriate to use an unweighted average of model outputs in recognition of this. In line with this, our decision is that Northumbrian's modelled allowance for P-removal should be set equal to £72 million.

- *Yorkshire*

5.90 Table 5-8 shows that using an average of Models 1, 2, 4 and 5, instead of Models 1, 2 and 3 (as used in Ofwat's FD) would, given the same dataset, imply a modelled allowance of £583 million, which is £13 million less than Yorkshire's modelled allowance in Ofwat's FD. Table 5-8 also shows the implications of calibrating Models 1, 2, 4 and 5 when three United Utilities sites are removed from the data. These are sites which together account for a large PE across which relatively low unit P-removal costs were identified as resulting from the use of catchment management options.<sup>1440</sup> The average implied allowance for Yorkshire across Models 1, 2, 4 and 5 when the three United Utilities sites are removed is £629 million, £32 million higher than the modelled allowance provided for by Ofwat's FD. We consider that both of these estimates have some relevance to the assessment of Yorkshire's modelled allowance.

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<sup>1440</sup> We initially identified 6 sites for removal that were all shown as having a 'N/A' future consent level in a spreadsheet provided by Ofwat. However, 3 of these sites were subsequently identified as having been costed on the basis of conventional on-site treatment (in [Ofwat's response to the provisional findings – cost and outcomes](#), p31), and so were reinstated.

**Table 5-8: Implied P-removal allowances for Yorkshire under different modelling assumptions**

	£m	
	<i>Using FD data</i>	<i>Excl 3 UU sites</i>
Requested totex	652	
Ofwat modelled allowance	597	
Model 1 (PE, No. of sites)	578	627*
Model 2 (PE, sites <=0.5mg/L)	583	626
Model 4 (PE, sites <=1mg/L)	580	626
Model 5 (PE, sites - no current consent)	593	637*
Unweighted average	583	629
Difference from Ofwat's modelled allowance	-13	+32
%	-2.2%	+5.4%

Source: CMA Analysis

\* 'Number of sites' variable not significant at 95% level

- 5.91 Ofwat told us it acknowledged that the UWWTD requires on-site treatment, and precludes the adoption of potentially cheaper, more flexible catchment solutions, but said that schemes with sole WFD driver are also, more often than not, delivered using the same on-site solution (generally chemical dosing) as an UWWTD driven scheme.<sup>1441</sup> In line with this, in its response to our Provisional Findings, Ofwat said that it considered the constraint imposed by the UWWTD to be very much an academic one, and that it was not persuaded that it drives higher P-removal costs.<sup>1442</sup> Ofwat said that, other than closing three STWs and transferring their flows to neighbouring sites, Yorkshire had not provided evidence it is planning catchment solutions for any of the 32 schemes in P-removal programme for the 2020-2025 period that do not have a UWWTD driver.<sup>1443</sup>
- 5.92 In response to these comments from Ofwat, Yorkshire said that, in 2018, it had not met the qualifying criteria imposed by the Environment Agency to deliver catchment solutions, and that its business plan reflected that position.<sup>1444</sup> Yorkshire said that it has subsequently received agreement from the Environment Agency that it may deploy catchment solutions at 8 WFD-only sites.<sup>1445</sup> Yorkshire said that its broader point was that it is wrong to benchmark its costs against those of companies that can employ such solutions at a greater proportion of their sites (because those companies lack the same proportion of UWWTD drivers), or whose catchment management options may have a significant effect on Ofwat's cost models.<sup>1446</sup>

<sup>1441</sup> [Ofwat's further submission on Yorkshire](#), paragraph 3.17

<sup>1442</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p22

<sup>1443</sup> [Ofwat's further submission on Yorkshire](#), paragraph 3.17

<sup>1444</sup> [Yorkshire's reply to Ofwat's further submission](#), p11

<sup>1445</sup> [Yorkshire's reply to Ofwat's further submission](#), p11. Yorkshire noted that the delivery date for these schemes extended beyond AMP7.

<sup>1446</sup> [Yorkshire's reply to Ofwat's further submission](#), p11. Yorkshire noted that the delivery date for these schemes extended beyond AMP7.

- 5.93 We consider this latter point – the potential for catchment management options to have a significant effect on Ofwat’s cost models – to be relevant to the assessment of Yorkshire’s P-removal costs given the extent of UWWTD-driven requirements it faces. We note that Yorkshire explicitly identified United Utilities’ Davyhulme STW as having a significant effect on Ofwat’s cost models,<sup>1447</sup> and that – notwithstanding its broader views – Ofwat considered there to be a case for excluding the Davyhulme scheme from the dataset.<sup>1448</sup> The extent of the effect of excluding the Davyhulme scheme (along with two other smaller United Utilities schemes identified as involving catchment management approaches) on model outputs can be seen from Table 5-8: the implied allowance for Yorkshire across Models 1, 2, 4 and 5 increases from £583 million to £629 million.
- 5.94 We consider that an approach that gives equal weight to the model results with and without the three United Utilities sites is likely to strike a reasonable balance. In particular, it recognises the risk that including those sites may imply an unduly low modelled allowance for Yorkshire, while also recognising that the sites also provide cost information that is relevant to the setting of Yorkshire’s allowance as a whole.
- 5.95 In its response to our Provisional Findings, Yorkshire said that only removing United Utilities’ catchment-based approaches from the modelling failed to reflect the fact that many other companies can also employ catchment management approaches more readily than it could, and encouraged us to make further adjustments to reflect this.<sup>1449</sup> However, we note Ofwat’s view that the constraint imposed by the UWWTD is very much an academic one, and that less than 10% of the PE of Yorkshire’s enhanced sites relates to obligations that are only driven by the UWWTD (implying that the constraint of having to use a treatment solution would not apply to all of the required improvement at other sites).
- 5.96 We do not consider that further adjustments would be appropriate. Our approach is not intended to strip out the effect of all catchment management options, but rather to guard against the risk that the inclusion of United Utilities’ high PE, relatively low cost, catchment management options could result in an unduly low modelled P-removal allowance for Yorkshire.
- 5.97 We consider setting Yorkshire’s modelled allowance equal to the average of the levels implied by Models 1, 2, 4 and 5, with and without the three United

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<sup>1447</sup> [Yorkshire’s reply to Ofwat’s further submission](#), p11. Yorkshire noted that the delivery date for these schemes extended beyond AMP7.

<sup>1448</sup> [Ofwat’s reply to responses to the provisional findings – costs and outcomes](#), p22

<sup>1449</sup> [Yorkshire’s response to the provisional findings](#), paragraphs 5.2.5



Utilities sites to be an approach that takes appropriate account of the constraints Yorkshire faces as result of the extent of its UWWTD driven obligations.

- 5.98 We note Yorkshire's view, in its response to our Provisional Findings, that the approach of giving each P-removal model equal weighting is not representative of its circumstances.<sup>1450</sup> Yorkshire pointed to the extent to which it is affected by the first time imposition of P-consents relative to other companies, and proposed that this could be taken into account by setting its modelled allowance based (only) on the results of Model 5 (which includes the number of enhanced sites at which there is currently no P-consent as an explanatory variable).<sup>1451</sup>
- 5.99 We do not consider it appropriate for Yorkshire's modelled allowance to be set on the basis of a single model (Model 5). We have included Model 5 in our assessment in order to recognise that P-removal costs can be affected by whether or not there has been previous P-removal investment at a site, but it does not provide a sufficient basis for taking other relevant cost drivers into account, and in particular it takes no account of the stringency of P-consents. We note that at its hearing, following the publication of our Provisional Findings, Yorkshire described the putting in place of treatment to meet UWWTD driven requirements as doing the 'heavy lifting', with the meeting of (more stringent) WFD requirements then described as a 'polishing' process. However, this characterisation does not align with the underlying rationale for including a measure of stringency of consent as a relevant variable when modelling costs, in particular given evidence on the extent to which the cost of meeting the more stringent P-consents required under the WFD in AMP7 are higher than those that had been required to meet less stringent P-consents in previous AMPs.
- 5.100 As noted in paragraph 5.82, all of Models 1, 2, 4 and 5 are relatively simple, and have clear limitations, but they each provide a way of taking account of the effect of different cost drivers that have been identified as relevant. We consider the use of an unweighted average of model outputs to provide a reasonable means of taking account of the key factors that have been identified as likely to affect P-removal costs.

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<sup>1450</sup> [Yorkshire's response to the provisional findings](#), paragraphs 5.2.12

<sup>1451</sup> [Yorkshire's submission following the second main party hearings](#), paragraph 3.2.17, and [Yorkshire's response to the provisional findings](#), Annex 02, p8



5.101 In line with this, our decision is that Yorkshire's modelled allowance of P-removal should be £606 million, £9.6 million higher than that provided for in Ofwat's FD.

5.102 We did not identify Yorkshire's comments with respect to its planned use of Biological Nutrient Reduction (BNR) approaches as raising material additional issues that affected cost assessment. We note Ofwat's comment that whilst Yorkshire raised a number of concerns with respect to its modelling at the draft determination stage, it did not highlight its use of BNR approaches as raising particular issues to be addressed at that time. We also note that the forecast cost per PE at the STWs where Yorkshire is proposing to introduce BNR is similar to that for other sites involving chemical dosing approaches.<sup>1452</sup> We consider broader issues concerned with the incentives companies face to adopt lower whole-life cost approaches in our assessment of cost sharing rates in section 6, paragraphs 6.70 to 6.106.

- *Enhanced ex-post reporting of P-removal spend in future reviews*

5.103 While we do not consider there to be a preferable alternative assessment available to the benchmark modelling of forecast P-removal costs among those we considered for determining P-removal allowances for AMP7, we nevertheless consider the approach to have material limitations. As we note below, when assessing the use of an upper quartile adjustment, companies can face weak incentives to identify and reveal efficiencies in their forecasts, as such revelation can result in lower allowances than may otherwise apply. Our consideration of how modelled P-removal costs are affected by different assumed levels of company forecast highlighted the extent of this sensitivity.

5.104 Given these limitations, and the materiality of P-removal spend in AMP7 and potentially in future AMPs, we recommend that Ofwat considers introducing a mechanism to provide a more effective basis for ex-post reporting on how actual P-removal costs compare to the levels companies had forecast and to the allowances that are set, and what underpins the identified differences. As well as providing an improved information base for determining future allowance levels, a strengthening of accountability in relation to P-removal may provide a form of reputational incentive in relation to an important, and high cost, area of environmental improvement.

5.105 We note Ofwat's comment, in its response to our Provisional Findings, that it will revisit the issue of ex-post reporting of P-removal costs for PR24, depending on the anticipated scale of the P-removal programme in AMP8,

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<sup>1452</sup> CMA analysis based on information from Yorkshire.

and the likely consent limits to be met.<sup>1453</sup> We would expect this to provide an opportunity for consideration of views that companies may have concerning the case for, and appropriate form of, such a mechanism, including points that were raised in response to our Provisional Findings.<sup>1454</sup>

#### *Other modelled wastewater enhancement allowances*

5.106 Our view is that other modelled wastewater enhancement allowances should be the same as the levels set in Ofwat's FD. As was noted above, we adopted a proportionate approach to assessing these allowances, and focused our attention on the three next largest areas for which modelled allowances were set (in terms of overall totex) after P-removal: schemes to increase FTFT; schemes to increase (storm tank) storage at STWs; and schemes to increase storage in the network to reduce the risk of combined sewer overflows. The evidence persuaded us that in its setting of modelled allowances set for each of these areas Ofwat had given sufficient weight to all material factors.

5.107 The Disputing WASCs raised limited concerns with the determination of these modelled allowances in Ofwat's FD, and those concerns were presented primarily in response to our questioning (rather than in SoCs). We note that:

- Anglian considered the fit of Ofwat's FTFT models was good and that it did not suggest further changes in that area.
- Northumbrian said that its approach to developing its cost forecasts in these areas was comparable to Ofwat's modelled approach in that it fundamentally focused on drivers of volume and number of sites. Northumbrian said that there were no other material cost drivers that should be included, or where industry wide comparable data was available to its knowledge.
- Yorkshire said that Ofwat's modelling of storage at STWs captured the relevant drivers, and whilst Yorkshire did not consider Ofwat's FTFT modelling to capture all relevant drivers, it said that it had not identified any other major drivers of FTFT costs.

5.108 Anglian and Yorkshire submitted that they had used non-storage solutions to address risks that would otherwise be addressed by solutions that provided more storage in the network. Both WASCs pointed to Ofwat's inclusion of a measure of effective storage capacity when assessing the modelled allowance for Dŵr Cymru for storage in the network, and submitted that a

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<sup>1453</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p31–32

<sup>1454</sup> For example, [Anglian's response to the provisional findings](#), paragraph 257–259

similar approach should be taken in relation to their non-storage solutions. In our view, the evidence presented by Anglian and Yorkshire was not sufficient to imply that any adjustment to the final determination assessment was appropriate.

- *Northumbrian's correction of its data on storage in the network*

5.109 Northumbrian noted it had identified that data it had submitted to Ofwat on the additional storage in the network provided for by its plan was incorrect.<sup>1455</sup>

Northumbrian said it considered that we should use its corrected figures, and that this would result in an increase in its modelled allowance for storage in the network from £16.5 million to £26.6 million.<sup>1456</sup> Ofwat said it did not consider it appropriate to make such an adjustment, noting that it is dependent on companies providing correct information when setting allowances.<sup>1457</sup> Ofwat said that companies are not incentivised to reveal information that may go against them, and that this raised a concern that corrections to data may only be reported where a company stands to benefit.<sup>1458</sup> Ofwat said that significant corrections to data had been a systematic issue for Northumbrian at PR19.<sup>1459</sup>

5.110 We note Ofwat's concerns over the incentives that companies may face in relation to data corrections, and regard this as making the adequacy of the justification for any associated changes to allowances a particularly important consideration. We note also that the modelled allowance identified in Ofwat's FD (£16.5 million) was around 30% higher than Northumbrian's forecast of its totex requirements (around £13 million), and that while Northumbrian has corrected its input data, it has not changed the level of its totex forecast. Northumbrian's proposed approach would result in a much higher modelled allowance (£26.6 million), that would be more than double its own totex forecast. We do not consider Northumbrian has provided a compelling case for adopting its proposed approach.

5.111 In these circumstances, we do not consider the observation that a significantly higher modelled totex figure would result from recalibrating the (single) model Ofwat used when setting Northumbrian's modelled allowance – using Northumbrian's corrected data and leaving all else equal – to provide a sufficient basis to justify Northumbrian's proposed change. Rather, we consider it to raise questions over the circumstances that may be driving such

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<sup>1455</sup> [Northumbrian's response to the provisional findings](#), paragraph 205

<sup>1456</sup> [Northumbrian's response to the provisional findings](#), paragraph 206

<sup>1457</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), p20

<sup>1458</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), p20–21

<sup>1459</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), p21

a large difference between forecast and modelled costs, and whether – if the corrected data were to be used – it may be appropriate also to make other changes to how the modelled allowance level is determined in order to reflect those relevant circumstances (for example, through the use of a deep-dive). Northumbrian's submissions did not address these broader questions, and instead relied solely on the mechanistic implications of revising its input data (in a context where its totex forecast remained unchanged). We do not consider Northumbrian to have shown that its proposed approach can be expected to provide a more reliable assessment than that provided in Ofwat's FD.

### ***Water models***

5.112 Ofwat used a benchmark model for at least some allowances in four of its cost categories in water, namely:

- (a) Meter rollout;
- (b) Meeting lead standards;
- (c) Supply/Demand Balance; and
- (d) Security.

5.113 While the Disputing Companies made comments on the reliability of Ofwat's enhancement models in general (as discussed in more detail in paragraphs 5.40 to 5.54), Anglian also raised specific concerns about two of these water benchmark models, (i) meter rollout and (ii) meeting lead standards. We discuss each of these in more detail below.

5.114 For the other two water enhancement categories where Ofwat used benchmark models, we received no specific evidence or arguments on the approach. Given this, we decide that Ofwat's modelling approach on these elements of the two cost categories is appropriate and adopt the same approach for our final determination.

#### ***Meter rollout***

5.115 These allowances reflect the cost of installing new water meters in properties which have not previously had one, including optants (where the customer has requested a meter), selective (where the company chooses to install a meter), and meters for business.

## *Ofwat's FD*

5.116 In Ofwat's FD, Ofwat set meter allowances using two single-variable models based on data from 2017/18 to 2024/25:<sup>1460</sup>

- (a) A linear model, where forecast costs are regressed on the number of meters to be installed; and
- (b) A log/log model, where the log of forecast costs are regressed on the log of the number of meters to be installed.

5.117 The former of these models effectively reflects a unit cost estimate of meters (albeit allowing for a potential fixed cost element), while the latter aims to account for non-linear changes in costs resulting from economies or diseconomies of scale in meter rollout.

5.118 Ofwat made two adjustments to the data in these benchmark models before running them:

- (a) **Removing Thames Water:** Thames Water appeared to be an outlier, with unit costs substantially higher than the next highest company;<sup>1461</sup> and
- (b) **Reallocating smart meter costs:** For Anglian and Northumbrian, Ofwat reallocated expenditure associated with replacing basic meters by smart meters, in order to allow for better comparability and consistency. Ofwat then assessed these other costs separately.<sup>1462</sup>

5.119 The  $R^2$  of these models is very high (0.93 for the unit cost model, and 0.96 for the log/log model).<sup>1463</sup>

5.120 Ofwat then took an unweighted average of these two models in order to develop its estimated costs for metering.<sup>1464</sup>

## *Water companies' views*

5.121 Anglian is the only Disputing Company which raised concerns with Ofwat's approach described above.

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<sup>1460</sup> Ofwat (2019) [Wholesale water enhancement feeder model: metering](#)

<sup>1461</sup> Thames submitted a cost adjustment claim which sought to explain its higher estimated unit costs being a result of company-specific factors. This is discussed in more detail in Ofwat (2019), [PR19 FD Thames Water cost efficiency additional information appendix](#), chapter 3

<sup>1462</sup> We discuss Anglian's proposed smart meter expenditure in more detail in paragraphs 5.513 to 5.582.

<sup>1463</sup> Ofwat (2019), [Wholesale water enhancement feeder model: metering](#)

<sup>1464</sup> Ofwat (2019), [Wholesale water enhancement feeder model: metering](#)

5.122 Anglian stated that Ofwat's benchmark models did not take into account the increasing marginal cost of meter installations. Anglian submitted that, for areas with high meter penetration, installing new meters would be more costly since a greater proportion of meters to be installed under these programmes would be difficult and costly to install.<sup>1465</sup>

5.123 To support its point, Anglian submitted analysis by its external adviser Vivid Economics which included a meter penetration variable in the model specifications. Anglian stated that 'In order to improve the models to account for this cost driver, Vivid Economics suggest meter penetration should be taken into account'.<sup>1466</sup>

#### *Ofwat's views*

5.124 Ofwat stated that, during the PR19 process, it had tested for inclusion of metering penetration data but found that this had had no material impact on the model fit or outputs but had added uncertainty in terms of data confidence. Ofwat therefore chose not to incorporate this variable.<sup>1467</sup>

#### *Our assessment and decision*

5.125 Meter replacement appears to be a reasonable activity to benchmark as it involves a repeated set of activities which should be similar across companies (excluding smart meter upgrades).

5.126 The number of meter replacements would appear to be a reasonable explanatory variable to use in benchmark modelling, but we do not consider the evidence we have assessed (including the analysis of Vivid Economics provided by Anglian)<sup>1468</sup> to provide a strong case for also including a meter penetration variable.

5.127 Our decision is to use a modelling approach based on numbers of meters, without a meter penetration variable, as Ofwat did. This results in no change to the Disputing Companies' allowances compared to Ofwat's FD.

#### *Meeting lead standards*

5.128 Water companies have an obligation to manage customer exposure to levels of lead, and keep this below the statutory limit. To achieve that, companies

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<sup>1465</sup> [Anglian SoC](#), footnote 451, p173

<sup>1466</sup> [Anglian SoC](#), footnote 451, p173

<sup>1467</sup> [Ofwat's Response to Anglian SoC](#), paragraph 3.164

<sup>1468</sup> Vivid Economics (2019), [Enhancement cost assessment modelling for the PR19 Initial Assessment of Plans](#), p30

replace lead communication pipes and may treat the drinking water to reduce the level of exposure.<sup>1469</sup> The allowances for meeting lead standards reflect the costs required to meet these obligations.

#### *Ofwat's FD*

5.129 In Ofwat's FD, Ofwat set allowances for meeting lead standards by using two models:<sup>1470</sup>

- (a) A random effects model using a log/log functional form, analysing forecast costs against the number of communication pipes being replaced; and
- (b) A unit cost model, where forecast costs are regressed on the number of communication pipes being replaced.

5.130 For some water companies, including Anglian, Ofwat undertook a deep dive to assess additional arguments and evidence.<sup>1471</sup>

5.131 Ofwat then took an unweighted average of these two models and reflected any additional allowance from its deep dives in order to develop its estimated costs for meeting lead standards.<sup>1472</sup>

#### *Water companies' views*

5.132 Anglian is the only Disputing Company which raised concerns with Ofwat's approach described above.

5.133 Anglian stated that Ofwat had based its benchmarking on the number of pipes being replaced, rather than the length of pipes. Since, Anglian had proposed to replace longer sections of pipe (including supply pipes on the customer's side of the boundary), its costs look anomalously high under Ofwat's benchmarking, not as a result of any inefficiency but due to 'Ofwat's flawed model selection'.<sup>1473</sup>

5.134 Anglian stated that its historical unit costs to replace the communication pipes only (the company's responsibility) broadly aligns with Ofwat's median costs,

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<sup>1469</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p109

<sup>1470</sup> Ofwat (2019), [Wholesale water enhancement feeder model: lead standards](#)

<sup>1471</sup> Anglian was the only one of the Disputing Companies for which Ofwat undertook a deep dive, allowing an uplift to reflect the cost of treating water to reduce the level of lead exposure and for the replacement of supply pipes; see Ofwat (2019), [Wholesale water enhancement feeder model: lead standards](#).

<sup>1472</sup> Ofwat (2019), [Wholesale water enhancement feeder model: lead standards](#).

<sup>1473</sup> [Anglian SoC](#), p198

and it is only the increase in average pipe length which results in the claimed inefficiency.<sup>1474</sup>

5.135 Anglian stated that an econometric model with the length of pipes as a cost driver would control for economies of scale, just as Ofwat has done with its econometric model using the number of pipes.<sup>1475</sup>

5.136 Anglian also raised concerns that, as noted by Vivid Economics, Ofwat's model at initial assessment of plans (IAP) stage was 'highly unstable and produces [an] implausible efficiency score range',<sup>1476</sup> and subsequently on Ofwat's draft determination model Vivid Economics highlighted a '[b]roader recommendation to justify model choice and triangulation weights remains, as unclear how median unit cost model arrived at'.<sup>1477</sup>

5.137 In its response to our Provisional Findings, Anglian highlighted concerns with the modelling approach, specifically:

(a) Ofwat and the CMA conducted a deep dive assessment in this area which relied on an inappropriate estimated allowance for the replacement of a communication and supply pipe taken from Hafren Drfydwy's business plan.<sup>1478</sup>

(b) Anglian's 'Water in Buildings' programme was inappropriately included in the models for meeting lead standards, which artificially increased its apparent costs and made it appear inefficient. Anglian argued that this programme covered a wider package of measures and should be assessed separately, potentially using a shallow dive approach (consistent with Ofwat's approach in other areas).<sup>1479</sup>

#### *Ofwat's views*

5.138 Ofwat stated that its approach to modelling the costs of meeting lead standards was theoretically sound, with high explanatory power ( $R^2$  of 0.8), and received substantial support from companies.<sup>1480</sup>

5.139 Ofwat stated that Anglian did not provide any convincing evidence that its plan involved longer pipes than other companies, nor that a cost-per-metre model

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<sup>1474</sup> [Anglian's reply to Ofwat's response](#), Part A.3, No.3.8, p50

<sup>1475</sup> [Anglian's reply to Ofwat's response](#), Part A.3, No.3.8, p50

<sup>1476</sup> [Anglian SoC](#), p198

<sup>1477</sup> [Anglian's reply to Ofwat's response](#), Part A.3, No.3.8, p50

<sup>1478</sup> [Anglian's response to the provisional findings](#), paragraphs 248–249; [Anglian's submission following the second main party hearings: Annex 2](#), paragraphs 68–75

<sup>1479</sup> [Anglian's response to the provisional findings](#), paragraphs 250–252

<sup>1480</sup> [Ofwat's response to Anglian's SoC](#), paragraph 3.181



would be better. It also stated that other companies had included the replacement of customers' pipes in their plans for the 2020-25 period.<sup>1481</sup>

5.140 Ofwat also stated that the replacement of a lead pipe has a dominant fixed cost element, related to the job setup and reinstatement work. This cost can then vary depending on the type of surface (eg paved, unpaved), the length of the pipe and the suitable pipe replacement methodology.

5.141 Ofwat disagreed with the concerns raised by Anglian following our Provisional Findings, and stated that:

(a) Anglian had not presented convincing evidence to justify its claimed cost differences for supply pipes, and that the cost estimate used which Anglian attributed to Hafren Drfydwy's business plan (£2,000 unit cost per pipe replacement) was based on joint research conducted by CCWater and the water companies.<sup>1482</sup>

(b) Anglian's 'Water in Buildings' programme was immaterial at £1.4 million, and while it may not fit perfectly into the meeting lead standards cost category it was a proportionate approach to treat the expenditure in this way. Furthermore, all companies have obligations regarding water quality in public buildings and may have included these in base expenditure or this enhancement category, but not identified as being unique or material.

#### *Our assessment and decision*

5.142 In order to test Anglian's arguments about the length of pipes being replaced we sought data on industry-wide historical and forecast figures on this from Ofwat. However, Ofwat stated that it did not have data on the length of lead pipes replaced by companies as this was not submitted by companies, and it had not considered it proportionate to collect it.

5.143 We consider that lead pipe replacement appears to be a reasonable activity to benchmark since, although individual replacements are likely to differ in cost, the overall programme represents a large and repeatable set of activities which should be similar between companies. The number of communication pipes would appear to be a reasonable explanatory variable to use in benchmark modelling, and we note that Ofwat refined its models during the PR19 process, including adopting Vivid Economics' main recommendation after IAP.<sup>1483</sup>

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<sup>1481</sup> [Ofwat's response to Anglian's SoC](#), paragraph 3.181

<sup>1482</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), pp15–16

<sup>1483</sup> [Ofwat's response to Anglian's SoC](#), paragraph 3.184

- 5.144 We recognise that the length of pipes being replaced is likely to be a factor in determining the cost of meeting lead standards. However, we understand this is just one of a number of additional factors (for example type of surface and methodology required) and it is not clear that this would represent a better approach or require specific adjustments. There would also appear to be a high fixed cost of replacing a pipe which would not be well reflected in a model which relied solely on length of a pipe. We would also expect that length of pipe being replaced would generally correlate with the number of communication pipes being replaced, albeit we are not able to test this empirically.
- 5.145 In the absence of any data which: (i) demonstrates that the length of pipe replaced is a better variable to use than number of pipes; (ii) demonstrates that Anglian is planning to replace longer pipes than other companies resulting in higher costs; or (iii) would allow us to create an alternative model based on the length of pipe, we consider that an econometric modelling approach using the number of communication pipes replaced represents the most appropriate method available.
- 5.146 We have further considered Anglian's concerns about the figures used to support the deep dive assessment and the use of the benchmark unit rate figure of £2,000 (supply pipe and communication pipe). We consider that this benchmark figure based on industry research is appropriate, particularly given the lack of evidence that Anglian's supply pipe replacement plans differ to the industry average, and so do not consider it justified to change this approach.
- 5.147 Finally, we have considered the inclusion of Anglian's 'Water in Buildings' programme in the modelling. Removing the associated £1.4 million from Anglian's requested figure of £31.2 million in this cost category would still result in it having the highest unit cost of all companies in the sector, and so we do not consider that this materially supports Anglian's claims about it driving an appearance of inefficiency.
- 5.148 We recognise the benefits of Ofwat's approach to consolidating the very large number of specific costs which a company might incur into broader categories, in order to allow for a practical assessment process. We are also concerned about the potential incentive effects of splitting out detailed individual cost lines, particularly when subject to the level of information asymmetry that is discussed in paragraph 5.19. Such an approach could result in companies seeking to split out increasingly granular or specific costs on the basis of imperfect comparators (even if the different companies have similar overall programmes), to undermine the intended effect of the benchmark models, and to benefit from the information asymmetry this would reintroduce.

5.149 Therefore, in the absence of evidence that the level of aggregation was flawed, or a material adjustment is required (for example, these costs being large and unique to Anglian), our decision in this case is to continue to include Anglian's 'Water in Buildings' programme in the 'meeting lead standards' benchmarking process.

5.150 Our decision on the benchmark model is to use a modelling approach based on the number of communication pipes replaced, as in Ofwat's FD. In doing so, we include the costs associated with the Anglian 'Water in Buildings' programme. These decisions result in no change to the Disputing Companies' allowances compared to Ofwat's FD.

## **Wastewater WINEP cost efficiency challenges**

### ***Ofwat's FD***

5.151 Ofwat applied an upper quartile efficiency adjustment on a 'WINEP in the round' basis. To make this adjustment, Ofwat identified an overall level of WINEP wastewater modelled allowance by summing the modelled allowances it had determined for each WINEP area (including P-removal). An upper quartile adjustment was then applied based on the relationship between the requested and modelled allowance at this 'WINEP in the round' level. This resulted in a 6.94% downward adjustment to modelled allowances.<sup>1484</sup>

### ***Water companies' views***

5.152 Anglian said that the confidence intervals around Ofwat's enhancement cost predictions, and the range of estimated inefficiency were much higher than from Ofwat's base models.<sup>1485</sup> It said that the size of this range resulted from the failings in Ofwat's approach and did not imply large inefficiency gaps.<sup>1486</sup> Anglian said that Ofwat's approach risked its expenditure allowances being driven by unrealistically optimistic forecasts by some companies, rather than efficiency.<sup>1487</sup> Anglian said that, given these issues, an average, rather than upper quartile, benchmark would be appropriate for the WINEP 'in the round' approach.<sup>1488</sup> Anglian said this would be consistent with past Ofwat statements linking the choice of cost benchmark to the confidence Ofwat had in the accuracy of its modelling.<sup>1489</sup>

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<sup>1484</sup> Ofwat (2019), *PR19 final determinations: Securing cost efficiency technical appendix*, p90

<sup>1485</sup> Anglian SoC, paragraph 800

<sup>1486</sup> Anglian SoC, paragraph 800

<sup>1487</sup> Anglian SoC, paragraph 798

<sup>1488</sup> Anglian SoC, paragraph 800

<sup>1489</sup> Anglian SoC, paragraph 798

- 5.153 Northumbrian said that the application of a programme-wide upper quartile efficiency challenge for WINEP wastewater spend was not appropriate.<sup>1490</sup> It said that the usefulness of regression models in this context was severely limited given the small sample size of ten data points, and that Ofwat's models were simplistic.<sup>1491</sup> Northumbrian said that the WINEP upper quartile benchmark was driven by, and highly sensitive to the inclusion of, two companies - Severn Trent and Southwest Bournemouth Water – and that modelled costs for these companies were heavily driven by Ofwat's P-removal modelling, which estimated significantly higher costs than those companies included in their business plans.<sup>1492</sup> Northumbrian said that the forecast costs used in Ofwat's modelling were not as reliable as historical costs, and that – given asymmetric totex cost sharing rates – companies were likely to propose costs that were lower than their allowance in order to reduce their downside risks.<sup>1493</sup> Northumbrian said that the confidence intervals of model coefficients implied a wide range of possible values, and made it difficult to identify the value that constituted efficient cost.<sup>1494</sup> Northumbrian said this meant that the application of a catch-up challenge to modelled costs based on company forecast data may result in unachievable allowances.<sup>1495</sup>
- 5.154 Yorkshire said that Ofwat's choice of an upper quartile benchmark was clearly flawed given the low accuracy of its WINEP cost predictions.<sup>1496</sup> Yorkshire said Ofwat's WINEP models were highly likely to omit important cost drivers, were based on forecast data which is inherently uncertain, and in some cases (as with P-removal) were based on only ten observations.<sup>1497</sup> Yorkshire said that Ofwat's efficient cost predictions had an implausibly large range of efficiency scores.<sup>1498</sup> In its response to our Provisional Findings, Yorkshire said that applying a 'WINEP in the round' upper quartile adjustment would mean it remained inappropriately benchmarked against United Utilities.<sup>1499</sup>

### **Ofwat's views**

- 5.155 Ofwat said that the forecast upper quartile was only used as a benchmark in enhancement areas where the accuracy of modelling was considered sufficient, including for wastewater WINEP, where it was applied at a

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<sup>1490</sup> [Northumbrian SoC](#), Section 5.7.3

<sup>1491</sup> [Northumbrian SoC](#), Section 5.7.3

<sup>1492</sup> [Northumbrian SoC](#), paragraph 423

<sup>1493</sup> [Northumbrian SoC](#), paragraph 428

<sup>1494</sup> [Northumbrian SoC](#), paragraph 430–431

<sup>1495</sup> [Northumbrian SoC](#), Section 5.7.3

<sup>1496</sup> [Yorkshire SoC](#), paragraphs 195–196

<sup>1497</sup> [Yorkshire SoC](#), paragraphs 195–196

<sup>1498</sup> [Yorkshire SoC](#), paragraphs 195–196

<sup>1499</sup> [Yorkshire's response to the provisional findings](#), paragraphs 5.2.5–5.2.6.

programme level.<sup>1500</sup> Ofwat said it considered that significant differences between its cost predictions and the amounts requested by companies were not unexpected in a context where - for enhancement schemes - companies had to determine both the scope of the required works and the efficient cost of providing that scope. Ofwat pointed to differences in the extent of detailed site investigations underpinning forecasts, different assumed technology choices, and differences in the level of non-compliance risk companies were willing to bear as examples of factors within management control that could materially affect company forecasts.

- 5.156 Ofwat said that there was a greater risk that companies overstated their enhancement costs than their base costs, as there were not robust historical benchmarks and therefore cost assessment was more dependent on company forecast information.<sup>1501</sup> Ofwat said that it was not aware of any evidence that showed the WINEP upper quartile benchmark was driven by unrealistically optimistic forecasts by some companies.<sup>1502</sup> Ofwat said that its 'WINEP in the round' approach meant that if a company was considered inefficient in one model and efficient in another, the outcomes would balance to a degree.<sup>1503</sup> Ofwat said that adopting this programme-level approach took better account of the accuracy of individual models and the potentially different approaches to cost allocations different companies may take.<sup>1504</sup>

### ***Our assessment and decision***

- 5.157 As was noted in paragraphs 5.152 to 5.154, the Disputing WASCs challenged Ofwat's use of a wastewater WINEP upper quartile adjustment on the basis that the underlying models were not sufficiently reliable, and pointed to the confidence intervals and range of implied efficiency scores in support of this. While these are relevant considerations, we consider it is also important to recognise that Ofwat's WINEP modelling was based on company totex forecasts. This makes the question of the reliability of the underlying data – as providing a basis for determining efficient costs – important to consider. In particular, unlike with base modelling, the WINEP models have not been developed and calibrated using historical actual figures. This raises questions over the reliability of the median as a guide to efficient costs that do not arise in the same way for base cost assessments.

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<sup>1500</sup> Ofwat's response to Anglian's SoC, paragraphs 3.168–3.173

<sup>1501</sup> Ofwat response to Yorkshire's SoC, paragraph 3.113

<sup>1502</sup> Ofwat's response to Anglian's SoC, paragraph 3.173

<sup>1503</sup> Ofwat's response to Anglian's SoC, paragraph 3.172

<sup>1504</sup> Ofwat's response to Anglian's SoC, paragraph 3.172

- 5.158 Using only forecast data for enhancement benchmarking creates inevitable tensions and difficulties when questions of model reliability stand to be assessed. The usefulness of measures of statistical fit may be subject to particular limitations in this context, as their relevance may be heavily dependent on the extent to which forecast costs can be regarded as 'efficient', in a context where assessing that question of efficiency is the primary purpose of constructing the models in the first place.
- 5.159 This data reliability concern, from the use of company forecasts, is important to consider as companies can face weak incentives to identify and reveal efficiencies in their forecasts, as such revelation can result in lower allowances than may otherwise apply. In line with Ofwat's comments, we note that this can affect assessments of the scope and form (such as technology choice) of what is identified as required in order to provide for a given enhancement, as well as the costs identified as necessary in order to deliver that.
- 5.160 Ofwat's application of an upper quartile efficiency challenge in relation to wastewater WINEP spend can be understood as providing a means to help guard against the risk that company cost forecasts overstate a reasonable level of funding, by putting more weight on those forecasts that have been identified as 'low' relative to modelled allowances. We consider Ofwat's use of fast-tracking to be an important means through which it has sought to counter tendencies for business plan forecasts to be unduly high, and a notable feature of Ofwat's WINEP assessment is that it identifies the fast track companies as most efficient in this area (the WINEP 'in the round' level assessment). We do not consider there to be a material risk that Ofwat's upper quartile benchmark was driven by unrealistically optimistic forecasts by some companies, and note that modelled allowances were set at the lower of the company's forecast and Ofwat's view. In line with this, our view is that it is appropriate to apply an upper quartile adjustment at the WINEP in the round level.
- 5.161 In line with our assessment in paragraphs 5.73 to 5.111, our view is that the modelled WINEP allowance should remain unchanged from Ofwat's FD for Anglian, and be increased by £4 million for Northumbrian and by £9 million for Yorkshire (as a result of increased modelled P-removal allowances). These changes to modelled allowances leave Ofwat's upper quartile calculation unaffected.
- 5.162 As was noted above, in its response to our Provisional Findings, Yorkshire said that applying a 'WINEP in the round' upper quartile adjustment would

mean it remained inappropriately benchmarked against United Utilities.<sup>1505</sup> We do not agree. Our approach to setting Yorkshire's P-removal modelled allowance is not intended to strip out the effect of United Utilities' costs from that assessment, but rather to guard against the risk that the inclusion of United Utilities' high PE, relatively low cost, catchment management options could result in an unduly low modelled P-removal allowance for Yorkshire (see paragraphs 5.90 to 5.102). We consider the approach we took to setting Yorkshire's P-removal modelled allowance adequately addresses that risk, and therefore that no further adjustments are required when benchmarking Yorkshire's WINEP costs against those of other companies, including United Utilities. Given this, we consider it appropriate to apply the upper quartile adjustment to Yorkshire's modelled WINEP costs in the same way as for the Disputing WASCs.

5.163 Our view is, therefore, that an upper quartile adjustment of 6.94% should be applied to modelled WINEP allowances as in Ofwat's FD.

## Shallow and deep dive efficiency challenges

5.164 Having set out our views on benchmarking, we now assess the approaches to applying efficiency challenges on shallow dives and deep dives.

5.165 As described in paragraph 5.12, Ofwat applied a number of efficiency challenges to certain cost categories. These can be considered on either a company-specific basis or a scheme-specific basis.

- (a) **Company-specific challenge (shallow dive):** Ofwat applied these shallow dive company-specific efficiency factors as a challenge on enhancement categories which were less material (less than 0.5% of a company's water or wastewater totex) and were not subject to a wastewater WINEP 'in-the-round' challenge (as discussed in paragraphs 5.151 to 5.163).
- (b) **Company-specific challenge (deep dive):** When conducting a deep dive assessment, Ofwat applied these company-specific efficiency factors as a challenge where there was insufficient evidence that the proposed costs were efficient.
- (c) **Scheme-specific challenge:** Ofwat applied these factors when conducting a deep dive assessment, and a company had provided some evidence that costs associated with the particular scheme were efficient,

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<sup>1505</sup> [Yorkshire's response to the provisional findings](#), paragraphs 5.2.5–5.2.6

but residual uncertainty remained which supported some degree of challenge different to the company-specific challenge discussed above.

5.166 The rest of this section assesses each of these three approaches in turn, with the shallow dive challenge discussed in paragraphs 5.167 to 5.188, the deep dive challenge in paragraphs 5.189 to 5.201, and the scheme-specific challenge in paragraphs 5.202 to 5.203.

### ***Company-specific efficiency factor (shallow dive)***

#### ***Ofwat's approach in PR19***

5.167 Ofwat calculated company-specific efficiency figures by taking the ratio of its view of efficient modelled **base** costs to the company's view of modelled **base** costs.<sup>1506</sup>

5.168 The outputs of these calculations for the Disputing Companies is shown in Table 5-9:

**Table 5-9: Ofwat's FD raw company-specific efficiency factor estimates**

	%	
	<i>Water</i>	<i>Wastewater</i>
Anglian	16.5	15.5
Bristol	12.0	n/a
Northumbrian	0.4	6.1
Yorkshire	-1.4	14.2

Source: Ofwat (2019), [Ofwat FD Company efficiency factor model](#)

5.169 In order to convert these raw figures into company-specific efficiency factors to be used in its enhancement assessment, Ofwat constrained them within set ranges.<sup>1507</sup> For its shallow dives, this range was specified as being between 0% and 10%. Ofwat stated that capping the range at 10% represented a trade-off between allowing for inefficiency and recognising that the company-specific efficiency factor is an imperfect indicator of the inefficiency of proposed enhancement costs.<sup>1508</sup> The floor of 0% would appear to reflect Ofwat's principle in enhancement of not providing a company with more funding than it specified in its business plan.<sup>1509</sup>

<sup>1506</sup> For this calculation, Ofwat removed enhancement opex from the company's view of modelled base costs; Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p55

<sup>1507</sup> We note that there may be other elements of the determination where Ofwat applied these raw figures, eg in the DSRA.

<sup>1508</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), pp55–56

<sup>1509</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p57



5.170 Applying these ranges resulted in company-specific efficiency factors for shallow dives as shown in Table 5-10:

**Table 5-10: Ofwat's FD shallow dive company-specific efficiency factors**

	%	
	<i>Water</i>	<i>Wastewater</i>
Anglian	10.0	10.0
Bristol	10.0	n/a
Northumbrian	0.4	6.1
Yorkshire	0.0	10.0

Source: Ofwat (2019), [Ofwat FD19: securing cost efficiency technical appendix](#), Table 12.

### *Water companies' views*

5.171 Two of the Disputing Companies disagreed with Ofwat's approach to shallow dive company-specific efficiency challenges.

5.172 Anglian stated that:<sup>1510</sup>

- (a) Ofwat's approach to the company-specific efficiency factors was ad hoc and inappropriate. In particular, it submitted that there was no reason to consider that a company's efficiency on base expenditure was a good indicator of a company's efficiency on enhancement expenditure. Anglian stated that this was supported by analysis it had conducted on its strategic interconnector project which showed that its plan was efficient (and this was verified by a Third Party, KPMG) and there was no evidence to indicate its planned enhancement expenditure was inefficient.<sup>1511</sup>
- (b) Furthermore, Ofwat did not sense-check these estimates in any way to test their reliability, and the approach was not supported by regulatory precedent.<sup>1512</sup>
- (c) Whilst areas of enhancement should have a proportionate level of review, and a proxy should be used for these shallow dives, base costs represent a poor proxy due to fundamental differences in the characteristics of base vs enhancement expenditure. A more robust proxy would be other areas of enhancement, where Anglian has shown itself to be efficient (notably in the Smart Metering and Strategic Interconnector schemes discussed in paragraphs 5.430 to 5.582), and where it uses the same approach and

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<sup>1510</sup> We note that Anglian's concerns stated here also relate to deep dive company-specific efficiency factors, discussed later in this section.

<sup>1511</sup> [Anglian SoC](#), paragraphs 803–804

<sup>1512</sup> [Anglian SoC](#), paragraphs 804–805

internal models to develop other enhancement schemes in its business plan.<sup>1513</sup>

- (d) Using enhancement projects as a proxy would result in appropriate incentives for companies to put forward efficient costs, particularly where the company is expecting to be lower cost (and hence judged to be efficient) due to the timing of its capital maintenance investment cycle.<sup>1514</sup>

5.173 Bristol stated that:

- (a) Although the company-specific efficiency challenges applied to individual categories may be small, applying them to a large number of categories results in a cumulative effect which adds to the materiality of the overall cost challenge in Ofwat's FD.<sup>1515</sup>
- (b) Ofwat was wrong to impose a further efficiency challenge absent an efficiency assessment, particularly because more detailed assessment of enhancement costs generally supported Bristol as being efficient.<sup>1516</sup>
- (c) Ofwat's decision to derive a company-specific efficiency factor using base costs was unjustified, particularly due to errors in its approach to base costs, and because Bristol applied different efficiency challenges to base and enhancement costs in its business plan (due to a different mix of opex and capex in these parts of its plan).<sup>1517</sup>
- (d) Ofwat was not justified in applying the maximum 10% efficiency challenge, particularly as Ofwat had the choice to apply any figure between 0% and 10%, and the final difference in base costs between Bristol and Ofwat's FD was only 6.9% (with Ofwat's calculation of 12% representing the difference versus Bristol's plan at IAP).<sup>1518</sup>

#### *Ofwat's views*

5.174 Ofwat stated that it had adopted a risk-based approach to assessing enhancement and, when assessing company business plans, this involved relying on a lighter touch (shallow dive) assessment for low materiality costs

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<sup>1513</sup> [Anglian's response to the provisional findings](#), paragraphs 166–174

<sup>1514</sup> [Anglian's response to the provisional findings](#), paragraphs 173

<sup>1515</sup> [Bristol SoC](#), paragraph 559

<sup>1516</sup> [Bristol SoC](#), paragraphs 561–567

<sup>1517</sup> [Bristol SoC](#), paragraphs 568–571

<sup>1518</sup> [Bristol SoC](#), paragraphs 572–576; [Bristol's reply to Ofwat's response](#), paragraph 302

and a more thorough assessment of the evidence (deep dive) for high materiality costs.<sup>1519</sup>

5.175 Ofwat stated that the application of the company efficiency factor is a proportionate approach for low materiality areas, where it does not require companies to support the proposed investments with substantial evidence as it does for more material areas.<sup>1520</sup>

5.176 In response to the points raised by the Disputing Companies listed above, Ofwat defended its approach, and stated that:

(a) The approach was risk-based and proportionate, and it carried out additional assessment where planned expenditure was material (as set out in paragraph 5.12).<sup>1521</sup>

(b) It would expect companies to apply the same level of efficiency to all costing elements of their plans, and so the company's efficiency on modelled base expenditure was a reasonable proxy.<sup>1522</sup>

(c) For Anglian in particular, Ofwat found the company to be inefficient in all areas of enhancement which it assessed using a modelling approach, often by more than Anglian's company-specific factor of 10%.<sup>1523</sup>

(d) For Bristol in particular, Ofwat explained that it did not apply any discretion when setting the company-specific challenge to 10%, this simply reflected the mechanical output of its described approach.<sup>1524</sup>

5.177 Ofwat stated that by capping its company-specific efficiency factor at 10%, it was potentially generous to both Anglian and Bristol which had raw figures higher than this.<sup>1525</sup>

### *Our assessment and decision*

5.178 We consider that detailed investigation of every small element of enhancement costs is likely to be disproportionate to the benefits provided. Requiring the companies to provide evidence on all aspects of their enhancement plans would require substantial time and resources, placing a large burden on both the regulator and all water companies involved.

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<sup>1519</sup> Ofwat (2019), *PR19 final determinations: Securing cost efficiency technical appendix*, p53

<sup>1520</sup> [Ofwat's response to Anglian's SoC](#), paragraph 3.186; [Ofwat's response to Bristol's SoC](#), paragraph 3.154

<sup>1521</sup> [Ofwat's response to Anglian's SoC](#), paragraph 3.187; [Ofwat's response to Bristol's SoC](#), paragraph 3.154

<sup>1522</sup> [Ofwat's response to Bristol's SoC](#), paragraph 3.154

<sup>1523</sup> [Ofwat's response to Anglian's SoC](#), paragraph 3.188

<sup>1524</sup> [Ofwat's response to Bristol's SoC](#), paragraph 3.155

<sup>1525</sup> [Ofwat's response to Anglian's SoC](#), paragraph 3.188; [Ofwat's response to Bristol's SoC](#), paragraph 3.155

- 5.179 Therefore, we have taken a more ‘light touch’ approach to our review of this issue. We recognise that this may result in a less precise answer than a detailed assessment might produce but we consider it justified by the need to minimise the risk of the regulatory regime becoming too burdensome and intrusive.
- 5.180 In this context, we consider that applying a proxy for efficiency is the best approach. We would be concerned about a blanket approach of applying no challenge on less material enhancement costs, particularly in the context of evidence of inefficiency in other parts of a company’s business plan. This is likely to result in customers overpaying for company inefficiency in these aspects of enhancement costs.
- 5.181 We consider that applying a percentage-based challenge across numerous small areas of cost is a reasonable approach given that the alternative of a more detailed assessment would require gathering detailed information on each of these small areas.
- 5.182 In principle, the closest proxy that might be used in such a challenge would appear to be other enhancement costs which have been assessed in more detail. However, we note that using other enhancement costs as the proxy raises serious challenges:
- (a) Some companies did not have many of their costs assessed via deep dives or models, and so there is a relatively small evidence base to use;
  - (b) This approach places even more weight on the enhancement models (which have intrinsic limitations as discussed previously),<sup>1526</sup> and is often very sensitive to a small number of cost category allowances; and
  - (c) Enhancement costs are sensitive to any changes in the scope of projects (for example, if a major project is disallowed then it could have a disproportionate effect on the estimate, even if this is unrelated to inefficiency of costs), and any potential adjustments for this would likely require an element of subjectivity (for example, whether the company’s inclusion of a disallowed scheme should be treated as demonstrating unnecessary work and hence inefficiency).
- 5.183 We note that the cost categories for the Disputing Companies which Ofwat assessed via its more detailed assessments (with benchmarking and/or deep dives) do not appear to support a view that the Disputing Companies which raised this concern are clearly more efficient than Ofwat’s use of a base proxy

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<sup>1526</sup> For example, see paragraph 5.72.

allowed for. For example, most of the models and deep dive assessments which Ofwat conducted resulted in substantially reduced allowances.<sup>1527</sup>

- 5.184 Anglian submitted that the evidence of its deep dives showed that its requested enhancement costs were efficient, and we should remove any shallow dive challenge as a result.<sup>1528</sup> However, while it specified two enhancement schemes which have been identified as efficient, it did not mention the other enhancement areas where it was found to be inefficient (eg Storage at STWs, P-removal, and the WINEP programme), nor the other disadvantages of using enhancement as a proxy discussed above.
- 5.185 Furthermore, we disagree that using enhancement costs as a proxy for shallow dives necessarily results in improved incentives over the use of base costs. Using a specific cost as a proxy for shallow dives will amplify the existing incentive structure for those underlying costs, since the estimated efficiency level is being applied to a wider cost base – this could have either positive or negative effects. We have discussed the structure of the incentive regime and any associated risks (eg improving incentives to reveal true efficient costs vs exacerbating incentives to submit artificially low business plans),<sup>1529</sup> but do not agree that the incentive regime for enhancement costs is clearly superior than that for base costs. We also note that, despite improvements made in this price review process, enhancement costs are likely to remain an area of greater information asymmetry, which increases the risk of regulatory gaming.
- 5.186 Accordingly, we consider that the best approach available to achieve the light-touch, proportionate approach to assessing these costs is to adopt a proxy for efficiency using an assessment of base costs as Ofwat did. We also constrain our figure within a range of 0% to 10% to avoid overcompensating the Disputing Companies while minimising the risk of potentially disproportionate interventions. We recognise the limitations in this approach but consider that it represents a proportionate approach to dealing with these less material enhancement costs.
- 5.187 Our decision is to adopt the same approach of using a base cost proxy for calculating a shallow dive company-specific efficiency factor. In order to avoid undermining the incentive to submit efficient business plans we maintain the figures from companies' business plans used by Ofwat, but update the

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<sup>1527</sup> For Anglian, of the 16 enhancement categories where Ofwat conducted a model and/or deep dive which resulted in an efficiency challenge, only 2 resulted in a cost challenge below 10%; for Northumbrian it was 3 cost categories out of 14; for Yorkshire it was 5 cost categories out of 17. For Bristol all 3 of its modelled cost categories resulted in no challenge, but its 2 deep dived categories resulted in 32% and 80% challenges.

<sup>1528</sup> See paragraph 5.172.

<sup>1529</sup> See paragraphs 6.84 to 6.93 in particular.

calculation to reflect our view on each Disputing Company's efficient modelled base costs (including the effects of the 2019/20 data). We use this to calculate new company-specific efficiency factors for water and wastewater, which we will then constrain within a range of 0-10% for use in our shallow dive assessment.

5.188 This results in calculations and resulting efficiency factors as shown in Table 5-11 and Table 5-12:

**Table 5-11: Updated calculation of company-specific raw efficiency factors**

	<i>Company business plan (from Ofwat feeder), £m</i>	<i>Our view on efficient modelled base costs, £m</i>	<i>Raw efficiency figure</i>
Anglian – water	1,575	1,358	13.8%
Anglian – wastewater	2,430	2,072	14.7%
Bristol – water	386	367	4.9%
Bristol – wastewater	n/a	n/a	n/a
Northumbrian – water	1,127	1,180	-4.7%
Northumbrian - wastewater	887	837	5.6%
Yorkshire – water	1,306	1,422	-8.9%
Yorkshire – wastewater	1,833	1,586	13.5%

Source: Ofwat (2019), [Company efficiency factor model](#); CMA calculations

**Table 5-12: Decision on shallow dive company-specific efficiency factors**

	%	
	<i>Water</i>	<i>Wastewater</i>
Anglian	10.0	10.0
Bristol	4.9	n/a
Northumbrian	0.0	5.6
Yorkshire	0.0	10.0

Source: CMA calculations

### ***Company-specific efficiency factor (deep dive)***

#### ***Ofwat approach in PR19***

5.189 To calculate deep dive company-specific efficiency factors, Ofwat adopted the same general approach as it did for shallow dives, as described in paragraphs 5.167 to 5.170. However, having calculated its raw figures, Ofwat constrained them within a narrower range of between 5% and 10%. Ofwat stated that the reason for applying a higher floor compared with shallow dives (where this was set at 0%) was that this efficiency factor was only applied when there was insufficient evidence that proposed costs were efficient.<sup>1530</sup>

<sup>1530</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p56

5.190 Applying these ranges resulted in company-specific efficiency factors for deep dives as shown in Table 5-13:

**Table 5-13: Deep dive company-specific efficiency factors**

	%	
	<i>Water</i>	<i>Wastewater</i>
Anglian	10.0	10.0
Bristol	10.0	n/a
Northumbrian	5.0	6.1
Yorkshire	5.0	10.0

Source: Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), Table 12.

### *Water companies' views*

5.191 One Disputing Company (Anglian) raised concerns about Ofwat's approach to applying a deep dive company-specific efficiency factor, albeit these concerns were explained in combination with issues around shallow dive company-specific efficiency factors. In response to our Provisional Findings, another Disputing Company (Northumbrian) submitted that we should use the same approach that Ofwat adopted, as described above.

5.192 As explained in paragraph 5.172, Anglian stated that Ofwat's approach is ad hoc, inappropriate, and is unlikely to be a good indicator of a company's efficiency on enhancement. In addition, Anglian stated that Ofwat should have sense-checked these estimates.<sup>1531</sup>

5.193 Northumbrian submitted that Ofwat's methodology accounted for the relative efficiency of the different water companies (ranging from 5% to 10%), and that the CMA should adopt the same approach. It submitted that this was because (i) the CMA has adopted differentiated efficiency factors for shallow dives, and (ii) the CMA has not provided any evidence on why Ofwat's approach for differentiated efficiency factors for deep dives was not appropriate.<sup>1532</sup>

### *Ofwat's views*

5.194 Ofwat provided limited comments on the deep dive company-specific efficiency factor specifically, instead combining its response with its response on shallow dive company-specific efficiency factors as explained above.

<sup>1531</sup> We note that Anglian's concerns stated here also relate to deep dive company-specific efficiency factors, discussed later in this section.

<sup>1532</sup> [Northumbrian's response to the provisional findings](#), paragraphs 207–209

## *Our assessment and decision*

5.195 Our consideration of this issue reflects concerns about the risk of customers overpaying for enhancement schemes from (i) poorly developed business plans, and/or (ii) information asymmetry inhibiting effective regulatory scrutiny. It is important that companies have strong incentives to develop business plans which are robust and efficient and demonstrate they have these qualities to the regulator, particularly where there is no comparative assessment possible. Companies should have undertaken this evidence-gathering as part of their business plan development, and so it should be relatively straightforward to provide this to the regulator.

5.196 Accordingly, the application of a deep dive company-specific efficiency factor needs to strike a balance between providing a sufficiently strong incentive on the companies to conduct a robust costing exercise and reveal this to Ofwat, while not risking disproportionately tough interventions which could cause wider concerns to the delivery of desirable enhancements or introducing potential financeability issues by underfunding these activities.

5.197 When intervening on a deep dive in this way, there are two steps:

- (a) Determining whether the company has provided sufficient evidence that its costs are robust and efficient; and
- (b) Where this is not the case, determining the level of efficiency challenge to apply.

5.198 The first of these steps will be undertaken on the specific facts of the case. If the company has failed to demonstrate its costs are efficient, it should be open to Ofwat to set a challenge figure based on its own judgement. Ofwat should ensure that the challenging figure is high enough that companies could not benefit by obfuscating their true efficient costs, and 'taking the penalty', but it should also not be disproportionate. This is the principle we aim to apply in our determination of the deep dive efficiency factors.

5.199 While Ofwat chose to apply its challenge as a sliding scale based on estimated efficiency of the company's base costs (constrained within a range of 5-10%), it is not clear to us that this represents a better approach than using a single efficiency factor. This is particularly due to the difference in circumstances in which we are applying these challenges, namely:

- (a) Shallow dives, where companies are not asked to provide evidence due to proportionality considerations; and



(b) Deep dives, where companies are expected to demonstrate that they have put forward efficient business plans, but have been unable to do so.

5.200 Applying a standardised figure to all companies is also consistent with Ofwat's own approach in areas of enhancement, including in deep dives, such as when there is a lack of optioneering.<sup>1533</sup>

5.201 Our judgement in this case is that a figure of 10% for deep dive company-specific efficiency factors is appropriate, and will generally properly balance the objectives discussed above.

### ***Scheme-specific efficiency challenge***

5.202 In paragraphs 5.189 to 5.201, we discussed the general approach to deep dive efficiency challenges. However, there are some circumstances where the default figure above is not appropriate, as it does not reflect the level of evidence provided or the potential balance of risks to customers. For example, where a company has largely justified its allowances, but a small amount of uncertainty remains, an efficiency challenge of below 10% may be preferable. Equally, in other circumstances, an efficiency challenge that is greater than 10% may be appropriate.

5.203 On this basis, depending on the specific circumstances and the evidence provided, we may decide that an alternative challenge to some or all elements of cost in a deep dive is more appropriate. These individual decisions require the application of judgement and will be explained where they occur.

### **The assessment of specific projects (deep dives)**

5.204 In this section we provide our assessment and decisions for the deep dives we have conducted on specific schemes which the Disputing Companies have highlighted:

- (a) Yorkshire – Living with Water Partnership in Hull and Haltemprice;
- (b) Yorkshire – Internal Sewer Flooding Scheme;
- (c) Northumbrian – Essex Resilience Scheme;
- (d) Northumbrian – Sewer Flooding Resilience Scheme;

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<sup>1533</sup> We note that this is consistent with Ofwat's approach to 'optioneering' where it would apply a standard 20% challenge to schemes where it considered that a company had not provided evidence that the selected option was optimal; see Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), pp54–55, as well as the decision to cap this figure within a range of 5-10%.

- (e) Anglian – Strategic Interconnectors Programme;
- (f) Anglian – Smart Metering Scheme;
- (g) Anglian – Water Resilience Scheme;
- (h) Anglian – SEMD/non-SEMD; and
- (i) Anglian – Bioresources Scheme.

5.205 These schemes represent more material claims which we consider are best assessed through a detailed assessment of the bottom-up evidence available.

5.206 When conducting these assessments, we adopt a proportionate approach such that a greater level of supporting evidence is required for larger investment proposals. However, we note the context of these assessments is one of significant information asymmetry between ourselves and the relevant Disputing Company, and so consider it appropriate to require the company to provide compelling evidence to support its claims.

5.207 We note that the above list does not represent all material enhancement schemes proposed by the Disputing Companies. However, in line with our approach stated in paragraphs 5.4 and 5.17, we have focused on areas where the Disputing Companies and Ofwat provided conflicting views and where we have needed to resolve these in coming to our determination. For other major schemes which met Ofwat’s evidential threshold to receive additional enhancement funding, we adopt the same approach as set out in Ofwat’s FD.

5.208 Ofwat set out a series of ‘gates’ which it used when conducting its deep dives. These can be summarised as follows:<sup>1534</sup>

- (a) **Need for investment:** is this investment required and what would it deliver?
- (b) **Need for cost adjustment:** is this already funded elsewhere in the determination?
- (c) **Management control:** is this driven by factors beyond management’s control?
- (d) **Best option for customers:** does this approach represent the most beneficial route to delivering the intended improvement for customers?

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<sup>1534</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), Annex 6

- (e) **Robustness and efficiency of costs:** has the company demonstrated that its proposed costs are efficient?
- (f) **Customer protection:** are customers protected if the investment is cancelled, delayed, or reduced in scope?
- (g) **Affordability (for highly material claims):** has the company considered the impact on customer affordability?
- (h) **Board assurance (for highly material claims):** has the company's board provided explicit assurance over the elements discussed above?

5.209 In the context of this determination, we do not consider it necessary to apply these criteria rigidly to every scheme but use them as a helpful assessment framework when reviewing the evidence available. We refer to these gates at various times throughout this section.

5.210 We make our assessment of each of these proposals in order to meet our legal duties and, recognising where tensions may occur, using our judgement where necessary to do so.

5.211 For each deep dive we:

- (a) explain the decision in Ofwat's FD;
- (b) present the evidence provided by the Main Parties (where appropriate, highlighting the relevant gate on which the dispute is focused);
- (c) highlight views of Third Parties where available;
- (d) provide our assessment and decision; and
- (e) Consider whether customer protections are appropriate.

### ***Deep dive 1: Yorkshire – Living with Water Partnership in Hull and Haltemprice***

5.212 In its PR19 business plan, Yorkshire referenced a proposal for an around £50 million programme to strengthen the resilience of Hull and Haltemprice against extreme flooding events. Yorkshire said that it sought £28.7 million for this scheme in allowed costs and that the balance was to be achieved through partnership funding.

5.213 In Ofwat's FD, Ofwat allowed £16.4 million for the proposed projects (a reduction of £12.3 million from Yorkshire's request).

5.214 Ofwat calculated this figure based on the ‘implicit allowance’ which Yorkshire received in its base allowance for reducing sewer flooding and scaled this up to reflect the increased risk of this occurring in Hull and Haltemprice. This process involved Ofwat:<sup>1535</sup>

- (a) Using its base models to estimate an implicit allowance for sewer flooding across the whole Yorkshire region;
- (b) Pro-rating this based on the length of sewers in order to estimate an implicit allowance for Hull and Haltemprice specifically (£3.97 million);
- (c) Multiplying this by 5.14, because customers in Hull and Haltemprice are 5.14 times more likely to experience sewer flooding in comparison to customers in Leeds and Sheffield (other large cities in the Yorkshire area), to give a total required allowance of £20.4 million; and
- (d) Finally, removing the implicit funding already provided in the base models for Hull and Haltemprice (ie £3.97 million) to produce a final adjustment of £16.4 million.

#### *Yorkshire’s views*

##### *Background and need for the scheme*

5.215 Hull is unusually situated as a port city within a basin and suffers from fluvial, pluvial, tidal and ground water flooding.<sup>1536</sup> Yorkshire highlighted that Hull is the city second most vulnerable to flooding in the UK, after London. The magnitude of the problem was highlighted in 2007 when the city and the surrounding areas experienced significant flooding and over 9,000 homes, 90 schools and 100 businesses were flooded.

5.216 The company stated that the city is unique in that it relies on the sewer system to remove all rainwater as well as sewerage. The issue is exacerbated by the fact that the Hull sewers are reliant on pumping rather than gravity, with the sewer tunnel system used to drain the city using two large Yorkshire pumping stations. Yorkshire stated that due to these challenges, Hull remains disproportionately at risk of suffering further flooding to properties.<sup>1537</sup>

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<sup>1535</sup> Ofwat (2019), *Cost adjustment claims feeder model: Yorkshire Water*, sheet: Hull resilience

<sup>1536</sup> Fluvial flooding occurs when rivers burst their banks as a result of sustained or intense rainfall. Pluvial flooding occurs when an extremely heavy downpour of rain saturates drainage systems and the excess water cannot be absorbed. Tidal flooding is the temporary inundation of low-lying areas, especially streets, during exceptionally high tide events, such as full moons. Ground water flooding is caused when the water table rises up from rocks or soils to above ground level, causing flooding to occur at the surface.

<sup>1537</sup> *Yorkshire SoC*, paragraph 309

5.217 Yorkshire estimated that a 1-in-30 year rainfall event would be likely to impact over 7% of the population (around 22,000 properties), compared with around 1% in other major cities in the Yorkshire region.<sup>1538</sup>

5.218 In 2017, Yorkshire formed a partnership with the Environment Agency, Hull City Council and East Riding of Yorkshire Council, called the 'Living with Water Partnership'. The aim of this was to work on a more integrated catchment basis to develop innovative solutions to combat flooding events faster.

### *Design and costing of the proposed scheme*

5.219 Yorkshire asked Arup to explore potential solutions to the flooding problems for Hull and Haltemprice. Arup identified that an infrastructure solution to expanding the pumping capacity of Hull's sewer system would cost around £1.8 billion.

5.220 However, Arup and Yorkshire identified that an alternative solution was to attenuate the water before slowly releasing it back into the sewers. While traditional approaches could be used (eg holding the excess water in tanks), Yorkshire and Arup also identified that it was also possible to use 'blue-green', environmentally-friendly approaches to attenuation such as: permeable paving, swale, detention basins, verge planters, street planters and geocellular storage.

5.221 Yorkshire said that an 'optimized Hotspot' GIS tool was used to determine clusters of at-risk properties. This approach identified an initial list of 47 'Hot Spots'. In collaboration with its Living with Water partners, Yorkshire then prioritised four of these Hot Spot locations to undergo further development.

5.222 The estimated cost for the four prioritised Hot Spots is shown in Table 5-14:

**Table 5-14: Estimated cost of delivery for blue-green vs traditional approaches**

<i>Hot Spot Number</i>	<i>Blue-green (£ million)</i>	<i>Traditional (£ million)</i>
2	33.2	35.7
4	2.5	4.9
13	11.3	25.7
27	3.5	5.7
<b>Total</b>	<b>50.5</b>	<b>72.1</b>

Source: CMA analysis

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<sup>1538</sup> Yorkshire (2019), [Our response to securing long term resilience \(relating to Ofwat's IAP YKY.L2.A2 and draft determination\)](#), p36

5.223 Although the purpose of the report by Arup was not to detail the specific benefits of blue-green solutions, it did explain various additional advantages over traditional methods. These included:

- (a) improved water quality reaching sewers and works (eg removal of hydrocarbons and suspended solids);
- (b) savings on treatment costs and other environmental benefits; and
- (c) improved biodiversity and amenity values to the city.

5.224 The expected impact of the scheme would be to reduce the number of properties exposed to flooding in rainfall events as shown in Table 5-15:

**Table 5-15: Impact of blue-green Hot Spot solutions**

	<i>1 in 5 year event (including climate change)</i>	<i>1 in 30 year event (including climate change)</i>	<i>1 in 75 year event (including climate change)</i>
Reduction in number of properties flooded during events of stated scale	494	808	644

Source: CMA analysis

5.225 Yorkshire said the total cost of delivering the plans at these four Hot Spots was just over £50 million and that it was requesting £28.7 million of this.<sup>1539</sup> The company explained that through innovation, collaboration and working to secure matched funding it could deliver the associated benefits with this lower allowance. Yorkshire said that it was seeking funding from additional sources, including the Environment Agency's Medium Term Plan for Flood Defence Grant in Aid. In its most recent update in November 2020, Yorkshire stated that it believed it could get matched funding from its partners which does not quite make up the full amount, but that it was working on this outstanding amount too.

5.226 Yorkshire submitted that the innovative nature of the project precludes precise solutions from being identifiable at this stage, and that a large efficiency challenge would be penalising the company for seeking to innovate. It also stated that the schemes are overseen by Yorkshire and its three partners all working together to ensure that it is conceived and delivered in an efficient manner.

5.227 Yorkshire disagreed with the methodology and calculated allowance used in Ofwat's FD. In particular, it stated that Ofwat's calculation (which relied on

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<sup>1539</sup> Yorkshire SoC, paragraph 317

base cost allowances) was opaque, disconnected from the resilience aims of the programme and had no sound analytical basis.<sup>1540</sup>

### *Customer views and customer protection*

- 5.228 Yorkshire said it engaged with various customers and stakeholders to collaboratively design a vision for future flood alleviation schemes in Hull. Yorkshire stated that feedback from its customers and other stakeholders emphasised that it must deliver its core services differently, focusing on holistic and sustainable approaches.<sup>1541</sup>
- 5.229 Yorkshire stated that it was open to a scheme-specific ODI to protect customers from non-delivery of this scheme. The company said that it would be able to demonstrate the output resulting from this spending, including through the use of the models it has produced to calculate risk exposure.
- 5.230 Yorkshire proposed a performance commitment and penalty-only ODI for this scheme and provided letters of support for the ODI from its three Living with Water partners. The approach which Yorkshire proposed involves a dual test of (i) Yorkshire's expenditure on this scheme compared with the allowance provided (protected with a financial ODI), and (ii) a 'gateway' condition of providing the stated benefit of reducing the number of properties at risk, as set out in Table 5-15 (protected with a reputational ODI).
- 5.231 Yorkshire proposed that this would function as:
- (a) An end-of-period test, with annual reporting;
  - (b) If Yorkshire had spent less than the allowance provided in the final determination at the end of the AMP, this shortfall would be returned to customers (equivalent to a 'log-down' system).
  - (c) If the service improvement in terms of numbers of households had not been delivered, it would be incumbent on Yorkshire to undertake further work without further funding, and this would be supported by a reputational ODI.
- 5.232 Yorkshire stated that this approach would protect customers from underperformance either in terms of under expenditure (where costs would be passed back entirely) or lower service performance (where the company would have to make good on the service improvement through further

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<sup>1540</sup> Yorkshire's Reply to Ofwat's Response, pp95–96, paragraphs 3.60.3 and 3.60.5

<sup>1541</sup> Yorkshire (2018), *Yorkshire Water's long term strategy*

investment).<sup>1542</sup> It explained that if its planned works ultimately were unlikely to deliver the service improvement specified, there were other Hot Spots in the area which it had identified, and which could provide sources for additional flooding protections.

5.233 Yorkshire noted that it expected to deliver the improvement schemes within AMP7, but if it was required to deliver additional schemes (for example, if the original ones did not provide the expected service benefits), then this might need to be delivered in AMP8. It said that this was primarily due to the circumstances of working in a city environment, and the associated planning rules and permissions required.

5.234 Yorkshire submitted that adopting an alternative approach which directly linked the full performance level to a financial penalty would raise issues since that would not reflect the partnership nature of the investment. Yorkshire was concerned this would expose the company to significant risk outside of its control, and would likely serve to deter other companies from pursuing these types of innovative partnership delivery models in the future.<sup>1543</sup>

#### *Ofwat's views*

5.235 Ofwat stated that a detailed bottom up analysis in its FD was not possible for the proposed enhancement, as it did not receive Yorkshire's details on costing and its Hot Spot analysis until very late in the process.<sup>1544</sup> It also submitted that:

- (a) The evidence provided by Yorkshire was not sufficiently detailed to allow Ofwat to identify the components of the proposal that mitigate the conditions specific to the area versus those that mitigate broader effects, such as those arising from climate change.<sup>1545</sup> Ofwat said the sector has been mitigating the effects of climate change in previous periods, and that Yorkshire's base allowance was sufficient to cover the necessary costs in this area.
- (b) It needed evidence of where the allowance would be efficiently invested. Ofwat said that, in particular, Yorkshire did not itemise what its customers could expect to receive from the proposed investment. Ofwat said that as

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<sup>1542</sup> Yorkshire's reply to responses to the provisional findings, paragraph 4.3.17

<sup>1543</sup> Yorkshire's reply to responses to the provisional findings, paragraph 4.3.19

<sup>1544</sup> Ofwat's response to the provisional findings – cost and outcomes, paragraph 3.104

<sup>1545</sup> Ofwat (2019), *Cost adjustment claims feeder model Yorkshire Water*, sheet: Hull resilience



a result of this it was unable to assess the scope of the costs using bottom-up analysis.<sup>1546</sup>

5.236 Ofwat stated that ordinarily where there was such a lack of evidence, it would reject the claim outright. However, it stated that in this case it was supportive of the innovation and partnership approach and understood the drainage issues that are unique to Hull. Therefore, Ofwat's FD included an allowance. Ofwat said due to the lack of evidence available, it made a top-down calculated allowance.<sup>1547</sup>

5.237 Ofwat also said that it expected Yorkshire to use its wider base allowance to reduce internal sewer flooding across its operating region by 47% and therefore meet its PC. It explained that if the company delivered a higher sewer flooding performance, it would be able to earn outperformance payments under the ODI framework.<sup>1548</sup>

5.238 In response to our Provisional Findings, Ofwat submitted that the evidence on aspects of the scheme was limited. Ofwat considered that Yorkshire had provided insufficient evidence of a full options appraisal, and was also concerned that the innovative nature of the scheme may be overstated. Furthermore, Ofwat highlighted some potential concerns about the efficiency and robustness of the costs included. Ofwat therefore supported the application of both an optioneering challenge (of 20%, consistent with the approach used in Ofwat's FD) and an additional cost efficiency challenge, when calculating an allowance for the scheme.<sup>1549</sup>

5.239 Ofwat was also concerned about the PC/ODI design proposed by Yorkshire, in particular, whether it aligned with the ideals and principles of the outcomes framework notably by focusing on customer outcomes and benefits. Ofwat submitted that it was more appropriate to implement a PC which applied underperformance payments if the stated properties' risk reductions (specified in Table 5-15) were not achieved. It particularly highlighted that:<sup>1550</sup>

- (a) Under Yorkshire's proposed approach, the benefit to customers of reduced flooding risk was only protected by a reputational incentive, which was insufficient for this purpose and left customers exposed to paying for benefits which they never receive. Ofwat stated that this was

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<sup>1546</sup> Ofwat's response to Yorkshire's SoC, p54, paragraph 3.104

<sup>1547</sup> Ofwat's response to Yorkshire's SoC, p54, paragraph 3.105

<sup>1548</sup> Ofwat's response to Yorkshire's SoC, p54, paragraph 3.106

<sup>1549</sup> Ofwat's response to the provisional findings – cost and outcomes, pp32–33

<sup>1550</sup> Ofwat's response to the provisional findings – cost and outcomes, pp33–36

the reason that none of its 50 scheme-specific PCs were based on expenditure spent.

- (b) An outcomes-based PC would provide the company with additional flexibility to adapt to the optimal cost benefit solution.
- (c) An outcomes-based PC would also ensure genuine partnership working, since the level of benefits proposed are based on the partnership programme in its totality, not just the company's component.
- (d) Ofwat had concerns around whether Yorkshire would be able to demonstrate the reduced risk of sewer flooding was a direct result of the investment undertaken, and suggested that an independent audit should be included to assist in verifying this.

### *Third Party views*

5.240 We received submissions from a number of Third Parties, the large majority of which voiced support for the principles and aims of the Living with Water Partnership.

5.241 Some of the other members of the Living with Water Partnership voiced explicit support for the scheme:

- (a) Hull City Council stated that Yorkshire's requested funding was essential to delivering the necessary physical and societal change across the city of Hull. It said that as Hull is a flood-prone city it requires innovative green solutions in order to make the city more resilient. It said that a reduction in funding would 'substantially threaten the ability to implement these vitally important and innovative schemes', and risked undermining the work completed to date.<sup>1551</sup>
- (b) East Riding of Yorkshire Council stated that the full funding of the proposals and continued collaboration between all the Living with Water partners is the only way that the area of East Riding and Hull can become more resilient to extreme weather events, and any reduction in this funding would be a major loss to local residents.<sup>1552</sup>
- (c) In a joint response to our Provisional Findings from both Hull City Council and East Riding of Yorkshire Council, they reiterated the importance of the Living with Water Partnership and the increased resilience it would

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<sup>1551</sup> [Hull City Council submission](#)

<sup>1552</sup> [East Riding of Yorkshire Council submission](#)

bring. The response welcomed an increase in allowances, and emphasised their ongoing work with Yorkshire to deliver this scheme.<sup>1553</sup>

5.242 In response to our Provisional Findings, the Yorkshire Forum for Water Customers also supported the view that additional funding should be made available to address the risk of flooding in Hull and Haltemprice.<sup>1554</sup>

5.243 Other Third Parties voiced general support for the principles of the Living with Water Partnership aims, albeit without specific reference to this scheme:

- (a) Blueprint for Water highlighted a significant increase in customer support for environmental schemes reflecting a shift in environmental awareness and concern across society as a whole;<sup>1555</sup>
- (b) City of Bradford Council stated that customers indicated overwhelming support of 97% for delivering Yorkshire's environmental plans, and 88% of customers supported Yorkshire's business plan more generally;<sup>1556</sup> and
- (c) The National Flood Forum stated that it strongly supported greater partnership working and collaboration, and that 'now is not the time to prioritise short term price savings over the trauma that many communities have to suffer'.<sup>1557</sup>

5.244 CCWater stated that it expects the CMA to ensure that the assessment of costs required to deliver sewer flooding solutions to the people of Hull is correct. It said that customers would expect Yorkshire to deliver an efficient solution that will address the extreme risk of flooding faced by the people of Hull and its surrounding areas. CCWater particularly highlighted that Ofwat's FD did not make clear why it reduced the allowance provided to Yorkshire from its request.<sup>1558</sup> In response to our Provisional Findings, CCWater particularly emphasised the importance of a scheme-specific ODI that will protect customers against non-delivery of the improvements that are needed.<sup>1559</sup>

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<sup>1553</sup> [East Riding of Yorkshire Council and Hull City Council's response to the provisional findings](#)

<sup>1554</sup> [Yorkshire Forum for Water Customers' response to the provisional findings](#), paragraph 3.3

<sup>1555</sup> [Blueprint for Water submission](#)

<sup>1556</sup> [City of Bradford Council submission](#)

<sup>1557</sup> [The National Flood Forum submission](#)

<sup>1558</sup> [CCWater response to Yorkshire's SoC](#)

<sup>1559</sup> [CCWater response to the provisional findings](#), paragraph 9.10

## *Our assessment and decision*

### *Our view on allowance for the scheme*

- 5.245 We consider that there is clear evidence demonstrating the unique conditions in Hull and Haltemprice which result in customers being at greater risk of flooding (including sewer flooding) compared to other cities in England and Wales. This appears consistent with the views of both Ofwat and Yorkshire. Consequently, we are of the opinion that there should be an allowance beyond Yorkshire's base costs for this programme.
- 5.246 We also welcome the innovative Living with Water partnership approach in promoting new ways of collaboration to address these challenges, particularly since the responsibility for mitigating the risks of flooding in Hull and Haltemprice would appear to be split across multiple organisations. We consider that this approach is likely to provide valuable lessons for other companies in the sector.
- 5.247 We note that Ofwat raised concerns about the aims and terminology used by Yorkshire for this scheme, specifically around 'internal flooding' compared with 'internal sewer flooding'. We consider that the aims of the Living with Water Partnership to reduce the risk of 'internal flooding' are clear (and have been clear in Yorkshire's submissions), and that the unique conditions in Hull support a broader approach than focusing only on traditional 'internal sewer flooding'. We have conducted our assessment throughout the determination process on this basis, noting that to do otherwise at this point would imply a fundamental change in the design of the scheme, Yorkshire's role in that scheme, and the wider partnership itself.
- 5.248 We have additional evidence, which was not available to Ofwat, that we have used to test Yorkshire's business plan on more of a bottom-up basis. In general, we consider that Yorkshire appears to have demonstrated the need, and provided some engineering justification for the design of the scheme.
- 5.249 However, we are concerned that the level of evidence on certain aspects of the scheme is still relatively limited, in particular:
- (a) We have seen no justification for the allocation of the £50 million estimated total costs between scheme partners, for example whether this reflects the actual responsibility for the delivery of improvements in flooding. This could result in Yorkshire's customers having to provide a greater proportion of this than is reasonable compared to other potential sources;

- (b) The activities which would be covered by the scheme are generally poorly specified. While some of this is likely due to the partnership model, this characteristic does not justify a 'blank cheque' for additional funds, and instead companies should ensure that the need for evidence to support their plans is built into the partnership model. This is particularly important if this approach is likely to be more prevalent in the future; and
- (c) Although Arup considered the difference between blue-green and traditional methods of delivering improved protection against flooding, there is limited evidence of broader optioneering (for example around the types of blue-green interventions used).<sup>1560</sup>

5.250 Overall, we consider that it is appropriate to assess the allowance on the basis of Yorkshire's business plan proposal (ie starting with the £28.7 million), as is the usual approach taken for other enhancement projects (see paragraph 5.11). However, we consider that Yorkshire has not fully demonstrated that the level of costs it has included represent an efficient and robust estimate, for the reasons given above. This would therefore support applying a challenge to Yorkshire's proposal.

5.251 We consider that the level of cost challenge to apply requires an exercise in judgement. In this case, we have applied a 20% challenge to the £28.7 million figure requested by Yorkshire, equivalent to a reduction of £5.7 million. In applying our judgement, we note that:

- (a) This is consistent with Ofwat's general approach to schemes which it considered had not demonstrated sufficient optioneering; and
- (b) Whilst Ofwat's implicit allowance calculation is only indicative, it suggests that Yorkshire has already received funding of around £4 million to address flooding in Hull and Haltemprice through its base allowances. If we were to apply an efficiency challenge of less than this, it risks Yorkshire being double-funded for these activities.

5.252 We considered whether a greater challenge on the scheme was warranted, as proposed by Ofwat. However, our view is that a 20% challenge is an appropriate judgement, given the evidence provided on optioneering and efficiency of the projected cost estimates.

5.253 We therefore apply a 20% challenge, and decide that the final determination should include an allowance of £23 million to enable Yorkshire to deliver the

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<sup>1560</sup> For example, Welsh Water's 'RainScape' scheme uses solutions such as filter strips and grass channels.

proposed scheme. This is equivalent to an increase of £6.6 million compared to Ofwat's FD.

### *Customer protection*

- 5.254 We believe that customer protection is an important consideration for this scheme, particularly given the risk of partnership funding not ultimately materialising and the impact this could have on the scheme. Our view is that it is necessary to include a scheme-specific PC and ODI to ensure that if the proposed scheme does not proceed, Yorkshire will return the provided allowance to customers.
- 5.255 Due to the partnership nature of this scheme, many of the details of final delivery are less well-specified than would be expected for a typical enhancement claim. This prevents one common approach to defining the PC, which relies on evidence of the completion of specified activities for determining whether allowances are clawed back.
- 5.256 We have considered the two approaches proposed, namely Ofwat's views of a financial penalty PC linked to service benefits, and Yorkshire's view of a dual test based on financial incentives on expenditure and reputational incentives on service benefits. We consider that both of these approaches provide flexibility to Yorkshire with regard to delivery (since they are agnostic to the activities which the company undertakes to deliver its service benefits), and both provide a degree of protection to customers if the company fails to deliver the expected level of service improvements.
- 5.257 We recognise that Ofwat's approach has some benefits; however we are concerned that it also introduces risks, largely due to the partnership nature of the scheme. In particular, we recognise Yorkshire's concern that it is exposed to the risk of penalties as a result of circumstances beyond its own control (for example, the partner organisations failing to achieve the level of funding they expected). In the circumstances, we consider that Yorkshire's proposed approach represents the most appropriate form of customer protection. We therefore include a PC and ODI of the following form:
- (a) An end-of-period test, with annual reporting.
  - (b) A financial ODI such that if Yorkshire has spent less than £23 million on this scheme at the end of the AMP, the shortfall will be returned to customers (equivalent to a 'log-down' system).
  - (c) A reputational ODI such that if the service improvement in terms of flooding risk reduction at numbers of households (as specified in Table 5-15) is not delivered, it will be incumbent on Yorkshire to undertake

further work without further funding.<sup>1561</sup> We would expect any such work to be completed by the end of AMP8 at the latest.

5.258 We note that with multiple interested Third Party partners also involved in the design and delivery of the scheme, its high-profile nature, as well as the inclusion of a reputational ODI, this scheme will be subject to substantial external scrutiny.

5.259 With regard to auditing the level of service improvement, Yorkshire submitted that all of its PCs are subject to stringent third party audit and assurance by appropriately qualified organisations, and that it was not necessary to include a third party audit in this specific instance.<sup>1562</sup> Given that measuring the service improvements is reliant on an understanding of complex risk models, we consider it is appropriate to include an explicit requirement for third party audit, particularly if this requires no incremental activity by Yorkshire, since it has said such an audit would take place anyway.

### ***Deep dive 2: Yorkshire – Internal Sewer Flooding Scheme***

5.260 During the PR19 process, Yorkshire requested either additional funding (a £106 million cost adjustment claim in its 2018 Business Plan) or a change to its internal sewer flooding PC to recognise the specific challenges the company submitted it faced from internal sewer flooding in cellared properties.<sup>1563</sup>

5.261 The £106 million claim was rejected by Ofwat at its draft determination. It stated that it considered the modelled base allowances to be sufficient for Yorkshire's needs, and that the company provided insufficient evidence to support its claim that it has a higher number of cellared properties than the industry average. Yorkshire then withdrew this claim prior to Ofwat's FD.<sup>1564</sup>

5.262 In its SoC, Yorkshire criticised Ofwat's approach to setting the PC levels, and submitted that it was disproportionately affected by regional and company-specific circumstances in relation to internal sewer flooding.<sup>1565</sup>

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<sup>1561</sup> We note that 'internal flooding risk' here would represent all forms of flooding, not just a narrow definition of 'internal sewer flooding'.

<sup>1562</sup> [Yorkshire's reply to responses to the provisional findings](#), paragraph 4.3.20

<sup>1563</sup> Yorkshire said that it has an atypically high number of cellared properties in its region relative to the rest of the industry. Consequently, the company contends that it is costlier, and more time consuming for it to limit and/or reduce internal sewer flooding compared to other companies in the sector. Furthermore, the company explained that industry-wide cost allowances and PC levels are not appropriate, unless they are adjusted to reflect the prevalence of cellars.

<sup>1564</sup> Feeder model [FM\\_CAC\\_YKY\\_ST\\_DD](#), tab 'WWN\_cellared properties'.

<sup>1565</sup> [Yorkshire SoC](#), paragraphs 11(d), 37, 69, and 159–160

5.263 We maintained Ofwat's PC levels for internal sewer flooding in our Provisional Findings. In response to the Provisional Findings, Yorkshire submitted a new enhancement claim stating that the CMA had not adequately taken account of the company-specific factors that impact the achievability of the PC targets set. The company argued that as a result incremental enhancement funding of £79 million was required.<sup>1566</sup>

### *Yorkshire's views*

#### *Background*

5.264 Yorkshire submitted that it has a higher proportion of cellared and back-to-back properties.<sup>1567</sup> Yorkshire highlighted that The Public Health Act 1875 gave powers to ban construction of this property type and this was formalised as an effective ban on construction in 1909. Yorkshire said that building of back-to back properties stopped in most areas of the country following these legislative changes, however, it highlighted that in Leeds and Bradford the ban was not enforced. Yorkshire stated that by exploiting a loophole in the legislation, construction continued until 1937 under a pre-approval process.

5.265 Yorkshire stated that this raises a unique challenge in relation to internal sewer flooding. It explained that in a cellared property the internal configuration of parts of the property sit at or below sewer level. Yorkshire said that this poses a risk of internal sewer flooding in two ways:

- (a) if a cellar connection to sewer is present, this often forms the lowest point on the network, so it is the first point of escape on network surcharge; and
- (b) any subsurface flows due to exfiltration have a potential route to internally ingress a property.

5.266 Yorkshire's engineering advisers, Stantec, provided an illustration showing how the presence of a cellar can result in a blockage either causing an internal sewer flooding incident, or converting an external sewer flooding incident into an internal sewer flooding incident:

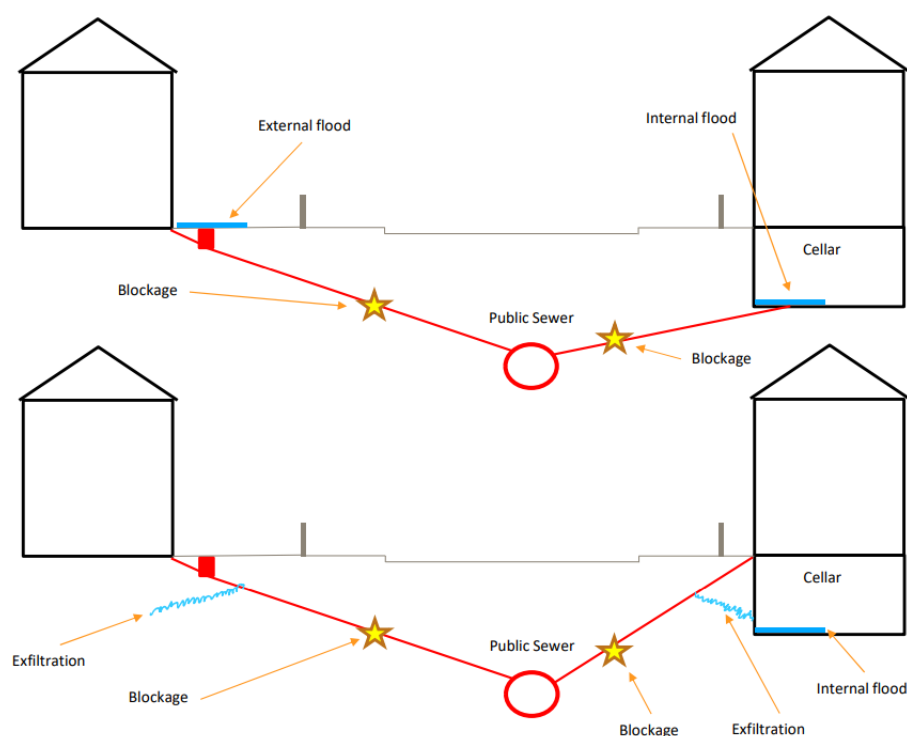
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<sup>1566</sup> [Yorkshire's response to the provisional findings](#), paragraph 6.1.6

<sup>1567</sup> Back-to-back properties are those which share three out of their four walls with neighbours, with the front wall having the only external door and windows.



**Figure 5-1: Example of how a blockage creates a different consequence of internal, external or potentially no flooding based on whether the property has a cellar or not.**



Source: Yorkshire

5.267 Stantec summarised this point by saying that ‘Cellared properties are more likely to flood due to being below ground level and more akin to external flooding for properties with no cellar. If Yorkshire Water had a lower proportion of cellars, then it is reasonable to assume that the external flooding may have increased.’

5.268 Stantec also emphasised the additional difficulty in addressing sewer flooding in these types of property due to access issues, which can affect monitoring, maintenance, and remedial action. Stantec supported this by highlighting a survey it undertook on properties in high-risk flooding hotspot areas within Yorkshire’s region, which concluded that the presence of cellars was very common,<sup>1568</sup> and the majority of properties did not have reasonable access to the network to allow proactive/reactive maintenance activities to be carried out.<sup>1569</sup>

<sup>1568</sup> Of the properties where the presence or absence of a cellar could be confirmed, 96% of these properties were confirmed as having a cellar. We note that it was only possible to confirm the presence or absence of a cellar in 59% of properties surveyed.

<sup>1569</sup> 32% of properties had an inspection chamber or a catch pitch gully which provided a good monitoring point and easy access to the sewer that supports proactive/reactive interventions.

*Evidence on number of cellars and propensity to suffer internal sewer flooding*

5.269 Yorkshire said that based on its own data, over 11.4% (or 260,000 properties) of wastewater connected properties in its region are cellared. Additionally, Yorkshire highlighted industry wide MORI survey data (1998) and Census data (2001). The company explained that the MORI data suggests that the proportion of cellars is over four times higher and the Census data two and a half times higher than the industry average respectively, as shown in Table 5-16:

**Table 5-16: Yorkshire prevalence of cellars and comparisons to the industry**

<b>Data source</b>	<b>% cellars YW</b>	<b>% cellars industry average</b>	<b>YW proportional no. cellars</b>
<b>YW internal</b>	11.4%	NA	
<b>MORI</b>	17.0%	4.1%	4.2 x
<b>Census 2001</b>	6.2%	2.4%	2.6 x

Source: Yorkshire

5.270 Yorkshire submitted that its recorded performance data over the last two years showed that around 70% of flooding incidents have been in cellars.

*Yorkshire's proposal*

- *Need for an enhancement allowance*

5.271 Yorkshire submitted that, given the unique challenges in its region, industry-wide cost allowances and PC levels are not appropriate for the company, unless there is an adjustment to reflect the higher than industry average prevalence of cellars and back-to-back properties in its region.<sup>1570</sup>

5.272 Yorkshire said that the Provisional Findings indicated that the PC targets were set at reasonable levels in Ofwat's FD and therefore that regional factors relating to internal sewer flooding should be addressed through cost allowances.<sup>1571</sup>

5.273 Yorkshire and its advisers, Economic Insight, submitted that the CMA's approach to leakage at Provisional Findings would support making an

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<sup>1570</sup> [Yorkshire's response to the provisional findings](#), paragraph 6.8.8

<sup>1571</sup> [Yorkshire's response to the provisional findings](#), paragraph 6.8.10

enhancement allowance since these circumstances met four criteria which had effectively been applied, namely:

- (a) **whether there are unique regional characteristics which prevent a company from efficiently meeting the targets:** It said that it considered there to be sufficient evidence that Yorkshire is subject to a regional factor that should be accounted for in its funding allowance;
- (b) **whether the targets represent a step change in performance:** Economic Insight explained that once regional factors were taken into account, Ofwat's PC levels represented a step change in performance for Yorkshire;
- (c) **whether there will be additional costs associated with the level of improvement:** Economic Insight said that to prevent incidents further expenditure would be required; solutions include short-term operational interventions such as jetting, along with long-term options such as installing non-return valves or network sensors; and
- (d) **whether the necessary investments should have been made in previous AMPs:** Economic Insight explained that Yorkshire has exceeded its PR14 targets in all years. Furthermore, Economic Insight said it was not aware of funding having been provided previously to specifically address internal sewer flooding related to Yorkshire's cellars.

- *Proposed value of adjustment*

5.274 Yorkshire estimated the impact on its internal sewer flooding performance if the number of cellars were adjusted to reflect the industry average. Yorkshire said that its analysis highlighted that if the number of cellars were proportionate to the industry average, the impact would likely be around a 50% reduction in the number of incidents per year, as shown in Table 5-17.

**Table 5-17: Yorkshire calculation of impact for adjusting internal sewer flooding for industry average propensity of cellars**

			No. incidents at proportional no. cellars	
AMP7 PC shadow reporting 2 year average	No. Incidents	%	MORI	Census 2001
Total YW incidents	1229			
In cellars	870	71%	208	331
Not in cellars	359	29%	359	359
Revised outturn			567	690
Hypothecated Delta			-54%	-44%

5.275 Yorkshire's advisers, Economic Insight used this estimate to calculate the figure of £79 million which was requested by Yorkshire in its response to our Provisional Findings. Yorkshire said this was based on the following approach:

- (a) Using the 50% figure above to calculate a 'cellar-adjusted' PC level for Yorkshire, which would represent the level of performance funded by base costs;
- (b) Calculating the gap between this 'cellar-adjusted' PC level and the upper quartile PC level set in 2025, giving an estimate of the improvement in performance for which the company is not funded through its base allowances;
- (c) multiplying this gap by an efficient unit cost of £0.33 million, as estimated by Yorkshire; and
- (d) subtracting the CMA's enhancement allowance for Hull and Haltemprice to avoid double-counting.

#### *Customer protection*

5.276 Yorkshire said that if the CMA were to provide additional enhancement allowance to address its internal sewer flooding challenges then the incentive package should also be changed to protect customers and ensure consistency with the approach taken for leakage in the Provisional Findings.<sup>1572</sup>

5.277 In summary Yorkshire proposed that:<sup>1573</sup>

- (a) a Tier 1 incentive rate should apply to performance immediately worse than the PC levels. The Tier 1 rate will apply between the PC level and the 'cellar-adjusted' PC level. This rate would be set such that it would recover the enhancement allowance if Yorkshire did not close the performance gap accounted for by cellars;
- (b) if performance was worse than the 'cellar-adjusted' PC level, the Tier 2 incentive rate would be applied (equal to Yorkshire's current penalty rate); and

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<sup>1572</sup> [Yorkshire's response to the provisional findings](#), paragraph 6.8.15

<sup>1573</sup> [Yorkshire's response to the provisional findings](#), paragraph 6.8.16

(c) the CMA's collar at Provisional Findings should be maintained, except for the early years in which it would be set equal to the 'cellar-adjusted' PC level. This would allow for full recovery of enhancement expenditure.

5.278 Yorkshire said that if the CMA were to decline to provide additional funding for internal sewer flooding, the CMA's provisional decision to change Yorkshire's collar would expose it to inappropriate financial risk. Yorkshire said that in those circumstances, the CMA should return the collar to the level applied at Ofwat's FD.<sup>1574</sup>

#### *Ofwat's views*

5.279 Ofwat said that in Yorkshire's September 2018 business plan, it submitted a cost adjustment claim for £106 million, using MORI survey data to argue the company had a disproportionately high number of cellared properties. Ofwat said that it rejected the claim on the basis that there was insufficient evidence that Yorkshire had a higher number of cellared properties than the national average. Ofwat noted that Yorkshire withdrew the claim in later submissions.<sup>1575</sup>

5.280 Ofwat highlighted that it provided a base allowance to 'reduce sewer flooding risk for properties' as well as the operational and capital maintenance costs associated with blockages, collapses and sewer refurbishment.<sup>1576</sup>

5.281 Ofwat argued that both cost adjustment claims and enhancement allowances have a high evidential bar, and that a company must demonstrate that it is company-specific circumstances (which are outside of management control) that are driving performance/additional investment requirements, and not poor management decisions. Ofwat highlighted that customers must not pay twice for a service that they should have received.<sup>1577</sup>

5.282 Ofwat said that if it were to make an additional cost allowance, it would expect a detailed cost breakdown for each type of cellared property, and a full options appraisal to demonstrate that the company had considered all options in light of the new evidence. Ofwat argued the company had failed to provide this.<sup>1578</sup>

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<sup>1574</sup> [Yorkshire's response to the provisional findings](#), paragraph 6.8.18.

<sup>1575</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), paragraph A2.21

<sup>1576</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), paragraph A2.22

<sup>1577</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), paragraph A2.15

<sup>1578</sup> [Ofwat's further submission on Yorkshire](#), paragraph 4.49

5.283 Ofwat said that it was of the opinion that the Provisional Findings on cost allowances with respect to leakage were not related to the issues the company had raised with respect to internal sewer flooding.<sup>1579</sup>

*Ofwat's assessment against its 'gates'*

5.284 Ofwat considered Yorkshire's request as a cost adjustment claim for additional funding for reducing internal sewer flooding, which was incorporated in the scope of the base models.<sup>1580</sup>

5.285 Ofwat said that in order to qualify for a cost adjustment claim, the value of a claim has to initially pass a materiality threshold. Ofwat explained that if a claim passes the materiality threshold, it then must provide compelling evidence against several relevant assessment criteria including 'need for adjustment', 'best option for customers' and 'efficiency of costs'.<sup>1581</sup>

5.286 Ofwat submitted that Yorkshire had not proven its claim against any of these requirements, and in summary:

**(a) The claim would not meet the materiality threshold for a cost**

**adjustment claim:** Even if this request of £79 million was combined with a previous request for £43 million in Yorkshire's original plan (total of £122 million), the potential gap to the allowance already provided to Yorkshire through the base cost models and Hull and Haltemprice enhancement scheme would not meet Ofwat's materiality threshold for a cost adjustment claim.<sup>1582</sup>

**(b) Yorkshire had not proven that an adjustment was needed:** Ofwat submitted that Yorkshire's evidence on prevalence of cellars was old, unreliable, and inconsistent. In particular, the MORI survey was not designed for this purpose, and produced very different results such as indicating that 17% of the properties flooded had cellars compared with Yorkshire's estimate of around 70%. Furthermore, the wide range of resulting estimates for cellar prevalence highlighted a degree of uncertainty and a lack of verifiable evidence to back up the company's claims.<sup>1583</sup> Ofwat also noted that, to the extent that the issue was driven

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<sup>1579</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), paragraph A2.4

<sup>1580</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), p43

<sup>1581</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), paragraph A2.23

<sup>1582</sup> Ofwat calculated an implicit allowance for internal sewer flooding in the base cost models for Yorkshire as being £77-118 million. Combined with £23 million for Hull and Haltemprice gives a total of £100-141 million. The difference between this and Yorkshire's claim was, at most £22 million, which was less than the materiality threshold of 1% of business plan totex for wastewater network plus, which for Yorkshire was £25 million. [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), A2.24–2.29.

<sup>1583</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), A2.32–2.34

by transferred sewers, the effect of this was already reflected in the base models.<sup>1584</sup>

(c) **Yorkshire had not proven the best option for customers:** Ofwat stated that the company had not set out details of the options considered for investment relevant for the different housing stock and locations of internal sewer flooding risk, or why its chosen solutions were the best options for customers.<sup>1585</sup>

(d) **Yorkshire had not proven the robustness and efficiency of its claimed costs:** The 'efficient unit cost' included in Economic Insight's analysis was based on a subset of Yorkshire's enhancement proposals and was only benchmarked against Yorkshire itself (which Ofwat considered to be inefficient). Furthermore, there was insufficient evidence to be able to assess the robustness of costs on a bottom-up basis.<sup>1586</sup>

5.287 Ofwat also disputed the evidence around access difficulty put forward by Yorkshire, and submitted that this had been overstated. Ofwat particularly highlighted that (i) claims that 'nearly all' properties surveyed confirmed the presence of a cellar did not reflect Ofwat's calculations that around 20% did not (ii) Stantec had been unable to confirm whether a cellar was present in 41% of properties, including in 17% of cases where an access survey was completed, and (iii) that while potentially 'non-ideal', the survey had found that monitoring was likely to be possible in 70% of the surveyed properties.<sup>1587</sup>

#### *Yorkshire's sewer network performance*

5.288 Ofwat said the CMA should consider the claimed impact of cellars in the context of the company's poor performance in this area relative to the sector. Ofwat explained this is an important consideration as customers should not be asked to pay to catch up with the performance of peers.<sup>1588</sup>

5.289 Ofwat highlighted that the latest 2019/20 performance data illustrated that Yorkshire had a wider issue in its sewer network beyond the claimed impact of cellars. Ofwat said that the data highlighted that Yorkshire:<sup>1589</sup>

(a) had the worst internal sewer flooding performance in the sector;

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<sup>1584</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, A2.35

<sup>1585</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, pp53–54

<sup>1586</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, p43

<sup>1587</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, p48

<sup>1588</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, paragraph A2.7

<sup>1589</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, A.2.9

- (b) had the second worst external sewer flooding performance in the sector;
- (c) had the second worst sewer collapse performance in the sector; and
- (d) had the joint third worst performance on pollution incidents in the sector.

5.290 Furthermore, Ofwat highlighted evidence from Yorkshire's business plan in which the company highlighted it has had very low sewer renewal rates.<sup>1590</sup>

5.291 Ofwat stated that there was a potential link between Yorkshire's poor sector relative performance on internal sewer flooding and the effectiveness of its asset and operational practices.<sup>1591</sup>

### *Customer protection*

5.292 Ofwat said as it rejected the request for additional enhancement funding, there is not the need for a two-tier structure to Yorkshire's internal sewer flooding ODI and the existing ODI structure should be retained. Ofwat explained that if the CMA did allow enhancement funding for Yorkshire, a two-tier ODI structure would be appropriate as a means of protecting customers.<sup>1592</sup>

5.293 Ofwat explained that it disagreed with Yorkshire's proposed Tier 1 ODI rate under the two-tier structure. Ofwat said that Yorkshire's proposed Tier 1 rate did not include penalty incentives for underperformance.<sup>1593</sup>

5.294 Ofwat said that regarding leakage ODIs, it set two-tier ODIs at PR19 for the companies that were given leakage enhancement funding. Ofwat explained that it allowed companies' Tier 1 rates to be clawback-only where the companies were leading performers with stretching performance.<sup>1594</sup>

5.295 Ofwat said that as Yorkshire was neither a leading performer on leakage nor internal sewer flooding, it therefore failed the requirements for clawback-only Tier 1 rates for both PCs. Ofwat stated that if the CMA were to allow Yorkshire additional enhancement funding, the Tier 1 rate should include both clawback and penalty incentives to ensure customers are protected against underperformance.<sup>1595</sup>

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<sup>1590</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, A.2.10

<sup>1591</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, A.2.11

<sup>1592</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, pp56–57

<sup>1593</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, pp56–57

<sup>1594</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, pp56–57

<sup>1595</sup> Ofwat's reply to responses to the provisional findings – costs and outcomes, pp56–57



## *Our assessment and decision*

- 5.296 In section 7, paragraphs 7.161 to 7.177, we consider the appropriate level to set for Yorkshire's internal sewer flooding PC. Here, we consider whether maintaining the upper quartile level used in Ofwat's FD would justify an increased allowance for Yorkshire.
- 5.297 We agree with Ofwat that this assessment is more akin to a cost adjustment claim, assessing whether Yorkshire has unique operating circumstances which drive higher efficient costs for the company relative to its peers.<sup>1596</sup> However, due to the similarity of the assessment frameworks between cost adjustment claims and enhancement deep dives, we have conducted our analysis as an enhancement deep dive, consistent with Yorkshire's request. In doing so, we note Ofwat's arguments that the claim would fail on the basis of materiality but also recognise the level of uncertainty around the scale of the claim compared with the allowances provided.
- 5.298 We also note that Yorkshire has been particularly unclear on this issue with regard to the treatment of cellars compared to back-to-back housing, often conflating these without explaining why or whether this is appropriate. While these two factors may be related, we would have expected Yorkshire to clearly set out its evidence and rationale for each potential driver of increased internal sewer flooding.

### *Need for additional funding*

- 5.299 While we have not explicitly adopted the four criteria test which Economic Insight has specified (see paragraph 5.273), it raises the key issues which we consider would be required to demonstrate the need for additional funding. In particular, we focus our assessment on:
- (a) Yorkshire's claims to have a higher prevalence of cellars in its region than the industry average; and
  - (b) Whether properties with cellars are more likely to suffer internal sewer flooding, which in turn requires Yorkshire to undertake additional activity.
- 5.300 We address each of these in turn below. In doing so, we note that these circumstances are different to leakage. For leakage, and unlike internal sewer flooding, historical funding was set on a company-specific, economically-derived basis (SELL), and we are now expecting the sector to

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<sup>1596</sup> See Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p136

improve substantially, with some companies' PCs set beyond the upper quartile. These PCs are discussed in more detail in sections 7 and 8.

- *Prevalence of cellars*

5.301 Yorkshire has provided three data sources for the prevalence of cellars in its region (its internal reporting, MORI, and census data), with two of these also having estimates for the industry. However, we have some concerns about the use of this data for the purpose of estimating cellar prevalence, in particular as the data sources give very wide estimates on both key measures. For example, estimates of the prevalence of cellars in Yorkshire ranges between around 6% and 17%, a nearly 3-fold difference, and comparisons between Yorkshire and the industry average number of cellars was 2.6x or 4.2x for the two data sources provided.

5.302 More concerning is the lack of activity on the part of Yorkshire to support its case. Where a company is requesting tens of millions of pounds of customers' money to undertake additional activity, we would expect it to undertake necessary work to support its case. Here, Yorkshire has instead relied on data gathered from third party sources designed for other purposes with bespoke, partial adjustments. This concern is exacerbated by the fact that, if cellars are as important to addressing internal sewer flooding challenges as Yorkshire has expressed, then having a good understanding of the number and location of cellared properties would appear to be a vital first step for the sector as a whole, with clear operational benefits.

5.303 On this basis, we consider that while Yorkshire has some data which shows that it may have a higher prevalence of cellars in its region than other water companies, the robustness of the evidence provided falls short of the necessary level to support its enhancement allowance claim.

- *Increased risk of internal sewer flooding in properties with cellars*

5.304 When assessing the effect of cellars on internal sewer flooding, we apply a high evidential bar. Companies have an incentive to identify specific circumstances which could increase costs, but there may be other offsetting factors which they do not draw attention to.<sup>1597</sup> In the absence of robust evidence that cellar prevalence is a material factor in contributing to cellar

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<sup>1597</sup> WRc stated that other companies may have factors which would increase sewer flooding prevalence, and which are less prevalent in the Yorkshire region, and that all of these factors would need to be balanced. It highlighted, as an example, that pitch fibre pipes found in many s105A sewers which occur widely in Southern England but not in Yorkshire and are known to cause sewer blockages due to its propensity to deform and collapse.

flooding, we would not consider it appropriate to provide a higher allowance and risk double-funding activities with customers' money.

- 5.305 Yorkshire and its advisers have presented an engineering explanation for why cellared and back-to-back properties could have an increased risk of internal sewer flooding (and higher costs associated with fixing them). However, it is unclear whether this is actually driving a difference in performance, such that this is a material factor.
- 5.306 Yorkshire has calculated an estimated effect of this, as shown in Table 5-17. The implication of this calculation is that cellared properties are nearly 20x more likely to flood than non-cellared properties.<sup>1598</sup> With such an extreme difference, we would expect to see broader recognition across the sector of the importance of this as a factor in addressing internal sewer flooding. However, we are not aware of such recognition.
- 5.307 We also note that, far from being a consistent issue amongst poor performers in internal sewer flooding, of the two worst performing large WASCs on internal sewer flooding, one has the highest prevalence for cellared properties, and the other has the lowest (according to the census-based data that Yorkshire provided).<sup>1599</sup>
- 5.308 Finally, we observe that Stantec's explanation about the effects of the presence of a cellar on an internal sewer flooding incident would indicate an expectation that a high prevalence of cellars would result in a reduced number of external sewer flooding incidents (since a number of these have instead collected into a cellar). Stantec stated that 'If Yorkshire Water had a lower proportion of cellars, then it is reasonable to assume that the external flooding may have increased.' However, as Ofwat observes, Yorkshire also performs poorly on external sewer flooding, which we consider supports a concern that it is not the prevalence of cellars which is driving Yorkshire's poor performance on this metric.
- 5.309 We therefore consider that Yorkshire has not demonstrated that a higher prevalence of cellars would represent a factor which required additional funding in order to reduce internal sewer flooding events.

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<sup>1598</sup> Yorkshire submitted that cellared properties made up 11.4% of its stock, but accounted for around 71% of its internal sewer flooding incidents. The ratio of flooding incidents in cellared vs uncellared properties is therefore  $(71\% \div 11.4\%) \div (29\% \div 88.6\%) = 19.03$ .

<sup>1599</sup> In the dataset provided, Yorkshire is listed as having 5.5% of properties with cellars, and Northumbrian is listed as having 0.6%. The [2019-20 service delivery report](#) indicates these two companies as being the worst performers at internal sewer flooding (excluding Welsh Water).

### *Proposed value by Yorkshire*

- 5.310 Economic Insight calculated a figure of £79 million for Yorkshire's enhancement claim on internal sewer flooding. This consisted of calculating an estimate for the number of 'excess' incidents which were driven by cellar prevalence, and then multiplying this by an estimated unit rate.
- 5.311 For the reasons explained above in relation to the need for an adjustment, we do not accept that the 'excess' incident calculation is robust. Furthermore, we have concerns about the unit rate used in this calculation, in particular:
- (a) The figure is based on Yorkshire's data without a robust cross-check or verification with any other sources; and
  - (b) The calculated unit cost of £330k per incident appears very high and likely to be substantially above the level of customer detriment, and we do not have sufficient data to conduct a proper cost benefit analysis (for example, an explanation on whether these include recurring costs, length of time the benefits are granted for etc) which might justify this level of expenditure.
- 5.312 Finally, we have concerns that Yorkshire has not provided details of how these additional funds would be spent based on its business plan, as would normally be expected for an enhancement deep dive.
- 5.313 Therefore, even if we were to accept Yorkshire's submission in relation to the potential for cellars to impact internal sewer flooding (which we do not), the calculation of the implied cost of addressing this effect would raise substantial concerns.

### *Decision on allowance*

- 5.314 On the basis of our above assessment, we consider that Yorkshire has not demonstrated either the need for making an additional allowance, or provided a robust estimate of the efficient costs of addressing any such need. Therefore, our decision is not to allow Yorkshire any additional customer funds for this claim.

### *Customer protection*

- 5.315 Since we have not provided any enhancement allowance, it is not necessary to include a two-tier ODI. However, we have considered Yorkshire's response to our Provisional Findings on the ODI collar, and the level it should be set at in section 7, paragraphs 7.174 to 7.177.

### ***Deep dive 3: Northumbrian – Essex Resilience Scheme***

- 5.316 In its PR19 business plan, Northumbrian proposed a £20.4 million<sup>1600</sup> enhancement investment for a 20km<sup>1601</sup> Abberton to Hanningfield raw water transfer main (also referred to as the Essex Resilience Scheme). The scheme aims to address potable (treated) water demand issues and improve water resilience in the company's Essex region.
- 5.317 Ofwat rejected the entirety of Northumbrian's proposal on the basis of undemonstrated need, particularly given other enhancement programmes for which additional funding had already been allowed.<sup>1602</sup>

#### ***Northumbrian's views***

##### ***Background and need for the scheme***

- 5.318 Northumbrian stated that, since the Abberton reservoir was expanded (this was completed in 2014),<sup>1603</sup> Essex had surplus total raw water supplies, with enough to meet a 1 in 200 year drought. However, this raw water needs still to be treated and distributed to customers.<sup>1604</sup>
- 5.319 Northumbrian explained that the proposed transfer scheme is designed to improve the resilience of the raw water system and enable the Hanningfield WTW to respond efficiently to outages and demand peaks within its network.<sup>1605</sup>
- 5.320 Northumbrian said the treated water supply network in Essex is integrated and there is a high degree of flexibility for moving potable water around the region to where it is required. However, the company highlighted that there is limited scope to transfer surplus raw water to align with the availability of surplus treatment capacity, and that this could result in a situation where one area was experiencing restrictions in supply whilst a neighbouring part holds ample raw water supplies which could not be used. Northumbrian stated that this represented the main resilience risk in the region.<sup>1606</sup>

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<sup>1600</sup> Northumbrian (2019), [3.3.2 Essex Resilience: Abberton to Hanningfield transfer main](#), p17

<sup>1601</sup> Northumbrian (2019), [Northumbrian: Ensuring long term resilience](#), p8

<sup>1602</sup> Ofwat (2019), [PR19 Northumbrian Water final determination](#), pp41–42

<sup>1603</sup> In response to the provisional findings, Northumbrian explained that the decision to expand Abberton was taken after 15 years and investigation of around 260 sites which found that this was the most viable option from an environmental, engineering and economic perspective. By contrast, any enlargement of the Hanningfield reservoir is not logistically possible due to the topography of the site. [Northumbrian's response to the provisional findings](#), paragraph 215.

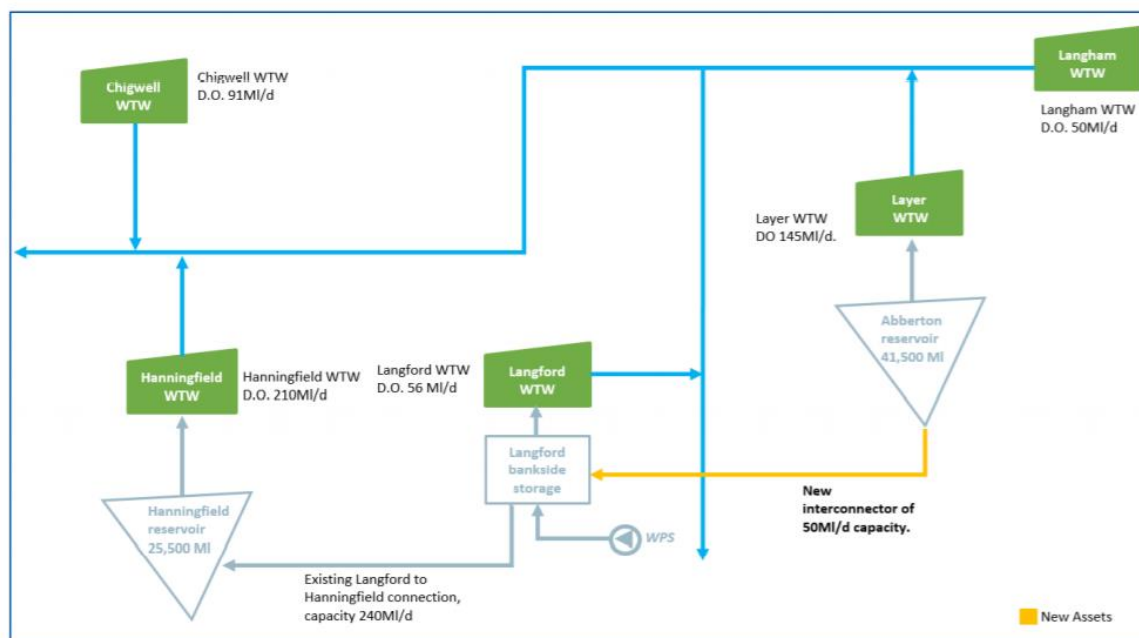
<sup>1604</sup> [Northumbrian's reply to Ofwat's response](#), paragraph 155

<sup>1605</sup> Northumbrian (2019), [3.3.2 Essex Resilience: Abberton to Hanningfield transfer main](#), p5

<sup>1606</sup> [Northumbrian SoC](#), paragraph 61

5.321 Northumbrian proposed an enhancement scheme to address this risk. The proposed enhancement involves building an interconnector pipe which would allow the company to transfer raw water directly from its larger Abberton reservoir to its Langford WTW, via its bankside storage reservoir. The company proposes to use the existing Langford to Hanningfield connection to further transfer the raw water to its higher capacity WTW at Hanningfield as shown in Figure 5-2:

**Figure 5-2: Schematic showing raw water and treated water assets in the Water Resource Zone<sup>1607</sup> (WRZ); yellow line depicts the proposed interconnector<sup>1608</sup>**



Source: Northumbrian

5.322 Northumbrian highlighted its concerns regarding the likelihood of failure which this scheme was designed to address. It stated that in both 2016 and 2018 raw water levels in the Hanningfield reservoir were at historical low levels due to restricted raw water transfer capability within its systems.<sup>1609</sup> In both cases, the company said, it came very close to having a major impact on customers, and if there had been any other shocks at the time (eg COVID-19) then it is likely it would have run out of supply in the Hanningfield region. Northumbrian submitted that as a result of its restricted raw water transfer capability, it could face localised water shortages, and this represented a significant and immediate threat to supplies.<sup>1610</sup>

<sup>1607</sup> A water resource zone is an area within which the abstraction and distribution of supply to meet demand is largely self-contained; see Natural Resources Wales and Defra (2016), [Final Water Resources Planning Guideline](#), p10

<sup>1608</sup> Northumbrian (2019), [3.3.2 Essex Resilience: Abberton to Hanningfield transfer main](#), p18

<sup>1609</sup> Northumbrian (2019), [3.3.2 Essex Resilience: Abberton to Hanningfield transfer main](#), pp8–12

<sup>1610</sup> Northumbrian (2019), [3.3.2 Essex Resilience: Abberton to Hanningfield transfer main](#), p6

5.323 Northumbrian highlighted five factors which it stated would increasingly impact its ability to balance water demand, resulting in increasing need for this scheme in the future:<sup>1611</sup>

- (a) **Algal blooms:** The company said that algal blooms are increasing in frequency and length and are more widespread due to warmer summers. These can result in outages at WTW which rely on slow sand filters (which are used in all of the WTW in the area other than Hanningfield), and so would increase the demand on the Hanningfield WTW which is better able to treat raw water impacted by algal blooms.
- (b) **Reducing rainfall:** The company stated that climate change is affecting its region and increasing the likelihood and severity of droughts and this could result in supply issues because of a lack of integration of the raw water network.
- (c) **Population growth:** The company said it expects to see a significant change in demand over the planning period with growth in population of almost 20% by 2045.
- (d) **Peak demand periods:** Northumbrian said that extreme weather events in recent years has resulted in more frequent peaks in demand, particularly in Essex during the summer. It stated that the technology at Hanningfield WTW allowed it to ramp capacity up and down more quickly to meet these changes, placing increased demand on the Hanningfield reservoir.
- (e) **Ely-Ouse transfer:** The Ely-Ouse to Essex Transfer Scheme is an Environment Agency-run scheme which transfers water from the Ely Ouse in Norfolk into the Essex rivers to aid in refilling Abberton and Hanningfield reservoirs. Northumbrian stated that this means that its ability to deploy the full output of Hanningfield WTW is in the hands of a third party and outside of its own control.

5.324 Northumbrian explained that it had not conducted any quantitative analysis to assess the impact that this scheme would have on reducing the risk of running out of water in Hanningfield. However, Northumbrian was able to provide a scenario analysis which demonstrated hypothetical drivers of local supply-demand pressures and the impact on water availability both with and without the proposed scheme.<sup>1612</sup>

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<sup>1611</sup> Northumbrian (2019), [3.3.2 Essex Resilience: Abberton to Hanningfield transfer main](#), pp4–6

<sup>1612</sup> [Northumbrian's submission following the main party hearings](#), pp9–11

### *Option appraisal*

- 5.325 As part of its option appraisal process to address the identified risks, Northumbrian considered three options:<sup>1613</sup>
- (a) **Do nothing:** Northumbrian stated that the risk of doing nothing was that a longer repeat event of the problems in 2016 and 2018 could result in an impact on supply to at least 365,323 properties. The company stated that this was not considered a viable option.
  - (b) **Increase Layer WTW capacity to 165 MI/d and triplicate mains (£58.8 million in 2006 prices):** Northumbrian said that, at the time of the Abberton reservoir enlargement scheme, its engineering consultancy (MWH) considered the option of expanding Layer WTW.
  - (c) **Link Abberton and Hanningfield reservoirs via a raw water pipeline capable of transferring up to 50 MI/d (£20.4 million in 2017/18 prices):** The proposed approach. The company stated that this option makes full use of existing assets and treatment capacity to address current risks in a way that defers the need for more costly expansion of Layer WTW until at least 2045.
- 5.326 Northumbrian stated that there were no alternative options available to address this risk as there are no other water resources that it could turn to for additional raw water. Therefore, it said that it could either move the raw water to treat it (option c) or treat it where it is (option b).
- 5.327 In response to our Provisional Findings, Northumbrian provided additional explanation of its considerations, both around expanding reservoirs and alternative sources of water. This included a report from its external engineering advisers in relation to alternative routes for the pipeline, which concluded that Northumbrian's proposed costs were 'reasonable'.<sup>1614</sup>

### *Sources of risk*

- 5.328 Northumbrian stated that the aim of the scheme is to reduce the risk of catastrophic supply failure arising from insufficient potable water supply in the Essex region, regardless of the specific causes. Northumbrian pointed to COVID-19 as an example of a risk factor which was not specifically identifiable in advance, but which has contributed to resilience issues, and if

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<sup>1613</sup> Northumbrian (2019), [3.3.2 Essex Resilience: Abberton to Hanningfield transfer main](#), pp16–18

<sup>1614</sup> [Northumbrian's reply to responses to the provisional findings](#), sections 4.5.1 and 4.5.2



this had coincided with other events such as those in 2016 or 2018 could have resulted in a loss of supply to households.

- 5.329 Ofwat's FD included funding for a Northumbrian proposal to add Dissolved Air Flotation (DAF) to the existing treatment process at the Layer WTW.<sup>1615</sup> The company said that the aim of this additional treatment process was to restore the deployable output of Layer WTW to pre-2016 levels.<sup>1616</sup> The company highlighted that the Layer scheme is focused on a single issue, meeting deployable output during algal blooms, and would not increase resilience against other potential risk factors.<sup>1617</sup> Northumbrian stated that while the case for the Essex Resilience Scheme and the Layer water treatments works scheme were related, they were separate and both investments were needed.
- 5.330 Northumbrian stated that it was unhelpful to focus on individual potential causes which occurred during the 2016 and 2018 events (such as algal blooms or a failure in pumping stations which made up the Ely-Ouse to Essex Transfer Scheme). Northumbrian submitted that although some of the specific concerns discussed in paragraph 5.323 may be less likely to occur in the future due to other changes, this scheme was still necessary to mitigate the identified risk.
- 5.331 Northumbrian said that it was also misleading of Ofwat to state that the drivers of the proposed enhancement were already factored into the WRMP process. Northumbrian explained that it was clear that this was not a supply-demand scheme under WMRP. It said that the factors of population growth, reduced rainfall and demand fluctuations were relevant to the overall consideration of risk from a resilience perspective.<sup>1618</sup>

#### *Robustness and efficiency of claim's costs*

- 5.332 Northumbrian explained that it had developed its cost estimates for this scheme using its internal systems and models, which it had developed using as-built information and market tested framework rates. Northumbrian commissioned its framework partner to carry out an assurance exercise on its enhancement schemes which generally found the costs to be robust, with estimates higher than Northumbrian's own costings.
- 5.333 Northumbrian's cost consultants provided further assurance, and produced estimates on average 7% lower than the company's costing and in this

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<sup>1615</sup> Ofwat provided an allowance of £22 million for this project.

<sup>1616</sup> Northumbrian (2019), [3.3.2 Essex Resilience: Abberton to Hanningfield transfer main](#), p2

<sup>1617</sup> Northumbrian (2019), [3.3.2 Essex Resilience: Abberton to Hanningfield transfer main](#), p5

<sup>1618</sup> [Northumbrian's reply to Ofwat's further submission](#), p14

particular project 14% lower, but with a base date of Q1 2017. Northumbrian described this as being 'within the expected range for the stage of the project'.

- 5.334 In response to our Provisional Findings and, in particular, challenges from Ofwat about the lack of external assurance of the scheme, Northumbrian commissioned an external report from Aqua Consultants to provide benchmarking and assurance of its proposed costs, as well as considering two alternative routes for the pipeline. This report concluded that 'an investment case with a totex value of £20.35m is reasonable'.<sup>1619</sup>

#### *Customer support and protection*

- 5.335 Northumbrian said that the Essex Resilience Scheme was one of three schemes collectively tested with customers which achieved 89% acceptance.<sup>1620</sup> Northumbrian explained that, to protect customers, it is proposing a cost adjustment mechanism. This would work by ensuring that if delivery was late or did not occur, a penalty would be calculated based on the net present value (NPV) of the difference in cash flows compared to on time delivery.<sup>1621</sup>
- 5.336 Northumbrian said that Ofwat's PR19 Outcomes Performance Commitment appendix sets out the customer protection ODI that incentivises the delivery of its water resilience enhancement programme.<sup>1622</sup> Northumbrian proposes to extend this ODI to also include the Essex Resilience Scheme.

#### *Ofwat's views*

- 5.337 In Ofwat's FD it rejected the Essex Resilience Scheme business case in full on the basis that the 'Need' test had not been met.<sup>1623</sup>
- 5.338 Ofwat said that Northumbrian emphasised in its own WRMP that the supply network in Essex is highly integrated and flexible. Ofwat stated that the scheme is therefore not necessary to enhance resilience in the Essex water resource zones (WRZ).<sup>1624</sup>

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<sup>1619</sup> Northumbrian's reply to responses to the provisional findings, paragraph 76

<sup>1620</sup> Northumbrian (2019), [3.3.2 Essex Resilience: Abberton to Hanningfield transfer main](#), p2

<sup>1621</sup> Northumbrian (2019), [3.3.2 Essex Resilience: Abberton to Hanningfield transfer main](#), p23

<sup>1622</sup> Ofwat (2019), [PR19 final determinations: Outcomes Performance Commitment Appendix](#), Section 1.2.26, p120

<sup>1623</sup> Ofwat (2019), [Wholesale Water Enhancement feeder model: Resilience](#), sheet: Deep dive\_NES, cell D15

<sup>1624</sup> Ofwat's response to Northumbrian's SoC, paragraph 1.36

- 5.339 Ofwat said that Northumbrian had not sufficiently demonstrated the existence of a significant drawdown risk to the Hanningfield reservoir or a significant risk to potable supplies in the Essex area.<sup>1625</sup>
- 5.340 Ofwat also raised broad concerns with potential inconsistencies in Northumbrian's reasoning and drivers of risk around the proposed scheme. It stated that many of these were already funded through allowances as part of the base models and other approved schemes.<sup>1626</sup>
- 5.341 Ofwat submitted that Northumbrian's reasoning for this scheme was inconsistent and had changed during its PR19 process.<sup>1627</sup>
- (a) At IAP, Northumbrian included the scheme in its supply-demand balance plans. Ofwat rejected the proposal due to insufficient evidence that the interconnector would provide any benefit to customers (eg whether an imbalance in reservoir levels would impact the system's deployable output).<sup>1628</sup>
- (b) At draft determination, Northumbrian moved the scheme to the resilience category. Ofwat assessed it on this basis and decided that this scheme would mitigate the same risks as the Layer WTW proposal to accommodate deteriorating raw water quality (for which Ofwat made an allowance of £22.2 million).<sup>1629</sup>

#### *Sources of risk*

- 5.342 Ofwat said that that the drawing down risk of Hanningfield reservoir was closely linked to algal and turbidity outages at Layer WTW, or to treatment works maintenance activities within management control.<sup>1630</sup>
- 5.343 Ofwat said that, as part of its assessment of costs to address deterioration in raw water quality, it made an allowance to mitigate the risk of algal and turbidity outages through the DAF treatment investment at Layer WTW. Ofwat acknowledged that while this may not address the full extent of the issues that the Essex Resilience Scheme aims to address, it considered it to be a major factor in reducing the residual risk to the reliability of water supply across the Essex supply zones. Ofwat stated that, since this scheme primarily mitigates the same risk as the investment for DAF treatment at Layer WTW, it considers

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<sup>1625</sup> Ofwat's response to Northumbrian's SoC, paragraph 3.147

<sup>1626</sup> Ofwat's response to Northumbrian's SoC, paragraphs 3.138, 3.139 and 3.142

<sup>1627</sup> Ofwat's response to Northumbrian's SoC, paragraphs 3.126 and 3.127

<sup>1628</sup> Ofwat's response to Northumbrian's SoC, paragraph 3.126

<sup>1629</sup> Ofwat (2019), *Wholesale Water Raw water deterioration – feeder model*, sheet: Deep dive\_NES, cell F34

<sup>1630</sup> Ofwat's response to Northumbrian's SoC, paragraph 3.128

the resilience risks this scheme seeks to mitigate are addressed through already funded schemes.<sup>1631, 1632</sup>

- 5.344 Ofwat said that Northumbrian had failed to set out the extent to which the baseline risk for the Essex Resilience Scheme is addressed by the Layer treatment scheme. Ofwat said that by not doing so the company would appear to be asking for two schemes that mitigate a similar risk.<sup>1633</sup>
- 5.345 Ofwat stated that the secondary risks are not quantified or assessed in the context of the Layer WTW having a DAF treatment process in place.<sup>1634</sup> Ofwat stated that many of the secondary risks such as population growth, low rainfall and peak demands relate to issues outside the scope of resilience enhancements (as they are reflected in the base models).<sup>1635</sup>
- 5.346 Ofwat further argued that Northumbrian had failed to adequately account for existing, built in resilience already in the Essex system which the company uses when local supplies are interrupted (such as supply from other WTW and more raw water provided through the Ely-Ouse to Essex transfer).<sup>1636</sup>
- 5.347 Ofwat stated that while there is inevitably an element of uncertainty in forecasting future risks, and it may be necessary to exercise judgement in these areas, many issues are known and can be reflected in models and quantitative assessments such as cost-benefit analyses.
- 5.348 In response to our Provisional Findings, Ofwat submitted that, despite Northumbrian having had multiple opportunities to present its evidence,<sup>1637</sup> the customer benefit of this scheme was unclear and the costs not well supported. It stated that the standard of evidence was low by reference to the standard met by other schemes which were allowed funding.<sup>1638</sup>
- 5.349 Ofwat stated that the evidence and arguments submitted by the company were an inadequate basis on which to assess the scheme, particularly highlighting the lack of quantitative evidence demonstrating the risks.<sup>1639</sup> Ofwat raised concerns that providing an allowance for the scheme based on judgement, supported by weak evidence and the fact that costs would be

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<sup>1631</sup> Ofwat (2019) [Wholesale Water Enhancement feeder model: Resilience](#), SOC509, Cell 'D15' on tab 'sheet: Deep dive NES'\_NES, cell D15

<sup>1632</sup> [Ofwat's response to Northumbrian's SoC](#), paragraph 3.127

<sup>1633</sup> [Ofwat's response to Northumbrian's SoC](#), paragraph 3.139

<sup>1634</sup> [Ofwat's response to Northumbrian's SoC](#), paragraph 3.127

<sup>1635</sup> Ofwat (2019) [Wholesale Water Enhancement feeder model: Resilience](#), sheet Deepdive\_NES, cell D15

<sup>1636</sup> [Ofwat's response to Northumbrian's SoC](#), paragraph 3.148

<sup>1637</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), paragraph 2.9

<sup>1638</sup> [Ofwat's response to the provisional findings – overview](#), p3

<sup>1639</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p37

modest, would be unlikely to further either the consumer or resilience objective.<sup>1640</sup>

- 5.350 Ofwat submitted that it was not appropriate to endorse a scheme based on two ‘near misses’, particularly because (i) there were no adverse effects from the incidents, (ii) Ofwat’s view that the funded enhancement work at Layer WTW would mitigate the risk – for example this would have prevented these historical ‘near misses’ from arising.<sup>1641</sup>
- 5.351 Ofwat stated that this was not a ‘now or never’ decision and that a more appropriate approach than providing an allowance now would be to delay a decision until robust evidence was provided.<sup>1642</sup> It said that this would give Northumbrian the opportunity to put forward a ‘proper analysis of the options’ for reconsideration at the next price review,<sup>1643</sup> as well as providing an opportunity for the company to link any design into broader regional plans such as a planned study into the Essex System and Water Resource East alliance’s Regional Plan.<sup>1644</sup>
- 5.352 Ofwat also submitted that allowing the scheme (particularly without an efficiency challenge) would be inconsistent with the assessment of other enhancement schemes.<sup>1645</sup> It stated that doing so would appear to be giving the company the ‘benefit of the doubt’,<sup>1646</sup> and that this approach could lower the evidential bar for enhancement schemes and undermine both customer confidence and Ofwat’s ability to intervene in the future.<sup>1647</sup>
- 5.353 Ofwat submitted that, if any allowance was made for the scheme, it should be subject to optioneering and efficiency challenges (resulting in a total challenge of 30%) in order to be internally consistent with the CMA’s approach to determining allowances for other ‘poorly evidenced’ schemes.<sup>1648</sup>

### *Third Party views*

- 5.354 We received submissions from a number of Third Parties, the large majority of which voiced support for this scheme, in particular:
- (a) Blueprint for Water stated that the scheme was developed with long-term resilience in mind, and reduced risk from weather, pollution events and

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<sup>1640</sup> [Ofwat’s response to the provisional findings – cost and outcomes](#), p37

<sup>1641</sup> [Ofwat’s response to the provisional findings – cost and outcomes](#), paragraph 2.42 and pp38–39

<sup>1642</sup> [Ofwat’s response to the provisional findings – cost and outcomes](#), paragraph 2.42

<sup>1643</sup> [Ofwat’s response to the provisional findings – cost and outcomes](#), paragraphs 2.10 and 2.42

<sup>1644</sup> [Ofwat’s response to the provisional findings – cost and outcomes](#), paragraph p40

<sup>1645</sup> [Ofwat’s response to the provisional findings – fundamental errors of approach](#), pp11 and 22

<sup>1646</sup> [Ofwat’s response to the provisional findings – cost and outcomes](#), paragraph 2.8

<sup>1647</sup> [Ofwat’s response to the provisional findings – overview](#), p2

<sup>1648</sup> [Ofwat’s response to the provisional findings – cost and outcomes](#), paragraph 2.42 and p40

other threats to the security of supply. It also highlighted the strong customer support for the scheme.<sup>1649</sup>

- (b) DWI stated that this scheme was an example of approaches which could improve raw water quality and mitigate contamination risk. However, the scheme was not submitted to the DWI for PR19 review and therefore it had not completed a technical evaluation of the scheme.<sup>1650</sup>
- (c) Essex Chambers of Commerce stated that it was supportive of this scheme and the resilience it would deliver for water supplies across the county. It submitted that failure to deliver the proposal would have ramifications for future growth of the Essex economy and would be a missed opportunity for businesses and residents.<sup>1651</sup>
- (d) Northumbrian and Essex and Suffolk Water Forums stated that the scheme would address risks beyond those that the Layer WTW investment addresses. It said that the security of water supply is necessary because of the effects of climate change already being seen in the UK.<sup>1652</sup>

5.355 CCWater stated that customers appeared to support this scheme, but it was unclear whether the improvements to Layer WTW offered the level of protection from risks of supply interruption and water quality that the transfer main scheme offered.<sup>1653</sup>

5.356 Water Resources East stated that this scheme would enhance the operability and resilience of the two crucial strategic reservoirs (at Abberton and Hanningfield) and potentially take pressure off water resources in the South East and London, which the work on the National Framework shows to have the largest challenge of any region.<sup>1654</sup> It stated that the proposed scheme would appear to be a well-supported, technically appropriate, and a relatively low cost, 'no regret' option for the county of Essex and beyond. It also highlighted the high level of customer support for Northumbrian's plans to increase resilience in Essex.<sup>1655</sup>

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<sup>1649</sup> [Blueprint for Water submission](#)

<sup>1650</sup> [Drinking Water Inspectorate submission](#)

<sup>1651</sup> [Essex Chambers of Commerce submission](#)

<sup>1652</sup> [Northumbrian and Essex and Suffolk Water Forum submission](#)

<sup>1653</sup> [CCW response to Northumbrian's SoC](#), p13, paragraph 8.7

<sup>1654</sup> The [national framework](#) was published by the Environment Agency and sets the strategic direction for long term regional water resources planning.

<sup>1655</sup> [Water Resource East submission](#)

*Need for additional funding*

- 5.357 We consider that, throughout this process, this has been a finely balanced decision. On the one hand, we understand the inherent logic in Northumbrian's submissions on aligning its raw water storage capacity with its treatment capacity, and that this could result in increased levels of resilience in ensuring that it is able to continue to supply customers. On the other hand, we recognise the lack of quantitative analysis that Northumbrian has put forward to support its assessment of the level of risk, and the limitations this would place on conducting any form of quantified cost-benefits analysis.
- 5.358 Ofwat appears to consider that without such quantified evidence, Northumbrian's proposal is effectively unsustainable. We disagree with this view. While quantitative analysis of the kind Ofwat has described is often helpful and is widely used within the regulatory regime, we do not consider that its absence should result in an outright rejection of a proposed resilience scheme in all cases. Instead, this case falls to an exercise of judgement regarding the evaluation of the specific facts available, and their implications. This is consistent with the CMA's general approach to evidence assessment.<sup>1656</sup> In that regard, there appear to be two key considerations:
- (a) Whether the 'near misses' which Northumbrian suffered in 2016 and 2018 represent reliable evidence of a supply risk in the company's water network; and
  - (b) Whether the additional work provided for at the Layer WTW reduces the level of residual risk to an acceptable level, compared with the cost of undertaking further activity.
- 5.359 On the former of these points, we consider that the fact that Northumbrian customers in Essex experienced two 'near misses' within a recent three year period is deeply concerning. While no adverse effects may have arisen during these events, they resulted in available local water supplies reaching historic lows (close to the emergency storage level) and in doing so demonstrated a substantial supply risk if any further shocks had occurred. Northumbrian has explained that it is seeking to mitigate against the impact of several low-probability events occurring simultaneously (such as drought, high demand, outages at all WTW except Layer) that would result in serious water

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<sup>1656</sup> See for example *Guidelines for market investigations: Their role, procedures, assessments and remedies* (CC3)(Revised) at paragraph 36 and *AXA PPP Healthcare Ltd v CMA* [2015] CAT 5 and *BAA Ltd v CC* [2012] CAT 3



restrictions across hundreds of thousands of households, before the negative effects on customers actually occurs.

- 5.360 We consider that actual experience of ‘near misses’ represents strong evidence for a potential risk in this case, which would support the need for intervention. When assessing the operational resilience of a network, an ex-post assessment of areas of actual failure (or near-failure) appears a straight-forward and effective approach to identifying sources of risk within the network. This is particularly true when considering the operational context of the supply area being in the driest part of the country,<sup>1657</sup> which limits the number of remedial measures available to the company.
- 5.361 More generally, we would be concerned about an assessment framework which required customer harm to occur before accepting this as evidence of the need for additional intervention. Such a reactive approach would expose customers to unnecessary harms and does not reflect the way that a responsible company would be expected to operate.
- 5.362 In relation to the additional work at Layer WTW, we understand Ofwat’s view that this particular risk factor has been addressed through the funded enhancement scheme. However, we agree with Northumbrian that there are numerous other risk factors which remain, including both specific identified concerns and the potential for unpredictable ‘black swan’ events. An approach which focuses on addressing individual issues one-by-one after they have arisen (and potentially negatively impacted customers) risks leaving customers exposed to unnecessary risks. At times this may be the only viable approach, but where solutions have been identified which can provide substantial resilience benefits across the broader network, we consider these to have additional merit. In this case, we consider that a broader viewpoint looking at level of redundancy is more appropriate. This appears similar to the outcomes-based approach adopted elsewhere in these determinations.<sup>1658</sup>
- 5.363 As explained above, for these types of decision, we are required to make a judgement about the overall likelihood of a potential event (or combination of events) occurring, compared to the impact of such an event, and whether the cost to customers of reducing this residual risk is justified. We also note that we have not seen evidence of other plausible explanations of the cause of the risk which would raise concerns about providing additional funding (such as

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<sup>1657</sup> [Essex & Suffolk Water WRMP Executive Summary](#), slide 3.

<sup>1658</sup> One example of an alternative approach to considering operational resilience is redundancy levels such as those reflected in Transmission System Security in England and Wales: National Grid Transco (2004), [Written Evidence before the Select Committee on Trade and Industry](#), paragraph 20



historical underinvestment, poor management decisions, or material risk of double-funding).

- 5.364 In these circumstances, we consider that the evidence supports a view that the residual risk that would be addressed by this scheme is material, while the cost of addressing the issue is relatively modest particularly given the number of households potentially affected (365,000 households)<sup>1659</sup> and the long-life nature of the solution which would provide ongoing benefits over many years. The cost of protecting a household is around £1 per year for this scheme.<sup>1660</sup> Therefore, while certain risk factors have already been addressed or reduced, without further action there remains a residual risk of serious disruption to customer supplies, which we consider justifies further activity.
- 5.365 This decision reflects the specific circumstances of the case, and we recognise that there may be other similar circumstances in which the residual risk identified by a water company would not justify additional funding of enhancement activities. However, in this instance and having carried out our own assessment, we find that there is sufficient evidence to support Northumbrian's proposal.
- 5.366 We note Ofwat's view that this is not a 'now or never' decision, which could be deferred to the next price control to allow Northumbrian time to develop its case. However, we have substantial concerns with this approach. By their nature, resilience projects are forward-looking and can generally be delayed, but this results in customers continuing to be exposed to the identified risk, which is not appropriate here.

#### *Robustness and efficiency of claim's costs*

- 5.367 Having accepted the need for the scheme, we now consider the level of the company's proposed costs.
- 5.368 We note some limitations in Northumbrian's internal cost estimate approach, particularly that they were reliant on cost curve models due to the lack of as-built cost information due to the large diameter of pipework required. Both Northumbrian's original cost consultants and Aqua Consultants appear to have provided lower estimated costs than Northumbrian itself (albeit Aqua Consultants difference is small when considering total project costs).<sup>1661</sup>

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<sup>1659</sup> [Northumbrian SoC](#), paragraph 695

<sup>1660</sup> £20.4 million allowance, divided by 365,000 property results in £56 per property. Assuming an expected lifetime of at least 50 years and potentially substantially more (see paragraph 5.477), this results in around £1 per property per year.

<sup>1661</sup> Aqua Consultant estimated the capex costs of construction for its alternative route 1 as being around 9% lower than Northumbrian's business plan, although once accounting for project on-costs this reduced to around 0.2%

Furthermore, Aqua Consultants assurance approach was built ‘top down’ and also relied on a ‘high level cost model’ rather than historical actuals for the majority of its estimated figures.

5.369 In the circumstances, we consider that the evidence provided by Northumbrian is not as robust as we would expect to justify the proposed costs of the scheme in full, so we consider it appropriate to apply the standard deep dive efficiency challenge of 10%<sup>1662</sup> to Northumbrian’s proposed estimates.

5.370 We note Ofwat’s concerns about the level of optioneering applied to the scheme, and the potential for additional challenges on this basis, but we do not agree with this view. Northumbrian explained the options it considered for expansion, justified the limited number of alternative approaches it considered, and assessed alternative routes for its pipeline as described above. We therefore apply no further optioneering challenge on this scheme.

### *Decision*

5.371 We therefore decide to allow Northumbrian an additional £18.3 million<sup>1663</sup> for the delivery of this scheme, subject to appropriate customer protection measures (see below).

5.372 Finally, we are aware of the incentive effect of this decision, and are content with the implications. Rather than undermining Ofwat’s ability to intervene in the future to protect customers, or lowering the ‘evidential bar’ for an enhancement scheme, we consider that this decision reflects a consistent and appropriate approach to assessing the evidence. In our judgement, it represents the proper balancing of all of our duties, including promoting the consumer and resilience objectives.

### *Customer protection*

5.373 As discussed in paragraphs 5.335 to 5.336, Ofwat’s FD included a customer protection PC and ODI that incentivises the delivery of Northumbrian’s water resilience enhancement programme. This ensures that customers are refunded if Northumbrian fails to complete the relevant work.

5.374 Northumbrian has proposed that this ODI is extended to incorporate the Essex Resilience Scheme. Northumbrian stated that to achieve this the incentive rate would need to be increased from -£0.294 million per unit (%) of

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<sup>1662</sup> See paragraphs 5.189 to 5.201.

<sup>1663</sup> £20.35 million \* 90% = £18.315 million.

delivery to -£0.388 million per unit in order to reflect the increased value of the programme.

- 5.375 Our decision is that the above approach represents a reasonable approach for protecting customers' interests. However, we have adjusted the incentive rate of the ODI to -£0.369 million per unit in order to calibrate this decision with our final determination,<sup>1664</sup> and include this scheme at a weighting of 22.6% in the PC.<sup>1665</sup>

#### ***Deep dive 4: Northumbrian – Sewer Flooding Resilience Scheme***

- 5.376 In its PR19 business plan, Northumbrian included a £86 million enhancement programme to reduce the risk of sewer flooding in its North East region, alongside a bespoke PC and ODI.
- 5.377 Ofwat rejected Northumbrian's resilience investment case in full. Ofwat stated that Northumbrian had received sufficient allowances within its base costs to fund its sewer flooding reduction activities.<sup>1666</sup>
- 5.378 Following our Provisional Findings, Northumbrian amended its proposal to reflect what it said would be possible to deliver in AMP7 following the redetermination process, particularly the need to deliver the scheme in four years rather than five. This represented a 20% reduction in both activity and requested funding, ie a £63.4 million enhancement claim to reduce the risk for 5,920 properties (down from 7,400 properties previously).<sup>1667</sup>

#### ***Northumbrian's views***

##### ***Background and need for the scheme***

- 5.379 Northumbrian submitted that historically it had undertaken activities to address internal sewer flooding which were focused on properties which had flooded in the past ('reactive programme'). This new programme of work was targeted at properties which had not flooded previously, but are at higher risk

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<sup>1664</sup> Ofwat's original FD allowed £63.709 million for Northumbrian's water resilience enhancement schemes (see Ofwat (2019), [Feeder model: Enhancement aggregator](#), sheet: Water enhancements, cell: CL11). Including the additional £18.315 million results in a totex allowance of £82.02 million. We multiply this figure by the totex outperformance cost sharing rate of 45%, and divide by 100 to convert to a percentage completion rate of £0.369 million.

<sup>1665</sup> Northumbrian also noted that the Suffolk resilience scheme was omitted from Ofwat's FD, and should be included. Including the Suffolk scheme, and reducing the Essex weighting to reflect the 10% efficiency challenge applied results in in weights of the difference schemes of: Teeside (22.49%), Central (39.36%), Essex (22.58%), Tyne (0.46%), Suffolk (9.68%), and Too Critical to Fail (5.43%).

<sup>1666</sup> [Ofwat's response to Northumbrian's SoC](#), paragraph 1.35

<sup>1667</sup> [Northumbrian's submission following the second main party hearings](#), section 3; [Northumbrian's final submission](#), paragraph 15

of sewer flooding in the future as a result of the layout of the existing sewer network and ongoing trends around climate change<sup>1668, 1669</sup> and urban creep<sup>1670</sup> ('proactive programme').<sup>1671</sup>

5.380 To design its proactive programme, Northumbrian developed a geographic information system (GIS) tool and hydraulic models to assess how the performance of the sewerage network would impact sewer flooding. It used this to develop a red/amber/green assessment for its catchments and highlight areas of greatest risk. It then overlaid estimates of future climate change and urban creep to produce the figures shown in Table 5-18.<sup>1672</sup>

**Table 5-18: Increase in at risk properties due to urban creep and climate change**

	Property Impact - depth of flooding relative to ground level in m (No of properties affected)				
Rainfall Probability	<-0.5 Category 1	-0.5 to -0.2 Category 2	-0.2 to 0 Category 3	0 to 0.2 Category 4	>0.2 Category 5
1 in 20 year	464,663 (-17,409)	48,981 (-1,809)	32,077 (2,916)	129,899 (11,809)	49,668 (4,515)

Source: Northumbrian

5.381 Northumbrian stated that this illustrates that the impact of climate change and urban creep would increase the number of at-risk properties (categories 4 and 5) by 16,324.<sup>1673</sup> The company's enhancement proposal is to reduce the flood risk to 5,920 of the 16,324 properties during AMP7. Northumbrian explained that this number is derived from all the properties in category 5 and a proportion of the properties in category 4.<sup>1674</sup>

5.382 In response to our Provisional Findings, Northumbrian provided the following estimate of the level of customer risk reduction which its scheme would achieve:<sup>1675</sup>

<sup>1668</sup> Northumbrian (2019), [Wastewater reduce flooding risk for properties: enhancement business case](#), p10

<sup>1669</sup> Met Office (2019), [UKCP18 Science Overview Report](#).

<sup>1670</sup> Miller, J.D. and Hutchins, M. (2017), 'The impacts of urbanisation and climate change on urban flooding and urban water quality: A review of the evidence concerning the United Kingdom', *Journal of Hydrology: Regional studies*, pp345–362

<sup>1671</sup> [Northumbrian SoC](#), paragraphs 154 and 622

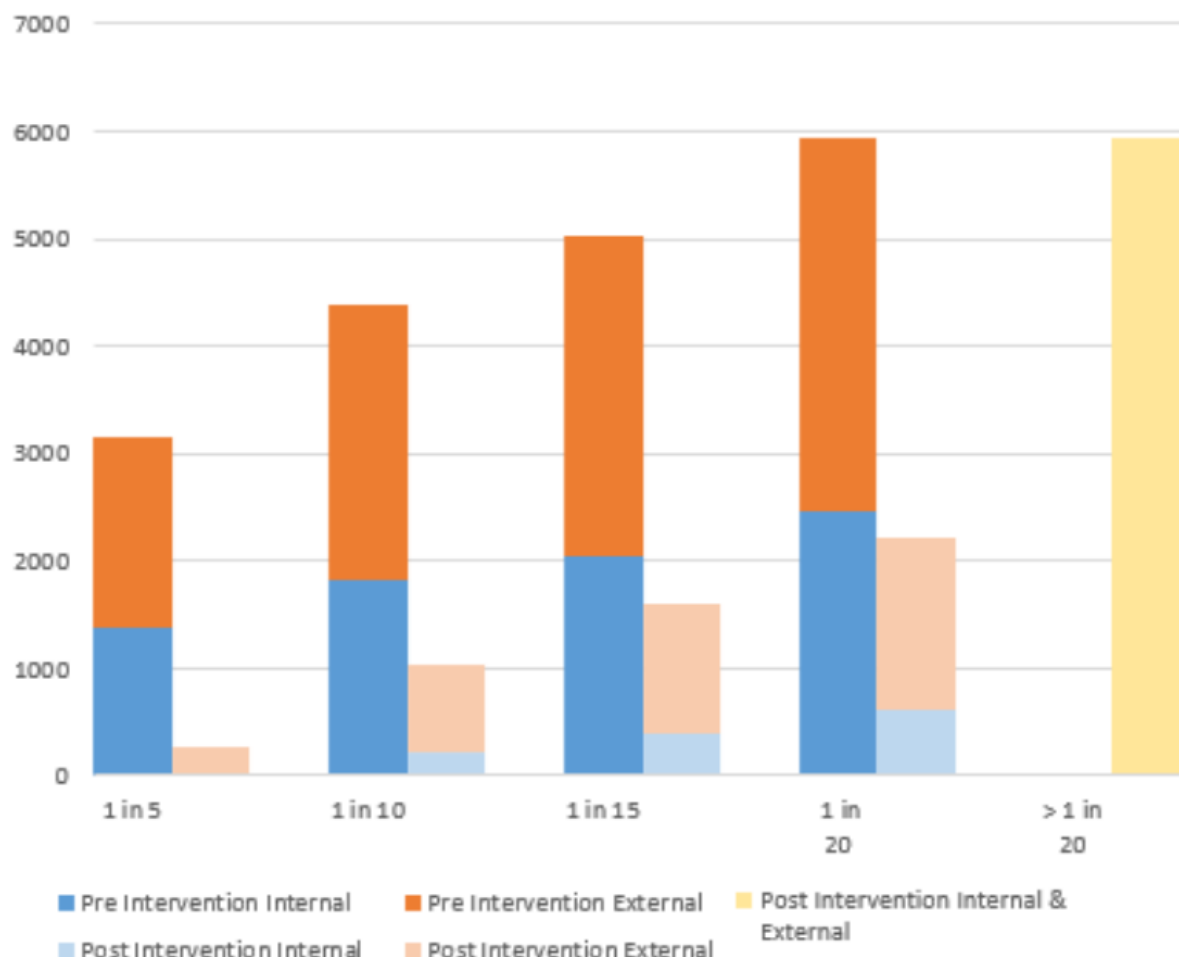
<sup>1672</sup> Northumbrian (undated), [Wastewater reduce flooding risk for properties: enhancement business case](#), p8

<sup>1673</sup> Properties that are assigned red (category 5) are typically those properties that Northumbrian would expect to flood internally, either from sewer surcharge affecting internal connections, or via surcharging manholes causing overland flows to breach property threshold levels. Those properties that are assigned to category 4, the higher 'amber' category, are typically those properties for which Northumbrian would expect curtilage flooding to occur, for example because the overland flow depth is not sufficient to breach the property threshold.

<sup>1674</sup> [Northumbrian \(2019\) - 3.3.1 Reducing Property Flooding Risk](#), p7

<sup>1675</sup> [Northumbrian's submission following the second main party hearings](#), p22 and Figure 4

**Figure 5-3: Northumbrian stated number of properties at risk by storm severity, pre and post intervention (cumulative)**



Source: [Northumbrian's submission following the second main party hearings](#), Figure 4

5.383 Northumbrian provided a draft of the first cycle of the Drainage and Wastewater Management Planning (DWMP) process. It stated that, while only draft, it represented evidence of a material increase in risk of sewer flooding in the Northumbrian (North East) operating area as a result of climate change and urban creep. Northumbrian stated that observations regarding the WRMP and DWMP process supported its view that there was a clear gap in the regulatory framework regarding the allowance of costs for investment to mitigate increasing flooding risk.<sup>1676</sup>

#### *Need for additional funding*

5.384 From 2011 to 2019, Northumbrian stated that it had invested £178 million in schemes and activities to mitigate sewer flooding risk and that £65 million of this was spent during AMP6 as part of the company's £240 million investment

<sup>1676</sup> [Northumbrian's final submission](#), paragraphs 16–21.

in its sewer network.<sup>1677</sup> Northumbrian submitted that, on a unit cost basis it has made one of the highest levels of investment in the sector to reduce sewer flooding in recent price control periods, which has enabled it to meet its performance targets in AMP5 and AMP6.<sup>1678</sup>

5.385 Northumbrian stated that the proposed proactive scheme was different from, and incremental to, its general internal sewer flooding programme. It estimated that its AMP7 cost to reduce sewer flooding consisted of £82 million of reactive expenditure. Meanwhile, this enhancement programme requiring an additional £63 million of proactive expenditure, aimed to improve resilience by reducing the risk of households flooding. Specifically, it submitted that:<sup>1679</sup>

- (a) the reactive expenditure represented historical activities and would be covered by base cost in its business plan (and implicitly covered by Ofwat's modelling).<sup>1680</sup> This funding would cover the activities necessary to meet the common sewer flooding performance commitment; and
- (b) the proactive expenditure represents new activities going beyond the base level, improving resilience to sewer flooding, and so should attract additional enhancement funding.

5.386 Northumbrian submitted that the base cost allowances would not provide funding for this scheme since they funded the historical activity to address sewer flooding, and did not address climate change or urban creep.<sup>1681</sup> The historical approach to sewer flooding consisted of:

- (a) up until 2015, companies focused on properties which had flooded in the past to seek to prevent them flooding again. Flooded properties were added to a register (termed DG5) and companies were provided a unit cost allowance to remove these properties from the register; and
- (b) during AMP6 companies targeted bespoke PCs proposed by individual companies.<sup>1682</sup>

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<sup>1677</sup> [Northumbrian SoC](#), paragraph 618

<sup>1678</sup> [Northumbrian's response to the provisional findings](#), paragraph 156

<sup>1679</sup> [Northumbrian SoC](#), paragraph 620

<sup>1680</sup> Northumbrian also argued that Ofwat's 'implicit allowance' estimate had material flaws; [Northumbrian SoC](#), paragraphs 638–649.

<sup>1681</sup> Northumbrian also submitted that historical approaches to modelling of storm events was also seen as outdated and the Environment Agency commissioned research which highlighted the need to include 'non-stationary' methods. [Northumbrian's submission following the second main party hearings](#), paragraphs 96–98.

<sup>1682</sup> [Northumbrian's response to the provisional findings](#), paragraphs 181–182, Annex 2

- 5.387 Northumbrian noted parallels with the historical approach of setting leakage for each company individually based on SELL and the ‘step change’ required to deliver against the new common targets.<sup>1683</sup>
- 5.388 Northumbrian stated that its request did not represent funding to catch-up with the rest of the sector in terms of its general sewer flooding performance.<sup>1684</sup> Northumbrian submitted that it was not seeking any additional funding to deliver its AMP7 sewer flooding PC, instead this scheme would improve long-term system resilience in the face of urban creep and climate change.<sup>1685</sup> Northumbrian submitted that on a simple benchmark of sewer flooding performance it might compare less favourably to other companies, but that this reflected differences in operating conditions.<sup>1686</sup>
- 5.389 Northumbrian submitted its view of the potential overlap between base funding and its enhancement request for this scheme. Northumbrian said that it took a conservative approach as to what might constitute an overlap in terms of both activity and outcomes and valued the potential overlap at a maximum of 8%. This was based on looking at the number of properties that would be covered by both its reactive and proactive approaches (that is, properties which had flooded previously but were also identified as high risk in its hydraulic models). Therefore, the company said that to eliminate the risk of overlap it proposed reducing its enhancement proposal by 8% with the ‘overlap’ activity being absorbed in its base allowance.<sup>1687</sup>
- 5.390 Northumbrian said it considered accelerating its base sewer flooding activities, but that the more strategic approach of its enhancement programme would future-proof communities against flood risk, with a lower cost per property than the base programme approach, as well as being above customer willingness to pay.<sup>1688</sup>

#### *Interactions with performance commitments*

- 5.391 As explained above, Northumbrian said that it set a target of reducing future risk of sewer flooding by 5,920 properties. Northumbrian explained that if it failed to successfully deliver the investments, then its proposed ODI would

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<sup>1683</sup> [Northumbrian's response to the provisional findings](#), paragraphs 183–187

<sup>1684</sup> [Northumbrian's response to the provisional findings](#), paragraph 170

<sup>1685</sup> [Northumbrian's response to the provisional findings](#), paragraphs 168 and 173

<sup>1686</sup> [Northumbrian's response to the provisional findings](#), paragraphs 173–177

<sup>1687</sup> [Northumbrian's submission following the main party hearings](#), p1

<sup>1688</sup> [Northumbrian's submission following the second main party hearings](#), paragraphs 92–93

ensure that £100 of totex allowances were returned to customers for each property out of the 5,920 that did not move into a lower risk category.<sup>1689</sup>

- 5.392 Northumbrian said that the ODI associated with the common PC applied a considerably higher penalty to underperformance relative to the bespoke ODI (on Northumbrian's calculations the total potential downside was about £22.9 million versus about £2.2 million respectively).<sup>1690, 1691</sup> Northumbrian explained that the ODI for the common PC included a potential reward for outperformance and its proposed bespoke PC would not.<sup>1692</sup>
- 5.393 Northumbrian said that the potential rewards available under the ODI for the common sewer flooding PC were not a viable source of funding for this sewer flooding enhancement proposal. Northumbrian submitted that even if it earned the maximum ODI rewards available in every year this would only provide £4 million of rewards, well short of the £63 million in investment costs.<sup>1693</sup> Northumbrian submitted that it was not feasible for the ODI framework to adequately fund major network investment, such as this scheme,<sup>1694</sup> and that it was not credible that the ODI framework would remain consistent for the 30-year time period which Ofwat's funding analysis would require.<sup>1695</sup>

#### *Robustness and efficiency of claim's costs*

- 5.394 Northumbrian stated that it had carried out a cost assessment for this specific investment and other enhancement claims through a structured and robust approach. This involved benchmarking cost estimates against various alternatives:<sup>1696</sup>
- (a) Northumbrian calculated a unit cost rate per property protected using the actual outturn cost for 20 schemes the company had constructed during AMP6 to reduce the risk of flooding. This approach confirmed a unit cost of £16,168 per property.
  - (b) The company undertook an assessment of its performance in 2018 specifically, reviewing benefits received and actual final outturn cost of

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<sup>1689</sup> [Northumbrian SoC](#), paragraph 663; number of properties updated to reflect amended proposal, see [Northumbrian's submission following the second main party hearings](#), paragraph 82.

<sup>1690</sup> [Northumbrian SoC](#), paragraph 672; we note that the figure for the bespoke ODI was not updated to reflect the reduced number of properties covered in Northumbrian's amended proposal.

<sup>1691</sup> Northumbrian calculations based on Ofwat (2019) [PR19 final determinations: Outcomes performance commitment appendix](#), pp29–33 and pp76–78.

<sup>1692</sup> [Northumbrian SoC](#), paragraph 672

<sup>1693</sup> [Northumbrian's reply to Ofwat's further submission](#), paragraph 5

<sup>1694</sup> [Northumbrian's submission following the second main party hearings](#), paragraphs 84–87

<sup>1695</sup> [Northumbrian's response to the provisional findings](#), paragraph 158

<sup>1696</sup> Northumbrian (undated), [Wastewater reduce flooding risk for properties: enhancement business case](#), pp18–19



completed projects. This assessment confirmed a unit cost rate of £12,372.

- (c) Northumbrian compared its unit cost per property to the figure of £30,000 used by the Environment Agency in its partnership funding calculator.

5.395 Northumbrian said that these three cost approaches were based on historical costs for a small sample size, and that it was likely that the cost per property would reduce for the enhancement proposal during AMP7 due to greater efficiencies. In light of this Northumbrian reduced its proposed unit cost per property to £11,650. The company explained that multiplying £11,650 by the estimated number of properties of 7,400 gave a proposed total spend of about £86 million.<sup>1697</sup> In its amended proposal, Northumbrian subsequently reduced this figure by 8% to remove the potential overlap with base costs, and a further 20% to reflect the reduced number of properties covered as discussed in paragraph 5.378.

5.396 In the Q1 2020, Northumbrian commissioned Aqua Consultants to undertake a benchmarking analysis of its originally proposed scheme costs based on similar projects. Northumbrian submitted that Aqua Consultants suggested the efficient cost was likely to be at the top end of the range estimated in their report of £61 million to £86 million.<sup>1698</sup>

#### *Customer views and customer protection*

5.397 Northumbrian emphasised that sewer flooding was arguably one of the worse service failures which could occur, and reducing the instances of it was rated as a key priority by customers.<sup>1699</sup>

5.398 Northumbrian said that the enhancement proposal was supported by 71% of customers.<sup>1700</sup> To ensure customers were protected against underperformance the company included a bespoke penalty-only ODI with two parts:

- (a) The first would state that if Northumbrian failed to undertake the activity during AMP7, it would return the associated funding on a pro-rated basis across the 5,920 properties; and

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<sup>1697</sup> Northumbrian (undated), [Wastewater reduce flooding risk for properties: enhancement business case](#), pp18–19

<sup>1698</sup> Northumbrian SoC, paragraph 660

<sup>1699</sup> Northumbrian's response to the provisional findings, paragraph 136

<sup>1700</sup> Northumbrian (undated), [Wastewater reduce flooding risk for properties: enhancement business case](#), p3

- (b) The second would return funds if any of the specified properties flood as a result of rainfall severity which it should have been protected against, during the course of AMP8.<sup>1701</sup>

### *Ofwat's views*

5.399 Ofwat welcomed that Northumbrian was adopting a proactive approach to reduce sewer flooding risk. However, it rejected the company's enhancement allowance request throughout the PR19 process. Ofwat said that relative to other companies in the sector, Northumbrian was a poor performer in relation to sewer flooding.<sup>1702</sup> It stated that customers should not pay twice for companies to catch up with the level of performance that it expected an efficient company to achieve.<sup>1703</sup>

### *Need for investment and adjustment*

5.400 Ofwat challenged whether Northumbrian required additional funding in order to reduce the risk of sewer flooding; instead, Ofwat stated that the company should be able to fund this investment from its totex allowance.<sup>1704</sup> Ofwat said it required companies to report annually on expenditure to 'reduce flooding risk for properties'. Ofwat highlighted that this expenditure was included in its econometric base models and therefore its base cost allowance included an allowance to address the risk of sewer flooding. It considered that the allowance should enable an efficient company to achieve the common upper quartile performance commitment it set the sector. Ofwat estimated that the implicit allowance included in the base models to reduce sewer flooding risk for properties was £63-115 million.<sup>1705</sup>

5.401 Ofwat said that the costs associated with the ongoing effects of long-running trends in the sector would be captured in its base cost models.<sup>1706</sup> Therefore, funding an enhancement programme in this area would require additional justification of need, for example that (i) there is a step-change in the expected associated risk, or (ii) a specific company was disproportionately exposed to the changing risks.

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<sup>1701</sup> [Northumbrian's submission following the main party hearings](#), paragraphs 20–27; [Northumbrian's submission following the second main party hearings](#), paragraphs 105–112, Appendix 3

<sup>1702</sup> [Ofwat's response to Northumbrian's SoC](#), paragraph 3.101

<sup>1703</sup> [Ofwat's response to Northumbrian's SoC](#), paragraph 3.117

<sup>1704</sup> [Ofwat's submission following the second main party hearings – costs and outcomes](#), paragraph 9.8

<sup>1705</sup> To produce this figure, Ofwat used three different approaches, (i) trying to isolate within the growth implicit allowance; (ii) splitting growth in and out of their econometric models; and (iii) a sense check by looking at base plus; [Ofwat's response to Northumbrian's SoC](#), paragraph 3.108.

<sup>1706</sup> [Ofwat's response to Northumbrian's SoC](#), paragraph 3.102

5.402 Ofwat stated that:

- (a) the implications of climate change and urban creep were not new, and the sector has been addressing the need to mitigate flooding risk from climate change and urban creep in previous AMPs.<sup>1707</sup> Consequently, it said that its base models took account of the costs of these mitigation measures; and
- (b) Northumbrian had failed to provide sufficient or convincing evidence that the company faced additional pressures relative to the rest of the water sector.<sup>1708</sup>

5.403 Ofwat said that the distinction between proactive and reactive activities was not relevant and overly simplistic,<sup>1709</sup> as one aim of the regulatory system is to provide companies with the flexibility to explore different approaches to efficiently conduct the necessary activities to perform its functions, and this distinction was simply one example of a potentially more efficient approach to dealing with the same risk.

5.404 Therefore, Ofwat concluded that there was no justification for providing Northumbrian with additional enhancement expenditure for this scheme.<sup>1710</sup>

5.405 Ofwat noted that at PR19 it moved historical enhancement expenditure to reduce sewer flooding risk into its base models. Ofwat explained that this resulted in its total base allowance at PR19 including an allowance for enhancement, on top of what is already included in base costs to maintain risk level of sewer flooding.<sup>1711</sup>

5.406 Ofwat disagreed with Northumbrian's view that its rejection of this and other sewer flooding schemes represented a 'gap in the regulatory regime'. Ofwat stated that many of the schemes identified by Northumbrian related to companies making similar claims about unique operating circumstances which necessitated a cost adjustment. Ofwat stated that it provided £1 billion of funding in base allowances to address the impact of flooding, as well as ODIs on internal and external sewer flooding performance, and £292 million for improving flood resilience of water and wastewater networks and treatment works (over 90% of the amount requested).<sup>1712</sup>

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<sup>1707</sup> Ofwat (2011), *Future Impact on Sewer Systems in England and Wales*

<sup>1708</sup> Ofwat's response to Northumbrian's SoC, paragraph 3.106

<sup>1709</sup> Ofwat's response to Northumbrian's SoC, paragraph 3.115

<sup>1710</sup> Ofwat's response to Northumbrian's SoC, paragraph 3.101

<sup>1711</sup> Ofwat's further submission on Northumbrian, paragraph 2.11

<sup>1712</sup> Ofwat's submission following the second main party hearings – costs and outcomes, paragraph 9.5 and Table 9.1

### *Interactions with performance commitments*

- 5.407 Ofwat explained that the historical DG5 register was a list of properties which flooded as a result of hydraulic incapacity, and provided an incentive on companies to address issues either by removing properties from the register or investing to avoid properties being added. The move to totex and outcomes provided greater flexibility to the company to reduce flooding risk to properties.<sup>1713</sup>
- 5.408 Ofwat stated that its overall framework provided funding for upper quartile sewer flooding performance and incentivised companies to achieve a stretching level of performance while prioritising those properties that are most at risk. Ofwat also highlighted that if a company makes investment beyond that, it will receive outperformance payments. Ofwat stated that its initial modelling indicated that the £86 million (Northumbrian's original request) could be funded through the ODI framework over an appropriate period of time.<sup>1714</sup> Ofwat also noted that sewer flooding was one of the most important outcomes which it has used since privatisation, and the risk that this would be removed from the regulatory framework was extremely low.<sup>1715</sup>
- 5.409 Ofwat also noted that the investment may benefit other PCs for which the company could earn a reward, in particular Northumbrian had stated in its business plan that this scheme would also reduce pollution incidents, for which Northumbrian has enhanced ODI rates.<sup>1716</sup>

### *Robustness and efficiency of claim's costs*

- 5.410 On the 'efficient cost' test, Ofwat stated that there was insufficient evidence to conclude that the Northumbrian unit cost of £11,650 represented an efficient estimate. Ofwat said that when Aqua Consultants conducted a review after Ofwat's FD, it identified several errors in Northumbrian's original cost calculation. It said once these were corrected for, the cost per property figure was £7,900, which is considerably lower than Northumbrian's £11,650

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<sup>1713</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), p18

<sup>1714</sup> Ofwat submitted that, given an underperformance cost sharing rate of 65.6%, Northumbrian would bear  $(1 - 65.6\%) \times £86 \text{ million} = £56.4 \text{ million}$  of the cost for this scheme. For its calculation, Ofwat assumed that the scheme would reduce Northumbrian's risk of sewer flooding for these properties, on average, from 1-in-15 years to 1-in-40 years. Ofwat used a discount rate of 2.92% (Ofwat's PR19 WACC), a payback period of 20 years (close to the recovery rate of Northumbrian's RCV additions), and an assumption that the ODI framework or equivalent continued into the future. Ofwat stated that under these assumptions Northumbrian would be expected to recover £53.6 million over 20 years, in present value terms, against net effective forecast costs of £56.4 million.

<sup>1715</sup> [Ofwat's submission following the second main party hearings – costs and outcomes](#), paragraph 9.7

<sup>1716</sup> [Ofwat's submission following the second main party hearings – costs and outcomes](#), paragraph 9.9

estimate.<sup>1717</sup> Ofwat stated that the company had not provided evidence that the cost estimate had been benchmarked across the industry.<sup>1718</sup>

### *Customer protection*

5.411 Ofwat said that Northumbrian had demonstrated that customers and stakeholders considered a reduction in sewer flooding risk as being important, and so it should be incentivised to achieve this. Ofwat stated that in this context it would not be appropriate to remove the bespoke PC, and that this complemented the common internal sewer flooding PC.<sup>1719</sup>

### *Third Party views*

5.412 We received submissions from several Third Parties in support of Northumbrian's proposals to reduce the risk of sewer flooding and increase resilience. The Third-Party submissions particularly emphasised the importance of:

- (a) planning for the future, and investing against projected changes in population growth, climate change and the potential for more severe weather events.<sup>1720</sup>
- (b) adopting environmentally friendly solutions.<sup>1721</sup>
- (c) the level of engagement and customer support for the scheme and for Northumbrian's business plan more generally.<sup>1722</sup>

5.413 We also note two particularly relevant points raised by Third Parties:

- (a) CCWater stated that while customers supported the principle of 'fast-tracking' investment to avoid sewer flooding, and more proactive actions are required, the additional investment must also be based on clear evidence of both the risk of future flooding and that the proposed 'outputs' offer the best long-term solution.<sup>1723</sup>

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<sup>1717</sup> [Ofwat's response to Northumbrian's SoC](#), paragraph 3.121

<sup>1718</sup> This statement was based on Northumbrian's originally proposed PC which now represents the first part of the PC described in paragraph 5.398; Ofwat (2019) [Cost adjustment claim feeder model Northumbrian Water](#), 16 December 2019, sheet: 'WWN\_Reducing\_sewer\_flooding', cell D31

<sup>1719</sup> [Ofwat's response to Northumbrian's SoC](#), paragraph 4.39

<sup>1720</sup> For example, [Northumbrian and Essex and Suffolk Water Forum submission](#); [Newcastle City Council submission](#); [North East England CBI submission](#); [Northumbria Regional Flood and Coastal Committee submission](#); [RSPB submission](#); [South Tyneside Council submission](#).

<sup>1721</sup> For example, [Blueprint for Water submission](#); [RSPB submission](#)

<sup>1722</sup> For example, [Northumbrian and Essex and Suffolk Water Forum submission](#); [Newcastle City Council submission](#); [North East England CBI submission](#); [North East England Local Enterprise Partnership submission](#); [South Tyneside Council submission](#)

<sup>1723</sup> [CCW response to Northumbrian's SoC](#)

- (b) Blueprint for Water stated that Northumbrian and Ofwat have a very different understanding of ‘what base funding can and should cover’, and that an ‘earlier discussion on the scope of base funding may avoid these differences’ in future spending reviews.<sup>1724</sup>

### *Our assessment and decision*

#### *Our view on allowance for the scheme*

- 5.414 When assessing whether to provide an additional allowance for this enhancement scheme, we consider that the key question is whether this scheme represents an enhancement (which should attract additional funding), or whether its activities are already covered by the base cost allowances and outcomes framework.
- 5.415 This differs to the assessment of leakage in section 8 which was historically set on a company-specific, economically-derived basis (SELL), and where we are now expecting the sector to improve substantially, with some companies’ PCs set beyond the upper quartile.
- 5.416 Northumbrian appears to accept that its base sewer flooding reduction activities are fully funded through base allowances, and that it would expect to meet the common PCs on this basis (using its ‘reactive’ approach). However, it characterises its proposed ‘proactive’ enhancement scheme as instead addressing sewer flooding resilience by reducing the number of previously unflooded households at risk of future floods.
- 5.417 Northumbrian submitted that the differences in inputs between its two approaches, both in terms of the activities it would undertake and the specific households which would be affected, demonstrated that these schemes do not overlap substantially. It also stated that it had removed funding for any potentially overlapping activity in order to be conservative.
- 5.418 We have serious concerns with this explanation. The outcomes of Northumbrian’s proposed enhancement scheme appear to overlap heavily or entirely with the outcomes that it stated it would deliver from base allowances, namely reducing the number of properties suffering from internal sewer flooding in the short to medium-term. One clear example of this is the impact assessment provided by Northumbrian, which shows that over half of the

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<sup>1724</sup> [Blueprint for Water submission](#)

relevant properties would be expected to flood within the next price control period if the company does nothing to prevent this.<sup>1725</sup>

5.419 While Northumbrian submitted that the draft DWMP shows that its region has an increased risk of sewer flooding by 2050 if it takes no actions to mitigate this, we place limited weight on this for our assessment of its proposed scheme. This is in particular because:

- (a) The submission is a draft using non-standardised assessment methodologies and thresholds, with these instead being determined by individual companies. Therefore, at this point, the analysis may be heavily dependent on a company's risk appetite rather than reflecting the true risk to customers.
- (b) The draft DWMP uses an assessment based on a 1 in 50 year storm, for which Northumbrian's scheme would have no benefit.<sup>1726</sup>
- (c) While Northumbrian submits that its region suffers from a material increase in risk, it is not clear from the maps provided whether it is particularly affected compared with the rest of the industry (which is the key input to the base allowances and common PC).

5.420 Northumbrian appears to be a poor performer for sewer flooding. We share Ofwat's concern that this enhancement request effectively represents an attempt by the company to gain additional funding to catch up with the performance in the rest of the sector, resulting in double-funding for these activities. We are concerned that providing additional allowance for this scheme would substantiate exactly the concern which Ofwat's regime was designed to address, namely:

- (a) Companies have chosen to invest in different areas historically, meaning that they will have areas of strengths and weaknesses.
- (b) Providing additional funding in individual areas risks double-funding activities, either because the company has chosen not to invest in these areas in the past or because it invested in them inefficiently.
- (c) Information asymmetry means that companies are always likely to be able to identify individual areas where they can claim that a proposed allowance is insufficient to meet their current funding requirements, but

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<sup>1725</sup> Figure 5-3 shows that over 3,000 of the 5,920 relevant properties would be expected to flood in a 1 in 5 year storm.

<sup>1726</sup> See Figure 5-3 which shows that the scheme has no benefit for these properties in a >1-in-20 year storm.

may not do so for areas where they are benefitting from receiving a higher allowance than is necessary.

- 5.421 Northumbrian submitted that the base models would fund ‘reactive’ sewer flooding activity, since the historical approach was largely focused on reactive responses (through the DG5 register and associated funding approach). However, it appeared to accept that companies would benefit by both removing properties from the register, or by avoiding properties from being added to the register. We consider that this would appear to provide companies with an incentive to protect properties in both reactive and proactive ways, and we have not seen any evidence that the sector only undertook reactive activities.
- 5.422 We also agree with Ofwat that, in principle, the regime is designed to be ‘agnostic’ to the specific approach which the companies choose to take. If a company is able to identify a more efficient delivery method (such as the movement from a reactive approach to including more proactive responses) then it would be expected to adopt this approach as part of its base activities. This would not support providing additional funding to deliver the new method as this would result in double-funding. This appears to be the case for this scheme, in particular since Northumbrian submits that its proposed enhancement programme has significantly lower unit costs per property protected than its base programme.<sup>1727</sup>
- 5.423 The ODI framework would also generally support an approach to efficient investment in reducing sewer flooding risk by prioritising properties which are most at risk in the future regardless of whether they have flooded previously or are identified through alternative methods.
- 5.424 We have not seen any robust evidence that the scheme proposed by Northumbrian represents incremental benefits for customers which should attract additional enhancement funding,<sup>1728</sup> rather than simply reflecting an alternative approach to carrying out its base activities. We therefore consider that any additional funding would be likely to result in customers paying twice for the same improvement in outcomes.
- 5.425 In light of the above, our decision is not to allow Northumbrian any additional customer funds, through enhancement allowances, to improve its sewer flooding performance in the North East.

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<sup>1727</sup> [Northumbrian's submission following the second main party hearings](#), paragraph 92

<sup>1728</sup> Consistent with our views expressed in paragraphs 3.21 to 3.31, we would not expect customers to be able to identify sources of funding in the regulatory settlement, and areas where double-funding might occur.



5.426 In making this decision, we note that the sector evidence available on wastewater resilience appears to generally be lagging behind the equivalent for water, particularly around availability and supplies of water. We consider that the DWMP is a positive step towards improving this situation (closing some of this gap with the WRMP). However, we would also encourage Ofwat and the water companies to prioritise this concern in the future, particularly given the negative impact which sewer flooding has on affected customers and the potential link to the integrity of the sewer network in general.

#### *Customer protection*

5.427 Ofwat's FD includes a bespoke PC and ODI associated with this scheme, albeit one which was calibrated to neither the allowances requested by Northumbrian nor the allowance which was included in Ofwat's FD.

5.428 Northumbrian proposed a new bespoke PC and ODI to protect customers as described in paragraph 5.398.

5.429 We consider that the common PC provides an appropriate mechanism for incentivising the delivery of activities to reduce internal sewer flooding. Given we have not provided any additional funding for this enhancement scheme, we decide not to include either the bespoke PC or the associated ODI.

#### ***Deep dive 5: Anglian – Strategic Interconnectors Programme***

5.430 In its PR19 business plan, Anglian included around £344 million<sup>1729</sup> to invest in a series of strategic interconnector pipelines, 'the Strategic Interconnectors Programme', to allow it to deliver improved security of supply, by moving water from South Humberbank in the North, to South Essex in the South East of its region,<sup>1730</sup> especially from areas of surplus to areas of deficit. Anglian regards this as especially important, given acute water scarcity issues in its region.<sup>1731</sup>

5.431 Ofwat's FD included an allowance of £305 million, in effect applying a total challenge of £38.9 million to Anglian's requested expenditure.<sup>1732</sup>

5.432 Ofwat primarily challenged Anglian's business plan with respect to the strategic interconnectors programme in three areas:

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<sup>1729</sup> Ofwat (2019) [Ofwat's Supply demand enhancement feeder model](#), tab 'Deep dive\_ANH', cell R204

<sup>1730</sup> Anglian (2019) [Anglian water resources management plan](#), p12

<sup>1731</sup> [Anglian SoC](#), paragraph 757

<sup>1732</sup> Ofwat (2019) [Ofwat's Supply demand enhancement feeder model](#), tab 'Deep dive\_ANH', cell W204

- (a) the capacity required for the various pipelines, including a reduced allowance as a result of challenging eight schemes out of the total 21;
- (b) whether Anglian had sufficiently considered engineering options for intra-zonal schemes when developing its plan; and
- (c) the efficient cost of the activities required, particularly by reference to an assessment of the benchmarking data which Anglian provided.

5.433 Ofwat's challenge focused on requiring the company to explain its decision making and the process followed in selecting its plan, and how the company decided on the sizing, balancing both the business as usual needs and possible future requirements.<sup>1733</sup>

5.434 Anglian produced a graphic showing its planned interconnectors, and those to which Ofwat's FD applied a capacity reduction challenge. This is shown in Figure 5-4:

**Figure 5-4: WRMP interconnectors scope reduction and strategy**



Source: [Anglian SoC](#), paragraph 757, figure 54, p178. Anglian's MI/d capacity for each relevant interconnector scheme is shown in purple. Ofwat's capacity assessment is shown in blue.

<sup>1733</sup> [Ofwat's response to Anglian's SoC](#), p98

*Development of Anglian's plan*

- 5.435 Anglian told us that it developed its plan following a framework set out in UK Water Industry Research (UKWIR) Guidance on decision-making processes and the WRPG.<sup>1734</sup>
- 5.436 The guidance provides a problem characterisation assessment within the framework. This approach helps to assess various strategic issues, risks and uncertainties, in the development and selection of a decision-making approach.<sup>1735</sup> Anglian told us it developed its problem characterisation before applying its economic balancing of supply and demand (EBSD) modelling.
- 5.437 Anglian stated that as part of its planning process, it considered an array of potential supply network options, including where it could jointly deliver supply-demand and resilience (dual source of supply) benefits.
- 5.438 Anglian started by setting capacity levels to meet the minimum requirements included in its WRMP, the baseline least cost plan through industry-standard EBSD modelling.
- 5.439 In relation to this EBSD planning, Anglian told us that:
- (a) the methodology is an established approach, which was agreed with the Environment Agency; and
  - (b) the model takes data feeds from additional validated models, such as Anglian's cost model, and automatically generates the least cost solution for the scenario presented.
- 5.440 Anglian subsequently identified an Alternative Least Cost plan, which allows for variations to its baseline assumptions, to consider alternative scenarios that may result in the need for greater water supply to meet supply demand deficits identified for WRMP19, for example if demand management outcomes are less effective than that assumed in the baseline least cost plan.
- 5.441 Since the Alternative Least Cost plan does not allow for any future uncertainty beyond WRMP19 Anglian considered additional plans to allow for further future uncertainty, before deriving its Best Value Plan (BVP). In doing so, it stated that the BVP caters for flexibility to adapt to 'core scenarios' for

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<sup>1734</sup> Environment Agency; Natural Resources Wales (2018) [EA Interim Water Resources Planning Guideline](#)

<sup>1735</sup> UKWIR

WRMP24.<sup>1736</sup> The incremental cost of the BVP compared to the Alternative Least Cost plan is £22.2 million.

- 5.442 Anglian stated it also became aware of potential abstraction licence changes during the planning process and after preparing its draft WRMP19 and September 2018 business plan. These would place further restrictions on its ability to abstract water from certain sources, resulting in a greater need for transporting water through its planned interconnectors.
- 5.443 Anglian told us that, in addition to the above, it also accounted for potential abstraction licence changes through planning intra-zonal schemes, where it became aware of the changes too late to be included in the WRMP planning tables.
- 5.444 In its submissions, Anglian has also referenced a ‘least worst regrets’ approach which it had applied in its scenario modelling, in effect to balance an allowance for flexibility to cater for future uncertainty against the incremental whole life costs.<sup>1737</sup>
- 5.445 Anglian stated that it applied performance criteria to select its option. Anglian’s strategy for selecting its BVP considered the following additional benefits:
- (a) Greater adaptability and flexibility,<sup>1738</sup> for development and sharing of new resource options beyond 2025, including potential utilisation of a future strategic reservoir scheme which has the potential to be ready for development within AMP8.<sup>1739</sup>
  - (b) Catering better for risk and resilience.<sup>1740</sup> The BVP performs better in stress testing including for dual supply resilience for communities currently on a single source of supply, as well as resilience for a 1-in-500 year drought.
  - (c) Providing better alignment with regional planning due to an increase in the capacity of strategic transfers across the region.

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<sup>1736</sup> The draft WRMP24 planning guidelines require companies to plan for 1-in-500 year drought events, rather than 1-in-200 year events required in WRMP19.

<sup>1737</sup> Anglian SoC, p165

<sup>1738</sup> This is based on quantitative analysis using EBSD model runs

<sup>1739</sup> Anglian SoC, paragraph 351

<sup>1740</sup> UK Water Industry Research defines water resilience in the water industry as ‘the ability of an asset or asset system to continue to withstand or to recover from the effects of an exceptional event such that acceptable service levels are maintained and/or restored quickly’ UKWIR (2013), *Resilience: Making a Business Case for PR14*

5.446 For select schemes, Anglian's planned capacity under its BVP is greater than that profiled under stress-tested scenarios, as illustrated at Table 5-19 for a sample of two schemes.

**Table 5-19: Summary of Anglian's profiled capacity of select schemes under several scenarios**

Scheme ref	Max capacity in each portfolio (combined scenarios)			Range of maximum utilisation across the stress test scenarios (M/d)						Max capacity utilisation across all scenarios
	LCP	BVP	BVP Max	LCP	BVP	BVP-Max	LCP with reservoir	BVP with reservoir	BVP max-with reservoir	
SFN4	32	40	43	15-32	15-35	15-43	23-32	24-33	27-43	43
ESU8	10	20	20	2-10	2-10	2-17	8-10	9-10	12-17	17

Source: Anglian

5.447 For these specific schemes, Anglian told us that:

- (a) in planning the capacity for scheme referenced SFN4, more weight was placed on the 'BVP max, with reservoir scenario', to account for wider regional planning.
- (b) The scheme at ESU8 is sized to also enable dual supply resilience, particularly at Alton.<sup>1741</sup>

5.448 Anglian stated that its BVP strikes a balance between known, firm requirements and potential future ones, considering the whole life costs of its options, the National Framework and draft WRMP24 guidance consultation in May 2020.<sup>1742</sup>

5.449 Anglian told us it has tested the principle of future proofing the investments with customers, and reported that the approach received a strong level of support.<sup>1743</sup>

### *Engineering options*

5.450 Anglian told us that, in order to maintain security of supply, and to deliver sustainability-related reductions in the use of water resources resulting from drivers such as the Water Framework Directive in AMP7, the only option

<sup>1741</sup> [Anglian's reply to Ofwat's response](#), Part A:3, 6.1, p57

<sup>1742</sup> [Anglian's reply to Ofwat's response](#), Part A.3, 2.1, p46

<sup>1743</sup> [Anglian SoC](#), section 4.9, paragraph 289, p64

available was the transfer of water. It submitted that this applied at the inter-WRZ and intra-WRZ level.<sup>1744</sup>

### *Cost estimation*

5.451 Anglian explained its approach to cost assessment as follows:<sup>1745</sup>

- (a) All options are entered into the Anglian Asset Investment Planning and Management tool, to estimate the cost.
- (b) The cost estimation module within the tool contains an asset cost model library covering assets from treatment steps (including pumping station and filters) to pipelines and equipment.
- (c) Where cost models do not exist, Anglian develops new ones, using a 'standard robust methodology'.
- (d) Anglian allocates cost confidence grades to feasible options. Lower confidence scores reflect limited information or relevant company experience.
- (e) Where cost information is unavailable from within the business, Anglian uses external data.

5.452 Anglian started an OJEU tendering process on its Strategic Interconnectors Programme after the submission of its September 2018 Plan. Anglian stated that it selected the most complex scheme, with the larger diameter and larger booster pumping station to capture economies of scale.<sup>1746</sup>

5.453 The tendering process allowed Anglian to market test its unit rate for pipelines, booster pumping stations and storage reservoirs.

5.454 Anglian provided unit cost data comparisons of its costs for water mains pipelines compared to that of construction companies using tendered cost information. Data extracts are provided at Table 5-20:

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<sup>1744</sup> [Anglian's reply to Ofwat's response](#), Part A.3, 2.1, p47

<sup>1745</sup> [Anglian, Our plan 2020-25](#) pp99–100, [Anglian water tables commentary](#), pp2–4, 62 and 146

<sup>1746</sup> [Anglian's reply to Ofwat's response](#), Part G.4, p48, section 4.3.2, paragraph 172

**Table 5-20: Anglian's breakdown of costs for water mains pipelines in its strategic interconnectors programme**

	<i>Proportion of water main costs (%)</i>	<i>WRMP length (km)</i>	<i>Anglian's plan costs (£/m)</i>	<i>Upper quartile cost (£/m)</i>
Open cut – fields	93	531,046	773	777
Open cut – roads	4	18,407	967	942
Directional drilling	3	5,714	1,953	1,161
<b>Totals</b>	<b>100</b>	<b>555,167</b>	<b>792</b>	<b>786</b>

Source: [Anglian PR19 Draft Determination](#), August 2019, p209, Table 81

5.455 Anglian stated that this supported its efficiency claims in that:<sup>1747</sup>

- (a) The table demonstrated that, of the total cost of water mains for its strategic interconnectors programme, 97% (93% fields, 4% roads) relate to costs of open cut and only 3% to directional drilling;
- (b) It provided benchmarking evidence that its costs for these open cut techniques (which account for 97% of its water mains laying) are below the upper quartile assessment of costs; and
- (c) Its proposed costs for the full length of the interconnectors programme are efficient at £792/m, compared to upper quartile costs of £786/m (a difference of less than 0.7%).

5.456 Anglian appointed KPMG<sup>1748</sup> to provide external assurance as to its cost estimates by reference to results from market testing.

5.457 In connection with Anglian's OJEU tender exercise, KPMG commented that:

- (a) the exercise covered one significant element of the strategic grid, the Central Lincolnshire to South Lincolnshire scheme, which included a pipeline with a diameter of 900mm, a booster station with capacity 2635kw, and a storage reservoir of 25,000m<sup>3</sup> capacity.
- (b) in total 63% of the total pipeline capex of the strategic pipeline related to pipelines with a capacity of 600mm or greater and hence the RFI may represent a good proxy for the wider strategic grid scheme.

<sup>1747</sup> [Anglian PR19 Draft Determination](#), August 2019, p209

<sup>1748</sup> Anglian Water Services undertook a market testing procurement exercise to assess and select bidders for the delivery of the strategic grid consisting of pipelines, pumping stations and associated structures, understood to represent a significant element of AWS' Water Resources Management Plan (WRMP) investment for 2020-25 (AMP7). KPMG was asked to consider the results of this market testing exercise against the cost estimates submitted to Ofwat as part of their original business plan (BP) and comment on the robustness of those estimates in light of this evidence.



5.458 KPMG assessed Anglian's comparative analysis by a review of costs submitted by bidders by line item. Data extracts are provided at Table 5-21.

**Table 5-21: Data extracts from market testing for cost comparisons by line item**

	<i>Cost Type</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Average</i>	<i>Anglian costs</i>
DI-OC-field NB:900mm Depth:900mm	Unit cost (£/m)	668	1,078	811	773
HPPE – DD complex NB:900mm Depth:1200mm	Unit cost (£/m)	792	6,894	2,458	1,953
Booster Pumping Station 1 (2635kW)	Total adjusted cost (£m)	2.3	12.1	5.5	3.7
Booster Pumping Station 2 (2557kW)	Total adjusted cost (£m)	3.6	11.8	6.8	3.6
Reservoir	Total adjusted cost (£m)	4.1	11.4	6.3	4.1
<b>Total scheme costs (£m)</b>		<b>49.8</b>	<b>86.8</b>	<b>67.2</b>	<b>58.6</b>

Source: Anglian

5.459 KPMG concluded that Anglian's cost estimates were 'well within the range of bids submitted in response to the RFI and below the average for all schedule items'.

5.460 Anglian stated that this demonstrated that its costs for laying water mains are consistent with the upper quartile level of costs, with its costs of £58.6 million comparing to an average of £67.2 million.<sup>1749</sup>

5.461 Anglian told us that its water resources planning programme was an ongoing process, and it has already started work on its WRMP24. This will likely result in future adjustments, including to reflect Ofwat's Strategic Resource Options. Anglian stated that, while the planned interconnectors would not constrain these decisions, there will be a relationship with future resource options, for example, new supply resources could increase interconnector capacity utilisation.

5.462 Anglian was concerned that opportunities to adapt in the future are disincentivised by the interconnector ODI, set as part of Ofwat's FD, which tightly specifies the source, destination, and capacity level of each interconnector. Anglian said this could result in it being penalised if it did not precisely match the current proposals, even if subsequent changes would be the best solution for its customers and the environment.

5.463 Anglian proposed amendments to the PC and ODI to:

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<sup>1749</sup> [Anglian's reply to Ofwat's response](#), Part G, p48, section 4.3.2, paragraph 172



- (a) Apply a measure of net supply benefit (ie net increase in supply capacity) in a WRZ in place of reference to capacity delivered by individual interconnectors; and
- (b) Consider a change in timing of measurement, to reflect when the transfer is in operation, in effect meaning that it is not contingent on delivery of the Elsham scheme works, which are part of the Direct Procurement for Customers (DPC) process.

5.464 In its response to our Provisional Findings, Anglian said it was critical that the PC allowed it flexibility to respond without unfairly penalising any re-optimising of interconnector design given the likelihood of significant sustainability reductions to its abstraction licences beyond that previously agreed, and with a different geographical spread.<sup>1750</sup> Anglian referred to its net supply benefit proposal as an outcomes-based rather than outputs-based approach, and pointed to the results of online customer engagement that it said showed that customers strongly supported the use of an outcomes-based approach to customer protection in relation to its interconnector programme.<sup>1751</sup> Anglian also said it was concerned about the potential for an ex-post review of the cost efficiency of its programme even if the required outcomes are delivered, pointing to comments in its FD Outcomes Appendix on the potential for its interconnectors underperformance incentive rate to be increased if it does not deliver schemes that have high average cost per Ml/d.<sup>1752</sup>

#### *Ofwat's views*

5.465 Ofwat stated that at a high level, an interconnection programme making best use of surplus water in some areas to supply others in a company with many discrete water resource zones was a reasonable strategy.<sup>1753</sup> In Ofwat's FD, it allowed investment to cover the majority of the company's identified scope.

5.466 However, Ofwat stated that despite its engagement with Anglian throughout the WRMP and business plan development processes, Ofwat was concerned about the transparency and robustness of the company's decision making in identifying its preferred programme.<sup>1754</sup>

5.467 Ofwat explained that it did not challenge the portion of capacity included in the programme that was identified in the WRMP as being utilised to balance

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<sup>1750</sup> [Anglian's response to the provisional findings](#), paragraph 362

<sup>1751</sup> [Anglian's response to the provisional findings](#), paragraph 370

<sup>1752</sup> [Anglian's response to the provisional findings](#), paragraph 375

<sup>1753</sup> Ofwat (2020) [Reference of the PR19 FD: Explanation of the final determination for Anglian Water](#), paragraph 2.44

<sup>1754</sup> [Ofwat's response to Anglian's SoC](#), paragraph 3.205

supply and demand over the next 25 years.<sup>1755</sup> Ofwat's principal challenge focused on requiring Anglian to explain its decision-making and the process followed from identifying its least cost plan to selecting its best value plan. This focused on the capacities selected for interconnectors and how the company decided upon the sizing for inclusion in its best value plan, balancing both the business as usual needs and possible future requirements.<sup>1756</sup>

5.468 To reflect its concerns, Ofwat included an allowance based on capacities greater than those identified in the least cost plan for all schemes, but in places set funding consistent with a lower capacity than Anglian's BVP. Ofwat considered this to be in accordance with customer support for 'investment now' while maintaining its duty as a regulator to challenge proposals to ensure requirements are well evidenced and costs are efficient.<sup>1757</sup>

5.469 Ofwat was particularly concerned that uncertainty in areas related to WRMP24 development and regional planning, including potential utilisation of a strategic reservoir, could lead to a very different set of requirements which would result in a considerably different best value plan.<sup>1758</sup>

5.470 Ofwat stated that it based its final determination on its assessment of this evidence. It said the inclusion of the scheme at East Ruston in its final determination was an example of how Ofwat based its decision on the latest evidence. This scheme had not been presented in the previous versions of the WRMP or business plans but was included by the company in its draft determination representation in August 2019, with further supporting information provided in October 2019.<sup>1759</sup>

5.471 Ofwat applied cost efficiency challenges to some of Anglian's spend, as it was concerned that cost benchmarking was presented for only some of the common activities to be completed as part of the programme. Ofwat considered that the remaining activities had very little information presented for them in order to assess efficient costs. For example, the cost uplift for project location costs appeared to be applied for all schemes without a clear explanation of what this represented.<sup>1760</sup>

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<sup>1755</sup> Ofwat (2020) [Reference of the PR19 FD: Explanation of the final determination for Anglian Water](#), paragraph 2.45

<sup>1756</sup> [Ofwat's response to Anglian's SoC](#), paragraph 3.206

<sup>1757</sup> [Ofwat's response to Anglian's SoC](#), paragraph 3.209

<sup>1758</sup> [Ofwat's response to Anglian's SoC](#), paragraph 3.211–3.213

<sup>1759</sup> [Ofwat's response to Anglian's SoC](#), paragraph 3.207

<sup>1760</sup> Ofwat (2020) [Reference of the PR19 FD: Explanation of the final determination for Anglian Water](#), paragraph 2.47

5.472 In its response to our Provisional Findings, Ofwat stated that an approach which provided Anglian its requested allowance without challenge would wrongly give Anglian the benefit of the doubt where it had failed to provide sufficient evidence.<sup>1761</sup>

5.473 Ofwat also raised concerns around Anglian's proposal to adopt a PC based on net supply benefit to provide additional flexibility around delivery. Ofwat stated that this submission indicated that Anglian had a lack of conviction in its own plans, which would support reducing allowances.<sup>1762</sup> Ofwat was also concerned that a PC in this form may not deliver all of the benefits (including supply-demand balance, resilience, and uncertainty mitigation) which the original scheme included.

### *Third Party views*

5.474 Water Resources East<sup>1763</sup> (of which Anglian is a member) expressed strong support for a 'no regrets approach', as adopted by Anglian. Its representation included that:<sup>1764</sup>

- (a) it supported the principle of allowing for future flexibility and resilience where there is uncertainty;
- (b) it regarded Anglian's interconnectors as an essential element of the future strategy for water resources across Eastern England; and
- (c) it considered delaying decisions until more technical information is available created a significant risk that long term costs would rise because of failure to act early – 'it is time for some 'no regret' decisions to be made'.

### *Engineering input and advice*

5.475 We consider engineering expertise important to our assessment of Anglian's plans. We have obtained commentary and advice from our independent engineering consultants, WRc, in relation to specific questions and have summarised these below.

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<sup>1761</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), paragraphs 2.8–2.11

<sup>1762</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), pp11–12 and 33–34

<sup>1763</sup> Water Resources East is an independent group with members including water companies, the agriculture and food sector, local authorities, Local Enterprise Partnerships, environmental organisations, community groups. Power companies and other interested parties.

<sup>1764</sup> [Water Resources East submission](#)

### *Expected economic life of a pipeline*

- 5.476 We consider the useful economic life of a pipeline important for several reasons, including the period relevant to planning for potential future risks as well as the length of time the pipelines will serve customers.
- 5.477 WRc advised us that the economic life for depreciation purposes may be assumed to be 50-100 years, depending on pipeline material chosen and its operating environment, however useful operational life could be considerably longer (perhaps by a factor between 1.5 and 2).<sup>1765</sup>

### *Planning for uncertainty, scenario modelling and adaptive planning*

- 5.478 We sought engineering advice as to whether scenario modelling and risk profiles would justify allowing for greater capacity than Ofwat took from Anglian's least worst regrets analysis. WRc advised us that:
- (a) If future resources planning at WRMP24 is to require a more extreme scenario of a 1-in-500 year drought event to be considered, then 'in our opinion it does make sense to consider this now, as water resources development options are by their nature long-term options'.
  - (b) Developing and extending pipelines is a highly disruptive exercise, and consideration needs to be given to the direct costs, the environment and societal impact of works, which should be quantified and considered as part of the 'whole life' costing exercise and for scheme comparison.
  - (c) The balance between current requirements and provision for long-term growth requires careful application of engineering planning and design, as well as financial modelling.
  - (d) Stress testing should explore areas of high uncertainty relating to demand or supply side constraints and 'you would expect to see stress testing possibly relating to population growth; longer, more severe future drought; or more extreme climate change impacts'.

### *Engineering options, complexity and cost estimation*

- 5.479 In response to questions presented in connection with engineering options, WRc told us that:

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<sup>1765</sup> WRc. This information was supplied in response to a CMA request in connection with intra-zonal pipelines. However, we interpret this to be similar to that of an inter-zonal pipeline.

- (a) the whole WRMP process (both supply-side and demand-side options), is a process for considering if there are realistic alternative options. The EBSD modelling is part of this process;
- (b) the options outlined were considered typical;
- (c) it is expected these would have been reviewed by the Environment Agency and other stakeholders during the WRMP process; and
- (d) 'if the EBSD repeatedly selected the transfer of water as a cost-effective option during the optioneering, despite modelling different constraints and echoing customer and regulatory priorities, then we would expect the process to be effective'.

### *Cost estimation*

5.480 We consulted WRc as a means of providing a level of assurance or validation over the cost estimation and to help us understand possible reasons for differences in cost estimates.

5.481 WRc holds a database which includes cost data from ten companies in relation to pipeline schemes. Much of the cost data is final account data on scheme completion, which feeds into statistical modelling, to enable cost estimation. Companies use this type of approach to estimate scheme costs where detailed quantified survey costs are not yet available or needed and to benchmark their own cost data or estimates provided by their supply chain.

5.482 To respond to our request to comment on Anglian's cost estimates WRc undertook cost comparisons based on pipeline diameters and length information, comparing Anglian's cost estimates to cost data in its database from the period 2005 to 2017 related to open-cut pipeline installations.<sup>1766</sup>

5.483 For the seven schemes which were challenged by Ofwat, WRc advised us that:

- (a) Anglian's cost estimates for five schemes appear reasonable based on WRc's own benchmarking data; and
- (b) Anglian's cost estimates for two schemes seem substantially greater than WRc's benchmarks. However, this is expected to be due to imperfect comparators, for example for reasons associated with ground conditions

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<sup>1766</sup> Anglian [WRMP 2019 technical document supply side option development](#)

and crossings. WRc noted Anglian identified a number of schemes which have crossings that require directional drilling.<sup>1767</sup>

5.484 WRc advised us that engineering complexity can increase with pipe size (diameter), ground conditions and the presence of crossings, by railways and roads. These factors can increase cost and the time to lay pipelines.

#### *Our assessment and decision*

5.485 Anglian's proposed Strategic Interconnectors Programme is a large and complex programme of infrastructure investment, with long-term implications for its customers and for water supply management in the region.

5.486 Ofwat appears to have accepted the need, the approach, and most of Anglian's proposed allowances in its final determination (allowing around 90% of Anglian's requested figure). However, in several areas Ofwat intervened to reduce Anglian's allowances for this scheme, and we have considered these in more detail below.

5.487 We understand and accept the need for resilience of supply, and the importance of this programme in delivering greater resilience to Anglian's region. In reaching our judgment on how different priorities and risks should be balanced in the context of these types of investment and the inevitable uncertainties that companies face, we consider it important not to lose sight of longer-term strategic objectives and pressures. Our approach to this judgement may differ to that adopted in Ofwat's FD, but we do not consider this to imply any undue lowering of the evidential burden that companies face.

#### *Capacity level selection*

5.488 Anglian appears to have adopted a low-risk approach to selecting the capacity of its interconnector pipes, increasing its capacity substantially over the level it had previously set out in its WRMP19. These increases came about from considering elements such as:

- (a) reflecting the latest information which was not all available at the time of the original WRMP;
- (b) the incremental costs of increasing capacity in the future, compared with incurring additional costs now;

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<sup>1767</sup> Anglian [WRMP 2019 technical document supply side option development](#), eg p107, Table 6.143

- (c) lower-than-expected efficacy of demand-side solutions;
- (d) improving resilience beyond the minimum level set out in the WRMP19 guidance, and more in line with what is expected for WRMP24; and
- (e) allowing additional flexibility for future elements of the wider water network.

5.489 The key questions at issue appear to be:

- (a) the extent to which Anglian should be seeking to continue to reduce the risk of addressable supply constraints (or costly future works), at an increased cost to its customers; and
- (b) the point at which the additional costs outweigh the associated benefits.

5.490 There are numerous elements in the water industry regulatory framework to encourage longer-term thinking, including the duty to promote the resilience objective, the SPS, the WRMP process, and the proper consideration of the consumer objective (as it applies to future customers). Ofwat explained this well when stating that ‘the regulatory framework and incentives must take account of future developments in both the short and longer term because the timescale for the commissioning, construction and operation of many capital projects stretches much longer than five years’.<sup>1768</sup>

5.491 We are concerned that making relatively minor interventions on individual pipe capacities, with limited implied cost savings, loses sight of overall strategic objectives particularly in light of the importance of ensuring future operational resilience. In this case, it is likely that climate change, population growth and other similar trends will continue to drive the need for moving water around Eastern England. Including a reasonable element of headroom in these capacities appears a prudent and beneficial approach.

5.492 We also place some weight on Anglian’s process in its capacity selection, balancing flexibility to respond to uncertainty with whole life costs for its customers.

5.493 Based on our detailed review of the evidence available to us, we consider that Anglian has followed a reasonably robust and transparent process and tried to balance meeting business as usual needs with the need for resilience in the face of future uncertain events. We consider Anglian’s selection of headroom is reasonable in the circumstances and seeks to provide a balance between

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<sup>1768</sup> Ofwat (2015) ‘Towards Water 2020 – meeting the challenges for water and wastewater services in England and Wales’, p29

customer costs and affordability, and the future need for resilience, also considering a potentially reduced cost of rework.

- 5.494 We also note that there could be risks associated with building too much capacity if it is not required. For example, if capacity is oversized, we understand this may result in a lower velocity of water flow which in turn can negatively impact water quality. This risk should reduce any incentive on Anglian to over-specify these capacities, since, if they were not ultimately required in the future, the company would bear the associated risks and costs.
- 5.495 We therefore decide not to include any cost challenges associated with capacity reductions on this scheme. This results in an increased allowance of £21 million compared to Ofwat's FD.<sup>1769</sup>

#### *Cost estimation*

- 5.496 We note the process Anglian undertook to develop its cost models, obtain information and assess cost estimates.
- 5.497 Whilst Anglian's benchmarking exercise had identified potentially cheaper options for some small areas of spend, we understand that differences could result from variations in contractor views as to how the work could be done, quality, differences in optimism bias, or risk appetite.
- 5.498 We understand that Ofwat's cost efficiency challenges have generally arisen as a result of the identification of individual benchmark figures below Anglian's estimated costs. However, given the alternative explanations discussed above, we are concerned that using the extreme ends of ranges is unlikely to provide a fair or informative comparator.<sup>1770</sup> This appears to have been supported by our independent engineering advisers who highlighted alternative explanations for higher cost estimates in some cases.
- 5.499 We particularly note that:
- (a) Anglian's planned costs are well within the range of costs obtained from its market testing exercise for the Central Lincolnshire to South Lincolnshire scheme.

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<sup>1769</sup> [Anglian SoC](#), Table 19; and [Ofwat's response to Anglian's SoC](#), Table 3.12

<sup>1770</sup> Institution of Civil Engineers (May 2019), [Reducing the gap between cost estimates and outturns for major infrastructure projects](#), p8, procurement



- (b) In respect of reservoir costs (where Anglian has a lesser degree of confidence from its own in-house data), Anglian adopts the lowest cost estimate.
- (c) Anglian has explained both its approach of considering an alternative, cheaper form of open cut drilling where possible in comparison to directional drilling, as well as demonstrating the risks of using imperfect comparators whereby the differences in cost can be large.

5.500 We consider that Anglian has followed a reasonably robust process, testing costs where it can using both internal and external benchmarks, based on an outline design, to establish that costs at this stage seem reasonable.

5.501 We consider it a low risk that Anglian has adopted inefficient cost estimates, and so decide to apply no cost efficiency challenges to this scheme.

5.502 In addition, we have considered Anglian's approach to optioneering for this programme. Having consulted our engineering advisers and based on our understanding of the process followed, we consider it low risk that Anglian has insufficiently considered engineering options.

5.503 Accordingly, we decide to apply no cost efficiency challenges in connection with the development of engineering options.

5.504 Our final decisions in relation to cost challenges and optioneering result in an increased allowance of £18 million compared to Ofwat's FD.<sup>1771</sup>

### *Customer protection*

5.505 There are multiple sources of uncertainty and risk to delivery for this scheme.

5.506 For large schemes with intrinsic uncertainty, it appears reasonable to include mechanisms to protect customers, whilst also allowing an element of flexibility if possible, so as not to compromise intended outcomes, given the long lead time and the applied use of adaptive planning.

5.507 Anglian said it had concerns in relation to Elsham, and that the timeline for delivery of the completed scheme may be affected by the Elsham DPC process. However, we note Anglian's statement that this should not delay the building of the interconnectors themselves, rather the DPC process may impact the potential connection to certain sources and the operability of connected pipelines.

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<sup>1771</sup> [Ofwat's response to Anglian's SoC](#), Table 3.12

5.508 The nature of scheme-specific ODIs which are focused on outputs rather than outcomes makes it hard to provide future flexibility with regard to the design and capacity of the schemes without exposing customers to substantial risk of funding a scheme that is never delivered. However, we consider it reasonable to try to mitigate some of the other risks which Anglian raises in relation to circumstances beyond its control. Our decision is therefore to:

- (a) adjust the PC to being focused on capacity delivery, rather than the delivery of water. This will ensure that the pipes are not delayed and can start to be used where interdependencies are not disrupted, but Anglian does not suffer penalties for delays to the delivery of water using these interconnectors due to circumstances beyond its control. This would be subject to external verification; and
- (b) remove intra-period ODI penalties, applying a claw-back on the schemes at the end of year 5 if they are not delivered. As these are primarily long-term investments, the largest risk for customers is associated with non-delivery rather than shorter term delays.

5.509 We also decide to recalibrate the PC and ODI to reflect the changes in our final decision, including capacities, totex allowances, and cost sharing. This results in an increased capacity requirement over Ofwat's FD<sup>1772</sup> of 27.2 MI/d,<sup>1773</sup> and an ODI rate of £0.460 million per MI/d in the case of non-delivery by the end of 2024/25.<sup>1774</sup>

5.510 In its response to our Provisional Findings, Anglian said that the prescriptive nature of this PC could limit or prevent its ability to develop and optimise solutions through the design process by penalising Anglian if it delivered an outcome which does not precisely match the defined output, even if that were the better solution for customers and the environment.<sup>1775</sup> We do not consider that Anglian's proposed approach (of setting the PC based on the net supply benefit to be provided in each relevant WRZ) would protect consumers adequately. While the schemes are intended to provide net supply benefit in specific WRZs, they are also intended to provide broader, longer-term benefits. In particular, under Anglian's proposed approach there would be a risk that net supply benefit requirements could be met in ways that provided

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<sup>1772</sup> Ofwat (2019) *PR19 final determinations: Anglian outcomes performance commitment appendix*, pp95–98

<sup>1773</sup> *Anglian SoC*, Table 19. The capacity figures in the Anglian Plan Scope column represent the new PC levels for the relevant schemes listed.

<sup>1774</sup> Increase of £38.9 million over Ofwat's FD allowance results in £390.7 million for full internal interconnection delivery, multiplied by the totex outperformance cost sharing rate of 45%, divided by the total capacity to be delivered of 382.4 MI/d, equals a unit rate of £0.460 million.

<sup>1775</sup> *Anglian's response to the provisional findings*, paragraph 360

more limited resilience benefits, and we consider Anglian's own evidence to have provided an illustration of this.

5.511 We note that Ofwat has a defined PC change process and that this would provide scope for the strategic interconnectors PC to be modified, if Anglian identifies a compelling case for change.<sup>1776</sup> We consider this process to provide an appropriate means of providing flexibility to Anglian, as it would allow for careful consideration of the risks customers may face from such a change (for example, in terms of reduced resilience benefits), and whether Anglian's proposed approach appropriately compensates customers for changes to the relevant balance of risks.

#### *Overall decision*

5.512 The effect of our determination for the Anglian Strategic Interconnectors Programme is to increase Anglian's totex allowance by £38.9 million above Ofwat's FD,<sup>1777</sup> and adjust the PC/ODI as described in paragraphs 5.508 and 5.509 above.

### **Deep dive 6: Anglian – Smart Metering Scheme**

5.513 In its PR19 business plan, Anglian included £179.2 million of additional allowances for costs associated with metering.<sup>1778</sup> Of this:

- (a) £20.2 million was associated with installing meters (both smart and dumb)<sup>1779</sup> in houses which had not previously had a meter installed;
- (b) £42.4 million reflected the increase in the number of meters that Anglian planned to replace in AMP7, over and above the number it would be replacing if it did not deliver its smart metering programme;<sup>1780</sup> and
- (c) The remaining £116.6 million was associated with the cost of the smart meters themselves and associated infrastructure.

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<sup>1776</sup> Ofwat (2019) [PR19 final determinations: Anglian outcomes performance commitment appendix](#), Annex 2

<sup>1777</sup> The difference between £343.8 million, stated as the company's view and £304.9 million, [Ofwat's response to Anglian's SoC](#), Table 3.11, p95.

<sup>1778</sup> Ofwat (2019), [Metering enhancement feeder model](#)

<sup>1779</sup> 'Dumb' or 'traditional' meters are read manually, at most a few times a year while smart meters record meter readings automatically and then relay them to suppliers; House of Commons (2019), [Briefing Paper – Water meters: the rights of customers and water companies](#), section 2.6.

<sup>1780</sup> [Anglian SoC](#), p173

5.514 In Ofwat's FD, it accepted the majority of these costs. However, for each of the above categories, it reduced the allowance provided for the following reasons:<sup>1781</sup>

- (a) Ofwat reduced the £20.2 million request by £3.1 million to reflect its own metering model results;
- (b) Ofwat assessed the £42.4 million as a base cost adjustment claim, and rejected it in its entirety since this was covered by base cost allowances and within the company's control to manage; and
- (c) Ofwat reduced the £116.6 million request by £7.4 million to reflect (i) claimed discrepancies in specific figures provided by Anglian, and (ii) Ofwat's treatment of the costs of smart meters for newly built houses.

5.515 This resulted in Ofwat allowing Anglian £126.3 million for this programme, all in the form of enhancement spend.

5.516 We note that the costs associated with accelerating existing meter replacement (the £42.2 million claimed by Anglian) reflect an adjustment to base costs, and so would usually be treated as a base cost adjustment claim (as in Ofwat's FD). Due to their close association with Anglian's smart meter enhancement programme, we have assessed these proposed costs in this section.

### *Anglian's views*

#### *Background and need for the scheme*

5.517 Anglian stated that it is in a water stressed area, and so it needed to reduce the demand for water where possible.<sup>1782</sup> It therefore proposed a plan to install around 1.1 million smart water meters in its region in AMP7,<sup>1783</sup> with the intention of achieving near-universal roll out by the end of AMP8.<sup>1784</sup>

5.518 Anglian submitted that smart meters were a core element of its demand management strategy and this was reflected in its WRMP,<sup>1785</sup> including as an integral part of its plans to reduce leakage. In particular, smart meters:

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<sup>1781</sup> Ofwat (2019), [Metering enhancement feeder model](#)

<sup>1782</sup> Anglian (2019), [Draft Determination Smart Metering Cost Adjustment Claim](#), p2

<sup>1783</sup> [Anglian SoC](#), paragraph 747

<sup>1784</sup> [Anglian SoC](#), paragraph 265

<sup>1785</sup> [Anglian SoC](#), paragraph 348

- (a) reduce per capita consumption by around 3 percentage points more than traditional dumb meters, with larger savings possible if combined with behaviour change initiatives;<sup>1786</sup>
- (b) allow for faster identification and fixing of leaks, with the plan expected to result in a total reduction of 7 megalitres of leakage per day; and
- (c) allow Anglian to develop a better understanding of its network<sup>1787</sup> and customer behaviours.

5.519 Rather than replacing meters on a reactive basis or when they reach the end of their lives, Anglian's proposal consisted of conducting a geographic-based approach, installing smart meters on an area-by-area basis and so replacing some existing dumb meters before the end of their lives. Anglian submitted that this approach was more efficient and would ensure that it would get the best value from its fixed network whilst allowing for a more targeted approach to demand management through behaviour change.<sup>1788</sup>

5.520 In addition to the above, Anglian highlighted that smart meters provide additional benefits to customers, in particular:<sup>1789</sup>

- (a) providing the customer with greater information and control of their water usage; and
- (b) allowing Anglian to notify customers of potential leaks in their supply pipes (which customers are responsible for) or in their properties so that they can arrange for these to be fixed faster.

#### *Need for an adjustment*

5.521 Anglian submitted that it had not undertaken any substantial smart metering in the past,<sup>1790</sup> and this would not be reflected in Ofwat's base models. Therefore, any smart uplift costs should be treated as enhancement expenditure.<sup>1791</sup>

5.522 In relation to its base cost adjustment claim, Anglian submitted that only around 442,000 of the planned 1.1 million meters would be replaced in AMP7 as a result of reaching their end of life, with the remainder requiring early

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<sup>1786</sup> Anglian (2019), [Anglian water resources management plan](#), p51

<sup>1787</sup> Anglian SoC, p174

<sup>1788</sup> Anglian SoC, p174; Anglian (2019), [Draft Determination Smart Metering Cost Adjustment Claim](#), p4

<sup>1789</sup> Anglian's reply to Ofwat's response, Part A.1, row 7.4, pp21–22

<sup>1790</sup> Anglian SoC, paragraph 747

<sup>1791</sup> Anglian (2019), [Draft Determination representation](#), p129

replacement.<sup>1792</sup> Anglian stated that, since the base models would only reflect average run-rate meter replacement, the costs of these additional meter replacements had not been funded.<sup>1793</sup>

5.523 Anglian submitted that this demonstrated the requirement to accelerate the replacement of its meters and the need for its associated base cost adjustment claim.<sup>1794</sup>

5.524 Anglian stated that if it only installed a smart meter when the existing dumb meter reached the end of its life this would delay rollout such that it would not be completed until the end of AMP9, with a corresponding impact on its supply-demand balance as well as delaying the customer benefits that smart meters provide.<sup>1795</sup>

#### *Robustness and efficiency of claim's costs*

5.525 Anglian stated that it had developed a robust and efficient cost estimate for its smart metering programme.

5.526 In order to validate its estimated costs, Anglian conducted an international benchmarking exercise (assisted by KPMG) which it considers demonstrates that its cost estimates are efficient, as shown in Table 5-22:<sup>1796</sup>

**Table 5-22: Anglian's international comparisons of smart metering costs**

<i>Location</i>	<i>Anglian</i>	<i>Yarra Valley (Australia)</i>	<i>Valencia (Spain)</i>	<i>Austin, Texas (US)</i>
Number of replacements	c.1,000,000	800,000	550,000	250,000
Unit cost per meter (incl base replacement)	£156	£191		£240
Unit cost per meter (incl base replacement, but excl network configuration costs)	£119		£120	

Source: Anglian

5.527 Anglian also submitted that it had compared its cost estimates with Northumbrian's proposed scheme which supported the view that the cost estimates it provided are efficient.<sup>1797</sup>

5.528 Finally, KPMG provided external assurance on Anglian's smart meter programme, stating 'we consider that the business case has been prepared following a robust process, utilising both analysis and customer engagement.

<sup>1792</sup> [Anglian's reply to Ofwat's response](#), Part A.1, row 7.2, pp20–21

<sup>1793</sup> Anglian (2019), [Draft Determination Smart Metering Cost Adjustment Claim](#), p2

<sup>1794</sup> [Anglian's reply to Ofwat's response](#), Part A.1, row 7.2, pp20–21

<sup>1795</sup> Anglian (2019) [Draft Determination representation](#), p129

<sup>1796</sup> Anglian (2019), [Draft Determination Smart Metering Cost Adjustment Claim](#), p4

<sup>1797</sup> Anglian (2019), [Draft Determination Smart Metering Cost Adjustment Claim](#), p4

We consider this to be a challenging programme both in terms of delivery and against the high-level cost benchmarks we have been able to obtain'.<sup>1798</sup>

5.529 In relation to the areas of metering where Ofwat reduced Anglian's allowances in its final determination (without rejecting in full), Anglian submitted that:

- (a) Ofwat's metering benchmarking models do not take into account the increasing marginal cost of installing meters in areas with higher meter penetration, and so underestimate Anglian's costs;<sup>1799</sup> and
- (b) Ofwat failed to consider the costs associated with different types of meter installations.<sup>1800</sup>

5.530 In response to our Provisional Findings, Anglian stated that it had submitted incremental costs for smart meters at new and existing properties on the same basis, and that (to the extent that the CMA allowed costs in relation to one of these categories), to be consistent the CMA should allow all of these costs.<sup>1801</sup>

#### *Customer views and protection*

5.531 Anglian stated that its research found that customers feel very positive about smart meters because they enable them to save money, not just through reducing wasteful use but, more importantly, through being able to identify leaks on their own property.<sup>1802</sup> In particular, Anglian highlighted that:

- (a) 72% of customers attending Anglian's Water Festival in Norwich stated that they wanted a smart water meter when asked;<sup>1803</sup> and
- (b) during AMP6, it conducted trials in two areas involving a total of around 16,000 smart meters, which found a positive customer response and resulted in a reduction in water usage and better identification of leaks on customer property.<sup>1804</sup>

5.532 In response to our Provisional Findings, Anglian submitted that the ODI unit rate should be calibrated based on the number of smart meters funded by the

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<sup>1798</sup> Anglian (2019), *Draft Determination Smart Metering Cost Adjustment Claim*, p5

<sup>1799</sup> Anglian SoC, footnote 451

<sup>1800</sup> Anglian SoC, Table 20; *Anglian's reply to Ofwat's response*, Part A.3, row 5.2, pp53–54

<sup>1801</sup> *Anglian's response to the provisional findings*, paragraph 231

<sup>1802</sup> Anglian SoC, paragraph 264

<sup>1803</sup> Anglian SoC, paragraph 262

<sup>1804</sup> Anglian SoC, paragraphs 264 and 265



totex allowance in AMP7. It particularly noted that if its base cost adjustment claim was rejected, this would reduce the number of smart meters funded.<sup>1805</sup>

*Avoiding over-recovery and balancing risk*

5.533 In response to our Provisional Findings, Anglian recognised that a cost adjustment claim which sought to bring forward future base expenditure from future AMPs into AMP7 (in this case for replacing in-life meters) would risk over-recovery in future years.<sup>1806</sup>

5.534 Anglian therefore proposed a cost adjustment mechanism which would involve providing additional allowances in AMP7 and AMP8 to reflect additional meter replacement activities, but to true-up these adjustments in AMP9 on an NPV-neutral basis:<sup>1807</sup>

**Figure 5-5: Anglian proposed mechanism for avoiding over-recovery of base costs:**

AMP7:  $B1 = M1 + X$   
AMP8:  $B2 = M2 + Y$   
AMP9:  $B3 = M3 + Z$   
Where  $X + Y + Z = 0$  (in NPV)

Where: B is the total base allowance for each AMP. M is the total base allowance before any smart meter adjustments. X is the cost adjustment required in AMP7 to allow the necessary early meter replacements. Y and Z are the adjustments in AMP8 and AMP9 to reflect the scale of meter replacements in those years due to the early replacements in AMP7.

Source: [Anglian's response to the provisional findings](#), paragraph 218

5.535 Anglian submitted that, in the absence of the base cost adjustment allowance, it would be exposed to risks associated with:<sup>1808</sup>

- (a) Changes in future cost sharing rates;
- (b) Botex and cashflow pressure;
- (c) Changes in future regulatory processes (eg base cost allowance calculations); and
- (d) Perceptions of inefficiency.

5.536 Anglian submitted that it cannot be expected to manage the 'lumpiness' of this scheme within its base costs due to the non-discretionary nature of the work (since it is a necessary step in installing a smart meter) and the sheer scale of

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<sup>1805</sup> [Anglian's response to the provisional findings](#), paragraphs 233–234

<sup>1806</sup> [Anglian's response to the provisional findings](#), paragraph 211

<sup>1807</sup> [Anglian's response to the provisional findings](#), paragraphs 217–219

<sup>1808</sup> [Anglian's response to the provisional findings](#), paragraph 214



the programme (replacing 600,000 meters, double the number expected without the programme).<sup>1809</sup>

#### *Ofwat's views*

5.537 Ofwat stated that it was supportive of smart metering as this will provide benefits over a basic meter, such as enabling the company to better understand leakage from customers' pipes and support detailed engagement with customers regarding water efficiency.<sup>1810</sup>

5.538 At draft determination and in Ofwat's FD, it assessed Anglian's proposed costs on metering in two parts:

- (a) Enhancement expenditure, which reflected the cost of installing new meters, and the incremental cost associated with upgrading meters to being smart (including the technology to use this functionality).
- (b) A base cost adjustment claim, which reflected the increase in the number of meters the company proposes to replace in AMP7, over and above the number it would replace if it did not need to deliver its smart metering programme.<sup>1811</sup>

#### *Enhancement expenditure*

5.539 Ofwat allowed Anglian £126.3 million for metering enhancement, equivalent to 92% of the requested enhancement amount (that is, excluding the £42 million base cost allowance request).<sup>1812</sup> It reduced allowances in three areas for the following reasons:

- (a) Effect of meter penetration on metering costs: Ofwat stated that it tested for inclusion of metering penetration data and this had no material impact on the model fit or outputs but added uncertainty in terms of data confidence, and therefore it did not incorporate this variable.<sup>1813</sup> The Ofwat enhancement metering model resulted in a reduction in allowance of £3.1 million, compared to Anglian's request.
- (b) Unit cost figures for smart meter replacement activities: Ofwat stated that it could not reconcile the amount Anglian requested for its smart meter upgrade activities with the unit cost uplift the company proposed and the

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<sup>1809</sup> [Anglian's response to the provisional findings](#), paragraphs 212–213

<sup>1810</sup> Ofwat (2020) [Reference of the PR19 final determinations: Explanation of our final determination for Anglian Water](#), paragraph 2.31

<sup>1811</sup> Ofwat (2019), [Anglian Water cost adjustment claim feeder model](#), sheet: WN\_Smart Metering

<sup>1812</sup> Ofwat (2019), [Wholesale Water Enhancement feeder model: Metering](#), sheet: Deep dive\_ANH

<sup>1813</sup> [Ofwat's response to Anglian's SoC](#), paragraph 3.164

volume of meters. Ofwat used the calculation of unit rates and volumes which resulted in a reduction in allowance of £5.5 million, compared to Anglian's request.<sup>1814</sup>

- (c) New development meter upgrade costs: For new connections Ofwat made no additional allowance for the type of meter installation because the costs for installation were included within the 'new connections' part of the growth allowance. Ofwat stated that its metering enhancement allowance for new connections was therefore the variance in cost between a dumb and smart meter unit. This resulted in a reduction in allowance of £1.9 million, compared to Anglian's request.<sup>1815</sup>

5.540 In response to our Provisional Findings, Ofwat submitted that Anglian had provided insufficient evidence to justify its requested incremental costs of upgrading a dumb meter to a smart meter. Ofwat submits that Anglian has only explained the costs of smart meter installation itself, without explaining the activities which would drive the claimed incremental costs over a basic installation.<sup>1816</sup>

#### *Base cost adjustment*

5.541 Ofwat rejected Anglian's smart metering base cost adjustment claim of £42.4 million which reflected the costs of early meter replacement (costed as a dumb-for-dumb replacement) to facilitate its geographic rollout approach.<sup>1817</sup>

5.542 Ofwat stated that Anglian's approach to rolling out smart metering was discretionary and within management control. It considered that the company had the opportunity to optimise the delivery of this programme efficiently within its base allowance and balance the benefits against the costs.<sup>1818</sup>

5.543 Ofwat stated that in capital maintenance (of which metering is a part), as in other areas, it makes a long-term average allowance. It believes that it is in the best interest of customers, and reduces the complexity of the regulatory framework, that the onus is on companies to manage the peaks and troughs in individual elements of their investment portfolio.<sup>1819</sup>

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<sup>1814</sup> [Ofwat's response to Anglian's SoC](#), paragraph 3.166

<sup>1815</sup> [Ofwat's response to Anglian's SoC](#), paragraph 3.165

<sup>1816</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p46

<sup>1817</sup> Ofwat (2020) [Reference of the PR19 final determinations: Explanation of our final determination for Anglian Water](#), paragraphs 2.32 to 2.33

<sup>1818</sup> Ofwat (2020) [Reference of the PR19 final determinations: Explanation of our final determination for Anglian Water](#), paragraph 2.33

<sup>1819</sup> [Ofwat's further submission on Anglian](#), p22

- 5.544 Ofwat stated that, in general, it expected large companies to be able to manage long-term investment plans within their base allowance, which allows for an element of lumpy maintenance. It considered this approach to be no different to any company selecting to bring forward asset replacement in order to deliver its chosen strategy.<sup>1820</sup> Ofwat submitted that the scale of the request for Anglian was around 1% of its wholesale base allowance and that in this context, introducing a complex multi-period reconciliation mechanism, as Anglian proposed, would add unnecessary regulatory burden.<sup>1821</sup>
- 5.545 Ofwat submitted that the variation in cost sharing rates over time was part of the regulatory regime, and that Anglian could not expect certainty in that regard. However, it said that if Anglian submitted efficient and well justified business plans in the future, its cost sharing rate can be such that it recovers the same amount as the current investment, or even a higher amount.<sup>1822</sup> Ofwat stated that it intended to review the incentive effects of long term investments during the development of its PR24 methodology.<sup>1823</sup>
- 5.546 Ofwat also stated that it was not appropriate for Anglian to ask customers to bear the costs when the company will receive the majority of benefits from the early replacement strategy.<sup>1824</sup> Furthermore, it said Anglian has not quantified the benefits which it will receive from the scheme to offset the investments it is planning to make.<sup>1825</sup>
- 5.547 Ofwat stated that the company had not presented a compelling argument why customers should bear the costs of early asset replacement.<sup>1826</sup> Ofwat submitted, therefore, that this was not an activity it considered appropriate to provide additional funding for beyond its base model allowance, and this was consistent with the approach it had taken for other companies.<sup>1827</sup>

### *Customer protection*

- 5.548 Ofwat included a PC and ODI to protect customers against under-delivery of this scheme. This included two elements:<sup>1828</sup>

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<sup>1820</sup> Ofwat (2020) [Reference of the PR19 final determinations: Explanation of our final determination for Anglian Water](#), paragraph 2.33

<sup>1821</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), pp12–13

<sup>1822</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), pp12–13

<sup>1823</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p25

<sup>1824</sup> [Ofwat's response to Anglian's SoC](#), paragraph 3.162

<sup>1825</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), p13

<sup>1826</sup> [Ofwat's response to Anglian's SoC](#), p41

<sup>1827</sup> Ofwat (2020) [Reference of the PR19 final determinations: Explanation of our final determination for Anglian Water](#), paragraph 2.33

<sup>1828</sup> Ofwat (2019) [PR19 final determinations: Anglian outcomes performance commitment appendix](#), 1.2.17

- (a) A variable penalty, which would claw-back the incremental cost ('direct costs') associated with meter upgrades on a linear basis if Anglian delivered fewer smart meters than it proposed in its business plan.
- (b) An additional penalty mechanism, which would claw-back the allowances associated with fixed infrastructure costs if Anglian delivered below 50% of its proposed smart meters.

5.549 In response to our Provisional Findings, Ofwat raised concerns about the use of deadbands when setting PCs and ODIs particularly it said that these can dull incentives.<sup>1829</sup>

### *Our assessment and decision*

5.550 Ofwat and Anglian both explained the benefits from smart meters, both to the company and to its customers.

5.551 We are also aware of third-party reports which support the wider introduction of smart metering. For example, the National Infrastructure Commission stated that 'There is a good case for enabling more widespread smart [water] metering by the 2030s',<sup>1830</sup> and the Committee for Climate Change is reported as stating that water meters are the key tool for measuring future demand and facilitating measures to reduce it.<sup>1831</sup>

5.552 We recognise that the introduction of smart meters can advance the interests of both company and customers, providing benefits in the form of reduced leakage, reduced consumption, and other improvements. We have therefore focused our assessment on the specific areas where Ofwat intervened in Anglian's plans.

5.553 We have set out a summary of Anglian's proposal and Ofwat's FD allowance in Table 5-23:

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<sup>1829</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), pp47–48

<sup>1830</sup> National Infrastructure Commission (April 2018), [Preparing for a drier future: England's water infrastructure needs](#), p12

<sup>1831</sup> National Audit Office (2020), [Water supply and demand management](#), paragraph 3.25

**Table 5-23: Breakdown of metering programme costs**

£ million				
Row #	Description	Anglian proposal	Ofwat FD allowance	Difference
1	Installing meters (smart and dumb) at houses which have not previously had a meter	20.2	17.0	-3.1
2	Dumb exchanged for smart (at end of life or when faulty)	22.4	19.6	-2.8
3	Dumb exchanged for smart (before end of life)	29.4	26.7	-2.7
4	Smart increment - new connections in roll out areas	4.2	2.3	-1.9
5	Fixed data network	40.6	40.6	0.0
6	Demand management programme	20.1	20.1	0.0
	<b>Total Enhancement</b>	<b>136.8</b>	<b>126.3</b>	<b>-10.5</b>
7	Base adjustment claim: Dumb exchanged for dumb (at end of life or when faulty)	42.4	0.0	-42.4
	<b>Total Allowance</b>	<b>179.2</b>	<b>126.3</b>	<b>-52.9</b>

Source: Ofwat (2019), [Wholesale Water Enhancement feeder model: Metering](#)

Note: numbers may not sum exactly due to rounding.

5.554 We provide our assessment of relevant groupings of cost by reference to the above table, before presenting our overall decision. We note that we have received no additional evidence on the fixed data network (row 5) or demand management programme (row 6), on which consensus had previously been reached, and so do not discuss these allowances any further.

*General metering costs (row 1 – Anglian proposes £20.2 million)*

5.555 These are costs which Ofwat assessed through its enhancement model benchmarking, and on this basis it set Anglian a lower allowance than it had requested. This is discussed in more detail in paragraphs 5.115 to 5.127 above.

5.556 Anglian submitted that the benchmark model used does not properly account for differences in meter penetration which drive its higher cost requirements.

5.557 As discussed in paragraphs 5.125 to 5.127 above, we have not found evidence to support Anglian's arguments regarding meter penetration, and so maintain the modelled allowance of £17.0 million.

*Accelerated meter replacements, base cost adjustment claim (row 7 – Anglian proposes £42.4 million)*

5.558 Anglian is proposing to accelerate its rollout of smart meters by replacing existing dumb meters which are not yet at the end of their useful lives. The £42.2 million figure reflects the estimated cost of replacing these meters with another dumb meter, and hence represents the amount which would be considered part of base costs. Other rows (discussed below) capture the incremental enhancement costs of upgrading these meters to provide smart functionality.

- 5.559 This funding request therefore reflects the acceleration of what would otherwise be covered through implicit capital maintenance allowances provided to the company as part of its base costs in future AMPs. Anglian appears to accept this principle, referencing equivalent capital maintenance costs of around £56 million in the current AMP.
- 5.560 However, we are concerned that, by providing additional funding for this element of the scheme now, Anglian would be double-funded for these activities. In essence, it would receive the equivalent of its AMP8 metering costs in AMP7 from this base cost adjustment claim, and the same again as part of its base cost allowances next AMP. Instead, we would expect Anglian to invest in the most efficient manner it can identify, on the basis of recovering its base cost expenditure through base cost allowances. As long as Ofwat continues to provide a level of capital maintenance which reflects average meter replacement rates, Anglian will be able to recover its efficient costs for these activities over the medium term.
- 5.561 We recognise Anglian's proposal for a reconciliation mechanism could address the issue of double-funding. However, we have serious concerns about intervening in this way, particularly since:
- (a) The scale of costs being discussed are within a range we would expect the company to be able to manage. There are other costs of a similar or larger scale which Anglian and other water companies are expected to manage (eg capital maintenance);
  - (b) Adopting this approach would start to undermine the principles of the totex framework, as it would require the regulator rather than the company to make judgements about the best timing and form of investment;
  - (c) The mechanism proposed would result in substantial additional regulatory complexity over numerous AMPs; and
  - (d) The mechanism proposed provides limited detail regarding implementation. This is likely to result in disagreements over implementation in the future which would exacerbate both the complexity and the uncertainty already present.
- 5.562 We also agree with Ofwat that large companies would be expected to manage a degree of lumpiness in their costs, and that Anglian is able to manage its activities in this area as part of its overall base costs.
- 5.563 We therefore conclude that it is not appropriate to provide Anglian with a higher allowance to reflect this base cost adjustment claim (with or without a

reconciliation mechanism of the form proposed by Anglian), and therefore reject this aspect of Anglian's claim.

5.564 In making this decision, we note that, to the extent that Anglian's proposed approach to geographic roll-out represents a more efficient form of delivery, it should remain incentivised to adopt this approach. We consider that these incentives remain as long as Anglian can reasonably expect to recover its investment (in this case equivalent to any early replacement cost) over the medium-term. Therefore, we consider that, to the extent that Ofwat continues to evolve its approach in the future, it will be important to ensure a degree of regulatory consistency in this regard. If there is too much uncertainty around the likelihood of recovering current investments from lower costs in future AMPs, companies will be unwilling to make such investments, and the efficiency of the industry will be reduced as a result.<sup>1832</sup>

*Incremental cost of upgrading to smart meters (rows 2 and 3 – Anglian proposes £51.8 million)*

5.565 These are costs which reflect the incremental cost of upgrading from a dumb meter to a smart meter, both for those meters which would otherwise require direct replacement during AMP7 (due to reaching their end of life or faults arising) and those which Anglian proposed to replace early.

5.566 Anglian provided information on these proposals in the form of unit costs and expected numbers of meters. In Ofwat's FD, it noted that the 'use of the figures that the company presents results in a lower allowance than the company's request'. It therefore provided an allowance which reflected this lower figure.

5.567 During our redetermination, Anglian has provided additional information on these cost figures which has allowed us to reconcile its proposal to the full amount of its claim. In particular, the differences between the figures appear to represent incremental installation costs beyond the meters themselves.

5.568 Anglian has also provided evidence indicating that its estimated costs are efficient compared to available benchmarks.

5.569 We therefore consider that Anglian should be provided with its full requested allowance for these incremental smart meter costs, worth £51.8 million (£5.5 million more than was included in Ofwat's FD).

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<sup>1832</sup> We note that this point is not specific to smart meters but represents a general principle around flexibility over the efficient timing of investments. As noted in paragraph 5.545, Ofwat has recognised this point, and intends to consider it further as part of PR24.

*Smart meter costs for new properties (row 4 – Anglian proposes £4.2 million)*

- 5.570 These costs reflect the activity of installing smart meters in new properties which are built during the AMP.
- 5.571 We understand that the dispute between Ofwat and Anglian is the extent to which the growth allowances already reflect the costs of installing a meter, compared with the increment required to upgrade these to smart meters.
- 5.572 The growth allowances are based on historical actual spend to connect properties. We would expect this to include the costs of installing a standard dumb meter, and this is consistent with at least one submission from a water company which explicitly states this as an activity which is covered.<sup>1833</sup>
- 5.573 Ofwat's enhancement allowance here was based on Anglian's unit costs of upgrading a meter from a dumb meter to one which provides the smart functionality which it intends to implement. This resulted in an allowance of £2.3 million.<sup>1834</sup> Whilst Anglian has said that this approach misses other installation costs for these smart meters, we have not seen convincing evidence that the activities required to install these smart meters in newly built houses differ substantially from those which Anglian and other water companies have undertaken in the past to justify nearly doubling the upgrade costs. In particular, we have not seen robust evidence from Anglian about the incremental activities required to fit a smart meter over a basic meter, and the associated costs.
- 5.574 We therefore decide to adopt the same approach as in Ofwat's FD, resulting in an associated allowance of £2.3 million for these activities.

*Customer protection*

- 5.575 Anglian's smart metering scheme is a major enhancement project with substantial associated funding. We therefore consider it is appropriate to protect customers in case Anglian decides to delay or reduce its proposed activities.
- 5.576 We consider that different types of cost (eg fixed and variable) complicate the structuring of this PC and ODI. An approach which removes fixed costs allowances if the company reduces the scope of its plan risks removing allowances which have already been efficiently spent, while one which does not include these fixed costs risks overcompensating the company.

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<sup>1833</sup> [South East Water submission](#), p6

<sup>1834</sup> £44.30 per meter to upgrade from basic to AMI, being applied to 51,244 new meters = £2.3 million



- 5.577 We considered a potential approach which would provide separate ODI mechanisms to protect customers against scaled back activity for each of infrastructure and meter installations. However, we are concerned that this presents practical difficulties regarding the specification of infrastructure claw-back levels, as this is likely to be lumpy and the outputs may be difficult to specify with sufficient precision.
- 5.578 We consider that the best approach in the circumstances is to adopt an incentive structure using the same form as in Ofwat's FD. Therefore, we have set this PC based on the complete meter rollout proposed by Anglian (1,096,397 meters) and calibrated the ODI rate based on the allowance we have provided (excluding fixed infrastructure costs).<sup>1835</sup> This results in an ODI unit rate of £30 per smart meter.<sup>1836</sup> We also include an additional penalty mechanism, which will claw-back the allowances associated with fixed infrastructure costs if Anglian delivers below 50% of its proposed smart meters (£18.258 million if the company delivers fewer than 548,199 smart meters).<sup>1837</sup>
- 5.579 We note Anglian's concerns that setting the PC based on the number of smart meters proposed in its business plan does not reflect the lower allowance we have provided compared to its request. However, we disagree with the view that elements of its smart meter scheme were 'unfunded', since our allowances are based on providing sufficient funds to upgrade the full number of meters it requested, with base cost allowances covering any outstanding requirements over the medium term (see paragraphs 5.558 to 5.564 above). If we were to reduce the number of meters in the PC, this would be effectively increasing the funding per smart meter beyond that claimed by the company.

### *Overall decision*

- 5.580 For all the reasons explained above, our decision is to allow Anglian £131.8 million for the delivery of its metering programme. This is £5.5 million more than was included in Ofwat's FD.
- 5.581 We consider that our determination provides Anglian with all the funds it requires to undertake its proposed activities for smart metering. The cost of replacing the standard meters is covered by base allowances (in this and

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<sup>1835</sup> Total smart metering allowance (excluding fixed infrastructure costs): £22.4 million + £29.4 million + £2.3 million + £20.1 million = £74.2 million.

<sup>1836</sup> £74.2 million multiplied by the totex outperformance cost sharing rate of 45%, divided by the 1.096 million smart meters equals £30 per smart meter, or an ODI unit rate of -0.000030 in Anglian's PC.

<sup>1837</sup> Fixed infrastructure costs of £40.2 million multiplied by the totex outperformance cost sharing rate of 45% equals £18.258 million.

future AMPs), while the incremental costs of upgrading these to smart meters is covered by the additional enhancement allowances we are providing.

5.582 We have included a scheme-specific ODI to incentivise the delivery of the funded scheme, and to protect customers if Anglian does not ultimately undertake this work (see paragraph 5.578 above).

### ***Deep dive 7: Anglian – Water Resilience Scheme***

5.583 In its PR19 Business Plan, Anglian included a proposal to invest approximately £9 million in a programme to strengthen its water resilience.<sup>1838</sup> This represented the costs of undertaking two specific activities:<sup>1839</sup>

- (a) replacing existing ‘critical shutdown panels’ in its WTW with safer versions; and
- (b) implementing a risk visualisation dashboard to predict where the risk of supply interruptions is increasing.

5.584 Ofwat rejected Anglian’s request in full, as it considered that these activities were already funded through base allowances.<sup>1840</sup>

### ***Anglian’s views***

5.585 Anglian stated that the driver for these investments is to increase its service resilience and reduce the risk to customers. Anglian explained that its approaches to risk management of water quality have evolved over time, particularly highlighting the DWI’s new Risk Management Assessment Scheme (RMAS) which was launched on 1 August 2019. Anglian received its RMAS certification on the same day.

### ***Background and need for the scheme***

5.586 In relation to the critical shutdown panels, Anglian stated that:<sup>1841</sup>

- (a) the existing panels do not meet the standard safety requirements and, in particular, have the risk that they may fail in a ‘non-fail-safe’ mode which would risk un-disinfected water being supplied to customers; and

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<sup>1838</sup> Anglian SoC, Table 20

<sup>1839</sup> Anglian SoC, p190, paragraph 782, water resilience case study

<sup>1840</sup> Ofwat’s response to Anglian’s SoC, p2

<sup>1841</sup> Anglian (2019) *PR19 draft determination: supplementary evidence*, p31

- (b) the planned investment will provide protection against low-probability high-impact events caused by the failure of a shutdown system to operate effectively.

5.587 In relation to the risk visualisation dashboard, Anglian stated that utilising its asset criticality models, combined with its real time performance data and current water quality information, would allow a risk dashboard to provide a current predicted risk status, allowing early intervention to protect customers.<sup>1842</sup>

5.588 Anglian told us that it anticipated that the benefits of these schemes would be measurable and quantifiable in the following areas:

- (a) a reduction of events or incidents related to shutdowns or reductions in output at its WTW which affected its customers. This would be directly measurable through an improvement in Compliance Risk Index (CRI)<sup>1843</sup> and Event Risk Index (ERI),<sup>1844</sup> both of which are regulatory measures reportable to the DWI and represent the quality of service provided to customers.
- (b) a reduction of reactive work due to asset/process failure and process/site shutdowns due to early warning allowing more proactive intervention and better prioritisation of alarm response work.

#### *Robustness and efficiency of claim's costs*

5.589 Anglian told us that its cost estimates were based on costs incurred to develop a proof of concept dashboard at one site, from its framework consultants. The framework rates were market tested through a competitive tendering process.

#### *Ofwat's views*

5.590 Ofwat considered that the spend on both the replacement of Anglian's shutdown panels and its implementation of a risk visualisation dashboard to be covered by base costs allowances.<sup>1845</sup>

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<sup>1842</sup> Anglian (2019) [PR19 draft determination: supplementary evidence](#), p32

<sup>1843</sup> The definition of [compliance risk index](#) is set by the DWI. A CRI score is calculated for every individual compliance failure at water supply zones, supply points and treatment works, and service reservoirs. Ofwat (2019) [PR19 final determinations: Anglian outcomes performance commitment appendix](#), section 1.1.1.

<sup>1844</sup> The [Event Risk Index](#) is a measure defined by the DWI and designed to illustrate the risk arising from water quality events. It is calculated by reference to the seriousness of each drinking water quality event (the Event Category score), a measure of the company performance in managing the event and the impact of each event

<sup>1845</sup> [Ofwat's response to Anglian's SoC](#), p92, Table 3.10

- 5.591 In relation to the critical shutdown panels, Ofwat stated that it did not dispute the need for Anglian to ensure that its assets are maintained to meet prevailing safety standards. However, it considered that these activities reflected routine asset maintenance, constituting incremental improvement activities that are included in historical base costs.<sup>1846</sup>
- 5.592 In relation to the risk visualisation dashboard, Ofwat welcomed the introduction of approaches which improve risk management but stated that this is a core activity for a company and ultimately cost-beneficial to the company due to the costs avoided from expensive failure events.
- 5.593 Ofwat stated that these schemes therefore related to capital maintenance or to management control activity to assess asset criticality risks and were therefore related to base activities and covered by base allowances. Ofwat therefore disallowed these claims as resilience enhancements.<sup>1847</sup>
- 5.594 Ofwat also highlighted Anglian's statements about similar work that it had completed in this area historically (without additional funding), which Ofwat interpreted as supporting the views that such developments are simply a core function of a well-run company, and cost-beneficial over the longer term.<sup>1848</sup>

### *Our assessment and decision*

- 5.595 We agree with Ofwat and Anglian that the proposed schemes represent important and useful activities which would provide customers with an improved level of service by reducing the likelihood of service failure in the future. We have therefore focused on the question as to whether these activities should attract additional funding, or whether they have already been funded through base allowances.
- 5.596 These activities appear to reflect incremental improvements which the sector has delivered, and continues to deliver, as part of its day-to-day operational functions and so would be reflected in the base cost models. While major step-changes in safety requirements may require additional funding for many companies in the sector, capital maintenance and related activities would be expected to continue to meet gradual improvements in standards. While the particular schemes proposed by Anglian may be company-specific, we consider that these represent one example of the types of activity which an efficient company delivers as part of its base activities.

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<sup>1846</sup> Ofwat's response to Anglian's SoC, p92, Table 3.10

<sup>1847</sup> Ofwat (2019), [Wholesale Water Enhancement feeder model: Resilience](#), sheet: deep dive\_ANH

<sup>1848</sup> Anglian (2019) [PR19 draft determination supplementary evidence](#), p31

5.597 Furthermore, we consider that the following principles are likely to apply to these schemes:

- (a) Where investments result in lower whole-life costs to Anglian (including reductions in operating costs or through avoiding expensive failure events), it will already have the incentive and implicit funding to implement these changes. This is because over the longer term, it is likely to recover any initial outlay through lower ongoing costs.
- (b) Where these investments improve service levels against performance commitments with financial incentives,<sup>1849</sup> the outcomes framework provides the opportunity for additional funding through rewards or reductions in penalties.

5.598 Overall, we consider that these activities form part of Anglian's base activities and so have already been funded. Providing enhancement funding would therefore be likely to result in customers paying twice for the same activities. We therefore decide to provide no associated increase in cost allowances for these schemes.

### ***Deep dive 8: Anglian – SEMD/non-SEMD***

5.599 Planned enhancement spend on water security measures is differentiated between the categories of SEMD and non-SEMD based on whether it relates to SEMD,<sup>1850</sup> or otherwise.<sup>1851</sup>

5.600 Anglian included enhancement expenditure of £16.8 million in its business plan,<sup>1852</sup> approximately £1.7 million related to SEMD and £15.1 million to non-SEMD spend.

5.601 Ofwat rejected Anglian's SEMD enhancement expenditure in full, disallowing approximately £1.7 million. For non-SEMD, Ofwat applied a cost challenge of approximately 10% on the basis of insufficient evidence on cost efficiency, resulting in a reduction in this allowance of £1.6 million to £13.5 million.<sup>1853</sup>

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<sup>1849</sup> For example, water quality compliance, Ofwat (2019), [PR19 final determinations: Anglian outcomes performance commitment appendix](#), p4

<sup>1850</sup> [The Security and Emergency Measures \(Water and Sewerage Undertakers\) Direction 1998](#) directs undertakers to maintain plans to provide a supply of water at all times. [The Security and Emergency Measures \(Water Undertakers\) Direction 2006](#) places a qualified duty on undertakers to provide a water supply to a licensed water supplier where (i) there is an access agreement in place and (ii) the licensed water supplier requests the water undertaker to provide it with a supply of water in the event that the licensed water supplier is unable to provide a supply to its customers due to an emergency or security event. See the following for more details: Defra (2017), [Water supply and sewerage licensing: updating security and emergency measures directions consultation webpage](#).

<sup>1851</sup> Other costs associated with water security driven by the requirement to ensure that the water network is resilient in the event of an emergency situation.

<sup>1852</sup> Anglian (2019), [PR19 draft determination: supplementary evidence](#), p38

<sup>1853</sup> Ofwat (2019), [Water Security Feeder Model](#), sheet: Allowance

Therefore, Ofwat's FD included a total of £13.5 million funding for Anglian's requested £16.8 million for SEMD and non-SEMD expenditure.

5.602 Although SEMD and non-SEMD are both related to security, and Ofwat assessed these as a single cost category, we consider that the relevant facts differ, and so we have assessed these individually as set out below.

## *SEMD*

### *Anglian's views*

5.603 Anglian stated that the additional SEMD funding aimed to provide:

- (a) £1 million to invest in additional tankers, to meet alternative supplies provision, to address low-probability, high-impact loss of supply incidents;<sup>1854</sup> and
- (b) £0.7 million for emergency preparedness, driven by necessary security upgrades to a 'Critical National Infrastructure' site.

5.604 Anglian told us that these activities provided additional protections to customers and represented a specific requirement from DEFRA. This is similar to previous AMP periods where Anglian invested to meet the requirements.<sup>1855</sup> In addition, Anglian stated that certain requirements arose during the course of the previous AMP which have necessitated these additional activities.

5.605 Anglian told us that all infrastructure installed must be procured from a limited number of the Centre for the Protection of National Infrastructure<sup>1856</sup> Product Approved Specialist vendors, which limits the availability of benchmarking data. It therefore developed the costs in its plan based on the benchmarks which were available alongside its own experience of historical delivery of schemes.<sup>1857</sup>

### *Ofwat's views*

5.606 Ofwat told us that it did not dispute the need for Anglian to ensure it operates securely and meets its legislative obligations. However, Ofwat stated that there are no new legal requirements that justify the additional allowance. The

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<sup>1854</sup> Such incidents may occur through a variety of causes, within and outside Anglian's management control.

<sup>1855</sup> *Anglian (2019) PR19 draft determination: supplementary evidence*, pp37–38

<sup>1856</sup> The Centre for the Protection of National Infrastructure is the government authority for protective security advice to the UK national infrastructure. Its role is to protect national security by helping to reduce the vulnerability of the national infrastructure to terrorism and other threats.

<sup>1857</sup> *Anglian (2019) PR19 draft determination: supplementary evidence*, p41

legal requirements are set out in SEMD 1998 and no new relevant directions came into effect in AMP6. Ofwat stated that what may be new is the identification by Anglian of new schemes required to comply with existing legislation.<sup>1858</sup>

- 5.607 In PR14 Ofwat had provided the company with a substantial security enhancement allowance to deliver a large programme which provided a significant step-change in security access to the network.<sup>1859</sup> Ofwat's assessment in PR19 which disallowed the additional requested expenditure took account of the overall security costs in the period 2011-12 to 2024-25 and provided companies with a cost envelope to complete the programme.<sup>1860</sup>
- 5.608 Ofwat stated that in PR14, Anglian was allowed £26.1 million for SEMD capex across water and wastewater, but the company only spent £14.4 million of this allowance during the AMP (ie 55% of its allowance). Ofwat submitted that this scale of saving was most unlikely to have been generated purely by efficiency.<sup>1861</sup>
- 5.609 Ofwat told us that there was a government expectation that the programme of security standards work that companies were required to carry out should be completed by the end of AMP6, and there has been no change to the planned completion date. Ofwat therefore considered that the previous allowance envelope was sufficient for Anglian to undertake this scheme. Whilst Ofwat acknowledged that certain additional schemes may have been identified during AMP6 which would result in an improved level of security, it believed that Anglian's SEMD activities were already funded.<sup>1862</sup>

#### *Our assessment and decision*

- 5.610 We understand that Anglian's planned activities relate to the identification of new schemes identified during the course of AMP6 needed to comply with the SEMD requirements, rather than new legal requirements. We note that Anglian has limited flexibility in the delivery of these schemes, as it:
- (a) is a legal requirement with little opportunity for reducing scope through finding alternative approaches; and

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<sup>1858</sup> Ofwat's response to the provisional findings – cost and outcomes, p49

<sup>1859</sup> Ofwat's response to Anglian's SoC, p92, Table 3.10

<sup>1860</sup> Ofwat's response to the provisional findings – cost and outcomes, p49

<sup>1861</sup> Ofwat's response to the provisional findings – cost and outcomes, p50

<sup>1862</sup> Ofwat (2019), *Water Security Feeder Model*, sheet: deep-dive\_ANH

(b) requires delivery through approved vendors, further limiting the company's ability to flex its activities within a specified cost allowance.

5.611 However, Ofwat provided a level of funding in PR14 that was intended to fund the entirety of Anglian's delivery of security enhancements required for SEMD, consistent with government expectations on timings. Of this allowance, Anglian has only spent £14.4 million leaving 45% of its funding in order to carry out any necessary investment. We agree with Ofwat that, particularly given the delivery restrictions noted above, it is highly unlikely that this is totally attributable to efficiency. This would appear to provide for a degree of increased scope of activities, such as those now being described by Anglian. While these new schemes were not known to Anglian at the time of requesting the allowance, we consider that Anglian has sufficient scope within its current allowances to fund this work.

5.612 On this basis, our decision is not to allow the £1.7 million cost allowance associated with Anglian's requested SEMD activities.

#### *Non-SEMD*

##### *Anglian's views*

5.613 Anglian submitted that its non-SEMD enhancement costs were directly attributable to ensuring vulnerable sites are compliant with new regulatory requirements, namely the Network and Information Security (NIS) Directive.<sup>1863</sup>

5.614 Anglian submitted that prior to the NIS directive, surveying sites for cyber security vulnerabilities was not a recognised requirement and therefore not undertaken, and its submitted costs were directly attributable to meeting this increased requirement (over and above its general replacement plans).<sup>1864</sup>

5.615 Anglian stated that although Ofwat had voiced some concerns about the costs which Anglian had included in its plan:

(a) Anglian has one of the largest telemetry systems in the industry, and so would be expected to have a high absolute cost compared to other companies;<sup>1865</sup> and

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<sup>1863</sup> Anglian (2019) [PR19 draft determination: supplementary evidence](#), p40

<sup>1864</sup> Anglian (2019) [PR19 draft determination: supplementary evidence](#), p40

<sup>1865</sup> Anglian (2019) [PR19 draft determination: supplementary evidence](#), p40



(b) companies which Ofwat used for its comparison have included very different levels of activity in their enhancement plans.<sup>1866</sup>

5.616 To support its cost estimates, Anglian produced a schedule of costs showing a breakdown of component and unit costs which were used to develop its estimates. This also provided a brief explanation of the source(s) used to generate the relevant estimates, as shown in Table 5-24:

**Table 5-24: Summary non-SEMD cost schedule**

<i>Description</i>	<i>£ million</i> <i>Estimated cost</i>
106 water sites upgraded with new scada systems, based on estimated average cost per site, includes hardware set up costs, site local area network upgrade, server hardware, licenses and server rack	12.5
ASDL connection, includes local firewall, BT construction charges, installation resource effort	1.0
106 water sites BT costs at an average cost per site per annum	0.5
Remote monitoring, vulnerability and threat management	1.0
FTE cost for ongoing management of scada systems	0.3
<b>Total</b>	<b>15.3</b>

Source: Anglian

5.617 Anglian noted that these costs were derived using both external and internal data sources including prevailing market rates for certain cost components and specialist personnel. However, for certain elements, the early stage of the process and the site-specific differences meant that these costs were unknown. This therefore required Anglian to estimate these costs.

5.618 Anglian also stated that customers are protected in relation to the delivery of the investment of its non-SEMD plan through an associated ODI as set out in Ofwat's FD.

#### *Ofwat's views*

5.619 Ofwat did not dispute the need for Anglian to ensure it operates securely but considered that at the time of Ofwat's FD, Anglian had not provided sufficient evidence to justify its high non-SEMD costs nor demonstrated how its costs had been derived, and so Ofwat applied approximately a 10% cost challenge.

5.620 In its response to our Provisional Findings, Ofwat welcomed the CMA's acknowledgement that Anglian's cost forecasts were not demonstrably efficient and accepted that the CMA had a different view on the appropriate cost challenge.

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<sup>1866</sup> Anglian (2019) [PR19 draft determination: supplementary evidence](#), p40

5.621 Ofwat agreed that the existing performance commitment would need to be amended to reflect any changes to the activities that were being supported and the ODI rate would need to be increased to reflect the increased cost allowance.<sup>1867</sup>

*Our assessment and decision*

5.622 The dispute between Ofwat and Anglian on non-SEMD allowances appears to centre on the extent to which the submitted costs have been demonstrated to be robust and efficient.

5.623 During our redetermination, Anglian submitted additional evidence, which we consider broadly supports its case. However, the schedule of costs provided indicates that an element of uncertainty remains about whether these estimates are a robust reflection of efficient costs. In particular, around one third of the requested costs result from the estimate of a figure for which actuals are unknown and no cost models are available.<sup>1868</sup>

5.624 We accept that intrinsic uncertainty is something which companies need to deal with on these types of projects, particularly early on in the process. Nonetheless, we are also concerned that cost outturn may be lower than estimated and customers should not bear the cost of this. This risk is particularly acute in areas of severe information asymmetry such as is the case here.

5.625 As explained in paragraphs 5.189 to 5.201 above, the standard deep dive efficiency challenge we have adopted for this determination is 10%, equivalent to the cost challenge applied to this scheme in Ofwat's FD. However, we consider that the evidence provided by Anglian (and described above) is sufficiently robust to warrant a lower, scheme-specific efficiency challenge of 5%.

5.626 Therefore, we decide to allow Anglian £14.4 million for the delivery of its non-SEMD scheme; this is an increase of £0.8 million over Ofwat's FD.

5.627 In reaching this decision, we note that this change in allowance should be reflected in the existing associated ODI, and correspondingly have set

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<sup>1867</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p50

<sup>1868</sup> £45k per site for Site LAN upgrade at 106 sites = £4.8 million

Anglian's underperformance payment-standard rate to £0.0648 million / unit.<sup>1869</sup>

### **Deep dive 9: Anglian – Bioresources Scheme**

5.628 Anglian submitted a proposal for £12.5 million<sup>1870</sup> of enhancement investment to provide additional sludge treatment capacity at its Whitlingham sludge treatment centre (STC), to accommodate additional sludge production due to population growth and increased levels of P-removal.<sup>1871</sup>

5.629 Ofwat recognised that the level of sludge was likely to increase over time for the reasons which Anglian identified.<sup>1872</sup> However, Ofwat applied a challenge based on its views as to the need for Anglian to develop this capacity in-house. Ofwat's allowance was based on its view of the efficient costs of an outsourced contract for bioresource processing. Ofwat's FD therefore included a cost allowance of £5.7 million,<sup>1873</sup> disallowing £6.8 million of Anglian's request.

#### **Ofwat's views**

##### ***Ofwat's statements on its approach to the bioresources market***

5.630 Ofwat has been actively reviewing the bioresources market in the past number of years and made an explicit decision to separate out these activities in PR19 as a distinct price control:<sup>1874</sup>

'We are taking steps to inform, enable and encourage the development of two new markets – sludge (which is becoming recognised as a bioresource and we use this term in place of sludge) and water resources – where there is potential to unlock substantial benefits for customers, companies, investors and the environment.'

5.631 Ofwat stated that it saw the potential that the trading of bioresources could be a real breakthrough. It believed that it should be seeking to 'kick-start' the

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<sup>1869</sup> The ODI protection for customers as set out at page 123 of Ofwat (2019), [PR19 final determinations: Anglian outcomes performance commitment appendix](#). The updated ODI unit rate is based upon an allowance of £14.4 million multiplied by the totex outperformance sharing rate of 45%, and divided by 100 to convert to a percentage completion rate of £0.0648 million.

<sup>1870</sup> Amount reflected as the representation value assessed in final determination, Ofwat (2019), [Wholesale Wastewater Enhancement feeder model: Sludge](#), sheet: deep dive\_ANH

<sup>1871</sup> Ofwat (2019), [Wholesale Wastewater Enhancement feeder model: Sludge](#), sheet: deep dive\_ANH

<sup>1872</sup> [Ofwat's response to Anglian's SoC](#), p93

<sup>1873</sup> Ofwat (2019), [Wholesale Wastewater Enhancement feeder model: Sludge](#), sheet: deep dive\_ANH

<sup>1874</sup> Ofwat (2017), [Information Notice IN 17/01](#)

market to develop even more low-carbon energy generation and reduce water bills.<sup>1875</sup>

- 5.632 Ofwat recognised that these steps will take some time to have their intended effects, for example stating that ‘We expect sludge markets to develop gradually’.<sup>1876</sup> It also noted that barriers exist in this market, for example stating that ‘it is challenging and costly for incumbents and potential entrants, both other WASCs and firms in wider waste markets, to identify profitable trades or optimisation opportunities’.<sup>1877</sup>

#### *Ofwat’s decision on Anglian’s bioresources enhancement scheme*

- 5.633 Ofwat agreed with Anglian that the level of sludge was likely to increase over time which would result in increased treatment requirements.<sup>1878</sup> However, Ofwat was concerned whether Anglian had demonstrated that its proposed scheme represented the best option for customers. Ofwat benchmarked Anglian’s costs against a two-and-a-half year guaranteed trade contract with a third-party provider and stated that this produced a lower estimated cost than Anglian’s plan.<sup>1879, 1880</sup>
- 5.634 Ofwat’s specific allowance of £5.7 million was derived on the basis of the cost for 3 years of initial opex to manage increased bioresources volumes and a 2.5-year contract in the bioresources market in the period 2022-2025 with the efficient fully loaded gate fee applied to 6,400tds pa capacity.<sup>1881</sup>
- 5.635 Ofwat disagreed with Anglian’s views about the restrictions on the ability of third-party suppliers to provide additional capacity, in particular disagreeing with Anglian’s views that only WASCs can process waste sludge, since other third-parties can undertake co-treatment with appropriate permits. Ofwat also stated that it may be economically viable for a third-party with currently unused digester capacity to either co-digest or co-locate treatment facilities for both materials. Ofwat noted that this option did not appear to have been considered by Anglian.<sup>1882</sup>
- 5.636 In its response to our Provisional Findings, Ofwat stated that giving Anglian an allowance to build its own capacity forecloses the market by creating capacity

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<sup>1875</sup> Ofwat (2020), [Bioresources market webpage](#)

<sup>1876</sup> Ofwat (2016), [Water 2020: Our regulatory approach for water and wastewater services in England and Wales](#), p112

<sup>1877</sup> Ofwat (2017), [Bioresources market information guidance](#), p3

<sup>1878</sup> [Ofwat’s response to Anglian’s SoC](#), p93

<sup>1879</sup> Ofwat (2019), [Wholesale Wastewater Enhancement feeder model: Sludge](#), sheet: Deep dive\_ANH

<sup>1880</sup> Ofwat (2019), [PR19 final determinations, Securing cost efficiency technical appendix, December 2019](#), p118

<sup>1881</sup> Ofwat (2019), [Wholesale Wastewater Enhancement feeder model: Sludge](#), sheet: Deep dive\_ANH, cell D17

<sup>1882</sup> Ofwat (2019), [Wholesale Wastewater Enhancement feeder model: Sludge](#), sheet: Deep dive\_ANH tab, cell D17

that could be provided by other market participants.<sup>1883</sup> Ofwat also raised concerns about the additional capacity being built at Whitlingham as it is far away from the borders with other companies and there are sites significantly closer to the borders with other companies.

5.637 Ofwat considered that Anglian's proposed allowance was overstated, both in terms of capacity (as growth is overstated) and cost (due to the inclusion of additional opex). Ofwat said that Anglian's additional sludge volumes from population growth were overstated as they used the same assumptions as in its WRMP (see paragraph 4.791 above). Ofwat considered that Anglian's predicted growth should be reduced by 56%.<sup>1884</sup>

5.638 Ofwat stated that even if the CMA considered it should make an allowance for Anglian to build its own capacity, it should not make an allowance for:

- (a) 'bioresources availability optimisation' as this is an activity that all companies are expected to undertake anyway and is covered in the base expenditure allowance;
- (b) 'modelling to support trading'; and
- (c) 'opex associated with the Whitlingham additional digester' as this is covered in the base cost allowance for bioresources that already includes additional opex associated with increasing sludge volumes.

5.639 Ofwat also stated that Anglian had not included adjustments for increased revenues from power generation and biosolid farm sales. Ofwat considered that the CMA should take into account the additional revenue generation potential for example from increased energy efficiency of heat recovery.<sup>1885</sup>

## *Anglian's views*

### *Background and need for the scheme*

5.640 Anglian stated that there would be an increase in sludge production in the future as a result of increasing population and higher levels of activity of P-removal. Therefore, additional sludge treatment capacity would be required, beyond the level currently available.

5.641 Anglian explained that when operating the STCs at 90% of the design average capacity, production can be expected to outstrip available treatment

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<sup>1883</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p51

<sup>1884</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), pp52–53

<sup>1885</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p54

capacity for around 24 weeks of the year. However, it is able to manage periods of insufficient capacity by flexing its assets, balancing sludge production through storage and working with markets for potential trades, or by use of mobile treatment plants.<sup>1886</sup>

- 5.642 With the proposed investment, Anglian expects it would end AMP7 with capacity in a broadly similar position as at the start of the AMP.
- 5.643 Anglian selected the location of Whitlingham to expand its sludge treatment capacity because this site is the only one it has which offers the opportunity to increase the capacity throughput by upgrading the process design, to enable a relatively 'low build' engineering upgrade at a subcomponent level, rather than a need to replace or duplicate the whole anaerobic digestion pre-treatment process stream.
- 5.644 Anglian considered that Ofwat was incorrect that sludge volumes from population growth were overstated. Anglian stated that its growth forecasts were accurate. Anglian provided evidence showing that even if growth forecasts were reduced by 56%, as Ofwat considered they should be, this would not have a material impact on the need or timing for additional capacity. This was because a key driver for the requirement for additional capacity is the WINEP water quality programme rather than the growth forecast.<sup>1887</sup>

#### *Best option for customers*

- 5.645 Anglian strongly disagreed with Ofwat that developing capacity at Whitlingham would foreclose the Bioresources market. Anglian said it had tested the market in developing its plans but there was no satisfactory long-term trading opportunity with another provider.<sup>1888</sup>
- 5.646 Anglian considered the option for outsourcing its sludge processing to a third-party supplier. These potential suppliers can be broadly categorised as either neighbouring WASCs, or other third-parties.
- 5.647 In relation to outsourcing to other WASCs, Anglian told us that it already had existing trading arrangements with neighbouring WASCs to make use of available short-term capacity.<sup>1889</sup> However, Anglian considered that this would not be able to provide the additional capacity it requires because:<sup>1890</sup>

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<sup>1886</sup> Anglian (2019) [PR19 draft determination: supplementary evidence](#), p43

<sup>1887</sup> Over the full AMP period, reducing the growth forecasts by 56% would reduce Anglian's total sludge production requiring treatment by 4,955 tonnes dry solids, a difference of 0.62%

<sup>1888</sup> [Anglian's reply to responses to the provisional findings](#), p15

<sup>1889</sup> Anglian (2018), [Our plan 2020-2025](#), p124

<sup>1890</sup> Anglian (2019) [PR19 draft determination: supplementary evidence](#), p43

- (a) presently, viable trades are largely limited to its three directly neighbouring WASCs as a result of the legislative restrictions and challenges surrounding co-treatment;
- (b) its neighbouring WASCs are currently operating with similar levels of limited headroom, with uncertainty and capacity reductions resulting in companies being unable to make a firm offer on trades, with many having had plans to add capacity reduced as a result of Ofwat's FD;
- (c) the seasonal variance in sludge production will be broadly similar across all WASCs limiting available capacity for trading during peak sludge production times; and
- (d) any contract for guaranteed capacity with a neighbouring WASC would be on the basis of a fully loaded gate fee, to include capital costs elements as opposed to short-term non-committed trades, which typically have gate fees for the marginal operating cost plus fees only.

5.648 Anglian submitted that currently it is only other WASCs that can be contracted to procure additional digestion capacity for its bioresources. This is because, although it is theoretically possible for other third-parties to treat and dispose of sewage sludge, the additional cost burden for non-WASCs resulting from the current regulatory regime is preventing third-parties from entering the market.

5.649 Anglian told us that the wider market was therefore not currently able to provide guaranteed resilient capacity for bioresources. In particular, it submitted that it had completed a market consultation in January 2018 in order to assess the level of interest from third-party anaerobic digestion plant operators in the treatment of sewage sludge. This was sent to 88 potential third-party operators within the Anglian region, but only six suppliers responded, including two neighbouring water companies and the third-party supplier currently used for mobile lime treatment services.

5.650 Furthermore, Anglian stated that expanding its existing Whitlingham STC represents the lowest whole-life cost approach. To support this, Anglian produced a comparison between its planned capacity investment at Whitlingham and its view of the approach reflected in Ofwat's FD. Anglian's cost estimates include estimated annual capex costs of the assets. Anglian assumed Ofwat's allowance was based on a view of a fixed contract of [REDACTED] ttds per annum in AMP7 commencing 1 October 2022 and estimated a

trade out gate fee of £[~~8~~]/tds. The third-party provider would need to guarantee capacity.<sup>1891</sup> Anglian's cost comparison is provided at Table 5-25.

**Table 5-25: Relative whole of life cost profile: Anglian and Ofwat respective solutions**

	£ million	
	<i>Anglian</i> )	<i>Ofwat</i>
Equivalent annualised cost	0.7	2.6
Discounted whole life cost	15.5	39.0

Source: [Anglian SoC](#), paragraph 787

### *Robustness and efficiency of cost estimation*

- 5.651 Anglian submitted that it has extensive experience from previous AMPs of building digestion and sludge treatment systems and that its estimated costs for this scheme are built bottom-up using component costs based on comparators such as historical actuals, competitive tenders for at-scale projects, and its own cost models.
- 5.652 As the investment comprises an extension to Anglian's existing plant, Anglian stated that it can make use of much of the existing infrastructure to support its development, making this a lower cost option than if this were a stand-alone project.
- 5.653 Anglian disagreed with Ofwat's view that certain opex costs were already covered in base expenditure. Anglian considered that none of these costs were allowed for in base costs. It provided additional details on these costs as follows:
- (a) Bioresources availability optimisation – this was to fund a new post (Bioresources Production Manager) and to pay the model licence hosting for a new production planning model (PPM).
  - (b) Modelling to support trading – this new PPM would be adapted to support Anglian in making and assessing potential trade options. Anglian was also creating a new post of Bioresources Trading Manager.
  - (c) Opex associated with the Whitlingham additional digester – this was to account for increased throughput and the new assets.
- 5.654 Anglian also stated that the benefits from increased generation stemming from an extended plant at Whitlingham across AMP7 was included in its assessment of opex.

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<sup>1891</sup> [Anglian SoC](#), paragraph 787



### *Our assessment and decision*

5.655 AMP7 appears to be a transitional period in which Ofwat is attempting to start opening up the bioresources market, and in that context, we understand why it may be reticent to allow Anglian to use its customers' money to build additional fixed assets for sludge treatment.

5.656 However, we consider that the evidence Anglian has provided supports its submissions that:

- (a) there are likely to be limited or no third-party suppliers in the foreseeable future to which it is able to outsource these services (either other WASCs or non-WASCs); and
- (b) whilst Anglian building in-house capacity has a higher upfront cost, the lower whole life cost represents a more efficient form of delivering the necessary activities.

5.657 We are not convinced that adopting a less efficient outsourcing approach relying on the emergence of significant bioresource suppliers is an appropriate basis for our determination. In particular, this appears to be predicated on the market opening up substantially during the course of the AMP, which appears highly uncertain.

5.658 We consider that Anglian has provided evidence that, even if it uses Ofwat's projected population growth, Anglian will still require the extra capacity for sludge treatment.

5.659 However, we also consider that the base allowances are likely to provide for certain activities proposed by Anglian. In order to avoid double-funding of these activities, we have not allowed additional funding for these. In particular:

- (a) The introduction of new staff roles and models is not directly associated with this scheme, but would reflect business-as-usual processes being undertaken by Anglian for its bioresources operations. We would expect these to be funded by base allowances.
- (b) The base bioresource models (BR1 and BR2) already include a scale variable based on volume of sludge produced,<sup>1892</sup> and so we would expect that the associated operational expenditure for this STW to already be funded in the base models.

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<sup>1892</sup> See Table 4-2.

5.660 We therefore consider that Anglian does not require additional funding of £1.9 million for these activities.

5.661 On this basis, we decide to allow Anglian its proposed allowance for the delivery of this scheme but without the opex specified above. This results in an associated allowance for Anglian of £10.6 million (ie an increase of £4.9 million over Ofwat's FD).

5.662 In reaching this decision, we note that, if the bioresources market was opened up to competition in the short-term and Anglian were to participate in this market making use of assets paid for by customers through the price control, then it could result in some degree of double-funding.<sup>1893</sup> We consider that the most appropriate approach to managing this risk is for Ofwat to consider the treatment of the bioresources RCV as part of the market opening, since this risk is not unique to this specific scheme but reflects a general concern about bioresource assets owned by the WASCs.

#### *Customer protection*

5.663 As with other enhancement schemes, we consider it important to ensure that customers are protected from non-delivery. We therefore include an additional PC and ODI such that if Anglian does not deliver the additional sludge treatment capacity at Whitlingham (as described above) by the end of AMP7, it will incur a financial penalty of £4.77 million.<sup>1894</sup>

### **Calibration of scheme-specific PCs and ODIs**

5.664 In earlier sections, we have discussed the need to protect customers from the non-delivery of major enhancement projects through the use of PCs and ODIs. The aim of this protection is to reduce water companies' allowances in the event that they are unable, or choose not, to deliver these schemes which have been funded through another mechanism (eg enhancement allowances).

5.665 For a number of the deep dives we have assessed in detail, we have included a PC and ODI which aims to protect customers in this way. In order to calculate the relevant unit rate for these, we have needed to include elements from the wider determination, most notably the cost sharing rate. This is because, in the event of non-delivery, the company is already exposed to a cost sharing rate for any reduction in expenditure, and we should seek to

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<sup>1893</sup> For example, customer funds are used to build the asset, which then generates a higher return reflecting a competitive return on capital in the opened market.

<sup>1894</sup> Totex allowance of £10.6 million multiplied by the totex outperformance cost sharing rate of 45%.

avoid double-counting this. We note that this is a point which some of the Main Parties also raised with us in response to our Provisional Findings.<sup>1895</sup>

5.666 As discussed in paragraph 5.4 above, we have focused on areas where the Main Parties provided conflicting views and where we have needed to resolve these in coming to our determinations. However, we are aware that changes in our determinations can have consequential changes elsewhere, and that scheme-specific ODIs are one such area. We have therefore reflected these consequential changes to recalibrate relevant ODIs. In doing so, we have adopted the same approach that Ofwat did,<sup>1896</sup> but updated the figures to reflect our final determination, particularly the sharing rates discussed in section 6.<sup>1897</sup>

5.667 Ofwat provided us with a list of the relevant PCs and their associated ODIs, as well as the calculations underpinning them. These were available to all the Disputing Companies, with none raising any objections.

5.668 Our determination therefore includes updated ODI rates for the PCs as set out below. For the avoidance of doubt, we have not included any PC or ODIs which we have assessed in detail elsewhere in our determination, and all other aspects of the below PCs are unchanged from Ofwat's FD.

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<sup>1895</sup> See [Anglian's response to the provisional findings](#), paragraph 235; [Ofwat's response to the provisional findings – cost and outcomes](#), p48

<sup>1896</sup> See [Ofwat's PR19 final determinations: delivering outcomes for customers policy appendix](#), pp135–141

<sup>1897</sup> For PCs related to late delivery, we have also updated the ODI rates to reflect our final WACC figures.

**Table 5-26: Updated ODI rates for scheme-specific PCs**

<i>Company</i>	<i>Unique ID</i>	<i>Description</i>	<i>ODI rate</i>
Anglian	PR19ANH_42	Partnership working on pluvial and fluvial flood risk	-0.0595
Bristol	PR19BRL_PC20	Meter penetration [clawback]	-0.453
Bristol	PR19BRL_PC20	Meter penetration [outperformance]	0.554
Bristol	PR19BRL_PC24	WINEP Compliance [delay]	-0.00238
Bristol	PR19BRL_PC28	Glastonbury Street network resilience	-0.0531
Northumbrian	PR19NES_BES25	Delivery of lead enhancement programme	-0.0462
Northumbrian	PR19NES_BES26	Delivery of smart water metering enhancement programme	-0.194
Northumbrian	PR19NES_BES27	Delivery of wastewater resilience enhancement programme	-0.127
Northumbrian	PR19NES_BES28	Delivery of cyber resilience enhancement programme [clawback]	-0.0417
Northumbrian	PR19NES_BES28	Delivery of cyber resilience enhancement programme [delay]	-0.0073
Northumbrian	PR19NES_BES29	Delivery of Howdon STW enhancement	-0.0274
Northumbrian	PR19NES_BES31	WINEP [delay]	-0.0183

Source: CMA calculations

Note: all ODI rates are expressed as £m per unit, where the measurement unit is described in the relevant company's respective outcomes performance commitment appendix from PR19 final determination.

## Costs for metaldehyde removal (Anglian)

- 5.669 Anglian raised the issue of metaldehyde treatment in its representations. In December 2018, DEFRA introduced a ban on the use of metaldehyde slug pellets outdoors, to take effect from spring 2020.
- 5.670 Metaldehyde is costly to remove from water. Since much of Anglian's region is rural and agricultural, the ban would have a significant operational impact for it. Anglian had initially forecast that – absent the ban – metaldehyde removal would cost £68 million over the AMP (this estimate was subsequently reduced to £63 million).<sup>1898</sup>
- 5.671 On the basis of the ban, during PR19, Anglian had agreed to remove £68 million from its Business Plan that had been earmarked to deal with metaldehyde pesticide.
- 5.672 In July 2019, the ban was overturned by the High Court after its lawfulness was challenged. At the time we were issuing our Provisional Findings, government was considering reintroducing the ban but there was uncertainty regarding whether and when the ban may be reintroduced.
- 5.673 The ban was reintroduced in late September 2020, (around the time of our Provisional Findings)<sup>1899</sup> thus removing uncertainty around the extent to which Anglian and other water companies would incur costs removing it from water courses. Since this ban comes into force from the end of March 2022 (ie part

<sup>1898</sup> Anglian confirmed during the redetermination process that the costs associated with metaldehyde treatment are £63 million, as an additional £5 million was included in the Business Plan to expenditure associated with investment at Elsham treatment works.

<sup>1899</sup> Defra (2020), [Outdoor use of metaldehyde to be banned to protect wildlife](#)

way through the AMP), we therefore consider what allowances would be required to address this issue.

### ***Approach in Ofwat's FD***

5.674 In Ofwat's FD, it recognised that Anglian could be exposed to additional costs during AMP7, and that these would be beyond management control. It proposed that the mechanism for determining what unfunded costs were incurred, and the extent they should be recovered, was via a Notified Item.

5.675 Notified Items are considered in interim determination applications. Before an interim determination takes place, a materiality test is used to determine whether the costs incurred are significant enough to be considered for an interim determination. Anglian's Licence specifies that an Interim Determination of K (or IDOK) is unavailable unless the value of the claim for additional funding is at least equal to 10% of turnover.<sup>1900</sup>

### ***Treatment of this issue in our Provisional Findings***

5.676 Anglian said it was concerned that it had no realistic prospect of reaching the 10% of turnover materiality threshold in relation to metaldehyde treatment costs.<sup>1901</sup> Anglian said this would have meant it would only have been able to recover part of these costs, via the existing cost sharing mechanisms (the company estimated this as being £22 million out of the £63 million costs).

5.677 Anglian therefore asked that measures be taken so that it had certainty from Ofwat that the materiality condition would be amended to lower the threshold, so that the Notified Item would be subject to an interim determination, or for the provision of another workable reimbursement mechanism.

5.678 We provisionally agreed that Anglian should have certainty with regards to treatment costs associated with metaldehyde in all possible scenarios. Our Provisional Findings allocated £63 million for metaldehyde removal costs (profiling them evenly over the five years) but made them subject to a claw-back mechanism if the ban was reintroduced during the period.

### ***Reintroduction of the ban and views of Ofwat and Anglian***

5.679 Around the time of our Provisional Findings, DEFRA confirmed that the ban would be reintroduced, with manufacture prohibited from the end of March 2021 and sale and use banned from the end of March 2022. The timing of this

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<sup>1900</sup> Defra (2019), [Anglian Water Licence 14.2\(6\)\(b\) of Condition B](#)

<sup>1901</sup> [Anglian SoC](#), paragraph 121

decision meant that it could not be reflected in our Provisional Findings, but the decision was known to the Main Parties by the time of their responses.

5.680 In its response to our Provisional Findings,<sup>1902</sup> Ofwat stated that since the ban was being reintroduced, the £63 million allowance was no longer necessary, and should be removed. It submitted that:

- (a) the costs related to water treatment in transfer schemes which will not become operational until later in the AMP7 period, when the ban will be in place; and
- (b) modelled base costs already provided some allowance for metaldehyde treatment costs.

5.681 Ofwat further stated that if the CMA was to consider a partial allocation of costs for the period up to March 2022 (ie before the ban was in effect), this should reflect the profiling of the expenditure in Anglian's original business plan. It noted that 'Anglian Water's cost forecast was based on the original assumption of a ban being in place by April 2020. In this scenario it forecasted to incur the majority of the expenditure in years three and four of AMP7 – after the reinstated full ban will actually be in place'. Ofwat provided a table profiling metaldehyde related expenditure initially requested by the company in its business plan, split by opex and capex, and by type of activity.<sup>1903</sup>

5.682 Ofwat also submitted that, as a result of the reintroduction of the ban, there should be consequential changes to the PCs and deadbands, and made the broader point that the ban resulted in all of the Disputing Companies now receiving funding (via the base cost models) for an activity that was no longer necessary. Ofwat argued that as a result, the CMA should consider reducing totex allowances for all of the Disputing Companies.

5.683 Anglian's response to our Provisional Findings stated that, while the ban meant that much of its previously requested allowance was no longer needed, nonetheless it would continue to incur some costs. It estimated that it would require £13.4 million, a reduction of around £50 million from its original £63 million request. It said it will incur these costs because undertakings to the DWI remained in force and because:

- (a) the ban will commence part way through the AMP;

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<sup>1902</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), A4

<sup>1903</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), Table A4.1

- (b) there was no 'use-up' period provided in the legislation, meaning an increased risk of illegal use after March 2022; and
- (c) experience shows that metaldehyde stays in water courses for some time after it is used. Anglian submitted that metaldehyde is likely to be present 'in the Autumn run-off period from October to December 2022 as well as in lower levels due to residuals in the environment (and potentially illegal use) in October to December 2023'.<sup>1904</sup>

5.684 When estimating its costs to address metaldehyde, Anglian stated that it had reviewed both catchment management and treatment options at those sites that are affected, and that investment requirements had been re-costed to 'keep costs to a minimum'.<sup>1905</sup> To that end, it said:

- (a) It had reviewed its forward programme of commissioning of strategic interconnectors and identified those that will be in operation ahead of December 2023.<sup>1906</sup>
- (b) Treatment requirements had been designed to match 'business as usual' flows required for supply-demand balancing, without the additional capacity required to meet resilience needs. This is because the resilience schemes are only required at the end of AMP7, at which point metaldehyde should be almost entirely removed from the environment.
- (c) Any costs associated with a permanent solution (such as land purchase, permanent buildings, roads and landscaping) had been stripped out and that Anglian had included estimated equipment hire costs where equipment was commercially available to hire.

5.685 In terms of the required activities, Anglian stated that the costs also included operational costs for power and chemicals up to December 2023. As well as catchment and treatment, Anglian stated that there were two interconnectors (ELY9 and HPB1) where it proposed to include limited re-introduction of product substitution subsidies prior to the ban in March 2022.

5.686 For a third interconnector (RTS), Anglian considered that substitution would not be a workable solution, due to the large catchment area for the Grafham Water supply reservoir. Therefore, it instead proposed to use a combination of managing abstraction, balancing supplies, and treatment for this site.

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<sup>1904</sup> [Anglian's response to the provisional findings](#), Chapter E: enhancement, paragraph 239

<sup>1905</sup> [Anglian's response to the provisional findings](#), paragraph 242

<sup>1906</sup> [Anglian's response to the provisional findings](#), paragraph 241

5.687 Given the reintroduction of the ban and consequent removal of uncertainty, Anglian's response to our Provisional Findings also stated that the proposed uncertainty mechanism should be removed and that normal cost sharing arrangements should apply to the requested cost allowance.

5.688 In response to the revised Anglian request for £13.4 million, Ofwat said that Anglian had not provided adequate evidence to justify the requested allowance and recommended that the CMA 'applies a strong efficiency and optioneering challenge to Anglian Water's proposals in the light of such poor evidence'.<sup>1907</sup> In particular, Ofwat stated that:

- (a) It 'did not consider that Anglian Water would require much funding, if at all, to deal with metaldehyde risk before the ban is fully in place on 31 March 2022'.
- (b) Anglian had repeatedly failed to provide 'even the basic evidence required to assess its planned expenditure'.
- (c) Anglian had provided no information on the range of options considered, details of the proposed works nor a breakdown of costs that could be used to determine if they were efficient.
- (d) It was not clear why the mitigation for the ELY9 interconnector required both treatment and product substitution.
- (e) It was not clear what treatment was required over that existing currently of the raw water abstracted from Grafham Water to justify the material capital cost estimate of £9 million.
- (f) It was not clear whether Anglian had considered mitigations that would enable a delay in commissioning a specific transfer scheme until the pesticide is no longer prevalent and thus these costs avoided.

5.689 Ofwat also reiterated that, if the CMA made a material metaldehyde cost allowance for Anglian, there should be associated customer protections (for example, in the form of a new PC and ODI).

5.690 Meanwhile, Anglian said:

'Ofwat's response proposes no additional allowance for Anglian for metaldehyde. Ofwat fails to differentiate between the components of Anglian's proposed investment driven by investment in treatment and the proposed investment in

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<sup>1907</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), p15



catchment management. As set out in Anglian's PF response, Anglian proposed to return £50m of the CMA's PFs allowance. It also proposed, based on materiality of expenditure, to remove the proposed clawback mechanism. Anglian believes this is the right approach.<sup>1908</sup>

5.691 During its hearing, Ofwat accepted that Anglian should receive funding for a necessary activity, but outlined its concerns over the level of those additional costs. It also highlighted that the introduction of this ban will reduce the costs for all water companies and that there is an amount in the allowance for all companies which will now be saved.

5.692 Anglian explained that its efficient costs to address metaldehyde would be higher than the industry average, and so warrant an additional allowance, because:

- (a) While this issue affects other water companies, 'the nature of the crops and the intensity of agriculture in the East of England means metaldehyde is more widely used in the Anglian region than elsewhere';
- (b) In order to dissuade farmers from using metaldehyde, it needed to offer product substitution where possible. These costs of substitute products are 'certainly not' provided for in base costs;
- (c) Where the water catchment area is too large (eg Grafham Water, which takes water from along the river Ouse), Anglian needed to undertake treatment to remove metaldehyde from water. Where treatment activities are required, Anglian said it would use temporary equipment rather than large permanent installations to minimise costs;
- (d) Anglian is forbidden by DWI rules from transferring polluted water from one area to another, hence it must treat water at the specified locations; and
- (e) Metaldehyde takes at least two seasons to leave the water system and hence will require activity during most of the AMP in spite of the ban.

### ***Our assessment and decision***

5.693 We are satisfied from the evidence reviewed that metaldehyde is being used more extensively in the Anglian region than in a typical water company region, owing to the area's agricultural nature. This fact does not appear to be in

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<sup>1908</sup> [Anglian's reply to responses to the provisional findings](#), paragraphs 66–67

dispute between Ofwat and Anglian, and confirms that Anglian's costs will be atypically large, and so not sufficiently provided for within modelled base allowances.

- 5.694 Following the reintroduction of the ban, we have greater certainty around the key timings, in particular that the ban will only come into force part way through the AMP. Anglian has already, and will continue to, incur costs to discourage metaldehyde use and to remove it from water until March 2022. Further, it seems likely that metaldehyde will remain in soils and water courses for a period of time after 2022.
- 5.695 Ofwat appears to have accepted that providing some funding for this aspect of Anglian's costs is reasonable. The central issue is therefore whether Anglian's cost estimates are efficient.
- 5.696 In its response to our Provisional Findings, Ofwat suggested that, if the CMA were to make an allowance, it should be based on the figures in Anglian's 2019 business plan.<sup>1909</sup> The difference between Anglian's requested costs and its original business plan for the years 2020/21 and 2021/22 is relatively modest at £0.8 million (£13.4 million in its response to our Provisional Findings, compared to £12.6 million in its business plan).<sup>1910</sup> However we note that, as Ofwat point out, Anglian's business plan was based on an initial expectation that the ban would be in force by April 2020 – hence the profiling of the expenditure would be different.
- 5.697 Anglian has provided details of the locations and types of expenditure it plans to make to remove metaldehyde from its water. It has justified the reasons for this expenditure and explained how efforts have been made to minimise this expenditure through the use of temporary solutions instead of capital investment. The allowance requested does not differ significantly from earlier requests Anglian had made for this same purpose.
- 5.698 We therefore decide that Anglian should receive a cost allowance for the atypically high costs it faces to remove metaldehyde from water in its region. We start with the £13.4 million request which Anglian has made, but apply a scheme-specific efficiency challenge to reflect a degree of implicit allowance and the potential for efficiencies. In our judgement a 5% efficiency factor applied to Anglian's request is appropriate, resulting in a final allowance of £12.7 million.

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<sup>1909</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), paragraph A4.4

<sup>1910</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), paragraphs A4.4–4.5 and Table A4.1

5.699 We agree with Anglian that since these costs are no longer subject to uncertainty over the possibility or timing of a ban, an uncertainty mechanism is no longer required. Any over or under spend in these costs will be subject to the usual totex cost sharing arrangements, as discussed in section 6.

5.700 We considered whether it would be appropriate to change the PC structures as a consequence of the ban and the above allocation. We deal with this issue in section 7, paragraphs 7.240 to 7.241.

## **Our approach to Direct Procurement for Customers (DPC): Elsham (Anglian)**

5.701 The Elsham scheme provides for additional water transfer, storage and treatment capacity in Anglian's supply area. At PR19, Ofwat decided that the Elsham scheme should be taken forward through its newly established Direct Procurement for Customers (DPC) arrangements, which involve a water company competitively tendering for a third-party to design, build, finance, operate and maintain infrastructure that would otherwise have been delivered by the incumbent water company.<sup>1911</sup> In line with this, no totex allowance was included for Elsham within Ofwat's FD, other than to fund Anglian's costs of running the DPC process.<sup>1912</sup>

### **Anglian's views**

5.702 In its SoC, Anglian raised a particular concern over the funding arrangements that would apply if the Elsham scheme was to be ultimately delivered by Anglian itself:

'Anglian accepted Ofwat's proposal for the Elsham scheme to be carried out using a direct procurement process. The c.£122 million expenditure for this project was, therefore, removed from Anglian's requested allowance. However, if the in-house solution proves better value for money than any bidder proposal, or if there is no appetite in the market to bid for the Elsham scheme. Anglian will have to construct and pay for the

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<sup>1911</sup> Further details of Ofwat's DPC process can be found in Ofwat (2017), [Delivering Water 2020: Our final methodology for the 2019 price review](#), Chapter 7 and Ofwat (2017), [Delivering Water 2020: Our methodology for the 2019 price review. Appendix 9: Direct procurement for customers](#).

<sup>1912</sup> The DPC arrangements include a separate mechanism through which the costs of a third party provider can be recovered from customers. See Ofwat (2020) [Appendix 2 Direct Procurement for Customers: Briefing Note on the Procurement Process on the Procurement Process for 2020-2025](#).

scheme itself. It will have no cost allowance to do so, nor ... any mechanism for future recovery.’<sup>1913</sup>

- 5.703 Anglian said that the obvious and straightforward way to deal with this issue was through a workable reimbursement mechanism.<sup>1914</sup>
- 5.704 In its response to our Provisional Findings, Anglian requested that we reduce the scope of the Elsham DPC, and provide additional totex of around £83 million to fund its delivery of the transfer and storage elements of the Elsham scheme (which would then no longer be subject to the DPC arrangements).<sup>1915</sup> Anglian said that timetable constraints related to the transfer and storage elements would not allow them to be delivered through the DPC process within the timeframe required for it to meet its AMP7 environmental obligations, and ensure security of supply, even with optimistic assumptions.<sup>1916</sup> In relation to this, Anglian said that AMP7 water resource pressures were likely to be even greater than had been originally anticipated in its WRMP.<sup>1917</sup> Anglian said that, given these risks, it was necessary to revise the scope of the DPC process so that it only included the Elsham Water Treatment works, with the other two components being delivered in-house by Anglian.<sup>1918</sup>
- 5.705 Anglian provided us with a report it had commissioned from WSP, which reviewed opportunities and constraints with respect to the Elsham DPC. The conclusions of this included that Anglian was right to be concerned that the time necessary to develop and implement the full scope of the Elsham DPC presented an unacceptable business and service risk of failure to meet fixed dated licence reductions, as it would take markedly more time to adequately describe to the market, tender, negotiate and reach financial close than a business as usual approach, given the immaturity of the DPC approach and the complexity of the scheme interfaces. The report concluded that the resulting compression of the construction and commissioning programme was likely to leave insufficient time to allow for risks to the programme.
- 5.706 Anglian said that Ofwat’s response to our Provisional Findings had not adequately represented the extensive dialogue that had been undertaken to seek to resolve issues related to the scope of the Elsham DPC, and contained a number of factual inaccuracies.<sup>1919</sup> Anglian said that the advice referred to

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<sup>1913</sup> [Anglian SoC](#), paragraph 120

<sup>1914</sup> [Anglian SoC](#), paragraph 123

<sup>1915</sup> [Anglian’s response to the provisional findings](#), paragraphs 187–199

<sup>1916</sup> [Anglian’s response to the provisional findings](#), paragraph 186

<sup>1917</sup> [Anglian’s response to the provisional findings](#), paragraph 25

<sup>1918</sup> [Anglian’s response to the provisional findings](#), paragraph 186

<sup>1919</sup> [Anglian’s reply to responses to the provisional findings](#), paragraph 17

by Ofwat did not address the timetable concerns Anglian had identified,<sup>1920</sup> and that Ofwat's response failed to account for the potential harm to customers and the environment if Anglian could not meet its environmental obligations.<sup>1921</sup> Anglian said that any relative benefits for customers under DPC were highly uncertain and relied on the assumption that a Commercially Appointed Provider (CAP) was appointable, and would deliver at a much lower overall cost than an in-house alternative.<sup>1922</sup> Anglian said it had done further work to establish that the Elsham treatment works component still represented value for money for customers as a stand-alone DPC project, and had committed to do all it could to ensure the descoped DPC process was successful.<sup>1923</sup>

5.707 Anglian said that the scope of and process for delivery of the Elsham scheme formed part of Ofwat's FD that it disputed, that forming a view on scope was clearly within the remit of our redetermination, and that it had a legitimate expectation that we would address this matter.<sup>1924</sup> Anglian said that the risks of the CMA not changing the scope of Elsham DPC far outweighed the uncertain potential benefits of undertaking the full Elsham scheme through DPC.<sup>1925</sup>

### ***Ofwat's views***

5.708 Ofwat said it did not consider that the de-scoping issue needed to be dealt with as a part of the redetermination,<sup>1926</sup> and that its DPC IDOK licence change<sup>1927</sup> – which it had consulted on – would adequately address funding uncertainties related to changes in the delivery route for the scheme.<sup>1928</sup>

5.709 Ofwat said that it had a clear process for managing a DPC which had been widely consulted upon and aligned with best practice, and that required water companies and Ofwat to engage throughout and agree the scheme's

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<sup>1920</sup> See [Ofwat's response to the provisional findings – cost and outcomes](#), p55, where Ofwat said its legal advice suggested that a number of the timing issues Anglian had raised should be resolvable through the adoption of a slightly different structure for the process.

<sup>1921</sup> [Anglian's reply to responses to the provisional findings](#), paragraphs 19 and 22

<sup>1922</sup> [Anglian's reply to responses to the provisional findings](#), paragraph 20

<sup>1923</sup> [Anglian's reply to responses to the provisional findings](#), paragraph 23

<sup>1924</sup> [Anglian's response to the Elsham scheme working paper](#), paragraphs 10 and 77

<sup>1925</sup> [Anglian's response to the Elsham scheme working paper](#), paragraph 8

<sup>1926</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p55

<sup>1927</sup> An IDOK, or 'Interim Determination of K', is a process by which water companies can request that Ofwat resets their price limits between five-yearly price reviews. In order to do so, certain criteria need to be met around materiality and triviality. Ofwat can also trigger an IDOK based on the same criteria. Ofwat has brought forward a licence change to allow a 'DPC Interim Determination' which, in specified circumstances, would facilitate the use of the IDOK process on return of the project to delivery by the company rather than a third party; see Ofwat (2020), [Direct procurement for customers: Statutory consultation on proposed changes to the conditions of appointment of five water and sewerage companies](#).

<sup>1928</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p55

progression through a number of control points.<sup>1929</sup> Ofwat said that there were mechanisms to allow all or part of a project to revert to in-house delivery if it has determined (based on its assessment at these various control points) that DPC is not appropriate.<sup>1930</sup> Ofwat said that it expected the development of the project itself to continue in parallel to this process such that the decision on the procurement route should not delay the overall programme.<sup>1931</sup>

5.710 Ofwat said that the proposed de-scoping of the transfer and storage elements of the Elsham scheme would potentially result in significant costs for customers, and so it was considering Anglian's proposals and technical justification, carefully.<sup>1932</sup> Ofwat said that any decision to de-scope Elsham in our redetermination would undermine the DPC framework, and potentially lead to similar issues being raised in relation to other projects in order to try to avoid the use of the DPC process.<sup>1933</sup>

### ***Our assessment and decision***

5.711 The consideration of Elsham in our Provisional Findings focused only on the potential for the Elsham scheme to be unfunded if the DPC process resulted in the scheme having to be delivered in-house by Anglian.<sup>1934</sup> We noted that Ofwat had confirmed that it would consult on a potential solution to this issue, that Anglian had confirmed it was discussing this with Ofwat and that the issue was likely to be resolved, and that, given this, we made no provisional determination on the matter.<sup>1935</sup>

5.712 Ofwat consulted, in November 2020, on putting a bespoke DPC-related interim determination provision in Anglian's licence,<sup>1936</sup> and said that Anglian had subsequently provided the consent required to allow the licence modification to be made by agreement.<sup>1937</sup> Ofwat later confirmed that the relevant changes to Anglian's licence (including the DPC interim determination process) had been made. We consider this adequately addresses the potential funding gap issue that Anglian raised in its SoC.

5.713 The limited consideration given to the Elsham scheme in our Provisional Findings reflected the fact that the scheme was being taken forward through the DPC process. In its SoC, Anglian said that it accepted Ofwat's proposal

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<sup>1929</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), paragraph A1.4

<sup>1930</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), paragraph A1.5

<sup>1931</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), paragraph A1.5

<sup>1932</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p55

<sup>1933</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), paragraph A1.7

<sup>1934</sup> [Provisional findings report](#), paragraph 5.502(e)

<sup>1935</sup> [Provisional findings report](#), paragraph 5.502(e)

<sup>1936</sup> Ofwat (2020), [Direct procurement for customers: Statutory consultation on proposed changes to the conditions of appointment of five water and sewerage companies](#)

<sup>1937</sup> [Anglian's response to the Elsham scheme working paper](#), paragraph 2.3

for the Elsham scheme to be carried out using a DPC process, and the totex levels Anglian proposed in its SoC were consistent with this (ie they did not include an allowance for the Elsham scheme other than in relation to the costs of Anglian running the DPC process).<sup>1938</sup>

5.714 In its response to our Provisional Findings, Anglian presented a different position. Anglian said that unless the scope of the Elsham DPC process was reduced (such that it would deliver the transfer and storage elements of the Elsham scheme ‘in-house’), then it would not be able to meet its AMP7 environmental obligations, and ensure security of supply.<sup>1939</sup> Anglian requested that we reduce the scope of the Elsham DPC process as part of the redetermination.<sup>1940</sup>

5.715 In assessing Anglian’s request, we considered it important to recognise that the DPC process, which Ofwat noted was established after wide consultation,<sup>1941</sup> already provides a mechanism through which the case for descoping can be reviewed at a number of defined control points,<sup>1942</sup> and that the case for descoping the Elsham scheme has been under consideration within that existing DPC process. Ofwat said that its ongoing review of Anglian’s submissions as part of this process includes detailed consideration of a range of matters, including evidence on the extent and implications of the timing pressures Anglian faces (and, in particular, its assessment of its 2025 supply-demand need case, its response options, and its preferred commercial delivery approach).<sup>1943</sup>

5.716 Ofwat said that Anglian submitted its Strategic Outline Case (for Stage 2 of the DPC process) on 24 December 2020, and that – following feedback from Ofwat – it submitted a revised version on 19 January 2021, and supplementary evidence on 26 January and 2 February 2021.<sup>1944</sup> Ofwat said that Anglian had addressed its feedback and provided an evidenced case for a preferred delivery route, and that Ofwat was in the process of deciding on the appropriate course of action.<sup>1945</sup>

5.717 There is, therefore, an assessment of the relevant risks associated with descoping the Elsham scheme already provided for (as part of the DPC process that Ofwat established), that has been ongoing alongside the latter

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<sup>1938</sup> [Anglian SoC](#), paragraph 120

<sup>1939</sup> [Anglian’s response to the provisional findings](#), paragraph 186

<sup>1940</sup> [Anglian’s response to the provisional findings](#), paragraph 26

<sup>1941</sup> [Ofwat’s reply to responses to the provisional findings – costs and outcomes](#), paragraph A1.4

<sup>1942</sup> The DPC process is described in: Ofwat (2020) [Appendix 2 Direct Procurement for Customers: Briefing Note on the Procurement Process on the Procurement Process for 2020-2025](#).

<sup>1943</sup> [Ofwat’s submission following the second main party hearings – costs and outcomes](#), section 8

<sup>1944</sup> [Ofwat’s final submission](#), paragraphs 6.4–6.5

<sup>1945</sup> [Ofwat’s final submission](#), paragraphs 6.5–6.6



part of this redetermination. Given this, we consider it would be inappropriate for us to intervene in relation to the scope of the Elsham DPC as part of this redetermination. Doing so would introduce unnecessary and substantial risk into our determination for Anglian's customers. We also agree with Ofwat that our doing so would risk undermining the DPC process,<sup>1946</sup> in a context where there will be significant management control over project timetables, and where companies may face incentives to delay undertaking steps, such as market testing, so as to increase the likelihood of delivery being brought in-house as a result of a subsequent assessment of time pressures.

5.718 We note Anglian's view that it had a legitimate expectation that the de-scoping issue would be addressed as part of our redetermination,<sup>1947</sup> but we do not consider this to be the case. Anglian made no representations on the descope of Elsham DPC in its SoC, or in response to our Approach Document<sup>1948</sup> which did not identify the scope of Elsham DPC as a matter we intended to examine as part of the redetermination.

5.719 On 22 February 2021, Ofwat told us that – following its assessment of Anglian's Strategic Outline Case for the Elsham DPC – it had accepted in principle Anglian's proposal to reduce the DPC scope, subject to further discussions it planned to have with Anglian on how to ensure value for money for customers. Anglian said that, should Ofwat decide to reduce the scope of Elsham DPC, then the public interest would be better served by implementing that reduced scope through our redetermination, rather than through the more time consuming IDOK process that Ofwat would have to operate, not least because the biggest risk is to the timetable of the scheme, which could be averted.<sup>1949</sup>

5.720 Our decision is not to adjust the scope of Elsham DPC as part of this redetermination, and therefore that no consequential adjustments to totex allowances (or PCs or ODIs) are needed. We note that Ofwat's assessment of Anglian's proposal to reduce the scope of Elsham DPC is now well progressed, with Ofwat having accepted the proposed reduction in scope in principle.

5.721 We consider the DPC IDOK arrangements that Ofwat has introduced provide an appropriate means through which resulting funding issues can be addressed.<sup>1950</sup> This would enable Anglian's totex and PC/ODI proposals

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<sup>1946</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), paragraph A1.7

<sup>1947</sup> [Anglian's response to the Elsham scheme working paper](#), paragraph 77

<sup>1948</sup> [CMA approach to water redeterminations](#), paragraph 42

<sup>1949</sup> [Anglian's final submission: Annex 1](#), paragraph 16

<sup>1950</sup> We note that the DPC IDOK arrangements include provisions for Anglian to dispute Ofwat's decision, and for the matter to be referred to the CMA for redetermination.



(which did not form part of Ofwat's FD, and have not been evaluated as part of this redetermination) to be assessed and consulted on appropriately, without giving rise to material timetable risks. We note that Ofwat plans to expedite its consideration of this matter, and said it would aim to finalise the process well within the 3 month period that is usually estimated for an IDOK.

## **The application of frontier shift on enhancement allowances**

5.722 Our overall approach to frontier shift is discussed in the section on modelled base costs in paragraphs 4.497 to 4.653, including setting the figure. In this section, we discuss some specific issues which arise around the application of frontier shift to enhancement allowances specifically.

### ***Water companies' views***

5.723 The Disputing Companies raised concerns about the application of a frontier shift to enhancement spend, in particular the fact that Ofwat's enhancement assessment relies on forward-looking company business plans. The Disputing Companies said that to the extent that water companies had already included some level of frontier shift assumption in these business plans, any further frontier shift on enhancement allowances would represent inappropriate double-counting.

5.724 The Disputing Companies stated that they had included the effects of frontier shift in their own business plan figures, which gave rise to concerns about double-counting.<sup>1951</sup>

5.725 Two of the Disputing Companies stated that companies which affected Ofwat's upper quartile wastewater WINEP benchmarks had appeared to include a frontier shift in their business plans, which would then feed into the forward-looking efficiency challenge applied to other companies.<sup>1952</sup>

5.726 In response to our Provisional Findings, the Disputing Companies reiterated or maintained some of their concerns described above,<sup>1953</sup> as well as providing two annexes each produced by Oxera (on behalf of Anglian and Yorkshire), which supported their concerns about elements of double-counting:

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<sup>1951</sup> [Anglian SoC](#), Chapter 4.E, Overview; [Northumbrian SoC](#), paragraph 412; [Yorkshire SoC](#), paragraph 201

<sup>1952</sup> [Anglian SoC](#), paragraph 791; [Northumbrian SoC](#), paragraph 446

<sup>1953</sup> [Anglian's response to the provisional findings](#), paragraphs 139–142 & 498–499, [Northumbrian's response to the provisional findings](#), paragraph 64 & 411; [Yorkshire's response to the provisional findings](#), paragraph 1.3.10 and Annex 2 (noting that Yorkshire was not asking the CMA to reopen this issue, instead providing its views due to the importance of this issue in PR24).

- (a) Oxera's assessment was that it cannot be concluded that there is no double-counting due to assumptions used in the company business plans, and there may be some evidence that this is likely to have occurred;
- (b) That deep dive schemes were already subject to efficiency challenge as part of this assessment, including the effects of frontier shift;
- (c) That applying a frontier shift to costs which have already been subject to company-specific efficiency factors (both deep dive and shallow dive), which have incorporated the frontier shift in their calculations, would result in double-counting the effects of this frontier shift; and
- (d) That applying a frontier shift challenge to these costs would result in an incentive for companies to explicitly provide enhancement expenditure submissions without any assumed frontier shift challenge in the future.

### **Ofwat's views**

5.727 In Ofwat's FD it applied its frontier shift and RPEs to wastewater WINEP and some parts of metering. Ofwat's justification for applying this to enhancement costs was that its estimated figure was based on all costs in comparator industries, not just base or on-going costs. However, it applied this challenge only to certain elements because it considered the potential gains from productivity improvements were likely to be more significant for large, relatively homogenous programmes of work that were more common across companies.<sup>1954</sup> Ofwat also stated that it did not apply a frontier shift to other enhancement costs because it already made relatively large adjustments to other enhancement costs, where required, for lack of appropriate justification for cost efficiency and optioneering.<sup>1955</sup>

5.728 In response to the Disputing Companies' submissions on the risk of double-counting, Ofwat accepted that enhancement costs were based on company estimates of future costs and that therefore, to the extent that these had already incorporated future efficiency improvements due to frontier shift, there could be scope for double-counting.<sup>1956</sup> However, Ofwat stated that it reviewed the available evidence and found that company forecasts of frontier shift on enhancement expenditure were often unclear, tended to be limited and were offset, or more than offset, by RPE adjustments.<sup>1957</sup>

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<sup>1954</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), section 5.1.2

<sup>1955</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p190

<sup>1956</sup> Ofwat's response to common issues in companies' statements of case: [Cost efficiency](#), paragraph 7.66

<sup>1957</sup> Ofwat's further submission on cross-cutting issues, paragraph 3.20; Ofwat's response to common issues in companies' statements of case: [Cost efficiency](#), paragraph 7.66

5.729 Ofwat submitted its view of the best available evidence, which it stated supported its view that the Disputing Companies had not applied a 'net frontier shift' (ie any cost decreases from frontier shift were at least offset by cost increases from the company's assumed RPEs):

**Table 5-27: Ofwat's view on company business plan frontier shift and RPE assumptions (negative shows cost decreases, positive show cost increases)**

	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
Frontier shift challenge	-1.0%	-0.9%	-1.0%	Unclear, possibly 0%
RPE allowance	+1.2 to +1.4%	+0.9%	+1.0%	0.6 to 0.9%
<b>Net challenge</b>	<b>+0.2 to +0.4%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>Unclear, possibly 0.6 to 0.9%</b>

Source: [Ofwat's further submission on cross-cutting issues in companies' responses](#), Table 2.1

5.730 Ofwat also assessed figures and statements from the four companies which it assessed as representing the most efficient wastewater WINEP performers and stated that there was no evidence that any of these had applied a frontier shift once you had accounted for the effect of RPEs.<sup>1958</sup>

5.731 In response to our Provisional Findings, Ofwat went further and submitted that the evidence for Anglian and Yorkshire would support a downward adjustment in their enhancement allowances, since the evidence indicated that their business plans included a negative net frontier shift (ie an increase in costs since upward RPE adjustments in the business plans were larger than downward frontier shift).<sup>1959</sup>

### ***Our assessment and decision***

5.732 For the reasons explained in paragraphs 4.497 to 4.653 above, our decision is to apply a frontier shift and RPE adjustment to all of wholesale totex, and that this should include both base and enhancement costs. We do not consider it appropriate to constrain this to specific elements of enhancement.

5.733 However, we agree with Ofwat and the Disputing Companies that if the figures included in business plans (which we have used in our assessment) have already included a frontier shift, this could result in a degree of double-counting which should be removed. This could arise either as a result of double-counting with the business plans of the Disputing Companies themselves (for example, cost categories where we apply a shallow dive efficiency factor), or from those companies which set the comparative benchmarks (for example, the upper quartile wastewater WINEP companies).

<sup>1958</sup> [Ofwat's response to common issues in companies' statements of case: Cost efficiency](#), paragraphs 7.68 to 7.72

<sup>1959</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), pp19–20

5.734 In order to better understand the basis on which water companies submitted their business plans, we asked each of the Disputing Companies and those which represent the wastewater WINEP upper quartile benchmark<sup>1960</sup> to provide us with the frontier efficiency and RPE assumptions that they incorporated into their enhancement costs as part of their business plans. Although individual companies built their business plans differently and so did not always clearly report total enhancement frontier shift for us to use, we found that:

- (a) Once we account for frontier shift and RPEs, three of the four Disputing Companies appear to have projected costs to be flat or slightly increasing.<sup>1961</sup>
- (b) One of the Disputing Companies (Anglian) appears to have included some degree of future cost decrease to reflect frontier shift and RPEs, albeit less than we have decided on.<sup>1962</sup>
- (c) The two non-disputing water companies which set the upper quartile benchmark for wastewater WINEP told us that they were not able to report on exact frontier shift and RPE assumptions on enhancement costs. This is because they had not included explicit top-down challenges on frontier shift and RPEs, since their bottom-up business plan had already incorporated their best view of expected efficiency improvements from various sources. We note that Ofwat's FD included a lower allowance than requested in their business plans, partly as a result of applying the frontier shift and RPE estimates.

5.735 Consistent with the views of the Main Parties and their advisers, we consider that the evidence submitted is hard to interpret, in particular, since companies' business plans are not typically calculated in a manner which fits this regulatory approach (for example, differentiating between catchup, frontier shift, and RPEs). Similarly, companies tend to report on an opex / capex basis, which does not directly align with a totex regulatory framework considering base and enhancement.

5.736 Oxera challenged the 'narrow scope' of a review which focused on the Disputing Companies and the WINEP benchmark companies on behalf of Anglian, and submitted that evidence of Yorkshire's overall efficiency

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<sup>1960</sup> Dŵr Cymru and United Utilities. We note that at the time, the companies which would represent our wastewater WINEP benchmarks were not settled and so we also asked another water company but have not reflected its response here.

<sup>1961</sup> Bristol, Northumbrian, and Yorkshire.

<sup>1962</sup> Anglian; combined effect of frontier shift and RPEs appears to reflect c.0.35% pa.

challenge exceeding the estimated RPEs and catchup figures used supports the likelihood of it including a net frontier shift in its business plan.

5.737 On these two points, we consider that:

- (a) Our determination is focused on setting allowances for the Disputing Companies. We must undertake a reasonable and proportionate review. Given in particular the limited additional evidence that the companies have been able to provide around the level of frontier shift that they have included in their business plans, we do not consider it appropriate to expand our evidence gathering to other water companies or stakeholders.
- (b) As described above, the evidence we have received from companies is mixed, and we have concerns around the methodology Oxera proposed, including that it appears to indicate implausible estimates of frontier shift which are inconsistent with Yorkshire's other submissions about the level of frontier shift which is achievable.<sup>1963</sup>

5.738 As discussed in paragraph 5.19 above, the assessment of enhancement is an area of the determination which suffers from particularly acute information asymmetry. This is particularly true when investigating non-explicit assumptions made by the companies when developing their business plans. In these circumstances, we consider that the Disputing Companies carry the burden of proof that they have already incorporated this efficiency challenge. Our view is that the Disputing Companies have not met that threshold; the evidence does not indicate systematic double-counting of frontier shift in enhancement cost allowances. Furthermore, to the extent that individual companies have adopted marginally different frontier shift and RPE estimates, we do not consider it necessary or proportionate to adjust all enhancement figures to try to reflect these.

5.739 We also considered the potential for double-counting arising from the application of frontier shift to schemes subject to a deep dive, either through the assessment methodology for efficiency, or the application of a company-specific efficiency factor. We do not consider that double-counting is likely in either case because:

- (a) The deep dive process consists of an assessment of the same business plans we have discussed above, for which we conclude that the evidence does not appear to support concerns about systematic double-counting.

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<sup>1963</sup> For example, Oxera included a WINEP efficiency challenge net of RPEs of 18%. It compares this to a catch-up challenge of 5.9% on waste and 0% on water, indicating that the difference of this would support a net frontier shift having been applied. This calculation would indicate a frontier shift of around 4% pa on waste and around 2.5% pa on water.

While a more detailed analysis of specific schemes could help identify explicit assumptions made in some cases, in no instances have we seen the detail necessary to conclude that double-counting occurred (for example, explaining how RPEs and frontier shift have been treated at a project-level), and we would expect this to be harder to do than at a business plan level.

- (b) Our company-specific efficiency factors for deep dives do not rely on the companies' estimated efficiency in base costs (unlike Ofwat's approach), and so cannot result in double-counting concerns arising.<sup>1964</sup>

5.740 Finally, we considered the potential for double-counting arising from the application of shallow-dive efficiency factors which have been calculated using a benchmark which already incorporates frontier shift.<sup>1965</sup> We agree that this could raise the risk of double-counting frontier shift.<sup>1966</sup> In practice, the use of a cap at 10% has reduced the likelihood of this occurring, since companies were not exposed to the full challenge (including the effects of frontier shift). In addition, we do not consider it appropriate to apply a negative challenge, giving companies more than they requested.<sup>1967</sup> We therefore maintain this cap and collar. We have estimated the scale of the double-counting as shown in Table 5-28:

**Table 5-28: Calculation of double-counting arising from shallow-dive efficiency factors**

	<i>Raw efficiency figure (see Table 5-11)</i>	<i>Raw efficiency figure removing frontier shift *</i>	<i>Impact on allowances?</i>	<i>Allowance change from removing double-count</i>
Anglian – water	13.8%	12.4%	No – capped at 10%	None
Anglian – wastewater	14.7%	13.3%	No – capped at 10%	None
Bristol – water	4.9%	3.3%	Yes	£0.1m
Bristol – wastewater	n/a	n/a	n/a	None
Northumbrian – water	-4.7%	-6.4%	No – collared at 0%	None
Northumbrian - wastewater	5.6%	4.0%	No – no cost categories this factor is applied to	None
Yorkshire – water	-8.9%	-10.8%	No – collared at 0%	None
Yorkshire – wastewater	13.5%	12.0%	No – capped at 10%	None

Source: CMA calculations

\* Footnote: Calculated using the base cost models, and setting the net frontier shift to zero

5.741 In summary therefore, our decision is to apply our frontier shift and RPE to all enhancement allowances for each of the Disputing Companies, as we have with base allowances. However, we reduce this frontier shift by £0.1 million for

<sup>1964</sup> See paragraphs 5.195 to 5.201 where we explain our approach to calculating deep-dive efficiency factors in more detail.

<sup>1965</sup> See paragraphs 5.178 to 5.188 where we explain our approach to calculating shallow-dive efficiency factors in more detail.

<sup>1966</sup> For example, if a company has submitted base costs of 100, and the regulator has estimated pre-frontier shift efficient costs as 90, and post-frontier shift efficient costs as 85, if we used the 85 as a proxy and then applied frontier shift again, this would result in double-counting.

<sup>1967</sup> This is consistent with our overall approach to enhancement allowances.

Bristol to remove double-counting which has arisen from the use of the shallow dive efficiency factors already incorporating frontier shift.

5.742 We note that, in the future, there may be a benefit in clarifying the basis for the reporting of these figures more explicitly, in order to avoid factual disputes of this nature (such as double-counting). As well as removing the scope for factual disputes, this should resolve any concerns Oxera raised about incentive effects, since all companies would be reporting in a consistent fashion with Ofwat able to gather evidence and form a view on the appropriate level of frontier shift to apply to all companies.

## Implications for enhancement allowances for the Disputing Companies

5.743 The overall effect of the above decisions on the Disputing Companies' enhancement allowances are shown in Table 5-29:

**Table 5-29: Enhancement cost allowances for each Disputing Company compared with Ofwat's FD**

	£m			
	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
<b>Ofwat FD allowance</b>	<b>1,425</b>	<b>30</b>	<b>352</b>	<b>906</b>
Water models	0	0	0	0
Wastewater models (incl WINEP)	0	N/A	+4	+9
Shallow dive challenges	0	0	0	0
Deep dive challenges	0	0	-7	-5
Deep dives	+50	0	+18	+7
Metaldehyde	+13	0	0	0
Frontier shift*	-14	-1	-5	-1
Net change in leakage†	-7	0	0	+28
<b>Total enhancement allowance</b>	<b>1,466</b>	<b>30</b>	<b>363</b>	<b>943</b>
<i>Change vs Ofwat FD</i>	<i>+41</i>	<i>-0.3</i>	<i>+11</i>	<i>+38</i>

Source: CMA analysis

\* Footnote: Figures reported in the table above this line do not include the effects of frontier shift – all of this challenge is included in the specified row; this row includes both changes to scope and scale of frontier shift as well as removal of double-counting with shallow dives

† Footnote: Leakage enhancement allowances are discussed in section 8.

Note: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

5.744 Furthermore, we include scheme-specific PCs and ODIs, or adjustments to existing PCs and ODIs, for the following:

- (a) Including a new PC and ODI for Yorkshire's scheme to reduce flooding in Hull and Haltemprice;
- (b) Adjusting Northumbrian's water resilience enhancement PC and ODI to also cover the Essex Resilience Scheme;
- (c) Removing Northumbrian's Sewer Flooding Resilience Scheme PC and ODI;

- (d) Adjusting Anglian's Strategic Interconnectors PC and ODI;
- (e) Adjusting Anglian's Smart Metering Scheme PC and ODI;
- (f) Adjusting Anglian's non-SEMD and ODI; and
- (g) Including a new PC and ODI for Anglian's Bioresources Scheme.

5.745 Finally, we have updated the broader set of scheme-specific ODIs as shown in Table 5-26.



## 6. Overall totex assessment

### Introduction

- 6.1 In this section, first we consider the output from sections 4 and 5 to arrive at an overall view of totex for the Disputing Companies.
- 6.2 This section sets out our final decisions for:
- (a) modelled base costs;
  - (b) unmodelled base costs; and
  - (c) enhancement costs.
- 6.3 We also set out our decisions on the appropriate adjustments to each Disputing Company's totex allowances for leakage costs.
- 6.4 Our review of evidence, analysis and reasons for our decisions are explained in sections 4, 5 and 8, and we cross-reference to the relevant parts of those sections throughout this section.
- 6.5 Second, we set out our consideration and decisions on cost-sharing rates, information revelation incentives and performance incentives.

### Totex allowances

#### ***Modelled base costs***<sup>1968</sup>

#### ***Base cost modelling***<sup>1969</sup>

- 6.6 Base cost modelling is the first building block of Ofwat's methodology to reach a view on each company's totex allowance. Ofwat used econometric models with the companies' historical costs as the dependent variables and cost drivers, such as the size of the network, as independent variables. Ofwat used this modelling to identify how efficient companies were and to estimate future cost allowances.
- 6.7 Our approach to the modelling is similar to that adopted by Ofwat but we made three main changes.

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<sup>1968</sup> See paragraphs 4.2–4.970

<sup>1969</sup> See paragraphs 4.2–4.404

- (a) We added the squared term of weighted average of population density as an explanatory variable in wholesale wastewater model specification SWC2.
- (b) We did not find Ofwat's alternative specifications convincing based on our assessment of the following variables: the number of new connected properties, the APH, the percentage of mains renewed or relined, and performance on leakage targets. We therefore decide to drop these models.
- (c) We added 2019-20 data to our dataset and updated the forecasts accordingly. As a consequence of this decision, we postponed frontier shift and RPEs by one year.

6.8 We also assessed the overall statistical performance of our models as a basis for base costs allowances. We acknowledge that our models, like any econometric model, are subject to some limitations and a degree of uncertainty in their final estimates.

6.9 We assessed the Parties' arguments on multicollinearity and model accuracy, and overall, we decide that our models are sufficiently reliable for us to use to set companies' base cost allowances.

#### *Catch-up efficiency challenge*<sup>1970</sup>

6.10 Our cost models estimate how much it would cost the averagely efficient water company to cover base operations. We adopt a similar approach to Ofwat, use a similar comparator set, and use a five-year period to calculate the efficiency challenge benchmark. We differ in that we set the efficiency challenge at the upper quartile level and we use the 2019/20 data, which was not available to Ofwat at the time of its FD. This results in an efficiency challenge of 1.4% in wholesale water and 2.2% in wholesale wastewater.

#### *Frontier shift*<sup>1971</sup>

6.11 Frontier shift refers to the reduction of cost allowances to account for expected productivity improvements in the sector. Frontier shift represents the ability of even the most productive companies in the sector to increase their productivity over time through, for example, adopting new technologies.

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<sup>1970</sup> See paragraphs 4.405–4.495

<sup>1971</sup> See paragraphs 4.496–4.652

Frontier shift differs from catch-up efficiency gains, where companies lagging in efficiency catch up with the performance of the industry leaders.

- 6.12 On the basis of evidence of productivity levels and input costs in other sectors, we decide to apply a frontier shift of 1% per year. This is slightly lower than the frontier shift estimate Ofwat applied and increases the cost allowances for the Disputing Companies. The resulting changes to modelled base cost allowances for the four companies are summarised in Table 6-1.

**Table 6-1: Impact on PR19 modelled base cost allowances of changing frontier shift level from 1.1% to 1% (water and wastewater)**

	£m
<i>Impact of frontier shift changing from 1.1% to 1%</i>	
Anglian	10
Bristol	1
Northumbrian	6
Yorkshire	9

Source: CMA analysis.

- 6.13 The application of frontier shift from 2020/21 due to the inclusion of more recent data in the base models also increases cost allowances for the Disputing Companies.
- 6.14 We decide to apply this to the wholesale cost base, including enhancement costs but excluding business rates and abstraction charges.

### *Real price effects*<sup>1972</sup>

- 6.15 We considered whether to make adjustments to companies' allowed revenues to account for expected changes in the price of inputs such as labour, energy and chemicals above or below the level of inflation during the price control period (RPEs). We also considered the need for a true-up mechanism to reconcile expected changes allowed for in RPEs with out-turn changes in input prices.
- 6.16 We decide to provide an RPE adjustment based on March 2019 OBR forecasts for labour, but not for energy, chemicals, MPE nor other costs. We decide to use a true-up for labour costs based on the ASHE manufacturing wages out-turn index, but not use a true-up for energy, chemicals, MPE nor other costs.

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<sup>1972</sup> See paragraphs 4.653–4.740

## *Growth*<sup>1973</sup>

- 6.17 Growth expenditures are the costs driven by population growth such as connecting newly constructed houses to the network or increasing the capacity of the existing network.
- 6.18 We decide to take the following approach:
- (a) We allow for growth expenditure in the base models by not separating growth costs from other modelled base costs. We use the updated 2018 release of the ONS forecasts to forecast connection numbers.
  - (b) We use a growth unit rate adjustment to account for the growth costs related to different growth rates that were not captured by the base models.
    - (i) We use historical upper quartile unit rates including also the cost of reducing sewer flooding risk in the growth rate unit adjustment.
    - (ii) We calculate the downward growth unit rate adjustment in the same way as the upward growth unit rate adjustment.
    - (iii) We decide to update the growth unit rate adjustment with 2019/20 data.
    - (iv) We apply a frontier shift and RPEs from 2020/21 to the growth unit rate adjustment.
  - (c) We reject Anglian's request for a growth cost adjustment.
  - (d) We expand the DSRA true-up mechanism to capture total growth costs to address the forecasting uncertainty of the number of connections. When setting the DSRA unit rates we take into account the interaction with the cost-sharing mechanism. We do not implement an asymmetric DSRA.

## *Adjustment for enhancement opex*<sup>1974</sup>

- 6.19 Ofwat's historical data collection approach contained no distinction between base operating expenditure (opex) and enhancement opex. This meant that the opex included in historical costs, which Ofwat used to model base costs, included both base opex and enhancement opex. Ofwat's allowance for modelled base costs therefore implicitly included an allowance for

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<sup>1973</sup> See paragraphs 4.741–4.878

<sup>1974</sup> See paragraphs 4.879–4.905

enhancement opex, taking it beyond base costs. Since Ofwat set separate allowances for base costs and enhancement activities, Ofwat's cost allowance could double count the enhancement opex if an adjustment was not applied.

6.20 With a view to avoid double counting enhancement opex, Ofwat estimated the implicit enhancement opex allowance in its base models and subtracted this estimate from companies' base allowance. Ofwat relied on an estimate for its adjustment rather than using actual historical costs for each company because of the limitations in the available cost data.

6.21 We considered whether an adjustment should be made and decided to apply an adjustment to cost allowances using the same approach as that used in Ofwat's FD.

#### *Cost adjustment claims*<sup>1975</sup>

6.22 We assessed five cost adjustment claims: four for Anglian, relating to capital maintenance, sludge transport, APH and proportion of load treated, and one for Yorkshire, relating to changes in treatment complexity. We decide to reject all these cost adjustment claims.

#### *Total modelled base costs*<sup>1976</sup>

6.23 The overall effect of our modelling changes described above is shown in Table 6-2.

**Table 6-2: Modelled base cost allowances for each Disputing Company**

	£m *			
	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
Raw base models	3,494	367	2,133	3,161
Catch-up	-66	-5	-37	-57
Frontier shift + RPEs	-56	-6	-34	-51
Growth unit rate adjustment	30	4	-39	-47
Enhancement Opex	-14	-3	-11	-14
Cost adjustment claims	43	10	5	16
<b>Total modelled base costs</b>	<b>3,430</b>	<b>367</b>	<b>2,016</b>	<b>3,008</b>

Source: CMA analysis

\* Footnote: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

6.24 The comparison between Ofwat's FD and our final determination on modelled base costs is shown in Table 6-3.

<sup>1975</sup> See paragraphs 4.906–4.970

<sup>1976</sup> See paragraphs 4.1132–4.1133

**Table 6-3: Modelled base cost allowances for each Disputing Company compared with Ofwat's FD**

	£m *			
	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
<b>Ofwat FD allowance</b>	<b>3,368</b>	<b>340</b>	<b>1,955</b>	<b>2,896</b>
Raw base models	+7	+9	+17	+53
Catch-up	+40	+11	+37	+43
Frontier shift + RPEs	+33	+3	+20	+29
Alternative model specifications	-50	0	0	0
Growth unit rate adjustment	-11	0	-13	-12
Enhancement Opex	0	0	0	-1
Cost adjustment claims	+43	+4	0	0
<b>Total base cost allowance</b>	<b>3,430</b>	<b>367</b>	<b>2,016</b>	<b>3,008</b>
<i>Change vs Ofwat FD</i>	<i>+62</i>	<i>+27</i>	<i>+61</i>	<i>+112</i>

Source: CMA analysis

Footnote: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices. Numbers may not sum due to rounding.

### ***Unmodelled costs<sup>1977</sup>***

6.25 Ofwat's base cost modelling approach covers most but not all of the base costs a WOC or WASC may incur. As set out in section 4, the base costs which are not included in the base cost models are referred to as 'unmodelled costs'. These include costs associated with abstraction, business rates, and compliance with the IED, amongst others.

### ***Application of Frontier Shift to unmodelled costs<sup>1978</sup>***

6.26 All four Disputing Companies objected to the application of the frontier shift productivity challenge to unmodelled costs.

6.27 Assessing the arguments and evidence, we decide not to apply a frontier shift to business rates or abstraction charges. However, we apply a frontier shift to other unmodelled base costs of 1% together with a labour RPE. We do not consider that our approach gives rise to any double-counting necessitating an adjustment.

### ***Risk exposure<sup>1979</sup>***

6.28 Where a company exceeds its unmodelled costs allowances in AMP7, Ofwat included a 75/25 cost-sharing approach for the recovery of these costs, on the basis it leaves companies with relatively small exposures to risk of variation in charges, while keeping companies incentivised to manage costs and ensure they are efficient. Two disputing companies told us that this arrangement

<sup>1977</sup> See paragraphs 4.971–4.1131

<sup>1978</sup> See paragraph 4.975 & 4.628–4.630

<sup>1979</sup> See paragraphs 4.976–4.981

exposed them to unjustified downside risk and was not a fair approach, since management was not able to influence the level of unmodelled costs.

- 6.29 As a general approach, we decide that 75/25 is a reasonable default cost split for unmodelled costs.

*Approach to specific categories of unmodelled costs<sup>1980</sup>*

- 6.30 Ofwat made various allowances and determinations for the companies' unmodelled costs. We decide that these are largely appropriate.

- 6.31 We have made some company-specific and category-specific decisions on unmodelled costs which differ from Ofwat's FDs as follows:

(a) Abstraction charges for Bristol:<sup>1981</sup> We allow most of the cost adjustment claim it made for purchasing water from the Gloucester and Sharpness Canal. We also factor in additional charges which result from a backdated cost increase from CRT (the supplier) which was not known at the time of Ofwat's FD. This results in a total cost adjustment of £9.66 million. Any over or underspends on this amount will be subject to the standard unmodelled costs sharing rate of 55:45 (customer : company).

(b) Abstraction charges for Northumbrian:<sup>1982</sup> Northumbrian's abstraction costs have increased in two respects since Ofwat's FD was published. We decide to:

(i) Make a £60.88 million increase to the Northumbrian base allowance to cover the increase specifically relating to the Kielder Transfer Scheme abstraction costs. This cost category is treated as 100% pass through, with any over or underspend at the end of AMP7 trued up at the end, such that customers pay only the costs incurred.

(ii) Provide a £0.5 million per annum increase to base allowance from April 2020 for the increase to the costs of Northumbrian's bulk supply agreement from Thames Water. The 75/25 abstraction charge cost sharing rate applies to any cost increases (or decreases) from this level.

(c) Business rates:<sup>1983</sup>

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<sup>1980</sup> See paragraphs 4.982–4.1127

<sup>1981</sup> See paragraphs 4.984–4.1025

<sup>1982</sup> See paragraphs 4.1026–4.1046

<sup>1983</sup> See paragraphs 4.1054–4.1078

- (i) We apply a cost sharing rate of 90/10 (customer : company) for business rates, rather than using the 75/25 sharing rate that Ofwat set out in its FD; and
- (ii) For Northumbrian, where a downward revaluation was not known at the time of Ofwat's FD, we reduce its allowance by £11.74 million per year.

(d) Industrial Emissions Directive compliance costs:<sup>1984</sup> we decide to:

- (i) Provide Northumbrian with an upfront allowance of £12 million and then a reconciliation mechanism – on a 75/25 (customer : company) cost-sharing basis – for costs that exceed the allowance; and
- (ii) Provide Yorkshire no allowance but decide that the company can rely on a 75/25 (customer : company) cost-sharing mechanism to recover IED-related compliance costs at the end of the AMP.

6.32 In other regards, our final determination on unmodelled base costs is unchanged from Ofwat's FD.

#### *Overall effect on unmodelled base costs<sup>1985</sup>*

6.33 The overall effect of our approach on unmodelled base costs described above is shown in Table 6-4.

**Table 6-4: Unmodelled base cost allowances for each Disputing Company**

	<i>Anglian</i>	<i>Bristol*</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
				£m
Abstraction	50	15	200	26
Traffic management	6	4	6	21
Business rates	311	24	185	280
IED compliance	0	0	12	0
<b>Total unmodelled base costs</b>	<b>367</b>	<b>43</b>	<b>402</b>	<b>327</b>

Source: CMA analysis.

\* Footnote: Adjustments for Bristol's CRT is included as a cost adjustment claim in the 'modelled base' figures above

Note: Our decision not to apply the frontier shift productivity challenge to abstraction charges and business rates also increased unmodelled costs allowances compared with Ofwat's FD. Due to this change Anglian and Northumbrian's allowances both increased by £10m, Yorkshire's by £8m and Bristol's by £1m compared with Ofwat's FD. See section 4, paragraphs 4.628–4.630 & paragraph 4.1131.

6.34 The comparison between Ofwat's FD and our findings on unmodelled base costs is shown in Table 6-5.

<sup>1984</sup> See paragraphs 4.1079–4.1118

<sup>1985</sup> See paragraphs 4.1134–4.1135



**Table 6-5: Unmodelled base cost allowances for each Disputing Company compared with Ofwat's FD**

	£m			
	Anglian	Bristol*	Northumbrian	Yorkshire
<b>Ofwat FD allowance</b>	<b>357</b>	<b>42</b>	<b>376</b>	<b>319</b>
Difference in abstraction	+1	0	+67	+1
Difference in traffic management	0	0	0	0
Difference in business rates	+8	+1	-52	+7
Difference in IED compliance	0	0	+12	0
<b>Total unmodelled base allowance</b>	<b>367</b>	<b>43</b>	<b>402</b>	<b>327</b>
<i>Change vs Ofwat FD</i>	<i>+10</i>	<i>+1</i>	<i>+26</i>	<i>+8</i>

Source: CMA analysis.

\* Footnote: Adjustments for Bristol's CRT is included as a cost adjustment claim in the 'modelled base' figures above

Note: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices. Numbers may not sum due to rounding.

## ***Enhancement costs<sup>1986</sup>***

### ***Introduction<sup>1987</sup>***

- 6.35 Enhancement expenditure is one of the building blocks of Ofwat's methodology to reach a view of each company's totex allowance. Broadly speaking, enhancement expenditure relates to investment for the purpose of enhancing the capacity or quality of service beyond a base level.
- 6.36 Ofwat's preferred method of assessment for enhancement was a benchmarking analysis of forecast costs. Where this was not possible, Ofwat followed a 'risk-based process' of having a lighter touch ('shallow dive') assessment for low-materiality costs and a more thorough assessment of the evidence ('deep dive') for high-materiality costs, each based on the company's business plans.
- 6.37 We adopt the same broad approach as Ofwat to assess enhancement allowances, including a combination of benchmarking, deep dives and shallow dives. We have applied these approaches to categories of spend for the Disputing Companies, and considered any efficiency challenges which should be applied to these allowances.

### ***Benchmark models for enhancement<sup>1988</sup>***

- 6.38 Almost all Ofwat's benchmark modelling for enhancement was based only on company forecasts of required totex levels. While this raises some inevitable questions over the reliability of model results for the areas in which it was used, we did not identify a preferable alternative assessment method for

<sup>1986</sup> See section 5

<sup>1987</sup> See paragraphs 5.1–5.23

<sup>1988</sup> See paragraphs 5.24–5.26

determining AMP7 enhancement allowances, among those we considered, to the benchmarking of forecast costs (supplemented by cross-checks of the kind undertaken by Ofwat, where feasible). In line with this, our assessment focuses primarily on the extent to which Ofwat's benchmark modelling is likely to have given insufficient weight to material factors, and whether alternative approaches can be identified that are likely to provide a better means of taking such factors into account.

- 6.39 We assessed modelled allowances for water and wastewater enhancement benchmark models, set out below.

*Wastewater models*<sup>1989</sup>

- 6.40 We explored the use that might be made of approaches other than the benchmarking of company-level forecasts of enhancement costs in the setting of allowances for wastewater enhancement categories. However, we found there to be material constraints and limitations associated with the use of each of the other potential approaches we considered. We have made targeted recommendations for Ofwat to consider some additional data gathering in the future.
- 6.41 Our assessment of wastewater enhancement modelling focused primarily on P-removal. Our decision is to make adjustments to Ofwat's P-removal allowances based on use of a broader range of model specifications but to adopt the same overall approach.
- 6.42 Our decision is that the modelled wastewater WINEP allowance should remain unchanged from Ofwat's FD for Anglian, and be increased by £4 million for Northumbrian and by £9.6 million for Yorkshire as a result of increased modelled P-removal allowances. We decide that all other modelled wastewater enhancement allowances are the same as the levels set by Ofwat in its FD.

*Water models*<sup>1990</sup>

- 6.43 Ofwat used a benchmark model for at least some allowances in four of its cost categories in water. Anglian raised specific concerns about two of these benchmark models: meter rollout and meeting lead standards, which we set out below. We received no specific evidence or arguments on the approach for the other two water enhancement categories (supply/demand balance and

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<sup>1989</sup> See paragraphs 5.27–5.111

<sup>1990</sup> See paragraphs 5.112–5.114

security) and decide that Ofwat's modelling approach on these elements is appropriate and we use the same in our final determination.

- *Meter rollout*<sup>1991</sup>

6.44 These allowances reflect the cost of installing new meters in properties which have not previously had one. Our decision is to use a modelling approach based on numbers of meters, without a meter penetration variable, as Ofwat did. This results in no change to the Disputing Companies' allowances compared to Ofwat's FD.

- *Meeting lead standards*<sup>1992</sup>

6.45 The allowances for meeting lead standards reflect the costs required to meet obligations to manage customer exposure to levels of lead below a statutory limit, by replacing pipes and treating drinking water. Our decision is to use a benchmark modelling approach based on number of communication pipes replaced, as in Ofwat's FD. In doing so, we include the costs associated with the Anglian 'Water in Buildings' programme. These decisions result in no change to the Disputing Companies' allowances compared to Ofwat's FD.

*Wastewater WINEP cost efficiency challenges*<sup>1993</sup>

6.46 Ofwat applied an upper quartile efficiency adjustment on a wastewater 'WINEP in the round' basis. Ofwat identified an overall level of WINEP wastewater modelled allowance by summing the modelled allowances it had determined for each WINEP area (including P-removal). An upper quartile adjustment was then applied based on the relationship between the requested and modelled allowance at this 'WINEP in the round' level. This resulted in a 6.94% downward adjustment to modelled allowances.

6.47 Our decision is that it is appropriate to apply an upper quartile adjustment at the wastewater 'WINEP in the round' level.

6.48 In line with our decision on wastewater models, our decision is that the modelled wastewater WINEP allowance should remain unchanged from Ofwat's FD for Anglian, and be increased by £4 million for Northumbrian and by £9 million for Yorkshire (as a result of increased P-removal allowances). These changes to modelled allowances leave Ofwat's upper quartile

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<sup>1991</sup> See paragraphs 5.115–5.127

<sup>1992</sup> See paragraphs 5.128–5.150

<sup>1993</sup> See paragraphs 5.151–5.163

calculation unaffected. Our decision is that an upper quartile adjustment of 6.94% should be applied to modelled WINEP allowances as in Ofwat's FD.

#### *Shallow and deep dive efficiency challenges*<sup>1994</sup>

- 6.49 We assessed the approaches to applying efficiency challenges on shallow dives and deep dives, and assessed three approaches in turn: company-specific challenge (shallow dive), company-specific challenge (deep dive), and scheme-specific challenge.

#### *Company-specific efficiency factor (shallow dive)*<sup>1995</sup>

- 6.50 Ofwat calculated company-specific efficiency figures by taking the ratio of its view of efficient modelled **base** costs to the company view of modelled **base** costs. Anglian and Bristol disagreed with Ofwat's approach to shallow dive company-specific challenges.
- 6.51 Our decision is to adopt the same approach as Ofwat of using a base cost proxy for calculating a shallow dive company-specific efficiency factor. We maintain the figures from companies' business plans used by Ofwat, but update the calculation to reflect our view on each Disputing Company's efficient modelled base costs (including the effects of the 2019/20 data). We use this to calculate new company-specific efficiency factors for water and wastewater, which we then constrain within a range of 0% to 10% for use in our shallow dive assessment.
- 6.52 This results in calculations and resulting factors as shown in Table 6-6 and Table 6-7

**Table 6-6: Updated calculation of company-specific raw efficiency factors**

	<i>Company business plan (from Ofwat feeder), £m</i>	<i>Our view on efficient modelled base costs, £m</i>	<i>Raw efficiency figure</i>
Anglian – water	1,575	1,358	13.8%
Anglian - wastewater	2,430	2,072	14.7%
Bristol – water	386	367	4.9%
Bristol - wastewater	n/a	n/a	n/a
Northumbrian - water	1,127	1,180	-4.7%
Northumbrian - wastewater	887	837	5.6%
Yorkshire - water	1,306	1,422	-8.9%
Yorkshire - wastewater	1,833	1,586	13.5%

Source: Ofwat (2019), [Company efficiency factor model](#); CMA calculations

<sup>1994</sup> See paragraphs 5.164–5.166

<sup>1995</sup> See paragraphs 5.167–5.188

**Table 6-7: Decision on shallow dive company-specific efficiency factors**

	%	
	<i>Water</i>	<i>Wastewater</i>
Anglian	10.0	10.0
Bristol	4.9	n/a
Northumbrian	0.0	5.6
Yorkshire	0.0	10.0

Source: CMA calculations

*Company-specific efficiency factor (deep dive)<sup>1996</sup>*

- 6.53 To calculate deep dive company-specific efficiency factors, Ofwat adopted the same general approach as it did for shallow dives, as described in paragraph 6.50. However, having calculated its raw figures, Ofwat constrained them within a narrower range of between 5% and 10%. Ofwat stated that the reason for applying a higher floor compared with shallow dives (where this was set at 0%) was that this efficiency factor was only applied when there was insufficient evidence that proposed costs were efficient.
- 6.54 Our decision in this case is that a figure of 10% for deep dive company-specific efficiency factors is appropriate.

*Scheme-specific efficiency challenge<sup>1997</sup>*

- 6.55 In paragraphs 6.53 to 6.54 where we discuss company specific efficiency factor (deep dive), we note the general approach to deep dive efficiency challenges. However, there are some circumstances where the default figure above is not appropriate, as it does not reflect the level of evidence provided or the potential balance of risks to customers. On this basis, depending on the specific circumstances and the evidence provided, we decide that an alternative challenge to some or all elements of cost in a deep dive is more appropriate. These individual decisions will be listed where they occur.

*The assessment of specific projects ('deep dives')<sup>1998</sup>*

- 6.56 We now turn to the nine deep dives we have conducted on specific schemes which the Main Parties have highlighted.

(a) Yorkshire – Living with Water Partnership in Hull and Haltemprice:<sup>1999</sup> We decide that the price control should include an allowance of £23 million to

<sup>1996</sup> See paragraphs 5.189–5.201

<sup>1997</sup> See paragraphs 5.202–5.203

<sup>1998</sup> See paragraphs 5.204–5.663

<sup>1999</sup> See paragraphs 5.212–5.259

enable Yorkshire to deliver the proposed scheme. This is a 20% challenge to the figure requested by Yorkshire (a reduction of £5.7 million), and equivalent to an increase of £6.6 million over Ofwat's FD. Given the risk of partner funding not ultimately materialising and the impact this would have on the scheme, we decide that it is necessary to include a scheme-specific PC and ODI to ensure that if the proposed scheme does not proceed, Yorkshire will return the provided allowance to customers. The PC and ODI includes an end-of-period test, a financial ODI around expenditure and a reputation ODI (and commitment) around service levels.

- (b) Yorkshire – Internal Sewer Flooding Scheme:<sup>2000</sup> Our decision is not to allow Yorkshire any additional customer funds for this claim.
- (c) Northumbrian – Essex Resilience Scheme:<sup>2001</sup> We decide to provide Northumbrian with an additional £18.3 million for the delivery of this scheme. We also make an adjustment to the customer protection ODI that incentivises the delivery of Northumbrian's water resilience enhancement programme to protect customers from non-delivery of this scheme.
- (d) Northumbrian – Sewer Flooding Resilience Scheme:<sup>2002</sup> we do not include any increased allowance for this scheme in the North East. Ofwat's FD includes a bespoke PC and ODI associated with this scheme on top of the common PC. We decide not to include either bespoke PC or ODI.
- (e) Anglian – Strategic Interconnectors Programme:<sup>2003</sup> we decide to increase Anglian's totex allowance by £38.9 million above Ofwat's FD for this programme. We adjust the performance commitment to being focused on capacity delivery, rather than the delivery of water, and remove intra-period ODI penalties, applying a claw-back on the schemes at the end of year 5 if they are not delivered. We also recalibrate the PC and ODI to reflect the changes in our final decision.
- (f) Anglian – Smart Metering Scheme:<sup>2004</sup> we provisionally decide to allow Anglian £131.8 million for the delivery of its smart metering programme, which is £5.5 million more than was included in Ofwat's FD. We include a scheme-specific ODI, to incentivise the delivery of the funded scheme and to protect customers if Anglian does not ultimately undertake this work.

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<sup>2000</sup> See paragraphs 5.260–5.315

<sup>2001</sup> See paragraphs 5.316–5.375

<sup>2002</sup> See paragraphs 5.376–5.429

<sup>2003</sup> See paragraphs 5.430–5.512

<sup>2004</sup> See paragraphs 5.513 –5.582

- (g) Anglian – Water Resilience Scheme:<sup>2005</sup> we decide to provide no associated increased in cost allowance for this scheme.
- (h) Anglian – SEMD/non-SEMD:<sup>2006</sup> we decide not to allow Anglian its requested £1.7 million cost allowance associated with its SEMD activities. For non-SEMD, we apply a 5% efficiency challenge to Anglian's request, resulting in a total allowance of £14.4 million, an increase of £0.8 million over Ofwat's FD. We amend the existing associated ODI, to reflect this increased allowance.
- (i) Anglian – Bioresources Scheme:<sup>2007</sup> we decide to allow Anglian £10.6 million, which is £1.9 million less than its proposed allowance of £12.5 million for the delivery of this scheme (ie an increase of £4.9 million over Ofwat's FD). We include an additional PC and ODI such that if Anglian does not deliver the additional sludge treatment capacity at Whitlingham by the end of AMP7, it will incur a financial penalty of £4.77 million.

*Costs for metaldehyde removal (Anglian)<sup>2008</sup>*

- 6.57 In addition to the above schemes, we considered Anglian's costs for removing metaldehyde from water, following the reintroduction of a ban on the use of this pesticide part way through the price control period. We allow £12.7 million to ensure Anglian is funded for the water treatment and product substitution activities necessary until metaldehyde is no longer in the environment. Any over or under spend in these costs will be subject to the usual totex cost-sharing arrangements, as discussed later in this section.<sup>2009</sup>

*Our approach to Direct Procurement for Customers (DPC): Elsham (Anglian)<sup>2010</sup>*

- 6.58 The Elsham scheme provides for additional water transfer, storage and treatment capacity in Anglian's supply area. No totex allowance was included for Elsham within Ofwat's FD, other than to fund Anglian's costs of running the DPC process. The funding for this scheme is currently being considered by Ofwat as part of its newly established DPC arrangements and we therefore decide not to provide an additional allowance in relation to this scheme.

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<sup>2005</sup> See paragraphs 5.583 –5.598

<sup>2006</sup> See paragraphs 5.599–5.627

<sup>2007</sup> See paragraphs 5.628–5.663

<sup>2008</sup> See paragraphs 5.669–5.700

<sup>2009</sup> See paragraphs 6.70 to 6.107

<sup>2010</sup> See paragraphs 5.701–5.721

## *The application of frontier shift on enhancement allowances*<sup>2011</sup>

- 6.59 We considered whether it is appropriate to apply a frontier shift to enhancement allowances. The Disputing Companies raised concerns about the application of a frontier shift to enhancement spend, in particular the fact that Ofwat's enhancement assessment relies on forward-looking company business plans. The Disputing Companies said that to the extent that water companies had already included some level of frontier shift assumption in these business plans, any further frontier shift on enhancement allowances would represent inappropriate double-counting. They also raised concerns about double-counting arising from the application of efficiency challenges through deep dives or efficiency factors.
- 6.60 Our decision is to apply a frontier shift and RPE to all enhancement allowances for each of the Disputing Companies, as we have with base allowances. However, we reduce this frontier shift by £0.1 million for Bristol to remove double-counting which has arisen from the use of the shallow-dive efficiency factors already incorporating frontier shift.

## *Implications for enhancement allowances for the Disputing Companies*<sup>2012</sup>

- 6.61 The overall effect of the above decisions on the Disputing Companies' enhancement allowances is shown in Table 6-8.

**Table 6-8: Enhancement cost allowances for each Disputing Company compared with Ofwat's FD**

	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	<i>£m</i> <i>Yorkshire</i>
<b>Ofwat FD allowance</b>	<b>1,425</b>	<b>30</b>	<b>352</b>	<b>906</b>
Water models	0	0	0	0
Wastewater models (incl WINEP)	0	N/A	+4	+9
Shallow dive challenges	0	0	0	0
Deep dive challenges	0	0	-7	-5
Deep dives	+50	0	+18	+7
Metaldehyde	+13	0	0	0
Frontier shift*	-14	-1	-5	-1
Net change in leakage†	-7	0	0	+28
<b>Total enhancement allowance</b>	<b>1,466</b>	<b>30</b>	<b>363</b>	<b>943</b>
<i>Change vs Ofwat FD</i>	<i>+41</i>	<i>-0.3</i>	<i>+11</i>	<i>+38</i>

Source: CMA analysis

\* Figures reported in the table above this line do not include the effects of frontier shift – all of this challenge is included in the specified row; this row includes both changes to scope and scale of frontier shift as well as removal of double-counting with shallow dives.

† Leakage enhancement allowances are discussed below.

Note: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

<sup>2011</sup> See paragraphs 5.722–5.742

<sup>2012</sup> See paragraphs 5.743 to 5.745



### ***Leakage totex<sup>2013</sup>***

6.62 We consider allowances for funding for leakage reduction measures in section 8. Reducing leakage rates will require companies to take measures both to detect and repair leaks, and also to reduce the risk of leakage in the first place. We set out our determination in this section as it relates to appropriate adjustments to each Disputing Company's totex allowance.

### ***Base costs for leakage<sup>2014</sup>***

6.63 We considered the potential need for changes in base cost allowances to reflect differentials in the current level of leakage between the different water companies. Our decision is that Anglian should receive an adjustment to base costs for leakage of £42.6 million for AMP7. We do not make any adjustment for Bristol. We decide that Northumbrian and Yorkshire should not receive an adjustment to base costs for leakage.

6.64 This is shown in Table 6-9.

**Table 6-9: Our determination of adjustments to base costs for leakage**

	<i>AMP7 Base Cost Adjustment for Leakage Expenditure: CMA</i>	<i>Difference to Ofwat FD19</i>
Anglian	£42.570m	+£18.1m
Bristol	-	-
Northumbrian	-	-
Yorkshire	-	-

Source: CMA analysis

Note: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

### ***Enhancement costs adjustments for leakage<sup>2015</sup>***

6.65 We considered the need for additional cost allowances to reflect the reduction in leakage relative to a level which should be achievable through the base cost allowances. Any additional cost allowances above base are included within enhancement costs.

6.66 Our decision on enhancement allowance for each of the Disputing Companies is as follows:

(a) Anglian: we decide on an enhancement allowance of £64.085 million.

(b) Bristol: we decide on an enhancement allowance of £4.7 million.

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<sup>2013</sup> See paragraphs 8.31 to 8.175

<sup>2014</sup> See paragraphs 8.48 to 8.82

<sup>2015</sup> See paragraphs 8.83–8.174

(c) Northumbrian: we decide that no enhancement allowance is appropriate.

(d) Yorkshire: We decide on an enhancement allowance of £28.2 million.

6.67 Table 6-10 summarises our determination of adjustments to enhancement costs made for leakage.

**Table 6-10 Our determination of adjustments to enhancement costs for leakage**

	<i>AMP7 Enhancement Cost Adjustment for Leakage Expenditure</i>	<i>Difference to Ofwat FD19</i>
Anglian	£64.085m	(£7.3m)
Bristol	£4.694m	(£0.1m)
Northumbrian	-	-
Yorkshire	£28.200m	+ £28.2m

Source: CMA analysis

Note: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

### *Summary of overall totex adjustments for leakage<sup>2016</sup>*

6.68 The combined effects of our adjustments for base and enhancement cost allowances for leakage are shown in Table 6-11 (being the sum of Table 6-9 and Table 6-10).

**Table 6-11: Our determination of adjustments to base and enhancement costs for leakage**

	<i>AMP7 Totex Cost Adjustment for Leakage Expenditure by CMA (rounded)</i>	<i>Difference to Ofwat FD19</i>
Anglian	£106.7m	+£10.8m
Bristol	£4.7m	(£0.1m)
Northumbrian	£0m	No change
Yorkshire	£28.2m	+ £28.2m

Source: CMA analysis

Note: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

### ***Total totex allowances***

6.69 Our determination of the Disputing Companies' wholesale totex allowances is shown in Table 6-12.

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<sup>2016</sup> See paragraph 8.175

**Table 6-12: Totex cost allowances for each Disputing Company**

	£m			
	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
Modelled base allowance (including CAC)	3,430	367	2,016	3,008
Unmodelled allowance	367	43	402	327
Enhancement allowance	1,466	30	363	943
Other totex allowances*	-90	-7	-40	-67
<b>Total</b>	<b>5,173</b>	<b>432</b>	<b>2,742</b>	<b>4,211</b>
<i>Change vs Ofwat FD (£m)</i>	<i>+108</i>	<i>+27</i>	<i>+112</i>	<i>+158</i>
<i>Change vs Ofwat FD (%)</i>	<i>+2.1%</i>	<i>+6.6%</i>	<i>+4.3%</i>	<i>+3.9%</i>

Source: CMA analysis

\* Footnote: Other totex allowances include operating lease adjustments; strategic regional water resources solutions and other cash items; third party costs; non-section 185 diversions; ex-ante cost sharing adjustment; grants and contributions (after adjustment for income offset, and updated for our determination); and pension deficit recovery costs. Prices are deflated for inflation (based on CPIH) measure). The other totex allowances are unchanged from Ofwat's FD; see table 3.2 of each Disputing Company's PR19 final determination document.

Note: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

## Cost-sharing incentives

- 6.70 Having established in sections 4 and 5 and set out above the totex allowances for the Disputing Companies, we now consider the appropriate incentive mechanism to apply to ensure that companies have the right incentives to outperform the totex allowances through acting efficiently. Ofwat's framework uses cost-sharing incentives applied at the level of totex, where companies gain rewards and incur penalties for over- and under-spend, but some of the benefits of cost efficiency or cost overruns are also shared with consumers.
- 6.71 In this section, we consider how these incentives should be set in AMP7. In particular, we assess the appropriate cost-sharing incentives for use in our determinations. These provide incentives for the water companies to outperform, as they retain part of any underspend. They also provide some protection for the water companies against overspend. A totex cost-sharing incentive contains two parts:
- (a) cost basis – the allowance, which is compared to actual costs to calculate the cost difference; and
  - (b) sharing rate – the proportions in which any cost difference is shared between customers and investors.

### Cost basis

- 6.72 Ofwat set the cost basis equal to the companies' totex allowances, adjusted for certain items, such as pension deficit recovery costs, which are subject to different cost-sharing mechanisms.

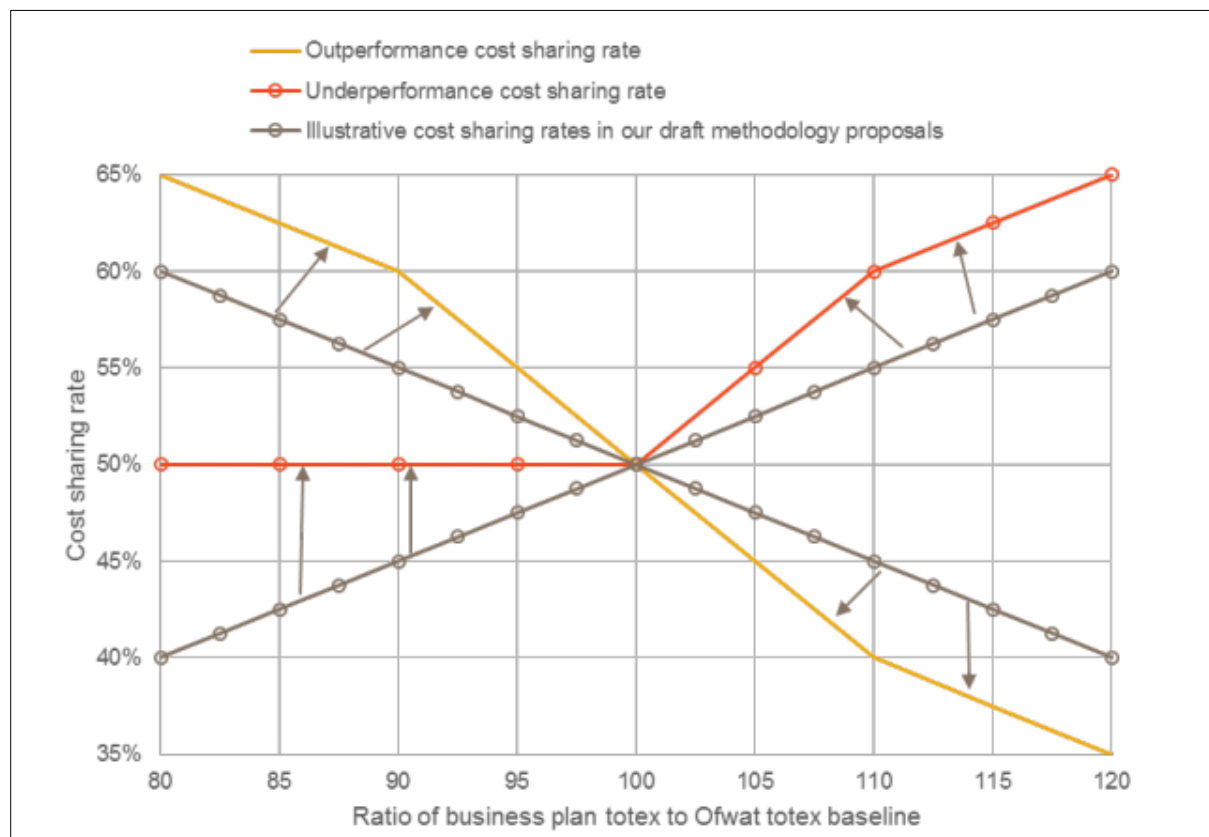
## **Sharing rates**

- 6.73 The sharing rates set the proportion of underspend or overspend that a company is exposed to (that is the proportion of any savings that a company gets to keep or the proportion of any cost overruns that it must bear). Once determined, the cost-sharing rate applies throughout AMP7.
- 6.74 For fast track companies, Ofwat set the sharing rate at 50%. For slow track companies, the sharing rates depended on the difference between Ofwat's totex allowance and the two iterations of the companies' business plans submitted during PR19. Ofwat specified distinct sharing rates for underspend and overspend.
- 6.75 Figure 6-1 summarises how the sharing rates vary according to the difference between Ofwat's totex allowance and the companies' totex estimates contained in their business plans.<sup>2017</sup>

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<sup>2017</sup> Ofwat (2017), *Delivering Water 2020: Our final methodology for the 2019 price Review. Appendix 11: Securing cost efficiency*, p5

**Figure 6-1: The PR19 cost-sharing mechanism**



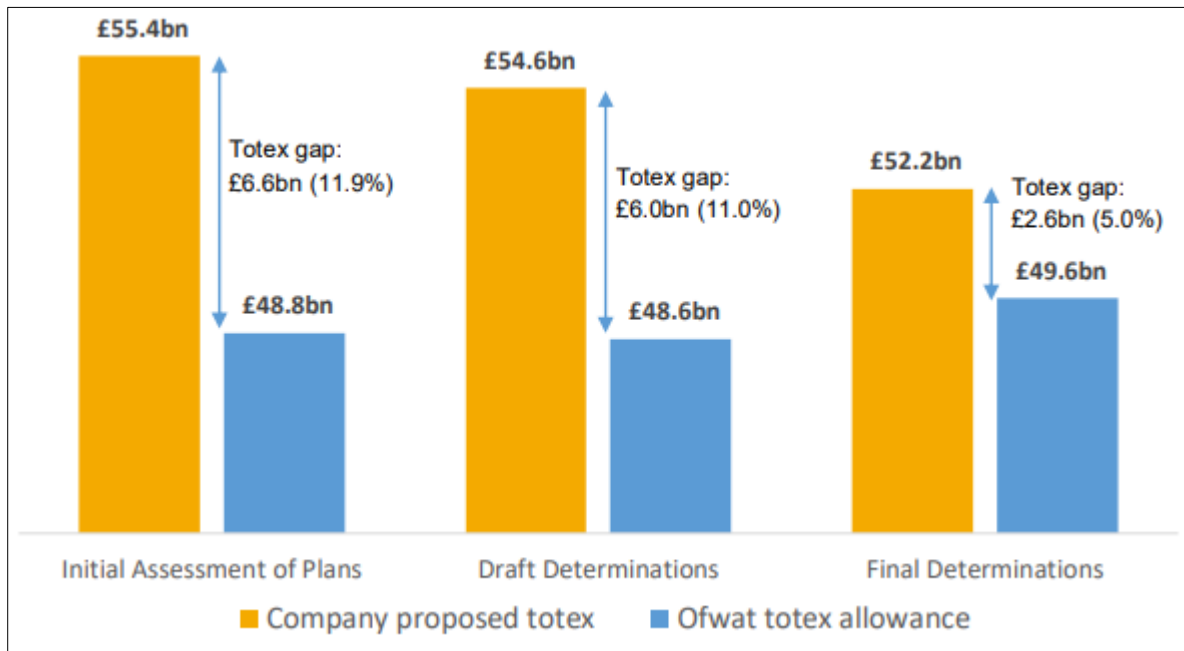
Source: Ofwat (2017), [Delivering Water 2020: Our final methodology for the 2019 price review, Appendix 11: Securing cost efficiency](#)

6.76 Ofwat said that the gap between its cost allowances and the company business plans narrowed over the stages of the PR19 process.<sup>2018</sup> This is shown in Figure 6-2.<sup>2019</sup>

<sup>2018</sup> Ofwat (2019), [PR 19 final determinations: Securing cost efficiency technical appendix](#), p7

<sup>2019</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), p 8

**Figure 6-2: Difference between company plans and Ofwat allowance over time**



Source: Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#)

6.77 This iterative process, which was carried out separately for water and wastewater, and the approach summarised in Figure 6-1 together produced the sharing rates for each of the Disputing Companies. These are summarised in Table 6-14.

**Table 6-13: Cost-sharing rates for 2020-25**

Company	Water resources and water network plus		Wastewater network plus	
	Out-performance	Under-performance	Out-performance	Under-performance
Anglian	31.89	68.11	34.96	65.04
Bristol	39.76	60.24	n/a	n/a
Northumbrian	46.19	53.81	34.40	65.60
Yorkshire	38.06	61.94	33.21	66.79

Source: Ofwat<sup>2020</sup>

Notes:

1. Fast-track companies receive 50% cost-sharing rates.
2. Percentage rates shown are the proportion of underspend (outperformance) received, or overspend (underperformance) borne, by the companies. The remainder is passed to customers.

### **Disputing Companies' views**

6.78 All the Disputing Companies said that they would like us to replace Ofwat's sharing rates with a symmetrical 50/50 sharing rate.

6.79 Northumbrian said that the cost basis should be adjusted by applying its views on specific cost items, rather than Ofwat's views. It said that this approach

<sup>2020</sup> Ofwat (2019), [PR19 final determinations: Securing cost efficiency technical appendix](#), Table 24, p140

would mean that its forecast would be close to Ofwat's plan, resulting in revised sharing rates of 49:51 for water and 50:50 for wastewater.<sup>2021</sup>

- 6.80 Northumbrian said that, rather than incentivising efficient business plans, the cost-sharing incentive scheme incentivised companies to submit business plans that were low relative to the expected Ofwat cost allowance to secure a more favourable sharing rate.<sup>2022</sup>
- 6.81 In response to our provisional proposed cost sharing rate of 45:55, Northumbrian accepted our Provisional Findings, and Yorkshire stated that our decision was more appropriate. Anglian and Bristol stated that a symmetrical cost-sharing arrangement should be applied. In response to our reasons for maintaining some asymmetry in the cost sharing ratio, Anglian stated that it was unsatisfactory for Ofwat to prioritise its business plan assessment process over investment incentives, and that we should therefore use a 50:50 sharing rate that would ensure appropriate investment incentives. Bristol stated that a precedent for symmetrical cost-sharing rates was set by the CMA in our Bristol PR14 Determination and therefore that it was also appropriate for AMP7.

### ***Ofwat's views***

- 6.82 In response to our Provisional Findings, Ofwat stated that our decision was a major intervention, and that cost-sharing rates were a key element of its approach and played an important role in incentivising companies to challenge themselves.

### ***Our analysis: choice of sharing rate***

- 6.83 Ofwat's sharing rates had two purposes:
- (a) First, to provide incentives for information revelation - offering more advantageous sharing rates to those companies with lower costs in their business plans.
  - (b) Second, to provide incentives to be more efficient – offering companies the opportunity to keep a proportion of any underspend.

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<sup>2021</sup> Northumbrian SoC, paragraph 525

<sup>2022</sup> Northumbrian SoC, paragraphs 499–528 & Table 33

### *Information revelation*

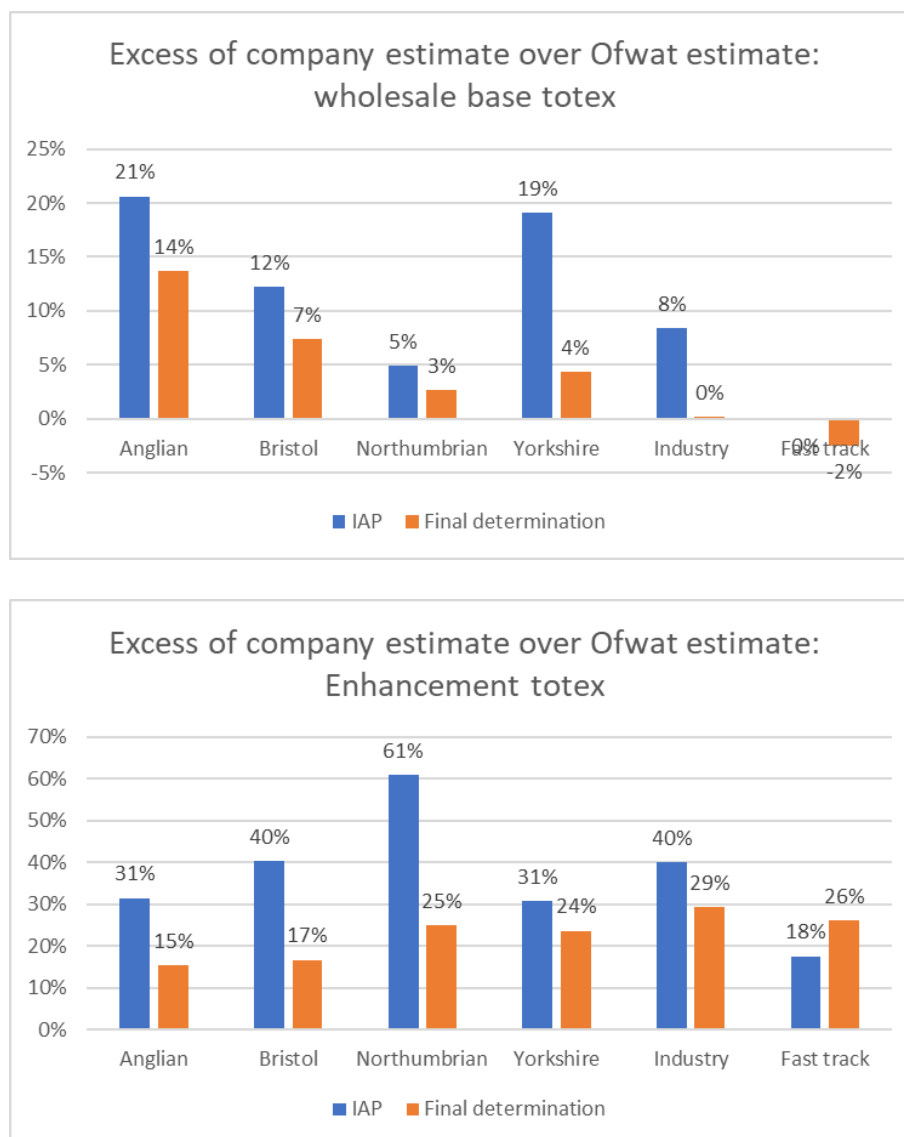
- 6.84 Ofwat said that the PR19 process had successfully reduced the gaps between the companies' business plans and Ofwat's allowances.<sup>2023</sup> In addition to fast-tracking, the cost-sharing methodology was an important part of the way PR19 had been designed to provide incentives for companies to agree to plans which were more closely aligned to Ofwat's draft allowances.
- 6.85 We did not accept Anglian's argument that Ofwat was wrong to set asymmetric cost sharing incentives because it had prioritised information revelation during the business plan assessment process over investment incentives. It appeared to us that Ofwat was entitled to use individual features of its methodology to seek to achieve one or more aims.
- 6.86 We note that while there was some movement between the initial business plans and the companies' business plans in responding to the draft determination, the objectives of the information revelation incentives are not necessarily the same for different cost elements. For example, it is often more difficult to forecast enhancement allowances than base cost allowances because enhancement spend tends to be more idiosyncratic and often relates to novel activities.
- 6.87 Figure 6-3 shows that, in percentage terms, the differences in ex-ante cost estimates were wider for enhancements compared to wholesale base totex. Fast track companies had smaller base totex gaps compared to the Disputing Companies at both the initial assessment of plans and final determination stages, but this was not true for enhancements.

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<sup>2023</sup> Ofwat (2019), [PR 19 final determinations: Securing cost efficiency technical appendix](#), p7



**Figure 6-3: Totex gaps for wholesale base and enhancement**



Source: CMA analysis of Ofwat data

- 6.88 We have considered Northumbrian’s point, stated at paragraph 6.79, that for base costs the companies could have the incentive to bid lower than Ofwat’s cost allowance to receive more advantageous sharing rates.<sup>2024</sup> We agree this is a theoretical risk, particularly if the companies were confident that Ofwat would be setting base allowances based on other benchmark companies.
- 6.89 There is little evidence that this occurred: the iteration of bidding shows that companies submitted plans for higher totex than Ofwat’s view, albeit particularly for enhancement totex, and that the gap narrowed across the sector in successive rounds. There are a number of potentially competing

<sup>2024</sup> [Northumbrian SoC](#), paragraphs 510–515

incentives on companies when they submit business plans and it is very hard to assess how the companies took these incentives into account when bidding. Even though the companies did not bid below Ofwat's proposed allowances, the cost-sharing incentives could still have influenced the bidding in the business plans and, if so, the effect is likely to have been different for enhancement and base cost forecasts. There is no single way of separating the different assumptions with the business plan forecasts, and the numbers suggest that there is no simple link between the size of the sharing rates and the effectiveness of the information revelation incentives.

- 6.90 In response to our Provisional Findings, CCWater told us that we did not find evidence on which to vary the cost-sharing rates from those applied by Ofwat. We disagreed with this interpretation of our Provisional Findings. We found evidence that the approach had the potential to result in unintended consequences in relation to business plan submissions; this was illustrated in Northumbrian's worked example. This led to an unintended consequence in that, in order to avoid being penalised in relation to cost-sharing rates when there is a difference between a company's genuine efficient costs and the results of Ofwat's modelling of an efficient company, a company may seek to under bid on its costs. While we did not find evidence that this was a widespread issue in PR19, we concluded that this provided evidence on which to proceed with an alternative approach.
- 6.91 In relation to Ofwat's response to the Provisional Findings, we note above that Ofwat's approach to the business plan assessment offered fast-track companies a bundle of incentives, of which cost-sharing rates is one part. Our approach to cost-sharing means that we depart from Ofwat's approach in PR19 in respect of one of this bundle of incentives. We do not expect that this change should significantly weaken Ofwat's ability to incentivise truth-telling in future price review periods.
- 6.92 In summary we considered that there was evidence to support the use of cost sharing incentives to promote information revelation. However, we had some concerns about the design of the mechanism used by Ofwat. Ofwat's mechanism was based around a formulaic approach linked to the difference between company plans and Ofwat's cost assessment, and the cost sharing incentives do not reflect any of the broader range of factors used to assess fast-tracking.<sup>2025</sup> We concluded that there were a number of concerns with this approach, including:

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<sup>2025</sup> Ofwat outlined its reasons for fast-tracking in its [Overview of Company Categorisation](#), which included other factors such as customer service, innovation and the companies' consideration of environmental issues.

- (a) fast-track companies could benefit from more advantageous sharing rates, but fast track companies also received other benefits, including a higher WACC, and therefore cost sharing is only part of the information revelation incentive;
- (b) information revelation is more challenging for enhancement costs rather than base costs, and under Ofwat's approach, a single sharing rate is applied to both;
- (c) there was no clear evidence from Ofwat's analysis that demonstrated that the cost sharing mechanism was appropriate for firms with plans that suggested higher costs than predicted by the models. Our review of the plans suggested that differences between plan and modelled costs might relate to a number of factors beyond efficiency, such as timing of investments, historical performance, regional differences, and judgement over the suitability of enhancement projects. Some of these differences are not well suited for significant penalties; and
- (d) an overly formulaic approach to sharing rates could also provide perverse incentives to submit lower business plan figures where companies expected that they would be provided with costs from benchmarking models, although there was limited evidence of this.

6.93 As a result of these concerns, while we agree with Ofwat that it was right to provide incentives for accurate business plans, we are not persuaded that the asymmetric sharing rates of closer to 33:67 for the Disputing Companies are consistent with this objective. We decided to apply an alternative cost sharing rate in our decision below.

### *Performance incentives*

6.94 In this section we consider the objectives of the cost sharing rate for performance incentives, and the consequences for an appropriate level of cost sharing rate.

6.95 There should be incentives for the water companies to minimise spend irrespective of the sharing rate, subject to consistency with three other incentives.

- First, enhancement incentives, where Ofwat has implemented a number of adjustment mechanisms. There are also scheme-specific ODIs which result in under-spend on certain enhancement schemes being returned to customers. Our understanding is that these other mechanisms would

apply before cost saving benefits are received, and therefore that the two can work together.

- Second, ODIs, where the totex sharing mechanism was incorporated into the process for calibrating ODIs. The penalties and rewards for some ODIs take into consideration the costs to achieve improvements in performance against the relevant service measures. We would need to revisit the ODI calibration if we decided to make a significant change to the approach.
- Third, the treatment of costs over multiple periods. Ofwat's approach to sharing rates raises concerns over the incentives companies may have when evaluating different enhancement options. In particular, companies may be discouraged from adopting lower whole-life cost options if those options involve incurring higher costs in AMP7 offset by savings in future periods. Under the final determination sharing rates, the Disputing Companies would have to bear around two thirds of any totex overspend as a result of additional AMP7 costs that may be associated with adopting lower whole-life cost options. However, they would be expected to be able to retain no more than 50% of any associated expected savings in future AMPs.

6.96 Anglian and Yorkshire said that Ofwat's FD discouraged the adoption of more sustainable approaches to P-removal.<sup>2026</sup> The companies said that more sustainable approaches involved higher upfront capital expenditure than traditional chemical dosing approaches but had lower whole-life costs and other environmental benefits, due to lower chemical requirements. Similar concerns arose in other enhancement areas where the distribution of likely costs and benefits across AMPs could differ materially between options, including smart metering roll-out decisions.

6.97 We found that when considering the benefits and costs of stronger cost-sharing incentives, and the use of cost-sharing incentives for information revelation, the approach chosen should be consistent with these broader regime objectives of providing incentives to optimise investment, including identifying lowest whole-life cost options for investment.

### ***Our determination on sharing rates***

6.98 In PR19, Ofwat's approach resulted in companies with totex estimates that were higher than Ofwat's allowance receiving a cost-sharing rate that was

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<sup>2026</sup> [Anglian SoC](#), pp193–197, [Yorkshire SoC](#), paragraph 30

less favourable to companies (and thus more favourable to customers). To achieve a 50/50 cost-sharing rate a company would either need to be in the 'fast track' or submit a business plan with identical, or lower, totex than Ofwat's FD. As a result, all four Disputing Companies had materially asymmetric sharing rates, with rewards below 40% for outperformance in at least one of water or wastewater and corresponding penalties above 60%.

- 6.99 The cost-sharing rate worked alongside other reward mechanisms that Ofwat applied at the initial assessment of business plans stage to incentivise companies to submit high quality business plans. There was no way to isolate the contribution of the cost-sharing rate from the overall package of information revelation incentives.
- 6.100 The Disputing Companies asked us to apply symmetrical cost-sharing rates, which we interpret as a 50/50 allocation between company and customers in relation to both totex outperformance and underperformance.
- 6.101 We agree that there is merit in Ofwat's approach of providing incentives to provide accurate business plan information, which placed companies in various tracks during its assessment process. This improved Ofwat's operational flexibility and ability to prioritise the reviewing of company business plans during the price review period. We therefore do not propose to use a 50/50 allocation, as, contrary to Ofwat's assumption in its submissions, we agree that it is appropriate for our determination to support the principle of providing incentives for information revelation. In PR19, it was clear throughout the process that the cost sharing rates would be a way in which fast-track companies would be distinguished from slow-track companies. We also find that the different process followed by Ofwat in PR19 distinguishes it from previous reviews, and we do not therefore agree with Bristol that we should follow our approach of setting a 50/50 sharing rate as in the PR14 Redetermination.
- 6.102 However, this does not mean that the particular cost-sharing rates applied by Ofwat were necessarily the best way to achieve this.
- 6.103 The formula Ofwat applied to determine the sharing rates may incentivise companies to submit unattainably low totex estimates in order to secure more favourable sharing rates - although we did not find any evidence that this had occurred in PR19. Most of the companies bid higher on enhancement, which might be expected given the information asymmetry that exists for enhancement schemes. Nevertheless, as set out in paragraph 6.90 the risk of unintended consequences is inherent in the design of the incentive arrangements and we decided to take a different approach in our redetermination.

- 6.104 The choice of cost-sharing rates needs also to provide effective incentives for cost efficiency. The wider range of sharing rates applied in PR19 will reduce companies' incentives to outperform and will also expose companies to higher risks from underperformance. There may be circumstances where these asymmetric cost-sharing rates create unintended incentives, including in relation to schemes that require investment over multiple periods.
- 6.105 Based on this analysis, we consider that the cost-sharing mechanism for AMP7 should seek to achieve the following:
- (a) Be sufficiently close to a symmetric cost-sharing rate to avoid creating a significant risk of perverse incentives, particularly over multiple periods.
  - (b) Maintain a distinction between the rates applied to fast and slow track companies, as part of the package of information revelation incentives applied in AMP7.
  - (c) Avoid some of the potential distortions which result from the formulaic approach, particularly the theoretical incentive to under-bid in some areas of base and over-bid in some areas of enhancement; and
  - (d) Balance the need to set strong efficiency incentives with the need to appropriately mitigate the risks of over or under performance, some of which will be likely to relate to factors outside the companies' control.
- 6.106 We were not in a position to re-run this entire process, as the business plan process took a number of years and our determinations run to a fixed timetable. In any case we were not persuaded that Ofwat had shown that a formulaic approach was appropriate for the reasons discussed in paragraph 6.92.
- 6.107 We therefore decide to apply the same asymmetric sharing rates to all the Disputing Companies. Our determination is that for outperformance the sharing rate should be 55% customers and 45% companies. For underperformance the sharing rate should be 55% company and 45% customers. These sharing rates would therefore apply as follows:
- (a) for totex spend above our allowance, the company would face 55% of the cost, with 45% being shared with customers; and
  - (b) for totex spend below our allowance, the company would retain 45% of the benefit, with 55% being shared with customers.

## 7. Outcomes: Performance commitments and incentives

### Introduction

- 7.1 As part of the building blocks of its approach, Ofwat sets the level of the outcome targets for certain PCs, together with a package of financial and reputational incentives or penalties (ODIs) relating to whether the relevant company fails to meet or surpasses these targets. These cover a range of outcomes, including customer-facing outcomes such as water supply interruptions, support for vulnerable customers and customer experience, and other outcomes relating to statutory obligations, asset health and resilience.
- 7.2 The outcomes regime is designed to ensure that service performance by the companies is measured against the outcomes that customers want from their water and wastewater providers. It also provides a means of assessing companies' standards of service delivery, and acts as a tool for incentivising companies to improve their performance. Ofwat introduced the incentive framework as a way of encouraging companies to focus on delivering what matters to customers and society; it said the framework has spurred extensive customer and stakeholder engagement, and would align the interests of management and shareholders with those of customers, by linking performance on metrics that are important to customers with returns that companies earn. In our redeterminations, we determine the outcomes that the four Disputing Companies should achieve for their customers and stakeholders in the period 2020-25.
- 7.3 The Disputing Companies raised concerns about the level and design of PCs and ODIs, including caps and collars on ODIs and potential asymmetric impact. In general terms, they indicated that the package of outcome incentives had increased levels of risk for companies, notably from the asymmetric profile of ODIs, and that, together with the other elements of Ofwat's FD, this had undermined financeability.
- 7.4 In this section, we cover the PCs and associated ODIs which include both financial and reputational incentives, and set out our determinations on the PC and ODI framework, as it applies to the four Disputing Companies. The structure is:
- (a) We review the general approach followed by Ofwat in setting PCs and ODIs including caps, collars and asymmetric incentives.
  - (b) We assess the decisions within Ofwat's approach and decide whether to adopt the same approach. This includes considering:

- (c) the approach to setting levels for PCs and ODIs including comparisons across the companies;
- (d) the role of customer evidence;
- (e) whether there is a cost-service disconnect and if so, what is the effect on the PCs and ODIs;
- (f) the use of caps, collars and deadbands; and
- (g) the role of asymmetry in the outcomes framework.

- 7.5 Based on our assessment of the overall approach to setting PCs and ODIs, we then set out our determination on each of the Common ODIs which are applied to all the Disputing Companies, and on selected other PCs and ODIs, which are described as Bespoke PCs and ODIs.
- 7.6 We consider Ofwat's use of an overall cap on rewards calculated on a gross basis.
- 7.7 We finally consider the overall package of incentives and impacts on risk for investors.
- 7.8 We have separately considered issues relating to leakage, covering both funding and PCs and ODIs in Section 8. We have considered this issue separately both because of its importance and the fact that the step change in targets imposed by Ofwat raises different issues to those relating to the other PCs, in particular in relation to funding.

## **Overview of Ofwat's PR19 approach**

- 7.9 In this section, we set out Ofwat's approach to setting the outcomes framework for PR19.

### ***Ofwat's PR19 process***

- 7.10 At the start of the PR19 process, Ofwat asked the water companies to prepare business plans for the AMP7 period containing proposed PCs. These were intended to set target standards of service, PC levels, based on customer and stakeholder priorities. To determine these priorities, Ofwat



required that extensive evidence of robust customer research and CCG engagement should be presented.<sup>2027</sup>

- 7.11 Ofwat expected the companies to demonstrate in their business plans how the targets proposed were sufficiently stretching, particularly where a company's current service standard lagged behind that of its comparators. Ofwat explained that by 'stretching', it meant stretching performance by reference to each company's business plan.<sup>2028</sup>
- 7.12 Some of the PCs were to be subject to financial incentives (ODIs), based on rewards for outperformance and/or penalties for underperformance. Other PCs were to be determined without an associated financial impact but failure to meet the PC would be subject to reporting and transparency requirements, with a potential reputational impact.
- 7.13 Companies were also asked to propose recommended reward caps (see paragraph 7.27), penalty collars (see paragraph 7.29), and deadbands (see paragraph 7.33), for the ODIs where applicable.
- 7.14 The value of the financial incentives was to be determined based on willingness to pay evidence from customer research, reflecting the relative importance that customers give to different performance indicators.
- 7.15 Ofwat then reviewed these business plans, in an iterative process that eventually led to Ofwat applying adjustments to those PCs and ODIs based on an assessment of the quality of the company's plans, and by comparison to other companies' plans. Interventions were made for a number of different reasons, including:
- (a) where company proposals were different to the proposals from other companies and where Ofwat concluded that the variation was not supported by evidence or suitable explanation;
  - (b) where Ofwat concluded that the business plans were not sufficiently stretching; and
  - (c) where Ofwat concluded that evidence of customer preferences was not sufficiently robust.<sup>2029</sup>

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<sup>2027</sup> In this respect the CCG's role was to challenge companies on the quality of their customer engagement, and how well the company's proposed outcomes, associated commitments and ODIs reflect their customer engagement and wider consumers' views and priorities.

<sup>2028</sup> Ofwat (2018), [Putting the sector in balance: position statement on PR19 business plans](#), p7

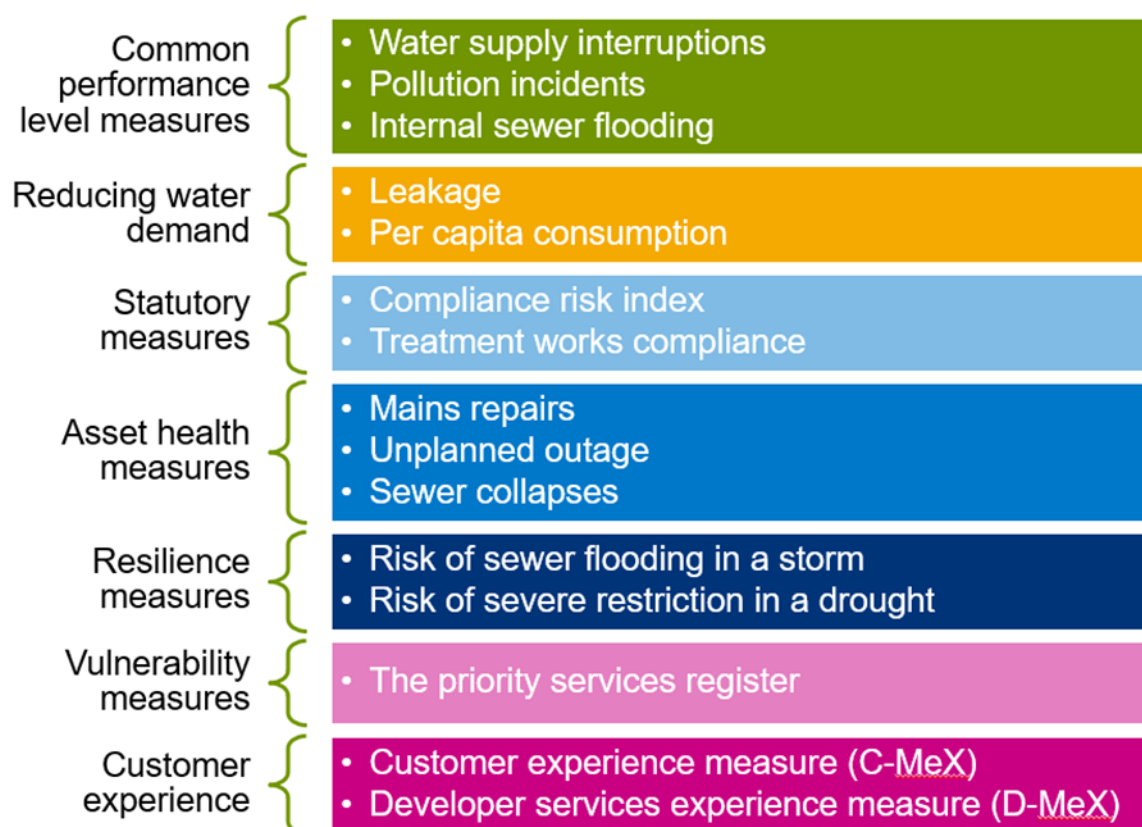
<sup>2029</sup> Ofwat's reasoning is outlined in full in Ofwat (2019), [PR19 final determinations: Delivering outcomes for customers policy appendix](#)

## Overview of Ofwat's approach

### Types of PC

7.16 Ofwat determined that the companies should be required to meet fifteen Common PCs applying to all relevant companies in PR19 (sewage sector PCs applied just to the 11 WASCs and not any WOCs). These are shown in Figure 7-1.

Figure 7-1 Common performance commitments



Source: Ofwat (2020), Reference of the PR19 final determinations: Overview, p36

7.17 These measures apply to all companies with relevant responsibilities. The PCs for pollution incidents, internal sewer flooding, treatment works compliance, sewer collapses and the risk of sewer flooding in a storm are only relevant to WASCs, so they apply to Anglian, Northumbrian and Yorkshire. All the other PCs apply to all water companies, including all four Disputing Companies.<sup>2030</sup>

7.18 We have not assessed the detailed working of the retail price controls,<sup>2031</sup> and therefore we have also not reviewed the associated customer measure

<sup>2030</sup> Ofwat (2019), [PR19 final determinations: Delivering outcomes for customers policy appendix](#)

<sup>2031</sup> See paragraphs 3.41-3.42

of experience and developer services measure of experience PCs (C-MeX and D-MeX PCs). In our determinations, these Common PCs are unchanged. In the rest of this section, where we refer to Common PCs this relates to the wholesale Common PCs which we have reviewed.

- 7.19 In addition to the Common PCs, there are Bespoke PCs. These may apply to only one company, or to a group of companies with similar circumstances and customer priorities. If they apply to multiple companies, and the PCs have the same or similar characteristics, they are called Bespoke comparable PCs.
- 7.20 In addition to the Common PCs, Yorkshire has 28 Bespoke PCs, of which 16 have financial incentives (ODIs). Northumbrian has 35 Bespoke PCs, including 22 with ODIs. Anglian has 28, of which 14 have ODIs, and Bristol has 19, of which 14 have ODIs.<sup>2032</sup>

### *Determination of PC levels*

- 7.21 PC levels are the service targets that companies are expected to meet, and against which their performance will be measured to determine any ODI rewards or penalties. Ofwat set PC levels taking into account companies' own proposals in their business plans, and evidence from across the sector. Where Ofwat made amendments to company proposals for PC levels, it did so using a range of approaches. For example:
- (a) For water supply interruptions, internal sewer flooding and pollution incidents, Ofwat set a common performance level for all companies derived from the upper quartile of all companies' business plan forecasts.
  - (b) For PCs related to statutory requirements, the CRI and treatment works compliance, Ofwat set the PC level at full compliance with the statutory measure.
  - (c) For the asset health PCs, Ofwat determined an industry good level of performance and set companies' PCs by reference to that level.

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<sup>2032</sup> The exact number depends on whether some ODIs are considered together. Full details are in Ofwat (2019), [PR19 final determinations: Anglian Water – Outcomes performance commitment appendix](#); [PR19 final determinations: Bristol Water – Outcomes performance commitment appendix](#); [PR19 final determinations: Northumbrian Water – Outcomes performance commitment appendix](#); [PR19 final determinations: Yorkshire Water – Outcomes performance commitment appendix](#)

## *Financial ODI rates*

- 7.22 A number of PCs have associated financial penalties and/or rewards. In setting financial incentive rates, Ofwat first asked for proposals from the companies. Companies were expected to set their ODI rates on a bottom-up basis using evidence of customer valuations for service increments and the forecast efficient marginal cost of delivering them.
- 7.23 Ofwat carried out a series of checks on companies' proposed outperformance and underperformance rates, starting with a benchmarking check against the reasonable range. This provided an initial check that a company's proposed rates were comparable to the rest of the industry.
- 7.24 Following this initial benchmarking check, Ofwat assessed the customer research evidence, company-specific evidence, including rates in AMP6 if these applied, and company performance to decide whether or not to intervene on each ODI rate. Ofwat also looked at the balance of the overall ODI package and adjusted rates to prevent over- or under-incentivising spend and management focus on particular PCs.<sup>2033</sup>

## *Reputational incentives*

- 7.25 Some PCs do not have financial incentive rates and instead have what Ofwat refers to as reputational incentives. All companies are required to report outturn performance annually against their PCs. Customers and other stakeholders can therefore see if their company has under or outperformed, and so all PCs carry potential reputational effects. There is evidence that CCGs and other customer representatives understand how their company has performed, including in comparison with other companies.<sup>2034</sup>
- 7.26 We have not intervened further in reputational incentives, which sit outside the price control. We encourage Ofwat, the industry and other stakeholders including customer representatives to consider ways of ensuring performance data is made available in a way which can be easy for users of that data to understand, particularly in light of the large number of PCs that apply to each company.

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<sup>2033</sup> Ofwat (2019), [PR19 final determinations: Delivering outcomes for customers policy appendix](#), section 4.3.3

<sup>2034</sup> For example, CCW's comments on internal sewer flooding ODI rates in Ofwat (2019), [PR19 final determinations: Anglian Water – Delivering outcomes for customers final decisions](#), Bristol Water Challenge Panel's comments on water supply interruptions in Ofwat (2019), [PR19 final determinations: Bristol Water – Delivering outcomes for customers final decisions](#)

## *Caps and collars*

- 7.27 Caps on outperformance payments limit the financial reward that a company can receive, so as to provide protection for customers from increased bills, and also mitigate the risk that incentives will unduly distort its behaviour, for example leading a company to chase outperformance on a particular PC, perhaps one that is relatively easier for it to perform well on, to the detriment of delivering on others.
- 7.28 Ofwat's general approach to setting the cap for each PC was to regard the P90 performance level as indicating a reasonable cap (that is, the level at which there is only an estimated 10% chance that the outcome performance level would be higher). However, during the feedback process of PR19 Ofwat made some adjustments to both cap levels and to its estimated P90 levels, raising these where a company's proposed cap was above its original estimate.<sup>2035</sup>
- 7.29 Ofwat also set collars, which are limits to the exposure that companies face to financial penalties in relation to missing the PC levels. The objective of collars is to address the risk that companies may face disproportionately high penalties, for example as a result of one-off failures in the network (an illustration of this being in the case of water supply interruptions: Bristol faced a single event which resulted in performance being multiple times worse than the PC targets in one year, see paragraph 7.147).
- 7.30 For most Common and Bespoke comparable PCs, Ofwat set collars as a multiple of the 2020-21 PC level and used this collar for all years. This has the effect of increasing the total potential financial consequence of not meeting the PC over time, as PC levels tend to get progressively more stretching over the period.<sup>2036</sup> In some cases, Ofwat set a graduated collar, with linearly increasing exposure over the price control period.
- 7.31 The collars for all the Common PCs were fixed for the Disputing Companies for the five years of the price control, with the following exceptions:
- (a) Yorkshire and Northumbrian's collar for internal sewer flooding was profiled to be closer to the PC level in early years and further from it in later years;
  - (b) Anglian's collar for sewer collapses was profiled to become slightly closer to the PC level over the five years.

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<sup>2035</sup> Ofwat (2019), [PR19 final determinations: Delivering outcomes for customers policy appendix](#), pp163-165

<sup>2036</sup> Ofwat (2019), [PR19 final determinations: Delivering outcomes for customers policy appendix](#), p168

- 7.32 For Bespoke PCs, Ofwat set collars at the P10 performance level, that is, the level at which there is only an estimated 10% chance that the outcome performance level would be worse.

### *Deadbands*

- 7.33 For some PCs, Ofwat introduced a 'deadband' for underperformance. A deadband is a value below the PC for which companies will not incur a penalty. Deadbands can also be set for outperformance, intended to ensure companies are rewarded only for significant over-delivery of a PC, but Ofwat did not set outperformance deadbands for the Common PCs in PR19.
- 7.34 Ofwat set deadbands for CRI and Treatment Works Compliance, both of which are linked to statutory requirements, and both of which have PCs set around 100% compliance targets.

### *Asymmetric incentives*

- 7.35 Some of the ODIs set by Ofwat are symmetric, that is, the increase in allowed revenues for each unit of outperformance is equal in size to the reduction for each unit of underperformance. However, for three Common PCs, the rate for underperformance is greater than the rate for outperformance. In the context of these redeterminations, ODI rates with this structure are called asymmetric.
- 7.36 Additionally, where Ofwat has set caps on outperformance rewards and collars on underperformance penalties, the cap is normally set closer to the PC level than the collar is set. This has the same effect as asymmetric rates, in making the total award available lower than the possible penalty for underperformance.
- 7.37 For five Common PCs, there are only penalties for underperformance; outperformance does not attract a financial reward.
- 7.38 Ofwat's approach resulted in the following balance of symmetric and asymmetric ODIs for the Common PCs associated with the wholesale business:
- two symmetric ODIs: For supply interruptions and internal sewer flooding, there are upper quartile PCs, but symmetric ODIs around those PCs for almost all companies, including the Disputing Companies;
  - three asymmetric ODIs: For leakage, per capita consumption and pollution incidents, Ofwat set asymmetric ODI rates, within reasonable ranges; and

- five penalty-only ODIs: For the two statutory PCs (CRI and treatment works compliance), and for three other Common PCs (mains repairs, unplanned outages and sewer collapse), Ofwat set penalty-only PCs with few exceptions. The only exception for the Disputing Companies is for Northumbrian on mains repairs, where an outperformance payment is possible.

7.39 Table 7-1 sets out the Common PCs, whether they have related financial incentives, and if so, whether these are symmetric.

**Table 7-1: Structure of the wholesale Common PCs in Ofwat's FD**

<i>Performance category</i>	<i>Financial/ reputational</i>	<i>Rewards for outperformance</i>	<i>Penalties for underperformance</i>	<i>Symmetrical ODIs?</i>
<b>Water supply interruptions</b>	Financial	Yes (except for Hafren Dyfrdwy)	Yes	Yes
<b>Internal sewer flooding</b>	Financial	Yes	Yes	Yes, for all 3 disputing WASCs
<b>Pollution incidents</b>	Financial	Yes for most companies (but not Hafren Dyfrdwy, South West and Thames)	Yes	No
<b>Leakage</b>	Financial	Yes	Yes	No
<b>Per capita consumption</b>	Financial	Yes	Yes	No
<b>Compliance Risk Index</b>	Financial	No	Yes	No
<b>Treatment works compliance</b>	Financial	No	Yes	No
<b>Mains repairs</b>	Financial	Only for some companies, including Northumbrian	Yes	No
<b>Unplanned outages</b>	Financial	Only one company (South Staffs)	Yes	No
<b>Sewer collapses</b>	Financial	Only some companies	Yes	No
<b>Risk of severe flooding in a storm</b>	Reputational	N/A	N/A	N/A
<b>Risk of severe restriction in drought</b>	Reputational	N/A	N/A	N/A
<b>Priority Services Register</b>	Reputational	N/A	N/A	N/A

Source: Ofwat

### *Enhanced ODIs*

- 7.40 For some PCs, companies proposed Enhanced ODI rates above and below certain performance levels. Enhanced ODI rates are a new initiative in PR19 and are in place only on request for high-performing companies. The purpose of Enhanced ODIs is to drive frontier shift and set new benchmarks for sector performance. The highest-performing companies are given additional incentives to innovate in order to further improve performance and develop new techniques for doing so which can be shared across the sector.
- 7.41 Where enhanced rates apply, the company will earn (or pay) a standard ODI rate for outperformance and underperformance to up to the standard rate cap or collar. Additional outperformance or underperformance attracts higher rates, up to an enhanced cap or collar.

- 7.42 For Enhanced ODIs, Ofwat set caps on the amount that a company can earn on a single PC at 1% of its RoRE<sup>2037</sup> measured by reference to the RCV of the water service, or wastewater service, as relevant. Ofwat's view was that caps on enhanced outperformance rates 'will mitigate the risk that the Enhanced ODI rate may be incorrectly specified or that companies focus excessively on a single PC to the detriment of their wider commitments'.<sup>2038</sup>

### *Overall reward caps*

- 7.43 Ofwat set a cap on the amount of aggregated outperformance payments a company can earn. This cap was set at 3% of the projected RoRE, to be applied on an annual basis. Ofwat said that this cap would provide additional protection for customers against bill volatility.<sup>2039</sup> Outperformance rewards above this limit are shared 50:50 with customers. The aggregated outperformance payments are calculated gross, that is, they are not offset by any underperformance penalties the company has incurred in the year. Similarly, Ofwat set a symmetric collar of 3% of RoRE on underperformance penalties.
- 7.44 Ofwat said that a gross overall reward cap is more appropriate than a net cap, 'as it provides a higher level of customer protection with a greater focus on minimising poor performance'.<sup>2040</sup>

## **Assessment of the overall approach to the incentive framework**

### ***Our approach***

- 7.45 We now set out our review and assessment of an appropriate PC incentive framework. As set out in paragraph 3.5, we have based our approach on the building blocks used by Ofwat and have agreed with many aspects of Ofwat's approach.
- 7.46 In general, the overall framework for PCs and its objectives are not a material point of dispute between Ofwat and the Disputing Companies. We have therefore followed the broad approach used by Ofwat, with revisions and adaptations as discussed below. It is the application of the outcomes framework that has been challenged, particularly the interventions to company business plan proposals for PCs and ODIs that Ofwat imposed.

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<sup>2037</sup> The return on regulated equity is defined as the return to shareholders as a proportion of the equity component of RCV, calculated by reference to the notional capital structure. The RCV represents a measure of the capital base of a company, used in setting price limits.

<sup>2038</sup> Ofwat (2019), [PR19 final determinations: Delivering outcomes for customers policy appendix](#), p122

<sup>2039</sup> Ofwat (2019), [PR19 final determinations: Delivering outcomes for customers policy appendix](#), p171

<sup>2040</sup> Ofwat (2019), [PR19 final determinations: Delivering outcomes for customers policy appendix](#), p171



Third parties, Ofwat and the Disputing Companies have also raised points on specific PCs and ODIs, and we consider those in this section.

- 7.47 The outcomes framework was introduced as part of PR14. Ofwat's decisions at PR14 appear to have resulted in some performance improvements, and not resulted in major financial gains for the companies during AMP6. This experience suggests that the framework of defining PCs and associated ODIs can be applied in a way which balances company and customer interests.
- 7.48 We have reviewed each of the Common ODIs and considered on a case-by-case basis whether to redetermine the level of the PCs and associated ODIs. We have not reviewed the majority of bespoke PCs and ODIs. Our review has focused on the way Ofwat applied changes to the companies' business plans. This is partly because neither Ofwat nor the four Disputing Companies have suggested there are material issues for us to review in respect of the majority of the individual PCs and ODIs. However, there are also significant practical challenges to us testing and proposing alternatives. For example:
- (a) If we were to conclude that fresh evidence from customers would have helped with defining the form of PCs or the appropriate PC level target, it would not have been plausible to ask companies to provide new evidence of customer engagement within the timescale of a redetermination. Ofwat did this at the Initial Assessment of Plans stage when there were several months available for the companies to undertake further specific customer research.
  - (b) The timescale of a redetermination does not allow for a full technical assessment of each PC.
  - (c) We are not in a position to conduct a trial of new different reporting definitions or new measures of performance whereas the new Common PCs have been subject to 2 years of shadow reporting to test their application.
- 7.49 This framework applied by Ofwat is also a significant development from the approach taken at PR14. Whilst we have taken account of some of the experience from PR14 in terms of performance against PCs and ODIs, and the consequence for achievability of PCs in AMP7, the broader framework has been expanded and extended by Ofwat as part of PR19. Much of the development of the Outcomes regime has been supported by the Disputing Companies and the customer groups involved in the process.

- 7.50 We have, in this context, taken a similar approach to that taken by the CMA in the Bristol PR14 Redetermination of largely following the Ofwat approach to outcomes, with a priority review of specific areas highlighted by the parties. As discussed below, we have however reviewed each of the Common PCs with financial ODIs, to assess the concerns raised by the Disputing Companies about the way Ofwat intervened in setting targets for Common PCs and adjusted the associated ODIs.
- 7.51 The next section explains our approach in more detail, including our approach to aspects of the outcomes framework which were raised as concerns by the parties to this appeal.

### ***Our assessment – framework for assessing ODIs and PCs***

- 7.52 In this section we review the outcomes framework and come to a view on the framework we will follow in making our determinations on the package of PCs and ODIs. We consider the following in turn:
- (a) approach to setting levels for PCs and ODIs including comparisons across the companies;
  - (b) role of customer evidence;
  - (c) whether there is a cost-service disconnect and if so, what is the effect on the PCs and ODIs;
  - (d) the use of caps, collars and deadbands; and
  - (e) the role of asymmetry in the outcomes framework.

### ***Setting levels of PCs and ODIs***

- 7.53 We first describe the way in which levels of PCs and ODIs were determined by Ofwat and then go on to evaluate the Disputing Companies' objections to Ofwat's approach.
- 7.54 As noted at paragraph 7.15, Ofwat made a number of changes to the level of PCs proposed by companies in their business plans. In each case, Ofwat made adjustments to bring PC levels in line with its assessment of good performance, either from 2020-21 onwards or on a glide path towards it. For example, Figure 7-2 illustrates how Ofwat took into consideration good performance in setting targets for mains repairs.

**Figure 7-2: Ofwat's analysis of mains repair PCs against good performance**



Source: Ofwat outcomes policy appendix, page 198

7.55 Ofwat also made a number of changes to the level of ODIs suggested by the companies, starting with a benchmarking check against the 'reasonable range'. The reasonable range of ODI rates for most PCs was defined by Ofwat as  $\pm 0.5$  standard deviations around the mean rate proposed by all companies in September 2018. However, Ofwat considered alternatives on a case-by-case basis. For example:

- (a) For water quality contacts (a Bespoke comparable PC), the mean from the April 2019 business plans was used.
- (b) For three asset health PCs, including sewer collapses (a Common PC), Ofwat set the boundaries of the reasonable ranges using the industry median and the inter-quartile of the industry range, as the existence of outliers meant that its standard approach would give too wide a range.<sup>2041</sup>
- (c) For mains repairs underperformance ODI rates, Ofwat set the underperformance rate for almost all companies, including the Disputing Companies, at the average of the reasonable range, to address what it considered would otherwise introduce unreasonable downside risk.<sup>2042</sup>

<sup>2041</sup> Ofwat (2019), *PR19 final determinations: Delivering outcomes for customers policy appendix*, section 4.3 beginning on p92

- 7.56 As discussed below, some of the Disputing Companies disagreed with the approach of intervening on PCs and ODIs in the way Ofwat did, on the basis that their own proposals, which were based on customer evidence, were more appropriate.
- 7.57 We considered potential reasons whether we should also make use of comparative data in our own determinations. We have concluded that we agree with Ofwat that there are benefits of the use of comparative data and have not seen evidence that the disadvantages are so great that it should be rejected, although there are reasons it should be used carefully, and that there may be implications for the costs of achieving the PCs.
- 7.58 For example, one reason not to intervene to address regional differences in targets across companies would be if service performance can be expected to differ for reasons of topography or weather conditions. This could be an example of why an approach based on comparisons across companies might result in PC levels which are not economically efficient for individual companies. However, we found there were a number of reasons why intervention should be able to be implemented effectively as part of the overall approach to these determinations:
- (a) companies can apply for enhancement expenditure to reflect local investment requirements;
  - (b) Ofwat did not change all PCs to the sector average, but took an approach of mitigating the largest proposed differences in the performance that customers in different regions would experience; and
  - (c) Ofwat followed a similar approach in assessing changes for the different PCs, and therefore whilst an approach may result in some PCs being more challenging for some companies, this should balance out across the common and comparable PCs for an efficient company.
- 7.59 We also recognise that in some circumstances, differences in customer evidence might reflect differences of opinion between customer groups about the willingness to pay for different service levels in different areas. We have also considered Ofwat's general approach in the light of representations made to us about the role of customer evidence as well as the link between cost and service. We describe these issues further in paragraphs 7.60 to 7.80.

## *Role of customer evidence*

- 7.60 Anglian requested that we reinstate its ODI package as it had been before Ofwat's FD, with some exceptions.<sup>2043</sup> It considered that Ofwat's interventions had had the effect of dismantling a package which had been supported by its customers in the round.<sup>2044</sup>
- 7.61 We have considered evidence of customer research on the PCs and ODI rates, as Ofwat did. Our view is that customer research can be highly informative in relation to particular issues, and that there is significant potential for development of customer research methodologies and its appropriate application. Perhaps more importantly, the extensive engagement and research undertaken has gone a long way to encourage company business plans and regulatory decisions to reflect the specific priorities and values of customers. We consider that this is a positive part of the business plan process and encourage Ofwat and companies to continue to develop the approach.
- 7.62 However, there are challenges in developing research methodologies to increase the reliability of survey results, particularly on willingness to pay studies. Ofwat has recently published a consultation paper inviting views on how customer preferences might inform future price reviews and setting out some initial ideas.<sup>2045</sup>
- 7.63 The outcomes framework is an area where customers and key stakeholders properly play a role in determining the standards of performance for which companies should be held to account. That said, and having examined examples of customer research (see for example paragraph 7.293), we consider that there are limits to the weight such evidence should be given. This derives from questions over the validity of research methods, the extent to which customers can comment meaningfully on complex technical matters, make comparisons between companies, or evaluate between different options.
- 7.64 Having examined examples of the customer research undertaken by the Disputing Companies, we consider that there are some areas where customers may not reasonably be expected to reach an informed opinion on the information available. Nor would customers necessarily be able to evaluate the differences between alternative plans. Customers may not have comparative information on the performance of other companies, and in any

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<sup>2043</sup> [Anglian SoC](#), p232

<sup>2044</sup> [Anglian SoC](#), p251

<sup>2045</sup> Ofwat (2020), [PR24 and beyond: Reflecting customer preferences in future price reviews](#)

case the differences between the methods used by the various companies could also affect the ability to make comparisons.

- 7.65 We have not attempted to review every company's customer research in relation to their PC and ODI packages. However, in our review of customer evidence provided by the Disputing Companies, we saw examples of PCs or ODIs being proposed that imply differences between customer groups of an order of magnitude that is hard to accept as an accurate reflection of the variation in customer preferences across different regions. This has underlined for us the importance of reviewing company-specific customer research alongside other evidence.
- 7.66 More generally, we consider it is the role of the regulator, whether the CMA or Ofwat, to take a view on the evidence available to it in the round when setting targets, which will include evidence from comparator companies and other sources not available to customers. We would therefore be concerned were expectations to be raised that customer evidence in and of itself should be determinative, in circumstances where other sources of evidence suggest an alternative approach could be more consistent with customer interests.
- 7.67 Anglian did not dispute the importance of comparative information in the regulatory process. Its concern was that, as stated in its SoC, the PC and ODI package had been, in its view, 'decoupled' from customers' stated preferences.<sup>2046</sup>
- 7.68 Yorkshire agreed with our provisional view that there must be some limits to the weight placed on customer evidence, and that in some cases 'the extent of variation implied in customer valuations is too large to plausibly only reflect differences in preferences across regions'.<sup>2047</sup> However, Yorkshire was concerned that the degree of intervention by Ofwat did not seem to be related to assessments of the quality of evidence provided.<sup>2048</sup> For the future, Yorkshire encouraged Ofwat to consider a cross-sector approach to gathering evidence, and suggested that the CMA consider recommendations relating to such a development.<sup>2049</sup>
- 7.69 Yorkshire also challenged our acceptance of Ofwat's approach in intervening on PC levels. It considered that Ofwat's determined levels, based on comparisons such as the 'good' performance described above, were

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<sup>2046</sup> [Anglian's response to the provisional findings](#), paragraph 341

<sup>2047</sup> [Yorkshire's response to the provisional findings](#), paragraph 6.2.7

<sup>2048</sup> [Yorkshire's response to the provisional findings](#), paragraph 6.2.8

<sup>2049</sup> [Yorkshire's response to the provisional findings](#), paragraph 6.2.9

ambiguous, and that the targets implied by PC levels should be set at the economically efficient level.<sup>2050</sup>

- 7.70 Blueprint for Water<sup>2051</sup> and the Anglian Customer Engagement Forum<sup>2052</sup> both voiced concerns about placing limits on the weight given to customer research. Blueprint for Water's concern focused on the Provisional Findings' finding on enhancement projects, although both third parties considered that high-quality customer research should be given relatively more weight in any intervention decisions.
- 7.71 CCWater expressed concern that consumer views of value for money, affordability, trust and fairness had not been considered more widely in terms of the overall effect on customers of the Provisional Findings. It said that evidence from its acceptability testing of Ofwat's Draft Determinations 'shows that customers may not support the bill increases proposed in the CMA's Provisional Determinations'.<sup>2053</sup>
- 7.72 National Energy Action (NEA) urged caution in applying reported willingness to pay directly as ODI rates for improved performance. In particular, it noted the risk to low-income households if an ODI rate was considered applicable because it was 'broadly acceptable', as a result of meeting an 80% acceptability threshold. The 20% of customers who did not find a rate acceptable could well be those who would be most at risk of detriment from a higher rate.<sup>2054</sup>
- 7.73 Citizens Advice stated that it was concerned that some of the Disputing Companies were misrepresenting consumer evidence 'to claim that consumer interests would be best served by setting higher prices for a better level of service'.<sup>2055</sup>
- 7.74 Following the publication of our Provisional Findings we held a hearing with Citizens Advice, CCWater and the four CCGs for each of the Disputing Companies, focused specifically on consumers. At the hearing Citizens Advice told us that there was a need for more consistency in customer engagement and research across the energy and water sectors to allow for more comparisons to be made.

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<sup>2051</sup> [Blueprint for Water's response to the provisional findings](#), p3

<sup>2052</sup> [Anglian Water Customer Engagement Forum's response to the provisional findings](#), pp1-2

<sup>2053</sup> [CCWater's response to the provisional findings](#), paragraph 4.4

<sup>2054</sup> [NEA's response to the provisional findings](#), pp3-4

<sup>2055</sup> [Citizens Advice first submission](#), p2

- 7.75 Citizens Advice also considered that there is a significant challenge for customers in understanding what the efficient cost of a service outcome, or service improvement outcome, would be. This view was shared by CCWater.

*Our assessment – overall approach to PCs and ODIs*

- 7.76 The PR19 approach to customer engagement has been an important improvement which should better ensure that outcomes are aligned with customer interests. However, it is a standard principle of economic regulation that the regulator also has a role in taking into account evidence from across the sector. We also found that there were limitations on the ability of customer research to address some of the more complex issues associated with the outcomes framework. We agree that customer evidence is important, but should not be treated in isolation. In reaching our determinations on individual PCs and associated ODI rates in this section we have considered this in striking balances where appropriate.
- 7.77 We consider that Citizens Advice's concern over the potential for customer evidence on service levels to be used in a way that tends towards upward pressure on bills is one that the regulator, and the CMA, should be mindful of in setting both overall allowances and ODI rates. Company research has indicated that many customers are prepared to prioritise objectives that may increase bills, and it is important that the aggregate costs to customers of achieving these objectives are properly considered.
- 7.78 NEA has also highlighted the risks that ODI rate decisions may result in higher overall allowances. The impact of water bills, and of changes to them, is clearly more important for lower-income households, although this should also be considered in assessing whether the companies have sufficient support in place for vulnerable and low-income customers. The regulator's overall interest in affordability should inform PC and ODI decisions as well as the overall package.
- 7.79 We have decided to follow Ofwat's overall approach of starting with the PCs and ODIs proposed by the companies following the process of customer engagement, and then adjusting the company proposals where appropriate, in particular to reflect comparisons across the companies. We agree as a matter of principle that there are good reasons for a sector regulator to take into account data from different companies, and to have regard to good practice in assessing the evidence from each of the companies. Given that Ofwat's outcomes framework has been largely accepted, and we have decided to use that framework, we have therefore decided to use the following approach:



- (a) first, we have taken the framework of PCs and ODIs as implemented by Ofwat and largely supported by the companies;
- (b) second, we have also taken an approach, following Ofwat's approach, of changing the PCs and ODIs associated with Common PCs to reflect comparisons across the companies; and
- (c) third, we have then reviewed each of the Common PCs, and those Bespoke PCs and ODIs where we received submissions which suggested that the Bespoke PC and/or ODI might have been wrongly determined.

7.80 For the other Bespoke PCs and ODIs where we received no evidence of concerns, we concluded that the use of customer research and company-specific analysis meant that it was not necessary for us to review and intervene further in these determinations.

### *Cost-service disconnect*

7.81 A number of the Disputing Companies raised concerns about what they perceived to be a disconnect between the service delivery requirements of the outcomes regime and the allowed expenditure, the so-called 'cost-service disconnect'.

### *Parties' assessment of the link between cost and service*

7.82 Ofwat's FD set PCs separately to the base cost allowances, and Ofwat considered that efficient companies should be able to be high performers both in cost and service performance. Ofwat provided examples, as illustrated in Figure 7-3, from past performance of some firms that had managed to be high performers in both cost and service.

7.83 The Disputing Companies raised concerns that Ofwat failed to recognise the connection between improved performance and the higher cost that firms incur to achieve and sustain that performance. We have therefore considered the arguments as to whether it is appropriate to set PCs separately to the base cost allowances.

7.84 Anglian provided detailed submissions on its view of the link between cost and service and why this matters.<sup>2056</sup> Anglian said that it was generally accepted that improved service incurs additional costs.<sup>2057</sup> Anglian provided

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<sup>2056</sup> Anglian SoC, section F

<sup>2057</sup> Anglian SoC, paragraph 911

specific examples, including the costs of improving leakage and the costs in AMP6 of achieving better performance in water supply interruptions.

- 7.85 Northumbrian and Yorkshire also said that there was a disconnect between costs and service which would affect the achievability of the PCs set by Ofwat at upper quartile targets. Yorkshire said that Ofwat's approach of requiring service improvements at the same time as requiring a frontier efficiency shift was a double count of any productivity improvements.<sup>2058</sup>

*Evidence from AMP6 on the link between cost and service*

- 7.86 We have considered the evidence provided by Ofwat and the companies on the relationship between costs and service during AMP6 which was the first period when ODIs were implemented alongside PCs.

- 7.87 Data provided by Ofwat suggests that during the first four years of AMP6, the water industry as a whole underspent (ie outperformed) its totex allowance by over £500 million, while generating net ODI rewards of over £100 million.<sup>2059</sup> Assuming an average totex cost-sharing rate of 50%, this results in operational outperformance contributing over £350 million of additional shareholder returns over the period.

- 7.88 Below the industry level, individual companies differed in their operational performance. However, the overall results mirrored that of the total industry in demonstrating a skew towards outperformance with:

- (a) 13 out of 17 companies generating positive shareholder returns from these operational metrics;
- (b) 7 out of 17 companies succeeding in outperforming on totex while simultaneously generating net ODI rewards; and
- (c) only 1 company (Thames) underperforming on totex while simultaneously suffering from net ODI penalties.

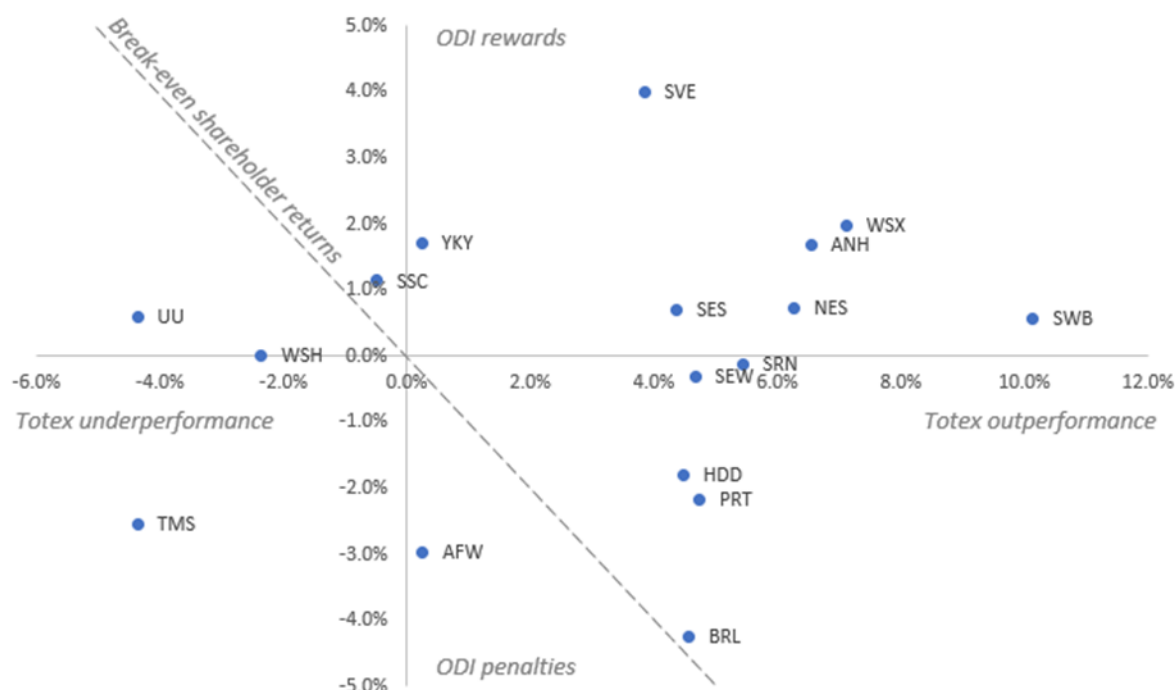
- 7.89 This can be seen in Figure 7-3.

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<sup>2058</sup> Yorkshire SoC, paragraph 140(c)

<sup>2059</sup> Ofwat (2019), [Service delivery report data 2018-19](#)

**Figure 7-3: Operational performance across years 1 to 4 of AMP6, and associated financial rewards for shareholders (as % of RoRE), by company**



Source: Ofwat (2019), [Service delivery report data 2018-19](#)

Note: applies a 50% cost-sharing rate to totex figures; Returns on notional regulated equity, taken as a sum of the individual % RoRE figures across the four years.

7.90 The four Disputing Companies all generated positive shareholder returns from these measures of operational performance, and three of them succeeded in outperforming on totex while simultaneously generating net ODI rewards. These results are shown in Table 7-2.

**Table 7-2: Operational out/underperformance across AMP6**

Company	Totex outperformance		Net ODI payments	
	Absolute (£m)	% RoRE*	Absolute (£m)	% RoRE*
Anglian	£324m	6.5%	£42m	+1.7%
Bristol	£13m	4.6%	-£7m	-4.2%
Northumbrian	£171m	6.3%	£10m	+0.7%
Yorkshire	£1m	0.2%	£36m	+1.7%

Source: Ofwat (2019), [Service delivery report data 2018-19](#)

\* Footnote: Absolute totex outperformance figures shown here do not include any cost-sharing rates; the RoRE figures apply a 50% cost-sharing rate; Returns on notional regulated equity, taken as a sum of the individual % RoRE figures across the four years

7.91 This indicates that three of the Disputing Companies (Anglian, Northumbrian and Yorkshire) underspent allowances while benefitting from net ODI payments suggesting target outcomes had been exceeded. This suggests that there has not been in practice a systematic link between cost and achievement of PC target levels.

- 7.92 Our overall review of the evidence provided on the companies' performance against individual ODIs and the related areas of cost assessment also suggested that there was no clear pattern of the highest performance for those companies which had increased spending. This also indicated there is no clear link in the evidence from AMP6 between the performance against PC and ODI targets, and the costs incurred by the water companies.

*Our assessment of the link between cost and service*

- 7.93 As a starting point the question associated with the existence of a cost-service disconnect is not, for the purposes of these determinations, whether there are links between cost and service as a matter of general principle. The question that we have to address is whether there are improvements in service required which go beyond the service performance that should be achievable by an efficient firm through base totex.
- 7.94 It is our view that Ofwat's approach of setting PC targets which require higher service performance did not automatically result in increased expenditure relative to Ofwat's models of base expenditure. In some cases, improvements to service could be achieved at little cost or may be of a recurring nature that would be included in base funding. For example:
- (a) improvements to operational processes and/or efficiency could lead to improved services at no cost, or at low costs that are not repeated;<sup>2060</sup>
  - (b) some similar improvements could need repeated additional expenditure, such as training or recruiting staff whose skills command higher pay, and which might therefore already be included in base funding;
  - (c) introducing technology could come at low one-off costs (for example, 'off the shelf' technology that is in wide use and has been proven elsewhere);
  - (d) new technology, once deployed, could reduce the ongoing costs of delivering the improved service; and
  - (e) baseline costs may already include some investment that was made in prior periods to deliver performance improvements.
- 7.95 We are aware of a number of examples where companies have in practice been able to improve service performance by new techniques and/or improving efficiency without any associated cost increases. This is also

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<sup>2060</sup> Our engineering advisers have noted that for wastewater incidents, for example, early notification, timely response, effective mitigation measures and appropriate repair by motivated, informed and engaged operatives will logically lead to higher performance.

consistent with the evidence illustrated in Figure 7-3 from AMP6 that the high performing companies on cost were often high performers on service. The performance regime should appropriately balance the interests of customers and the companies, and a situation where many companies consistently exceeded all or the vast majority of their PCs would not achieve that objective.

- 7.96 In its response to our Provisional Findings, Yorkshire agreed that there is a distinction between recurring expenditure and one-off expenditure to deliver improvements. However, Yorkshire did not agree with the other factors we identified, which it considered provide reasons why cost impacts might be mitigated, rather than that cost impacts would not arise. Yorkshire did not agree with 'the CMA's inference in many cases there are factors that mean the targeted service improvement does not require additional expenditure'.<sup>2061</sup>
- 7.97 South East Water considered that additional expenditure could be justified to meet PC levels not just in leakage but for other PCs, and offered supply interruptions as an example.<sup>2062</sup> Thames Water argued that as PR19 combined lower totex allowances and higher PC levels, there was a need for additional allowances. It offered supply interruptions and internal sewer flooding as examples, and suggested a case-by case assessment.<sup>2063</sup>
- 7.98 The approach taken by Ofwat is likely to mean that not all companies can achieve all targets without additional investment, and that it is for company management to decide how best to achieve an optimal outcome for that company and its customers across all the PCs by reference to its own circumstances. The ODIs have been designed on the basis that some companies may choose to underperform on some ODIs, if they conclude that the investment cost associated with achieving the targets is disproportionate.
- 7.99 While we did not find a systematic link between high performance and high costs, we agreed that there are likely to also be examples, including companies already at frontier performance, where improvements in performance will only come at a cost. For example, an efficient company using optimal approaches and technology may find utilisation of more inputs is the only practical way to improve outcomes.

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<sup>2061</sup> [Yorkshire's response to the provisional findings](#), paragraph 6.3.3

<sup>2062</sup> [South East Water's response to the provisional findings](#), section 3.3, pp7-8

<sup>2063</sup> [Thames Water's response to the provisional findings](#), section G – Performance Commitments, pp5-7

## ***Our decisions on the overall approach***

7.100 In reaching our decisions on the PC and ODI packages for the Disputing Companies, we have reflected the considerations above, on a case-by-case basis. Overall, with the exception of leakage, we found that at a sector level that Ofwat had not imposed targets that were unachievable. For example, in respect of supply interruptions, mentioned by Thames and South East Water, we do not see any evidence that Ofwat is expecting targets to be met which are unachievable from continuing trends during AMP6, and therefore which should be reflected in totex allowances.

7.101 We also took company-specific targets into consideration when assessing enhancement spend. We recognise that individual companies may face harder targets as a result of local conditions, but at least for the Disputing Companies, the evidence across the PCs and ODIs showed that service improvements could be met from totex. In this section, we outline our final adjustments to PC levels and ODI rates, and our decisions on enhancement spend are considered in Section 5.

### ***Use of caps, collars and deadbands***

7.102 Caps and collars can serve a useful function as part of the design of effective ODIs:

- (a) Caps provide protection for customers from increased bills, and also mitigate the risk that a company's objectives could be distorted by the opportunity to outperform on particular ODIs.
- (b) Collars mitigate the risk that underperformance on one PC (which could arise for various reasons, potentially including ones outside the control of the company) could lead to extreme penalty levels for firms.

7.103 We also agree that deadbands may be appropriate in certain circumstances. Deadbands may be appropriate where outcomes may not be fully within the control of management such as in the following circumstances:

- (a) The measure itself allows very little tolerance: In these cases, a company might 'miss' the PC without necessarily having objectively failed in management of the commitment. Ofwat set deadbands for the two statutory PCs (the water quality index CRI, and Treatment works compliance), for which the PC level is full compliance (an index score of zero, or 100% treatment works compliance).
- (b) Delivery of the PC is not wholly within companies' control: circumstances outside management control could lead to a small underperformance.

- (c) The measure is new, and its relation to desired company management behaviours and outcomes is not clear: setting a deadband can offer some reassurance to companies, while maintaining the incentive to deliver good performance.

7.104 Where one or more of the reasons above apply to a PC, a further pragmatic advantage of a deadband is to avoid unnecessary complications in processing small penalties (or rewards) where the link to the company's service delivery is uncertain, or not strong, for small variations in the measured output.

7.105 The common theme across caps, collars and deadbands is that they are able to make ODIs more effective in circumstances where there is difficulty in setting targets and defining a single appropriate level of penalty and rewards against those targets. We agree that some of the PCs and ODIs would be more effective if these additional mechanisms are applied in addition to standard reward and penalty rates.

7.106 Ofwat disagreed with our assessment of where deadbands might be appropriate in principle. It considered that since deadbands dull companies' incentives to improve performance, they should be applied only in exceptional circumstances, and gave the example of its decision to implement a deadband for the CRI PC.<sup>2064</sup>

### *Our assessment*

7.107 We consider that the circumstances in which deadbands may be appropriate are wider than Ofwat has suggested. Where delivery of the measured outcome is not wholly within companies' control, a deadband reduces the risk of penalising, or rewarding, outcomes resulting from external factors. Additionally, deadbands can be a useful transitional mechanism to avoid overly prescribing penalties or rewards relating to new measures, or measures calculated by new methodology.

7.108 We believe that there are good reasons for applying deadbands to performance incentives in a price control. We understand that this is to some extent a matter of judgement; however, we were persuaded by evidence in this redetermination that a greater use of deadbands is appropriate. We outline below that deadbands are appropriate in two additional cases to

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<sup>2064</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), paragraph 3.4

those used in Ofwat's FD: unplanned outages and mains repairs. We set out our decisions in paragraphs 7.223 and 7.234.

7.109 In the matter of caps, collars and the overall cap on the rewards a company can earn from the PC/ODI package, our decisions are set out later in in paragraphs 7.136-7.140.

### *Asymmetric rates*

7.110 As noted at paragraph 7.38, Ofwat's PR19 included asymmetric ODIs. There are a number of sources of asymmetry, primarily:

- (a) underperformance penalties exceed outperformance rewards;
- (b) penalty-only ODIs; and
- (c) where caps are set closer to the PC level than collars.

7.111 The Disputing Companies said that the ODI package, along with other elements of Ofwat's FD such as the cost-sharing mechanism, was unfairly skewed towards penalising them, compared with rewarding them for high performance. They linked this perceived skew to potentially undermining incentives, and the duty to ensure companies are financeable.

7.112 In this section we consider what role asymmetry should play in our determinations.

7.113 Ofwat made the following statements about the role of asymmetry:

Where we intervene, we set outperformance rates lower than underperformance rates in absolute terms (using a multiple of 1.2), to capture the likely diminishing returns of service improvement. This captures customer preferences and the average ratio of underperformance to outperformance suggested in companies' business plans. We only use the multiplier where we are intervening on an underperformance or outperformance rate and need to adjust the corresponding rate accordingly. Where we do not have reason to intervene then we consider that the ratio between under- and outperformance rates could be different to 1.2 for that particular PC.<sup>2065</sup>

First, our approach to outperformance was based on customer engagement, and in some cases, customers did not want to have

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<sup>2065</sup> Ofwat (2019), [PR19 final determinations: Delivering outcomes for customers policy appendix](#), p98



an outperformance payment, or found it hard to value it. For example, customers can struggle to financially value asset health measures, and in any case often consider asset health a core function of the business for which it should not receive additional outperformance payments. It would be inappropriate to have outperformance payments that are higher than the value that customers place on the benefit or are willing to pay. Companies have also, based on their interpretation of customer research, proposed underperformance rates exceeding outperformance rates. This suggests that companies also believe that customers can take a different view of outperformance to underperformance.

Second, in some cases 100% compliance is the statutory requirement. In these cases, our underperformance rate simply reflects lack of compliance with statutory obligations, and outperformance payments are not feasible.<sup>2066</sup>

7.114 Anglian made the following statement about the ODI framework in Ofwat's FD:

High penalties relative to low rewards and unattainable targets translate into a pronounced downside skew ... where companies are likely to trigger penalties even if improving performance levels. In several cases, companies may prefer simply to accept a penalty than to strive to meet an unrealistic target. This creates perverse incentives and takes away funding which could be spent in ways which customers value.<sup>2067</sup>

7.115 Bristol said:

Ofwat's introduction of significant asymmetric risk is not appropriate as a regulatory design and undermines our financeability, given the inadequate financial resilience it has imposed on us under the final determination through the cost of capital errors and cost allowance errors. It further compromises our ability to secure a reasonable return on our capital is one of the reasons why Ofwat has failed to meet its finance duty.<sup>2068</sup>

7.116 Northumbrian said:

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<sup>2066</sup> Ofwat's response to common issues in companies' SoCs: Outcomes, p50

<sup>2067</sup> Anglian SoC, paragraph 105

<sup>2068</sup> Bristol SoC, page 8

In aggregate FD19 results in an asymmetric package of measures which is unfinanceable. PC/ODI incentives are negatively skewed overall with reasonable analysis indicating more downside risk than upside opportunity even before the level of stretch in the targets themselves is considered, cost-sharing factors and uncertainty mechanisms are also negatively skewed. Overall this results in an unfinanceable package.<sup>2069</sup>

7.117 Yorkshire said:

The consequence of Ofwat's interventions is that the final determination ODI package is heavily skewed towards downside risk – which Ofwat could have established, if it had used a more robust approach to risk analysis.<sup>2070</sup>

7.118 We have considered the potential effects of symmetrical and asymmetrical ODIs for the Common PCs with financial ODIs, and the aggregate effects to estimate the scale of the downside risks faced by the companies under these Common ODIs.

7.119 Our analysis is shown in Tables 7-3 and 7-4. This includes leakage, which is considered separately in section 8. This provides a maximum penalty amount a company could incur for each PC. Taking the net effect of the maximum penalty, and the maximum reward, available for a single PC gives the overall financial risk of the ODIs attached to that PC – neutral (for symmetric ODIs), or downside risk (for penalty-only or asymmetric ODIs).

7.120 We calculated the possible penalties at P10 performance level, or at collar levels where this appeared more relevant, and compared with the potential rewards for asymmetric but not penalty-only ODIs. We have netted this against the maximum reward available for each PC. For symmetric ODI rates, we have assumed that the net downside risk is zero. Given the difficulty in accurately measuring the likelihood of significant outperformance against underperformance, we have not attempted to measure the effect of differences in approach to setting caps relative to collars, which would represent an additional source of asymmetry.

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<sup>2069</sup> Northumbrian SoC, paragraph 497

<sup>2070</sup> Yorkshire SoC, paragraph 154

**Table 7-3: Analysis of Ofwat's Common PCs' ODI downside penalty risk**

		Northumbrian		Anglian		Yorkshire		Bristol		£m
PC	Symmetry/ Penalty only/ Penalty rate higher than reward rate	Maximum penalty	Net downside	Maximum penalty	Net downside	Maximum penalty	Net downside	Maximum penalty	Net downside	
Compliance	P only	-18.2	-18.2	-29.3	-29.3	-17.9	-17.9	-1.8	-1.8	
Risk Index	Symmetric	-15.1		-64.4		-68.9		-8.1		
Water supply interruptions	P rate 1.2 x reward rate.	-23.9	-4.0	-45.6	-39.4	-33.8	-5.6	-2.0	-0.3	
Leakage	P rate 1.2 x R rate	-0.8	-0.1	-18.7	-3.1	-32.6	-5.4	-3.4	-0.6	
Per capita consumption	P only, except Northumbrian	-3.3	-1.1	-22.1	-22.1	-63.8	-63.8	-6.0	-6.0	
Mains repairs	P only	-36.6	-36.6	-19.1	-19.1	-58.5	-52.8	-4.5	-4.5	
Unplanned outages	Symmetric	-22.9		-52.9		-79.2		n/a	n/a	
Internal sewer flooding	P rate 1.6 x R rate	-11.9	-4.5	-31.4	-11.8	-38.9	-14.6	n/a	n/a	
Pollution	P only	-2.5	-2.5	-26.0	-26.0	-21.8	-21.8	n/a	n/a	
Sewer collapses	P only	-9.0	-9.0	-24.3	-24.3	-53.5	-53.5	n/a	n/a	
Treatment works compliance										
<b>Total</b>		-144.2	-76.0	-333.8	-175.1	-463.2	-235.5	-25.8	-13.2	
Per annum		-28.8	-15.2	-66.8	-35.0	-92.6	-47.1	-5.2	-2.6	

Source: CMA analysis

Note: Table based on CMA review of RFI responses from the Disputing Companies. Where there are two-way penalties, the range of performance against the PC is assumed to be symmetric, except for Anglian's leakage caps and collars, where our calculations reflect that the collar includes greater penalties than the cap provides opportunities for rewards. Leakage is discussed further in section 8.

**Table 7-4: Indicative total scale of asymmetry of Ofwat's ODI penalties and rewards**

	Northumbrian		Anglian		Yorkshire		Bristol	
	Penalty	Asymmetry	Penalty	Asymmetry	Penalty	Asymmetry	Penalty	Asymmetry
£m per annum	-28.8	-15.2	-66.8	-35.0	-92.6	-47.1	-5.2	-2.6
% RCV	-0.8	-0.4	-1.0	-0.5	-1.2	-0.6	-1.0	-0.5
% RoRE (40% equity)	-2.1	-1.1	-2.5	-1.3	-3.0	-1.5	-2.4	-1.2

Source: CMA analysis

7.121 As shown in Table 7-4, under our assumptions the potential exposure to downside risk for the Disputing Companies varies between 2.1% and 3.0% of RoRE. Looking at the asymmetry of netting off the maximum penalty against the maximum reward, this is a net downside of between 1.1% and 1.5% of RoRE. Given these asymmetric ODIs could potentially have a significant impact on returns, we consider further whether and when their use can be justified.

- 7.122 Ofwat disagreed with our estimation of the exposure to downside risk created by the structure of the ODIs for the Common PCs.<sup>2071</sup> We amended the calculation of the asymmetry associated with mains repairs following Ofwat's response, and made some other small changes which are reflected in the final calculations in Tables 7-3 and 7-4 above.
- 7.123 Ofwat provided analysis of companies' performance during AMP6 against the PR14 ODIs.<sup>2072</sup> It said that this meant it did not expect net underperformance over AMP7, and that there was 'reduced asymmetry' in the PR19 ODI structures compared with that in the PR14 structures.<sup>2073</sup> Ofwat submitted a detailed analysis based on its analysis of actual performance in AMP6, where it calculated that management actions meant that the actual distribution of outcomes had not been asymmetric.<sup>2074</sup>
- 7.124 We do not agree that Ofwat's historic analysis of companies' performance in AMP6 demonstrates that there is no asymmetrical risk in the AMP7 ODI framework. The PC and ODI framework in PR19 is different in scope (more financial incentives, including the introduction of new penalty-only incentives) and design (rates, caps and collars) from the PR14 framework. In our view, whether the PR19 framework creates an overall asymmetric risk depends on the PR19 structure. We also saw that the companies prepared their own analysis of the distribution of returns under the ODI framework. Bristol Water provided a Monte Carlo analysis with its assessment of the distribution of returns for the ODIs, and concluded that its package of ODIs was more asymmetric than we had calculated. Yorkshire Water provided an analysis of its business plan where it estimated that it expected to incur penalties of around 1% of RoRE.
- 7.125 We discuss the Disputing Companies' submissions further when we assess the consequences of asymmetry in section 9 (9.1334-9.1344). However, we found that this analysis illustrates that there are a number of ways of measuring the risk which will be introduced by the PR19 outcomes framework, which represents a significant expansion of the outcomes framework. In our view, trying to specify the 'right' measure of risk is not plausible at this stage, and experience from AMP7 as to how companies respond to Common PCs may help with designing incentives beyond the current period. We did not find that either Ofwat or the companies had provided sufficient evidence to demonstrate that the PCs had been set at a level which would result in expected outperformance or expected

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<sup>2071</sup> [Ofwat's response to the Provisional Findings – risk and return](#), paragraph 1.7, paragraphs A2.8-A2.9

<sup>2072</sup> [Ofwat's response to the Provisional Findings – risk and return](#), paragraphs A2.32-A2.36

<sup>2073</sup> [Ofwat's response to the Provisional Findings – risk and return](#), paragraph A2.37

<sup>2074</sup> [Ofwat's response to the Provisional Findings – risk and return](#), Appendix A2

underperformance across the portfolio. We therefore conclude that the structural asymmetry in the design of the ODIs should be considered as part of the in-the-round assessment of the risk associated with the determination, and that this should not be adjusted for expected outperformance or expected underperformance against the PCs.

7.126 Ofwat suggested that if asymmetry in the PC/ODI framework created asymmetric risk, then rather than taking this into account in the aiming decision on the cost of capital, this would be better addressed by adjusting the ODIs: either collars on underperformance penalties or adjusted incentive rates.<sup>2075</sup> We do not agree that adjusting ODI collars or rates is appropriate at this stage to address overall asymmetric risk. PCs and their associated ODI rates are intended to incentivise service improvement. The definition of PCs and ODIs has been developed over PR19 and we consider it would not be appropriate at this stage to fundamentally change the way in which they are designed and calibrated. Our assessment is that the package of penalty-only ODIs is expected to either result in a significant package of improvements in service, or in penalties that will return any underperformance to customers. This balance of risk has been implemented following a long process in PR19 and we consider that it is not appropriate as part of these redeterminations to intervene to, for example, put in place rewards or much reduced penalties as an alternative to asymmetry for the Disputing Companies.

7.127 We have taken the approach of adjusting rates, collars (including deadbands) and caps, where we consider that there is evidence relating to the relevant PC for the CMA to determine a different rate, collar or cap.

#### *Potential reasons to favour asymmetric incentives*

7.128 We now consider several possible circumstances where the use of asymmetric rates may be appropriate:

- *where the standard for compliance is set at the minimum*

7.129 The first reason to use penalty-only incentives is where there is a significant negative effect of the failure to achieve a PC, but conversely, out-performing the measure may not result in a better standard of service for customers, or is not possible.

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<sup>2075</sup> [Ofwat's response to the Provisional Findings – risk and return](#), paragraph 3.15

7.130 This is most obvious for the statutory measures: CRI, which relates to drinking water quality, and treatment works compliance. The statutory requirement for CRI is for a company to score zero, that is no recorded incidents of unwanted contents in drinking water.<sup>2076</sup> Companies are expected to deliver the statutory standard for the funding they receive. It is not possible to out-perform these statutory commitments, and so incentives to do so would not make sense.

- *to reflect customer preferences on relative performance*

7.131 Customers may be concerned about companies earning rewards for outperformance against some PCs. For example, Ofwat noted that customers often consider asset health a core function of the business for which it should not receive additional outperformance payments (see paragraph 7.113).

7.132 More broadly, on any measure where there may be diminishing benefits from further improvements in performance, customer interests may be better served by lower benefits once a target level is achieved.

- *to focus management attention on achieving the PC*

7.133 Performance against some PCs may be directly linked to management spend and time, and for these PCs a target with a penalty, or an asymmetric ODI, may be most effective in providing strong incentives to management to achieve the target.

7.134 ODIs with strong penalties can also ensure that companies have the incentive to mitigate the consequences of adverse events, even if the events themselves could not have been avoided.

- *to reflect the asymmetric information (or limited information) faced by Ofwat when setting incentives*

7.135 The PC/ODI level is initially set using information from companies, and it is possible in some cases that there could be errors in the setting of the PC/ODI which Ofwat is not able to identify. Where there is the greatest uncertainty about setting the appropriate levels of the PC/ODI, there is a case for reduced financial incentives. Equally, this may also be a reason to

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<sup>2076</sup> The CRI gives weights to the presence of various contaminants in drinking water, based on their potential effect on customers (health, aesthetics such as smell and taste) and other measures such as indicators of sub-optimal screening and treatment. A guide from the Drinking Water Inspectorate (DWI) to the index is available here: DWI (2018), [DWI Compliance Risk Index](#)

moderate the size of penalties, in cases where there is uncertainty about the achievability of PCs.

*Our conclusions on asymmetric rates*

7.136 In light of the above factors for and against the use of asymmetric incentives, we have decided to assess the proposed use of asymmetric incentives with reference to the following criteria:

- (a) Is there evidence that customers would not be willing to pay for outperformance, including where there is a statutory minimum requirement?
- (b) Is the PC hard to measure, and therefore is there good reason not to provide rewards to companies which may be in practice due to the approach to calibration of the PC?
- (c) Is there a strong link between failing the PC and management failure?

7.137 Where these criteria are most clearly met, we consider that there is justification for an asymmetric or penalty-only incentive.

7.138 At the same time, we recognise that ODIs have the disadvantage as part of the overall risk and reward framework that that they represent additional asymmetric risks to investors. We consider this risk further below in the context of the overall PC and ODI package for each Disputing Company resulting from our redeterminations.

7.139 We have therefore considered adjustments to the design of ODIs, where there is weaker evidence for asymmetric incentives against the criteria in paragraph 7.136. This should both provide an appropriate form of incentive to meet the relevant PCs and also reduce the scale of asymmetric risk faced by investors.

*Summary of our approach to assessing the ODIs*

7.140 Based on the analysis above, we take the following approach to assessing the PCs and ODIs in the scope of our review (Common PCs and a limited number of Bespoke ODIs);

- (a) we agree with Ofwat that comparing across the companies is appropriate, and assess the adjustments Ofwat made on that basis for each of the ODIs;

- (b) for each of the ODIs where there is an improvement in service required across the sector, we consider whether there is evidence that the costs to achieve these would not already be included in base totex;
- (c) we review the case for caps, collars and deadbands, particularly where the targets and incentives are most difficult to measure; and
- (d) we have assessed the use of assumptions which result in asymmetric ODIs, having regard to the criteria in paragraph 7.136. We also consider the effect of a package of asymmetric ODIs as part of our analysis of the cost of capital and financeability.

## Assessment of Common PCs and ODIs

7.141 We now review the Common PCs that Ofwat set and their associated ODIs, with the exception of four measures:

- (a) The C-MeX and D-MeX PCs, see Figure 7.1, which have financial incentives attached. These are measures of satisfaction with the service received and fall within the retail price control. Neither the Disputing Companies nor any third party made representations on these. We have therefore decided not to consider further Ofwat's determinations of these PCs and the incentives associated with them.<sup>2077</sup>
- (b) The resilience PCs (risk of sewer flooding in a storm, and risk of severe restriction in a drought), which do not have related financial incentives. Neither the Disputing Companies nor any third party made representations on these.

7.142 We first assess the three Common PCs set with PC levels at upper quartile level, which are water supply interruptions, internal sewer flooding and pollution incidents. We then review the remaining individual Common PCs.<sup>2078</sup>

### *The three upper quartile PCs*

7.143 This section reviews three Common PCs where Ofwat set targets based on upper quartile performance. Ofwat asked the water companies to propose PC targets in their business plans based on their view of upper quartile performance.<sup>2079</sup> Ofwat then intervened to set the targets for all the

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<sup>2077</sup> [CMA approach to water redeterminations](#), paragraph 73

<sup>2078</sup> Unless otherwise stated, the performance data for the charts in this section was provided to us by Ofwat.

<sup>2079</sup> Ofwat (2017), [Delivering Water 2020: Our final methodology for the 2019 price review](#), p53



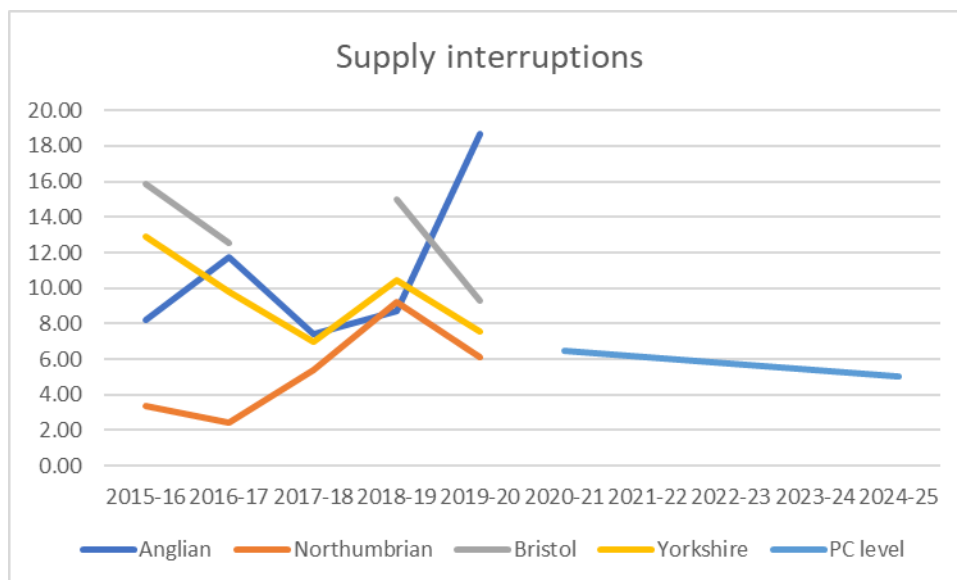
companies at a level based on the upper quartile of these business plan targets. For one of the three upper quartile PCs, water supply interruptions, Ofwat then moderated the target in its final determination to reflect submissions from the companies and past performance.

- 7.144 The use of upper quartile as a target for companies to achieve efficient performance is fairly standard in regulation and has also been used in the assessment of base totex. Whether upper quartile is achievable by the sector as a whole on any particular measure will depend on the reasons for the difference in performance between average and high-performing companies. In the case of the three Common PCs, the upper quartile targets are based not on actual upper quartile performance but on a comparison of the targets included in business plans. We have considered the targets for each of the relevant PCs based on evidence of actual performance and based on the Parties' submissions.

### *Water Supply Interruptions*

- 7.145 This PC deals with interruptions to water and incentivises water companies promptly to resolve operational events that lead to no water supplies. Significant supply interruptions, affecting multiple properties, often arise from bursts on trunk mains, but they can also arise from failures of upstream assets. While local conditions may affect the differing extent of challenges faced by companies, this PC is principally measuring the efficiency of responses to resolve operational incidents.
- 7.146 Water supply interruptions are measured as the time, in minutes, that customers on average are without water, rather than minutes per interrupted customer. This PC captures only 'no water' incidents lasting over three hours. Hence it serves to encourage companies both to have resilient networks and to restore supplies without delay through efficient operations.
- 7.147 The PC in Ofwat's FD is based on a glide path from 6 ½ minutes in year 1 of AMP7 (2020/21) to 5 minutes by year 5 (2024-25). To put this into context, Northumbrian's average AMP6 outturn was just over 5 minutes; for Anglian and Yorkshire it was around 10 minutes; whereas Bristol averaged over 25 minutes due to a major operational incident in 2017/18 when 35,000 properties were without water for up to 29 hours. This is shown on the following Figure 7-4, with Bristol's outturn of 75 minutes per property in 2017/18 excluded from the chart to assist with scaling.

**Figure 7-4: Disputing Companies' supply interruptions performance in AMP6, and AMP7 PC level**



Source: CMA analysis. Average minutes per property with no water.  
Bristol's performance in 2017/18 was 76 minutes and is excluded from this chart to preserve scaling.

7.148 Ofwat provided Figure 7-5, which illustrates the level of stretch in the PC for water supply interruptions in AMP7, by showing the industry average performance in AMP6 for comparison.

**Figure 7-5: Industry average performance on water supply interruptions in AMP6, and Ofwat's PC level for AMP7 for all companies**



Source: Ofwat - [Response to common issues in companies' SoCs: Outcomes](#)

- 7.149 The rewards for outperformance and penalties for underperformance are symmetrical and there are no deadbands. Ofwat agreed to both Yorkshire and Northumbrian having Enhanced ODIs as they are high performers.

#### *Ofwat's views*

- 7.150 Ofwat told us that it had softened the target from the Draft Determination based on representations that a target of 3 minutes for upper quartile by year 5 was too stretching for many companies and hence may not be achievable. It noted that AMP6 performance had been mixed, rather than an improving trend. Ofwat also noted that Northumbrian already had strong performance that had been regularly better than the AMP7 PC and that Yorkshire had forecast much better performance than the AMP7 PC.

#### *Disputing Companies' views*

- 7.151 Only one of the four Disputing Companies raised significant concerns about the PC for water supply interruptions. Anglian suggested that to meet the upper quartile target, it would have to make investments in a range of equipment which would increase its ability to address unplanned interruptions within the target period. Anglian also told us that its customers were unwilling to pay for improvements in supply interruptions.
- 7.152 As a means of addressing its concern, Anglian, in its response to our Provisional Findings, suggested we consider increasing its outperformance cap.<sup>2080</sup>

#### *Engineering Adviser Views*

- 7.153 Our engineering adviser, WRc, advised us that Ofwat's PC for water supply interruptions would be a challenge for some companies, but that a PC of 5 minutes in 2024/25 is achievable, whereas 3 minutes is unrealistic. It did not suggest that there were company specific issues outside of management control, such as topography, that were so unique or unusual, that would require company specific adjustments to be made to the target. It noted that while some major operational incidents may be triggered by events outside management control, a company's response to that incident lies within management control.
- 7.154 Companies may receive penalties if they do not resolve major problems promptly during rare extreme operational events. Such penalties are subject

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<sup>2080</sup> [Anglian's response to the provisional findings](#), paragraph 350

to collars, which contain the financial effect of major incidents whose trigger event may be outside management control. Our engineering advisers advised that companies could improve by learning lessons from previous events and that for some companies in the sector, there was scope to prioritise this further. For example, our engineering advisers told us that companies could improve by developing good telemetry and sensor coverage and a workforce that is able to respond quickly to maintain supply (and/or minimise the number of customers affected) through appropriate interventions such as re-valving or bypassing mains failures through temporary connections. Our advisers also told us that the degree to which supply interruptions commitments can be met is in a large part down to the way in which network operations are managed and delivered.

#### *Our assessment and decision*

- 7.155 We consider that it is reasonable to impose PCs which require further improvement across the sector in the form of Ofwat's target of moving towards upper quartile level for supply interruptions. The moderated target of 5 minutes by the end of AMP7 appears to require improvements which are consistent with continuing historical trends in performance, and appears to be achievable based on current performance trends for high performing companies including Northumbrian and Yorkshire.
- 7.156 In relation to Anglian's claims that it would need to make additional investments to meet upper quartile targets, since we accepted that it is reasonable to impose targets based on industry evidence, then Anglian would be expected to meet the cost of improvements which are necessary to achieve the target. The implication of the sector comparison is that other companies are already delivering better performance, either through improvements in productivity or through existing investments which will be reflected in in base cost allowances.
- 7.157 It is therefore possible that Anglian has underspent relative to comparators in the past or has not invested as well in areas that would minimise supply interruptions. As noted above, while local conditions may impact on the differing extent of challenges faced by companies, this PC is principally measuring the efficiency of responses to resolve operational incidents. We are not persuaded that the costs identified by Anglian as being associated with improving performance against supply interruptions targets go beyond what could be expected to be in the base cost allowances.
- 7.158 Anglian provided a long list of examples of spend it might need to incur to improve performance further, based on AMP6 experience. We have separately considered any evidence from the Disputing Companies for

enhancement spend to reflect any local conditions they face. Anglian has made a number of submissions for enhancement spend, which we consider in Section 5. As discussed in paragraph 7.198, the framework for PCs and ODIs is designed with the intention that PCs are set at a level which is consistent with high performing companies, and therefore will require investment by other companies. It is for company management to work out how best to respond to those challenges.

7.159 We note that Anglian's outperformance cap will be higher than most other companies during the whole of AMP7, only dipping below several other companies' caps in the final year. Those companies will have had lower outperformance caps than Anglian earlier in AMP7.<sup>2081</sup> We therefore do not consider that Anglian's outperformance cap should be adjusted.

7.160 We decide that it is appropriate to retain the PC and ODIs for water supply interruptions in line with Ofwat's FD for all four Disputing Companies. Furthermore, we reject any requests for cost allowances to be made to achieve the targets set.

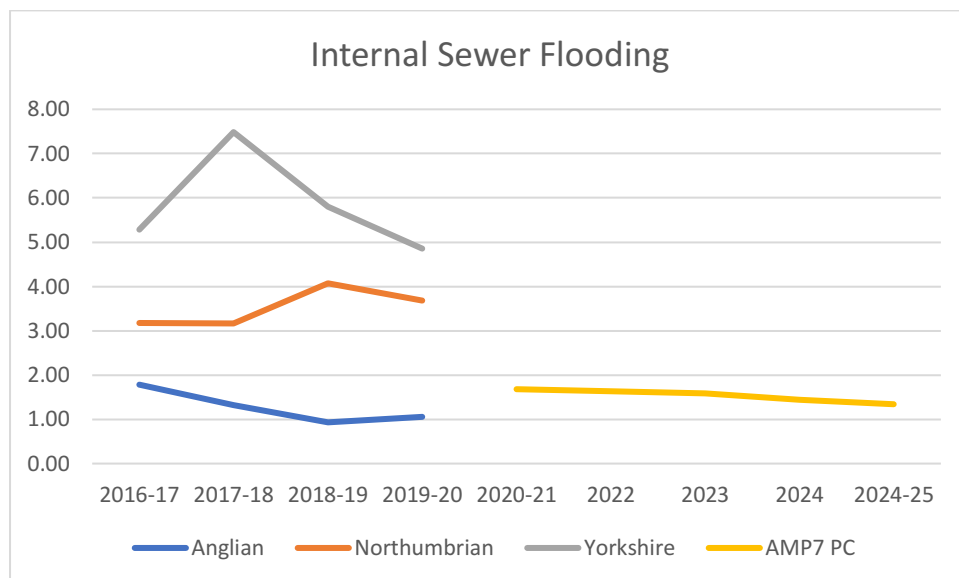
### *Internal Sewer Flooding*

7.161 This PC relates to the number of properties experiencing wastewater flooding in their property. The PC in Ofwat's FD is based on a glide path for forecast upper quartile performance from 1.68 (year 1) to 1.34 (year 5) incidents per 10,000 sewer connections. To put this into context, for the three relevant Disputing Companies, performance in 2019/20 was 1.1 for Anglian; 3.7 for Northumbrian and 4.9 for Yorkshire. This data also reflects overall AMP6 performance – Anglian already has comparatively strong performance for internal sewer flooding relative to Northumbrian and Yorkshire. This is shown in Figure 7-6.

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<sup>2081</sup> [Anglian's response to the provisional findings](#), Figure 11, p68

**Figure 7-6: Disputing Companies' internal sewer flooding performance in AMP6, and Ofwat's AMP7 PC level for all WASCs (incidents per 10,000 sewer connections)**



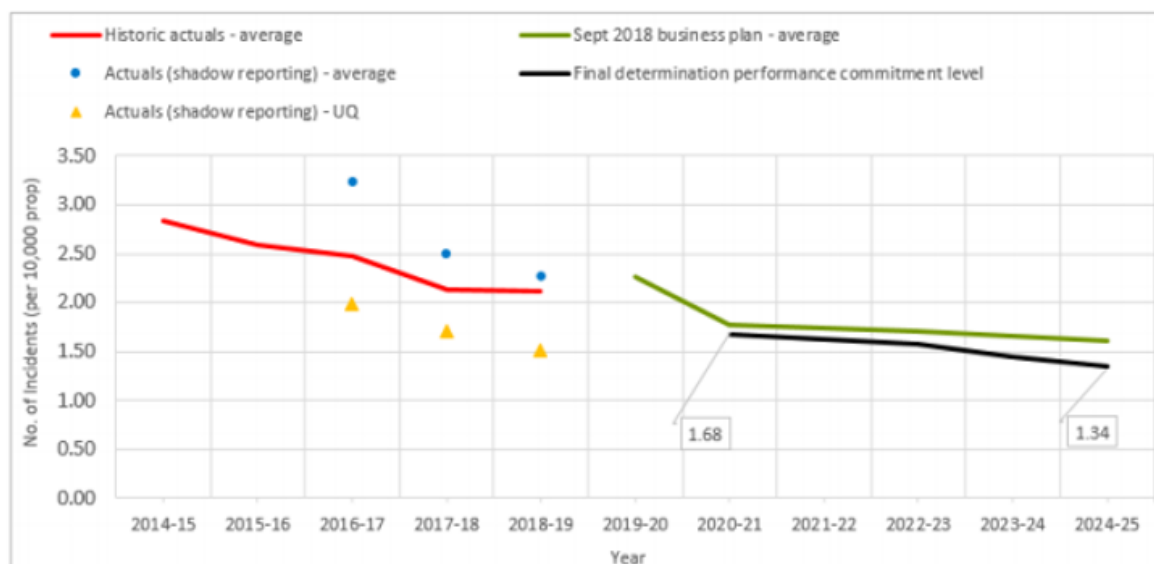
Source: CMA analysis.

7.162 The rewards for outperformance and penalties for underperformance set in Ofwat's FD are symmetrical and there are no deadbands. The penalty collars at the end of AMP7 (year 5) are 3.35 for Anglian, 4.0 for Northumbrian, and 4.1 for Yorkshire in Ofwat's FD. There are no Enhanced ODIs. This PC does not apply to Bristol as it is a WOC.

#### *Ofwat's views*

7.163 Ofwat noted that the PC stretch required in the AMP7 period was similar to the improvements experienced in the AMP6 period (2015-2020). Ofwat provided Figure 7-7, illustrating the level of stretch in the PC for internal sewer flooding in AMP7, by showing the industry average performance in AMP6 for comparison. This shows that the AMP7 PC is based on an expectation that the historic improvement seen since 2014/15 should continue through to 2025.

**Figure 7-7: Industry average performance on internal sewer flooding in AMP6, and Ofwat's PC level for AMP7 for all WASCs**



Source: Ofwat - [Response to common issues in companies' SoCs: Outcomes](#)

### *Engineering adviser views*

- 7.164 Our engineering adviser, WRc, suggested that there is insufficient evidence to provide a basis for setting individual PCs for internal sewer flooding for each of the WASCs. It noted that if all WASCs have the same PC for internal sewer flooding, some companies would have varying degrees of company specific challenges to address but considered this could be addressed through the cost allowances made. It noted that WASCs' work typically focuses on the improved management of operational issues, namely tackling sewer blockages and their potential impacts and through addressing the reliability of key assets that present a significant risk of failure, namely that of pumping stations and rising mains, which also contributes to preventing pollution incidents.
- 7.165 Our engineering adviser noted that the WASCs have invested heavily in past regulatory control periods to tackle many of the distinct sources of failure such as structural asset failure and areas at risk of hydraulic overload in the sewer network. This past investment was now having a positive impact on performance. Incident response was also a factor impacting on future performance. In our advisers' view, early notification, timely response, effective mitigation measures and appropriate repair by suitably trained staff will lead to higher performance and lower levels of sewer flooding incidents.

## *Disputing Companies*

- 7.166 The three relevant Disputing Companies did not raise specific issues with this PC before the Provisional Findings. However, Yorkshire and Northumbrian requested additional enhancement funding based on a desire to lower the risk of customers experiencing internal sewer flooding. We have considered those requests and set out our final determinations on them, in Section 5.
- 7.167 In its response to our Provisional Findings, Yorkshire said that if we confirmed our provisional decision not to award an enhancement allowance for one of its proposed schemes, confirming our provisional decision to increase its underperformance collar would expose it to ‘inappropriate financial risk’.<sup>2082</sup>
- 7.168 Anglian proposed that we consider increasing its outperformance cap for this PC.<sup>2083</sup> It argued that ‘on these metrics, the potential for outperformance by other companies is higher’ over AMP7.

## *Our assessment and decision*

- 7.169 We consider that Ofwat’s internal sewer flooding PC targets are set at reasonable levels. The PC trend required in AMP7 is broadly a continuation of historic performance. The PC should be achievable across the sector, subject to separate consideration of whether any enhancement spend is required. We recognise that two of the Disputing Companies, Northumbrian and Yorkshire, have been worse performers on internal sewer flooding, and that they will need to make significant improvements to achieve the PCs.
- 7.170 We separately considered as part of our enhancement assessment the case made by Yorkshire and Northumbrian for additional cost allowances to cover the costs of mitigating certain causes of sewer flooding:
- for Yorkshire's Living with Water Partnership in Hull, we approved additional enhancement funding in order to support improving service levels on sewer flooding and flooding more generally, see paragraphs 5.212-5.259.
  - we rejected Yorkshire's other requests for enhancement funding for internal sewer flooding, see paragraphs 5.260-5.315

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<sup>2082</sup> [Yorkshire's response to the Provisional Findings](#), paragraph 6.8.18

<sup>2083</sup> [Anglian's response to the Provisional Findings](#), paragraph 350



- for Northumbrian's Sewer Flooding Resilience Scheme, we rejected the proposed enhancement request, see paragraphs 5.376-5.429.

7.171 In our analysis of the components of this PC, we noted that Yorkshire's penalty collar for underperformance is set at 2.7 in year one rising to 4.1 incidents per 10,000 sewer properties by year 5. This is lower than its recent performance in the last four years of AMP6, where the outturn has been between 4.9 and 7.5 incidents per 10,000 connections, averaging at 5.9. For Northumbrian and Anglian, their penalty collars are set above historic levels of performance for internal sewer flooding.

7.172 We consider that there is a risk that the current penalty collar may not encourage Yorkshire to improve its performance, in that Yorkshire would stop incurring additional penalties at a level which is below current performance. We note that Yorkshire has made some improvement over the past two years. We decide that its penalty collar for potential underperformance should be re-set in line with Table 7-5 to incentivise improvements. The year 5 position of a penalty collar at 4.9 incidents per 10,000 sewer connections is consistent with Yorkshire's 2019/20 outturn performance.

**Table 7-5: Yorkshire's internal sewer flooding performance in AMP6, and our proposed AMP7 underperformance collars for Yorkshire**

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
Actual	5.3	7.5	5.8	4.9					
Ofwat FD					2.7	3.0	3.5	3.7	4.1
Penalty Collar									
CMA proposed					2.7	3.2	3.8	4.3	4.9
Penalty collar									

Source: Ofwat and CMA.

Note: numbers are per 10,000 connected properties.

7.173 In conclusion, we consider that the internal sewer flooding PC levels, and ODI rates, in Ofwat's FD are appropriate.

7.174 We have considered Yorkshire's and Anglian's representations since our Provisional Findings on their collar and cap levels.

7.175 While we note Yorkshire's view that the increased collar increases its exposure to financial risk, we consider it important that the collar should be set to ensure that there are financial incentives to maintain performance that is at least as good as was achieved during AMP6. The collars we proposed for the five years of AMP7 start at the same level as in Ofwat's FD and increase only slightly. We think it is right that there should be a financial incentive in year 5 that fully recognises the underperformance implied by an outcome no better for customers than in 2019/20. As discussed in paragraphs 5.260-5.316, we considered Yorkshire's enhancement requests

for internal sewer flooding and concluded that Yorkshire had not shown that they were necessary in addition to the base allowances to achieve target levels of service. On that basis, customers should expect to be compensated if Yorkshire's performance is not at least as good as in AMP6.

7.176 We note Anglian's view that its outperformance cap is set at higher levels of internal sewer flooding than for some (but not all) other companies.<sup>2084</sup> However, the ODI rates for companies also vary, affecting the absolute amount of rewards potentially available. Some companies, such as Severn Trent and South West Water, which have more 'headroom' set by their outperformance caps, also have asymmetric ODI rates, with higher penalties for underperformance than rewards for outperformance. There is no reason why the cap number should be the same for all companies. We do not consider that Anglian has made a case for increasing its outperformance cap.

7.177 Therefore, we decide that the collar and cap levels should be set at the levels set in Ofwat's FD, with the adjustment set out in paragraph 7.172 to Yorkshire's underperformance collar.

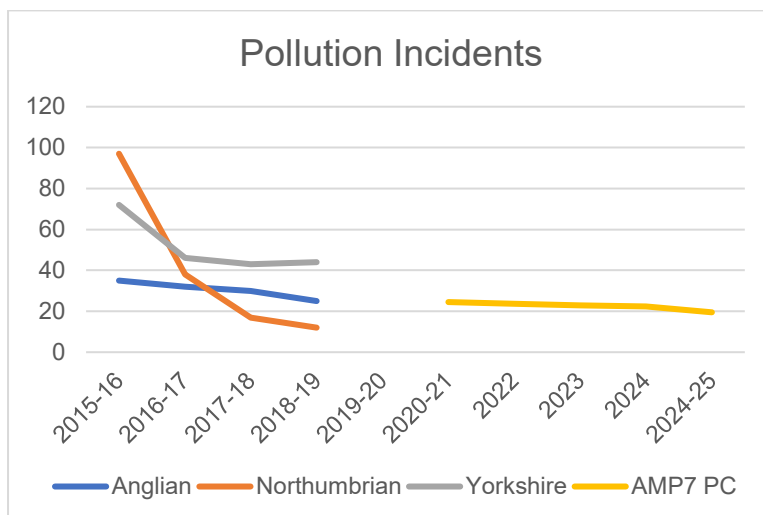
### *Pollution Incidents*

7.178 This PC relates to the number of pollution incidents caused by asset failures and operational activity associated with wastewater operations. The PC in Ofwat's FD is based on a glide path for forecast upper quartile performance from 24.5 (year 1) to 19.5 (year 5) incidents per 10,000 km of wastewater network. To put this into context, for the three relevant Disputing Companies, performance in the last years of AMP6 has averaged 30 for Anglian; 15 for Northumbrian and 41 for Yorkshire. Figure 7-8 shows the three Disputing Companies' performance in AMP6, and Ofwat's PC level for AMP7.

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<sup>2084</sup> [Anglian's response to the Provisional Findings](#), Figure 12, p68

**Figure 7-8: Disputing Companies' pollution performance in AMP6, and the Ofwat PC level for AMP7 for all WASCs**



Source: CMA analysis.

Note: Data is number of pollution incidents per 10,000 km of wastewater network.

7.179 Unlike the other two upper quartile PC's discussed above, which have symmetrical ODI rates for outperformance and underperformance for the Disputing Companies, the rewards and penalties for the pollution incidents PC are asymmetric. Penalty rates exceed reward rates. Yorkshire and Northumbrian have Enhanced ODIs. There are no deadbands. The standard penalty collars are 36.8 for Anglian; 41.6 for Northumbrian; and 41.6 for Yorkshire. Anglian has a lower standard outperformance cap at 4.5, whereas this is 9.4 for Northumbrian and Yorkshire.

### *Ofwat's views*

7.180 Ofwat noted that Northumbrian has industry leading performance on pollution incidents and confirmed it should receive outperformance rewards if it continues this good performance.<sup>2085</sup> Yorkshire would face enhanced penalty ODI rates at a level slightly better than its 2018/19 performance, so Yorkshire has a stronger incentive to improve on AMP6 than for most companies. In Ofwat's view, the level of challenge for Yorkshire in meeting the PC level, based on its historically poor performance, reflected Yorkshire's lack of improvement in AMP6.<sup>2086</sup>

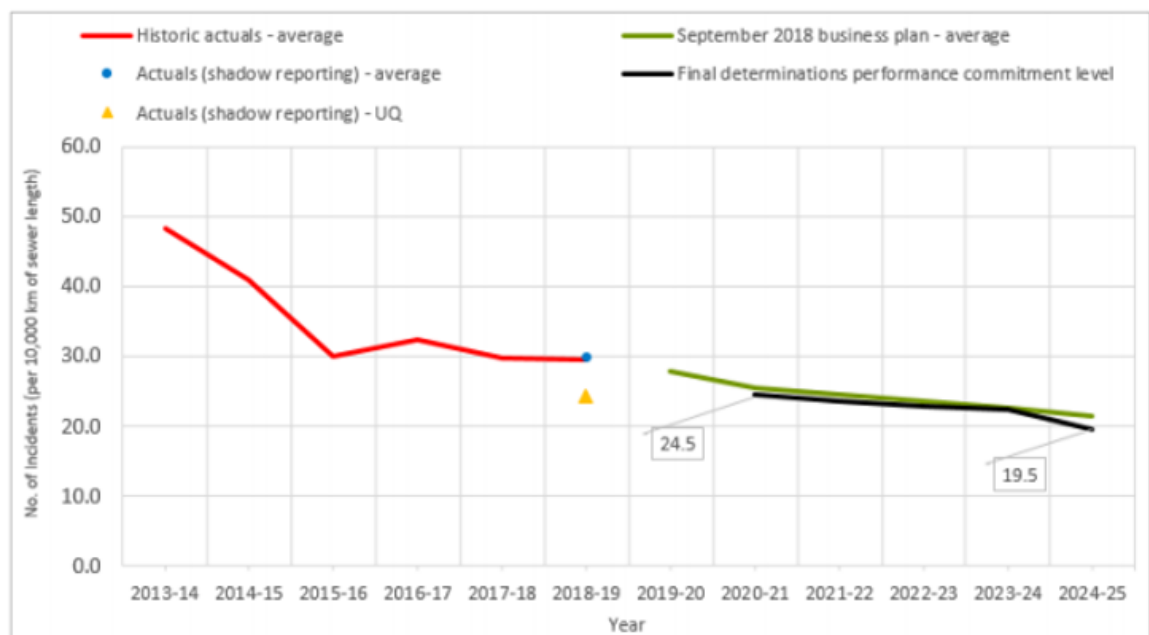
7.181 Ofwat provided Figure 7-9 illustrating the level of stretch in the PC for pollution incidents in AMP7, by showing the industry average performance in AMP6 for comparison. This shows there has been historic improvement seen since 2013/14, with some flatlining across the AMP6 period. The AMP7

<sup>2085</sup> Ofwat's response to Northumbrian's SoC, paragraph 4.9

<sup>2086</sup> Ofwat's response to Yorkshire's SoC, paragraph 5.25

PC represents an expectation that the rate of historic improvement should continue through to 2025.

**Figure 7-9: Industry average performance on pollution incidents, and the Ofwat PC for AMP7 for all WASCS**



Source: Ofwat - [Response to common issues in companies' SoCs: Outcomes](#)

### *Disputing Companies' views*

7.182 The three relevant Disputing Companies did not raise specific issues with this PC.

### *Engineering adviser views*

7.183 Our engineering adviser considered that Ofwat's targeted improvements in the PC were reasonable, given that pollution incidents were often preventable through:

- (a) compliance with recognised asset maintenance strategies, including focusing on key assets that present a significant risk to sewer pollution performance such as pumping stations and rising mains; and
- (b) implementation of proactive operational practices, namely tackling sewer blockages and their resultant impacts, either inside a property (resulting in internal sewer flooding) or in a watercourse or other environmentally sensitive environment (which would lead to a pollution incident).

7.184 Our engineering adviser noted that performance on pollution incidents was influenced by very similar factors to that for internal sewer flooding. It

reflected a combination of investment in key assets to maintain their health and resilience, coupled with good management action of operational issues.

### *Anglian's underperformance collar*

7.185 In our Provisional Findings, we proposed an adjustment to raise the level of Anglian's penalty collar.

7.186 In our analysis of the components of this PC, we noted that Anglian's penalty collar for underperformance is set at 36.8 incidents per 10,000 km for each year of AMP7. This is only slightly above its AMP6 actual performance, where the outturn has been between 25 and 35 incidents per 10,000 km, with performance at 35 incidents occurring in two years.

7.187 We consider that there is a risk that the current penalty collar may not encourage Anglian to improve its performance, to the extent that it would stop incurring additional penalties at a level which is below current performance. Anglian does not have enhanced underperformance penalties, unlike Northumbrian and Yorkshire, so the basis of the standard underperformance penalty cap is particularly important. Also, its performance in 2019/20 represented a deterioration compared to the previous trend in AMP6, suggesting more powerful financial incentives may be needed. Hence, we decide that its penalty collar for potential underperformance should be re-set at 41.6 incidents per 10,000 km, as shown in Table 7-6.

**Table 7-6: Anglian's pollution incidents performance and proposed AMP7 penalty collars**

	2015-16	2016-17	2017-18	2018-19	2019-20	AMP7 (2020-21 to 2024-25)
Actual	35.0	32.0	30.0	25.0	35.0	
Ofwat FD Penalty Collar						36.8
CMA proposed Penalty collar						41.6

Source: Ofwat and CMA

Note: numbers are incidents per 10,000 km of wastewater network.

7.188 Anglian was concerned that our provisional increase in its penalty collar for pollution incidents would increase the asymmetry of the incentive package. It considered that the increased incentive from increasing the collar would overlap with 'very strong reputational incentives from the star rating system and the risk of enforcement action by the EA'. It proposed reducing the collar, instead having a collar that would move in line with the PC level over the five years of AMP7 'to reflect the expectation that performance will

improve during AMP7' and to keep the penalty risk constant. Additionally, it suggested we consider increasing the outperformance cap.<sup>2087</sup>

### *Our assessment and decision*

- 7.189 We conclude that the level for this PC represents a reasonable target for the sector as a whole, and that Ofwat had good reasons to intervene and set a sector-wide target for this PC. Whilst it is based on the upper quartile of projected performance, the PC trend required in AMP7 is broadly a continuation of historic actual trends in performance. We agree with Ofwat that this target should be achievable across the sector, subject to assessment of any enhancement expenditure for individual companies. As with the other Common PCs, some companies will have to improve performance to achieve Ofwat's targets.
- 7.190 Our criteria for assessment of asymmetric ODIs (paragraph 7.136) suggest that asymmetric rewards and penalties are appropriate in this case. The nature of pollution incidents mean that customers would reasonably have concerns in paying rewards to companies for avoiding them, which should be part of the normal course of their business.
- 7.191 Furthermore, we consider that, since the targets should be achievable based on a continuation of the trends in improvement in AMP6, the base cost allowances are sufficient to allow for improvement in performance at a rate consistent with that achieved in AMP6.
- 7.192 We do not agree that the combination of strong reputational incentives, and the risk of enforcement action, mean that there should not be financial incentives that penalise underperformance. The non-price control measures recognise the importance of pollution incidents to customers and other stakeholders. We consider that a collar which is not far below recently achieved performance could dull the incentive to maintain, let alone improve, performance for customers.
- 7.193 Additionally, we note that the objective of ODIs is to provide direct redress for customers in areas with worse service performance. Enforcement is a different concept targeted at companies which have acted negligently, resulting in adverse environmental outcomes.
- 7.194 We decide that the PC levels and ODI rates in Ofwat's FD should stand, and one change should be made to Anglian's underperformance collar:

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<sup>2087</sup> [Anglian's response to the provisional findings](#), paragraphs 348-349

- Anglian's underperformance collar for pollution incidents should be 41.6 incidents per 10,000 km of wastewater network.

### ***Other Common PCs and ODIs***

7.195 We now consider the remaining individual Common PCs and ODIs.

#### ***Per capita consumption***

7.196 All companies have a PC intended to encourage them to act to reduce household per capita consumption, measured as the annual average litres per person per day consumed. This helps reduce the demand for water, which is important as water is a scarce resource. It also encourages environmental protection. There are a variety of ways in which water companies can encourage their customers to use water wisely and hence reduce per capita consumption. These include extending take up of water meters, public and school education and awareness, encouragement to purchase more water-efficient domestic appliances and fix leaking taps, and discouragement of unnecessary activities like garden watering with a sprinkler or hosepipe. Water companies can also provide free devices to customers like shower timers, tap washers and cistern devices. The PC levels are percentage reductions from the 2019/20 baseline.

7.197 Ofwat used several criteria in assessing companies' proposed PC levels. These included:<sup>2088</sup>

- (a) whether the proposed PC level was better than the WRMP target;
- (b) whether it was worse than the upper quartile absolute level of consumption of 128.6 litres per person per day in 2024/25;
- (c) whether the proposed reduction was at least 6.3%, the upper quartile percentage reduction;
- (d) the consistency of the proposed PC level with neighbouring or other similar companies;
- (e) whether the company has a supply/demand deficit;
- (f) other company-specific factors including demography, historic per capita consumption volumes, the total percentage reduction across AMP7 and metering penetration; and

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<sup>2088</sup> Ofwat (2019), [PR19 final determinations: Delivering outcomes for customers policy appendix](#), pp41-42

(g) the evidence provided by the company on why greater reductions than it had proposed would not be achievable.

7.198 Table 7-7 shows the percentage reductions set by Ofwat for the four Disputing Companies.

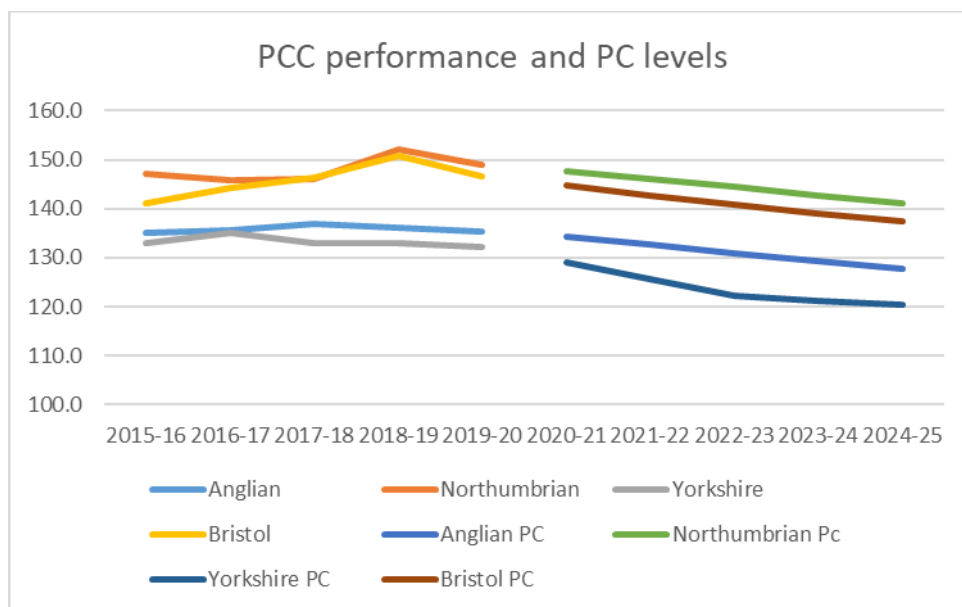
**Table 7-7: Ofwat's PC levels for per capita consumption for the four Disputing Companies**

Per capita consumption	% reduction on 2019-20 base				
	2020-21	2021-22	2022-23	2023-24	2024-25
Anglian	0.8	2	3.2	4.5	5.6
Northumbrian	0.8	1.8	2.9	4.1	5.3
Yorkshire	2.4	4.9	7.4	8.3	8.9
Bristol	1.3	2.6	3.9	5.1	6.3

Source: Ofwat (2019), [PR19 final determinations: Yorkshire Water – Outcomes performance commitment appendix](#)  
Ofwat (2019), [PR19 final determinations: Anglian Water – Outcomes performance commitment appendix](#)  
Ofwat (2019), [PR19 final determinations: Northumbrian Water – Outcomes performance commitment appendix](#)  
Ofwat (2019), [PR19 final determinations: Bristol Water – Outcomes performance commitment appendix](#)

7.199 Figure 7-10 shows the Disputing Companies' performance in AMP6, and their PC levels for AMP7, calculated by the CMA by applying their percentage reduction targets to the 2019-20 outturn, which was not known at the time of Ofwat's FD.

**Figure 7-10: Disputing Companies' per capita consumption performance in AMP6 and Ofwat's PC levels in AMP7, litres/person/day**



Source: CMA analysis.

Note: Data is litres per person per day, annual average

7.200 Tables 7-8 and 7-9 show Ofwat's ODI rates, collars and caps for the four Disputing Companies. Table 7-8 shows the standard rates, and Table 7-9 shows enhanced rates, which apply to Yorkshire but not the other Disputing Companies.



**Table 7-8: Ofwat's per capita consumption ODI rates and collars for the four Disputing Companies**

	<i>Standard underperformance rate (£m)</i>	<i>Collar (% reduction)</i>	<i>Standard outperformance rate (£m)</i>	<i>Cap (% reduction)</i>
Northumbrian	-0.198	-	0.175	-
Anglian	-0.374	-	0.312	-
Yorkshire	-0.222	-16	0.185	12.3
Bristol	-0.067	-8.6	0.056	9.7-11

Source: Ofwat (2019), [PR19 final determinations: Yorkshire Water – Outcomes performance commitment appendix](#)  
Ofwat (2019), [PR19 final determinations: Anglian Water – Outcomes performance commitment appendix](#)  
Ofwat (2019), [PR19 final determinations: Northumbrian Water – Outcomes performance commitment appendix](#)  
Ofwat (2019), [PR19 final determinations: Bristol Water – Outcomes performance commitment appendix](#)

**Table 7-9: Ofwat's per capita consumption Enhanced ODI rates for Yorkshire**

	<i>Enhanced underperformance rate (£m)</i>	<i>Collar (% reduction)</i>	<i>Enhanced outperformance rate (£m)</i>	<i>Cap (% of regulated water equity)</i>
Yorkshire	-0.787	-17.6	0.787	1

Source: Ofwat (2019), [PR19 final determinations: Yorkshire Water – Outcomes performance commitment appendix](#)

## Company views

7.201 Bristol was the only Disputing Company to raise concerns about its ODI rates for this PC. Bristol said that it disagreed with Ofwat's determination of how to allocate customers' expressed willingness to pay for more efficient water use, across this PC and its PC for increasing meter penetration. It therefore considered that the ODIs for these two PCs, taken together, were wrongly calibrated.

7.202 In its business plan, Bristol had proposed a 75% allocation of customer willingness to pay to the meter penetration ODI, with 25% for per capita consumption. This would have led to an underperformance penalty of £-0.024 million per percentage of reduction not achieved, and an outperformance payment of £0.014 million per percentage for achieving additional reductions.<sup>2089</sup> It said that the meter penetration rate was factored into the per capita consumption rates in its Water Plan.<sup>2090</sup>

7.203 Bristol provided evidence that its customers considered that Ofwat's per capita consumption ODI rates were too high, noting that per capita consumption is more within the customer's control than the company's, and is subject to external factors such as weather. The per capita consumption ODI ranked relatively low in customers' prioritisation of financial incentives. Bristol's CCG, the Bristol Water Challenge Panel, made this point in its representation to the CMA:

<sup>2089</sup> [Bristol SoC](#), paragraph 610

<sup>2090</sup> [Bristol's response to the provisional findings](#),p15

The research found that customer priorities did not align with the targets set by Ofwat in the Draft Determination. Customer preferences were supportive of the company's original ODIs and service priorities ...

- 7.204 In response to Ofwat's draft determination, Bristol proposed 'compromise' per capita consumption ODI rates of £-0.030 million for underperformance, and £0.025 million for outperformance<sup>2091</sup>.

#### *Ofwat's views*

- 7.205 Ofwat did not accept Bristol's proposed allocation and rejected its 'compromise' proposal. Ofwat did not agree that the contribution of meter penetration to water efficiency meant that the per capita consumption ODI rate should be adjusted. It said, contrary to Bristol's position, that the separate enhancement funding for Bristol to enable water meter rollout had not been directly factored into Bristol's per capita consumption reduction, which it said 'we expect companies to fund regardless of whether they have enhancement funding and at least partly from their base costs'.<sup>2092</sup>
- 7.206 Ofwat set a cost-recovery based ODI for meter penetration, in line with its broader approach to scheme-based PCs.<sup>2093</sup> On the basis that the meter penetration ODI did not reflect customer willingness to pay for efficient water consumption, it allocated 100% of expressed willingness to pay to the per capita consumption ODI.<sup>2094</sup> The net result was an increase in the combined penalty rates. The per capita consumption ODI rates were £-0.066 million for underperformance and £0.055 million for outperformance in its final determination.<sup>2095</sup>
- 7.207 Ofwat also said that while there was a financial ODI attached to meter penetration, the underperformance claw-back for under-delivery of the scheme would ensure customers did not pay for meters not installed, but would not reflect the loss to consumers for failing to reach the per capita consumption target. As a result, Ofwat believed that customers' willingness

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<sup>2091</sup> [Bristol's response to PR19 Draft Determination](#)

<sup>2092</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), pp 60-61

<sup>2093</sup> Scheme-based PCs differ from other PCs in that they are focused on delivering specified elements of an identified scheme, which are inputs to customer benefit, rather than related to measured outcomes. Ofwat's approach to setting ODIs for scheme-based PCs is set out in [Delivering outcomes for customers policy appendix](#), pp135-141.

<sup>2094</sup> [Ofwat's Response to Bristol's SoC](#), paragraphs 4.29-4.31

<sup>2095</sup> Ofwat (2019), [PR19 final determinations: Bristol Water – Delivering outcomes for customers final decisions](#), p6

to pay for water efficiency should be fully reflected in the per capita consumption ODI.

- 7.208 Ofwat also told us it did not agree ‘that per capita consumption performance was outside companies’ control to a considerable extent’.<sup>2096</sup> It mentioned various means of engagement available to companies to help customers to reduce their water use.

#### *Our assessment and decision*

- 7.209 We agree with Bristol that the two PCs (per capita consumption and meter penetration) contribute to reducing water consumption, and that this overlap of outcomes should be recognised in setting ODI rates. We do not agree with Ofwat’s assumption that no proportion of customer willingness to pay for water efficiency can be assumed to be related to meter penetration, even if this is not used to derive the meter penetration ODI rate because another method is in use. Customers have placed value on more efficient water use, and meter penetration, which is funded from customer bills as a part of the total service, contributes to this outcome.
- 7.210 We therefore do not agree that Ofwat has made a case for allocating 100% of reported willingness to pay for water efficiency to the per capita consumption ODI. We do not think it is plausible to interpret Bristol’s customers’ willingness to pay for improved water efficiency as excluding any efficiency delivered by the meter rollout, which they will be funding through the enhancement allowance.
- 7.211 We also considered the application of the criteria in paragraph 7.136 to justify asymmetric incentives. There is evidence that customers place value on reducing unnecessary water usage and it is not evident that this is subject to diminishing returns. However, we accept that this measure is only partly under management control and will depend on customer behaviour to a considerable extent. Therefore, whilst an asymmetric incentive may be appropriate, the extent of that asymmetry should be limited.
- 7.212 In response to Ofwat’s view that per capita consumption performance is not outside companies’ control to a considerable extent, we agree that companies should have incentives to encourage customers to use water more efficiently. Customer engagement is the main means by which performance is improved in addition to meter penetration and metered consumption charges, but consumption is also affected by weather

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<sup>2096</sup> [Ofwat’s response to the provisional findings – cost and outcomes](#), Table 3.1, p60

conditions and other factors outside companies' control including customer behaviour.

7.213 One example of this is that some companies' reported increases in household water consumption during 2020: while this is likely to be due to a number of factors, it is possible that increases in home-working, and the furlough scheme, played some part. As an example, Anglian, in its post-hearing submission, provided data on changes in household consumption in its region.<sup>2097</sup> As we have noted in section 3, the full impact of COVID-19 and its duration is unknown and still changing. We therefore consider that the most appropriate mechanism for taking the impact of COVID-19 into account would be an Ofwat industry-wide process. However, this provides a clear example of changes in per capita consumption that are outside companies' control.

7.214 We decide to reduce Bristol's per capita consumption ODI rates to those it proposed in response to Ofwat's draft determination: £-0.030 million for underperformance, and £0.025 million for outperformance.

7.215 Ofwat noted in response to our Provisional Findings that these ODI rates would be materially lower than Ofwat's assessed 'reasonable rate' range, and below all other rates in the sector.<sup>2098</sup> However, noting that Bristol's customers placed a relatively low priority on water efficiency, and that they will be asked to fund the meter rollout under the enhancement programme, we do not consider that Ofwat has made a persuasive case for increasing the overall incentive by re-instating its Final Determination ODI rates for per capita consumption.

### *Unplanned outages*

7.216 The unplanned outages PC is new for PR19. It is a Common PC designed to encourage good asset health. The PC and associated ODIs create an incentive on companies to maintain their overground assets so that they are available to maintain reliable supplies.

7.217 Ofwat did not consider there was good enough historical data on unplanned outages to use as a base to set the PC level by extrapolation. Instead, Ofwat took the median level of all companies' forecasts for 2024/25, at 2.34% of peak week capacity lost to unplanned outages, as the good performance level, and set that as the PC level for all companies in 2024/25. Companies at or below that level have a flat PC level profile of 2.34% in all years.

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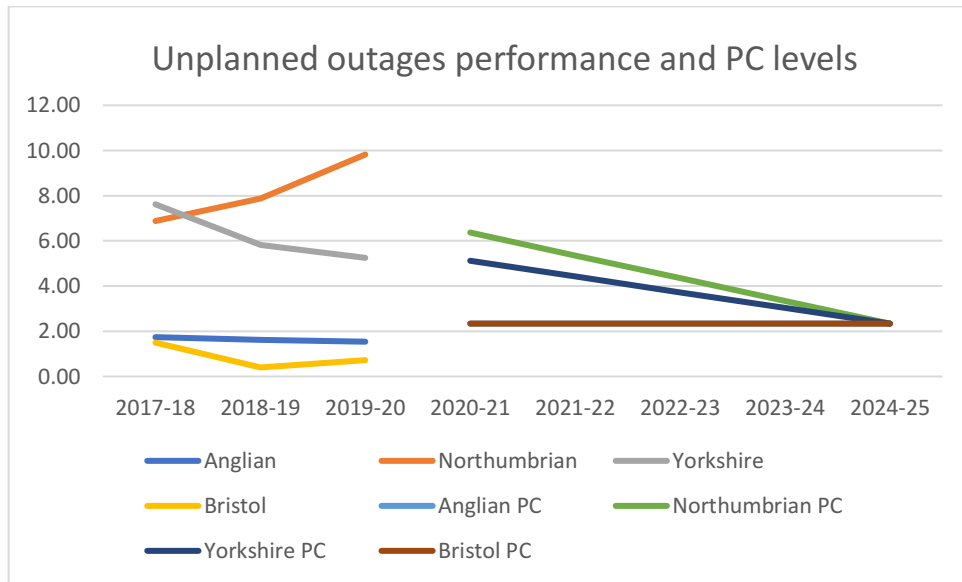
<sup>2097</sup> [Anglian's post-hearing submission](#), pp 5-6

<sup>2098</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), Table 3.1, pp 60-61

Companies with proposed performance worse than this level were set a glide path to reflect the improvement needed to reach this level of performance in 2024/25.<sup>2099</sup>

7.218 Figure 7-11 shows the Disputing Companies' recent performance (since 2017/18), and their PC levels. Table 7-10 shows the Disputing Companies' ODI rates and collars.

**Figure 7-11: Disputing Companies' unplanned outage performance and PC levels for AMP7 (percentage of peak week production capacity lost through unplanned outages)**



Source: CMA analysis

Notes: Units are the percentage of peak week production capacity lost through unplanned outages

**Table 7-10: Disputing companies' unplanned outage ODI rates and collars**

	Standard underperformance penalty (£m)	Collars (% of peak week production capacity)
Northumbrian	-1.72	12.74
Anglian	-1.324	5.22
Yorkshire	-1.799	10.23
Bristol	-0.381	4.68

Source: Ofwat (2019), [PR19 final determinations: Yorkshire Water – Outcomes performance commitment appendix](#)

Ofwat (2019), [PR19 final determinations: Anglian Water – Outcomes performance commitment appendix](#)

Ofwat (2019), [PR19 final determinations: Northumbrian Water – Outcomes performance commitment appendix](#)

Ofwat (2019), [PR19 final determinations: Bristol Water – Outcomes performance commitment appendix](#)

7.219 As this is a new PC, it does appear that there is some uncertainty around how the metric will work out in practice. The Disputing Companies acknowledged that unplanned outages may reflect asset management performance but noted there can also be unplanned outages arising from some factors that may be outside companies' control, such as source water

<sup>2099</sup> Ofwat (2019), [PR19 final determinations: Delivering outcomes for customers policy appendix](#), p56

quality or turbidity or power failures caused by thunderstorms. In other PC settings, Ofwat has applied a 3-year average to account for external influences. That approach does not work when the uncertainty concerns the metric itself, and therefore if the metric turns out to have unintended consequences, these may apply in each year.

7.220 Northumbrian also said that some unplanned outages are not problematic as the customer will not be affected if the company is able to find alternative sources to maintain supplies. We recognise that the asset health PCs are unusual in that the immediate effects of some of the outcomes are not directly relevant to customers. However, the objective of asset health PCs is to make sure companies maintain sufficient asset health before problems arise for consumers, so we do consider that the PC is relevant to customers.

7.221 We have also noted that Ofwat's underperformance collars are quite wide: double the first year's PC level, for all five years, meaning that the companies are exposed to a risk of fairly high financial penalties for a metric for which the effects are still under consideration.

### *Deadbands*

7.222 Ofwat did not agree with our principles (set out in paragraphs 7.103-7.104) under which deadbands may be appropriate for certain performance incentives.<sup>2100</sup> We set out Ofwat's views on this point in paragraph 7.106.

### *Our assessment and decision*

7.223 As noted at paragraphs 7.107 -7.108, we do not agree with Ofwat's position that our principles for applying deadbands are too wide.

7.224 With reference to the criteria in paragraph 7.136 for assessing asymmetric incentives, the untested nature of the measure and the possibility of outcomes due to matters outside management control suggest that the level of asymmetric risk exposure should be reduced.

7.225 For these reasons, we decide that an underperformance deadband should apply for each year for each of the four Disputing Companies. Although the level of a deadband is ultimately a matter of judgement, we have set the level at 1.2 times the PC level, to allow for some failures related to fluctuations outside the company's control, and uncertainty in measurement

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<sup>2100</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), paragraph 3.4

of this new PC. There are no outperformance ODI payments, so an outperformance deadband would not be applicable.

### *Mains repairs*

7.226 The mains repairs PC is a Common PC designed to encourage good asset health. This is a new PC for PR19.

7.227 Ofwat used the average of all companies' historical performance to project forecast performance, which produced a good level of performance for 2024/25 of 122 mains repairs per 1,000 km of mains.<sup>2101</sup> For companies proposing PC levels worse than this, and for companies proposing deteriorating PC levels (even if they were at or better than the good level), Ofwat set PC levels based on their best five years' historical performance. For companies proposing PC levels as good as this or better, and not proposing any deterioration, Ofwat accepted the proposals. Ofwat set the PC levels over AMP7 to increase performance levels by a reducing percentage, for all companies, in all years. The aim of this was to allow all companies flexibility to deliver a step change in leakage reduction, allowing more flexibility in the earlier years to use proactive mains repairs to reduce leakage.<sup>2102</sup>

7.228 Ofwat set the underperformance rate for mains repairs for almost all companies, including the Disputing Companies, at the average of the reasonable range.

7.229 Bristol challenged its ODI rates for this PC, claiming that Ofwat had failed properly to take account of its evidence on customer views, that Ofwat had incorrectly estimated the ODI RoRE range, and that Ofwat's rates exacerbated the negative asymmetry of the ODI RoRE range.<sup>2103</sup>

7.230 Figure 7-12 shows the performance of the Disputing Companies in AMP6, and the PC levels for AMP6. Table 7-11 sets out the ODI rates, collars and cap for the Disputing Companies. Only Northumbrian can earn outperformance rewards, and its cap moves downwards over AMP7 to remain around 14 repairs per 1,000 km of mains better than its PC level throughout the period.

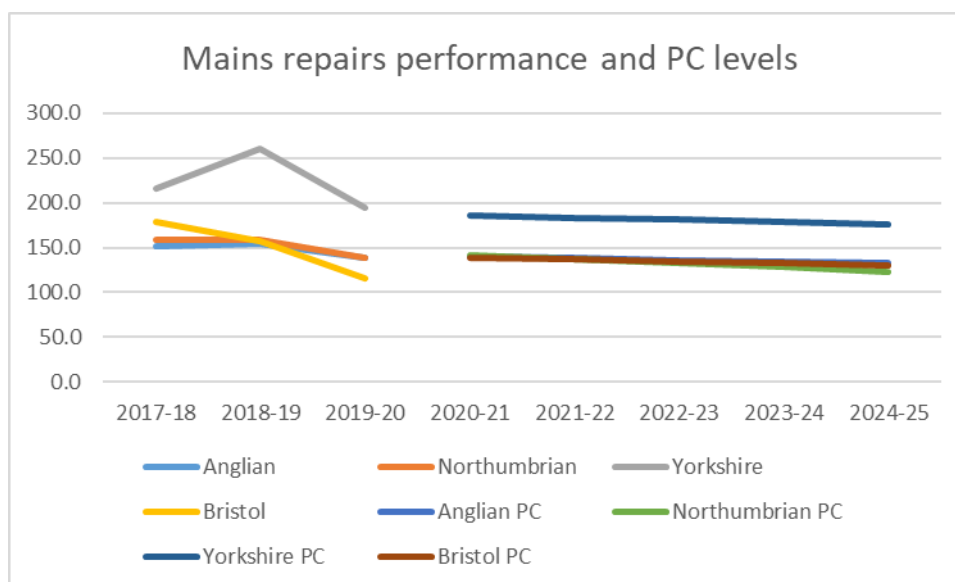
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<sup>2101</sup> Ofwat (2019), [PR19 final determinations: Delivering outcomes for customers policy appendix](#), p56

<sup>2102</sup> Ofwat (2019), [PR19 final determinations: Delivering outcomes for customers policy appendix](#), p17

<sup>2103</sup> [Bristol SoC](#), paragraphs 607-616

**Figure 7-12: Mains repairs performance in AMP6, and PC levels for AMP7 (number of mains repairs for each 1,000 km of mains)**



Source: CMA analysis

Notes: performance and PC levels are expressed as the number of mains repairs for each 1,000 km of mains.

**Table 7-11: Mains repairs ODI rates for the Disputing Companies**

	Standard underperformance penalty	Collar	Standard outperformance payment	£m
Northumbrian	-0.149	198.6	0.098	127.1 reducing over AMP7 to 110
Anglian	-0.165	-	-	-
Yorkshire	-0.167	-	-	-
Bristol	-0.04	193.8	-	-

Source: Ofwat (2019), [PR19 final determinations: Yorkshire Water – Outcomes performance commitment appendix](#)

Ofwat (2019), [PR19 final determinations: Anglian Water – Outcomes performance commitment appendix](#)

Ofwat (2019), [PR19 final determinations: Northumbrian Water – Outcomes performance commitment appendix](#)

Ofwat (2019), [PR19 final determinations: Bristol Water – Outcomes performance commitment appendix](#)

7.231 The PC and associated ODIs are intended to create an incentive on companies to lower mains repair numbers. This is because these repairs can cause problems with traffic disruption and potentially lead to customers experiencing either low pressure, no water, or in extreme cases flooding of properties. It therefore encourages companies to target mains replacement activity and other asset maintenance interventions so that mains prone to bursts or at high risk are renewed or have a lower risk of failure.

7.232 However, some pro-active leakage control activity will also find hidden leaks and bursts requiring a mains repair. The design of this Common PC could therefore serve to discourage such pro-active leakage control activity. Also, severe winter weather variations, such as freeze-thaw events, can influence the level of repairs needed and these triggers are outside of management control. Applying our asymmetric incentives criteria (paragraph 7.136), these



factors mean there are doubts over the benefits of outperformance and the extent to which outcomes are under management control.

7.233 For these reasons, we proposed in our Provisional Findings that this mains repairs PC should have an underperformance deadband applied for the four Disputing Companies. Ofwat did not agree with our principles (set out in paragraphs 7.103-7.104) under which deadbands may be appropriate for certain performance incentives.<sup>2104</sup> We set out Ofwat's views on this point in paragraph 7.106.

#### *Our assessment and decision*

7.234 We decide to adopt these mains repair PC and ODIs, but with an underperformance deadband applied for the four Disputing Companies. This allows a range of underperformance close to the PC where the ODI penalties would not apply. We have not adopted an outperformance deadband. While Northumbrian can earn outperformance payments, the ODI rate it has is a third lower than the rate for underperformance, so it does not seem necessary to apply an outperformance deadband.

7.235 The size of the deadband is a matter of judgement, based on balancing the risk of reducing incentives to improve the aspects of performance which matter most to customers against the objective of mitigating undue levels of penalty. We have determined that the underperformance deadband be set at 10 repairs per 1,000 km above the PC for each of the four Disputing Companies in each year of AMP7. To put this into context, this is around 5-10% of the PC for the four Disputing Companies. We consider that this small deadband maintains the disincentive to allowing asset health to deteriorate, whilst allowing for some proactive repairs and noting that poor winter weather conditions can impact on the level of repairs needed.

7.236 As we conclude at paragraph 7.108, we have considered Ofwat's position that our principles for applying deadbands are too wide, and, for the reasons set out in paragraphs 7.107- 7.108 we do not agree with that position.

7.237 In relation to Bristol's concerns about its ODI rates for this PC (see paragraph 7.229), we consider that introducing a deadband will adequately address the concerns with this PC and associated ODIs that we have identified.

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<sup>2104</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), paragraph 3.4

## *CRI, treatment works compliance and sewer collapses*

- 7.238 These are three penalty-only Common PCs on which the Disputing Companies did not raise objections. Nor was there other evidence that suggested we should consider making changes to them. Our asymmetric incentives criteria (paragraph 7.136) do not indicate the penalty-only design is inappropriate.
- 7.239 The CRI and treatment works compliance PC levels were set at full compliance with the statutory standard. The ODIs had a deadband, so that minor non-compliance would not attract a penalty.

### *CRI*

- 7.240 In response to our Provisional Findings, Ofwat proposed that since the metaldehyde ban was to be re-introduced,<sup>2105</sup> (see paragraphs 5.680-5.682) we should review the deadband for the CRI (as a measure of the presence of various contaminants in drinking water) in later years of AMP7. It proposed that the deadband originally proposed, which reduced from 2.0 in 2019-20 and 2020-21 to 1.5 in subsequent years, should be re-instated, instead of the more cautious level of 2.0 in all years which it had set in its FD.<sup>2106</sup>
- 7.241 We agree that the metaldehyde ban reduces the challenge faced by companies in complying with the DWI standards. In order to reflect the importance for customers of maintaining drinking water quality, we decide that the deadband for this PC should be 2.0 in 2020/21 and 2021/22, and 1.5 from 2022/23 onwards until the end of AMP7.

### *Sewer collapses*

- 7.242 For the sewer collapse PC, Ofwat determined an industry good level of performance as 8 collapses per 1,000 km of sewer pipe. This was based on the median of industry forecasts for 2024/25, using the forecasts from the April 2019 revised business plans and resubmitted data. Companies with proposed levels above this were set an improving profile based on the upper quartile percentage reduction proposed by other companies, with company-specific approaches applied in some cases.<sup>2107</sup>

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<sup>2105</sup> Defra (2020), *Outdoor use of metaldehyde to be banned to protect wildlife*

<sup>2106</sup> Ofwat's response to the provisional findings – costs and outcomes, p67

<sup>2107</sup> Ofwat (2019), *PR19 final determinations: Delivering outcomes for customers policy appendix*, p56

7.243 We note that Ofwat set the PC level for 2020/21 before outturn performance was known. All three Disputing Companies met or outperformed their 2020/21 level in 2019/20. However, we also note that the two companies with performance below the good level had worse performance in at least one previous year, and over the short period shown, performance has varied in both directions. Information provided to us by Ofwat for other years for all companies, does not suggest a consistent trend in either direction.

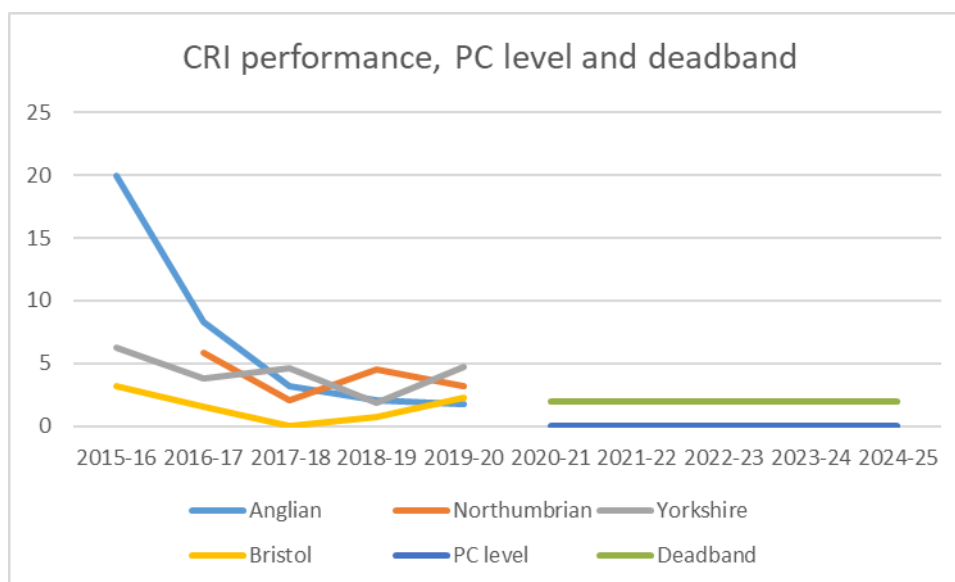
#### *Treatment works compliance*

7.244 Ofwat set an underperformance collar for treatment works compliance for Anglian, to retain the maximum level of underperformance payment implied by the company's customer evidence in its April 2019 revised business plan submission.<sup>2108</sup>

#### *AMP6 Performance and AMP7 ODIs and Collars*

7.245 Figures 7-13 to 7-15 show the Disputing Companies' performance for these three PCs in AMP6, or for the past three years for sewer collapses. Table 7-14 also shows the Disputing Companies' PC levels for sewer collapses in AMP7 and the PC levels for AMP7. Tables 7-12 to 7-14 show the ODI rates, caps and collars for these PCs.

**Figure 7-13: Disputing Companies' performance on the CRI in AMP6, PC level and deadband**



Source: CMA analysis

Note: the PC level for all companies is full compliance, ie a score of zero.

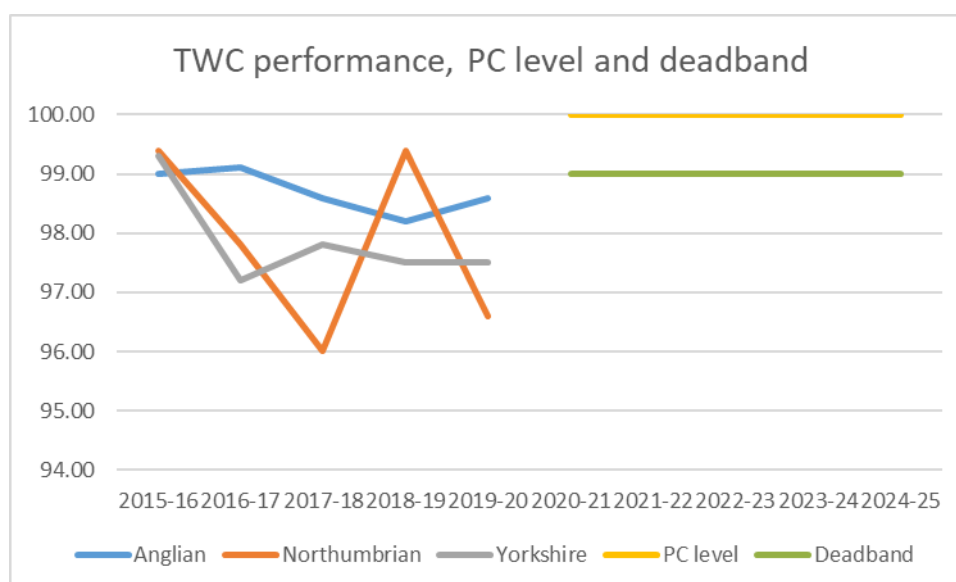
<sup>2108</sup> Ofwat (2019), PR19 final determinations: Anglian Water – Delivering outcomes for customers final decisions, p17

**Table 7-12: Disputing Companies' CRI ODI rates**

	Standard underperformance penalty	£m Collar
Northumbrian	-1.394	9.5
Anglian	-0.788	9.5
Yorkshire	-1.226	9.5
Bristol	-0.191	9.5

Source: Ofwat (2019), [PR19 final determinations: Yorkshire Water – Outcomes performance commitment appendix](#)  
Ofwat (2019), [PR19 final determinations: Anglian Water – Outcomes performance commitment appendix](#)  
Ofwat (2019), [PR19 final determinations: Northumbrian Water – Outcomes performance commitment appendix](#)  
Ofwat (2019), [PR19 final determinations: Bristol Water – Outcomes performance commitment appendix](#)

**Figure 7-14: Disputing Companies' treatment works compliance performance in AMP6, PC level and deadband**



Source: CMA analysis.

Note: the PC level for all companies is full compliance with standards set by the Environment Agency or Natural Resources Wales, ie a score of 100%.

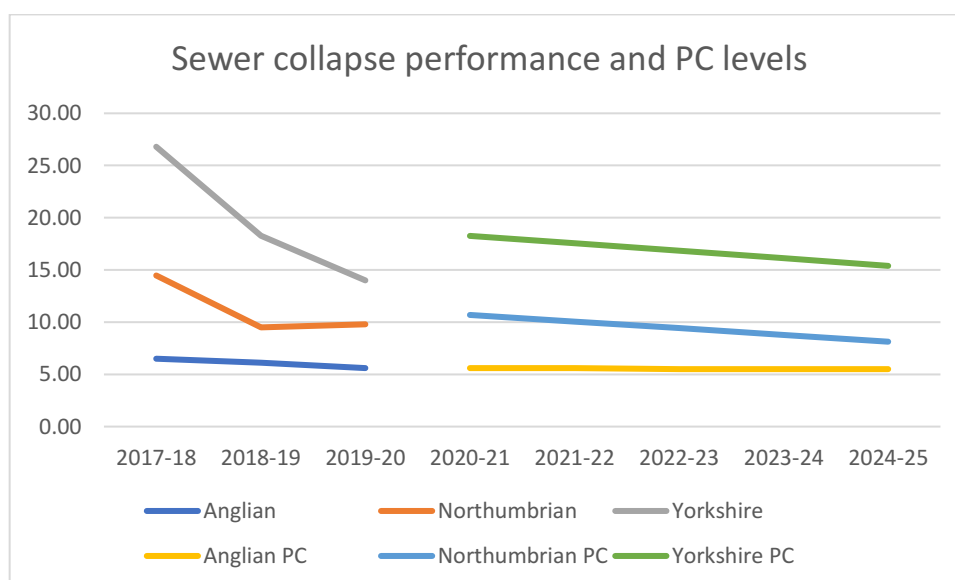
**Table 7-13: Disputing Companies' treatment works compliance ODI rates and collars**

	Standard underperformance penalty	£m Collar, %
Northumbrian	-0.597	-
Anglian	-1.188	95.4
Yorkshire	-1.226	-

Source: Ofwat (2019), [PR19 final determinations: Yorkshire Water – Outcomes performance commitment appendix](#)  
Ofwat (2019), [PR19 final determinations: Anglian Water – Outcomes performance commitment appendix](#)  
Ofwat (2019), [PR19 final determinations: Northumbrian Water – Outcomes performance commitment appendix](#)  
Ofwat (2019), [PR19 final determinations: Bristol Water – Outcomes performance commitment appendix](#)

Note: Ofwat introduced a collar for Anglian at final determination. Anglian was concerned that its ODI rate was higher than other companies'.

**Figure 7-15: Disputing Companies' sewer collapse performance since 2017-18, and PC levels for AMP7**



Source: CMA analysis

Note: Units are sewer collapses per 1,000 km of sewer network.

**Table 7-14: Disputing Companies' sewer collapse ODI rates and collars**

	Standard underperformance penalty	£m Collar
Northumbrian	-0.322	-
Anglian	-2.298	7.86-7.76
Yorkshire	-0.221	-

Source: Ofwat (2019), [PR19 final determinations: Yorkshire Water – Outcomes performance commitment appendix](#)  
Ofwat (2019), [PR19 final determinations: Anglian Water – Outcomes performance commitment appendix](#)  
Ofwat (2019), [PR19 final determinations: Northumbrian Water – Outcomes performance commitment appendix](#)  
Ofwat (2019), [PR19 final determinations: Bristol Water – Outcomes performance commitment appendix](#)

7.246 On the basis that these were not raised as concerns by the Disputing Companies or Ofwat, we decide not to make any changes to the PC levels, ODI rates, caps or collars in relation to these PCs. For these three incentives, we decide to retain the PCs and ODIs as set by Ofwat in its FD, with one change to the deadband levels for the CRI PC.

#### *Priority Services Register, and Bespoke PCs which are focused on assisting vulnerable customers*

7.247 The Priority Services Register common PC is one of the ways that water companies aim to assist customers who may be in need of special assistance. The PC level is the same for all companies and specifies a minimum level of households identified and contacted during AMP7. The Priority Services Register is one means by which vulnerable customers are supported, with others (and in particular social tariffs) falling outside the ambit of the price control (and this determination).

- 7.248 In our Approaches Document,<sup>2109</sup> we indicated our intention to review the PC for the Priority Services Register.
- 7.249 Citizens Advice expressed concern that the water industry had low customer engagement with support mechanisms and low awareness of the Priority Services Register among customers. It noted there were around 300,000 registered customers on the Priority Services Register for water compared to some 6 million for electricity. It also said there was variability on Priority Services Register registration rates between regions (and so suppliers), and it proposed that we should encourage the industry to better coordinate across water suppliers and with the energy sector.
- 7.250 The Yorkshire Forum for Water Customers also made the point that people move through a range of personal circumstances, meaning that they might become vulnerable, or face affordability challenges, at different points in their lifecycle. The Forum said that companies should be flexible in their approach so that these customers are not missed and was of the view that Yorkshire water adopted this approach. Citizens Advice mentioned the effects of COVID-19, which could lead to customers facing affordability challenges or otherwise becoming vulnerable.
- 7.251 Citizens Advice submitted that it received many approaches from customers on issues of affordability, debt repayments and financial support.<sup>2110</sup> It asked us to consider whether the overall support package for consumers should be enhanced and whether we should require different water companies to better coordinate and standardise additional support mechanisms. Examples of these mechanisms include social tariffs that companies may offer.
- 7.252 CCWater made the point that COVID-19 meant that new customers might need priority services, giving the example of self-isolating customers who would become vulnerable in a supply interruption event.
- 7.253 In addition to the Common PC for the Priority Services Register, there are a number of Bespoke PCs which support delivery of appropriate services to vulnerable customers, including inclusive services PCs and the assessed satisfaction of customers on the Priority Services Register with how the company has engaged with them in this regard, which we welcome. Some companies (including Anglian, Northumbrian and Yorkshire) have PCs relating to direct financial assistance schemes. Various companies, including Northumbrian and Anglian, have identified other ways to support vulnerable customers and provide access to the support initiatives available to

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<sup>2109</sup> [CMA approach to water redeterminations](#), paragraph 47

<sup>2110</sup> [Citizens Advice second submission](#)

them.<sup>2111,2112</sup> A thorough and up-to-date register may also prompt companies and their CCGs to think about further innovations that will help vulnerable customers.

- 7.254 The Priority Services Register PC is reflected in reputational impacts. Both Ofwat and the water companies currently appear to be giving support for vulnerable customers a high priority and high profile.
- 7.255 Given current interest, we think the threat of reputational consequences is likely to carry considerable weight with companies. It is not clear, and we received no suggestions on, how any financial ODI would work.
- 7.256 CCW said that in its view, financial penalties relating to the Priority Services Register PC would not be appropriate. Instead, it suggested a measure of how effective communication was about the Priority Services Register, and how aware customers were of the Priority Services Register.
- 7.257 Given the importance of this issue, we suggest that Ofwat monitor closely the success of this PC in increasing uptake of the Priority Services Register and growing awareness of support measures. While this has not changed our determination (see paragraph 7.261), we consider that the points made by Citizens Advice and CCW about changes in individual's circumstances over time, including the effect of COVID-19 on those who are self-isolating, increase the importance of awareness efforts by companies, and suggest companies and Ofwat bear it in mind when considering the effectiveness of the Priority Services Register.
- 7.258 It is imperative that Ofwat use the full potential of reputational incentives by publicising those companies that successfully engage and support vulnerable customers. Likewise, if any companies do not address this with sufficient attention, this should be made clear.
- 7.259 In relation to the points made by Citizens Advice about a lack of coordination between suppliers, differences from the energy sector and a lack of awareness across the industry, we agree this is a risk.<sup>2113</sup> Outside our redeterminations, there appears to be scope for regulators and companies across the water sector and across utilities to share experience of developing registers, and their approach to developing the criteria for inclusion.

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<sup>2111</sup> [Anglian SoC](#), paragraphs 272-274

<sup>2112</sup> [Northumbrian SoC](#), paragraphs 124 and 195

<sup>2113</sup> [Citizens Advice second submission](#), pp5-6

7.260 Regulators and regulated companies have a growing bank of experience and understanding of ways to assist vulnerable customers. We consider this would fit well with government's SPS priority in relation to low income and other vulnerable household customers.<sup>2114</sup>

7.261 We decide to retain the PC and we recommend that Ofwat progress this as a reputational ODI throughout AMP7.

## **Assessment of Bespoke PCs and ODIs**

7.262 As noted at paragraph 7.48, we have not reviewed the majority of bespoke PCs and ODIs. Here, we address three specific Bespoke PCs, and their associated ODIs, which do not apply to all companies, where we saw evidence that the PCs should be reviewed as part of our redeterminations. The PCs we have looked at are 'comparable' Bespoke PCs for water quality contacts and bathing water quality, and Yorkshire's low water pressure PC.

### ***Water quality contacts***

7.263 A number of companies have separate ODIs for water quality contacts from customers for appearance, taste and smell. The ODIs can include penalties for numbers of contacts above the PC level, and/or rewards for contacts below that level. Water quality contacts is a comparable Bespoke PC. It was not mandatory, but many companies have it because it is a common issue for customers to care about, and because it was in place for many companies in AMP6.<sup>2115</sup> The drivers of customer concerns and hence contacts vary by area (for example depending on the geology of the area). Among the Disputing Companies, Anglian and Yorkshire have a single water quality contacts ODI, while Bristol and Northumbrian have two separate ones.

7.264 For the purposes of setting the PC for water quality contacts at its Initial Assessment, Ofwat looked at each company's proposed target for total contacts – ie taking the two different types of contacts together where necessary – and set the minimum target at the upper quartile of the proposed reductions, which amounted to a reduction by 34% over the period.<sup>2116</sup>

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<sup>2114</sup> Defra (2017), [The government's strategic priorities and objectives for Ofwat \(SPS\)](#), p8

<sup>2115</sup> Ofwat discouraged companies from abandoning ODIs they had in PR14, on the grounds that it did not want companies to opt out of obligations they were struggling to meet. See Ofwat (2017), [Delivering Water 2020: Our methodology for the 2019 price review, Appendix 2: Delivering outcomes for customers](#), pp30-31

<sup>2116</sup> Ofwat (2019), [PR19 final determinations: Delivering outcomes for customers policy appendix](#), pp68-69



- 7.265 Ofwat considered that a good level of performance would be 0.67 contacts per 1,000 properties, on appearance and taste and smell combined. Anglian's, Yorkshire's and Northumbrian's PC level glide paths produced by the 34% reduction approach, but do not meet, the good level in 2024/25. Bristol's PC level glide path is just above the good level in 2024/25, at 0.68.
- 7.266 Anglian and Yorkshire asked us to adjust Ofwat's FD regarding this PC.
- 7.267 Anglian submitted that it was already a good performer in this area, albeit not quite upper quartile, and that its customers did not want it to spend significant amounts of money to achieve large improvements. It therefore proposed that we should set its PC level at its 2019/20 level of performance for each year of AMP7.<sup>2117</sup> Anglian said that there was likely to be a negative correlation between performance and ability to improve, and considered that its estimated costs of £7 million to meet the PC levels over AMP7 would make the improvement 'low value for money'.<sup>2118</sup>
- 7.268 Anglian in response to the Provisional Findings made a new proposal for PC levels that would represent a 17.5% reduction in contacts. It described this reduction as 'the level of improvement historically funded by base models'.<sup>2119</sup>
- 7.269 In Ofwat's reply to the responses to our Provisional Findings, it said that Anglian's proposed PC levels would result in its moving to be below the upper quartile at the end of AMP7. It also questioned the method used by Anglian to determine the proposed alternative, lower percentage improvement.<sup>2120</sup>
- 7.270 Anglian's submissions on customers' willingness to pay for further improvements contrast notably with what Northumbrian told us. For example, as part of its submissions on customers' priorities between different ODIs, Northumbrian said that 'customers of our Northumbrian Water service area told us their preference was to allocate 1.33% of their bill to reducing contacts for discoloured water, compared to 0.47% of the bill for reducing interruptions to supply'.<sup>2121</sup>
- 7.271 Similarly, Bristol went well beyond the minimum set by Ofwat and proposed to cut its water quality contacts by half, while Yorkshire described it as 'a

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<sup>2117</sup> [Anglian SoC](#), p249-250

<sup>2118</sup> [Anglian's response to the provisional findings](#), pp68-70

<sup>2119</sup> [Anglian's response to the provisional findings](#), p70. Anglian had proposed using a 'trendline' of WQC percentage improvements over AMP6 against another score, the DWI 'acceptability' score.

<sup>2120</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), pp32-33

<sup>2121</sup> [Northumbrian SoC](#), p116

priority for customers'.<sup>2122</sup> None of these companies performed as well as Anglian during AMP6, but they were not far behind.

7.272 The evidence provided by the Disputing Companies suggests a range of different views from their customers. In that context, we recognise that Ofwat used an approach which sought to have regard to the evidence gathered by the companies as a whole, in order to set a common challenge. We understand Anglian has particular concerns relating to the definition of its targets and recognise that there is a risk that it will incur costs to achieve the proposed target. It is less clear that these additional costs would not be allowed as part of the assessment of base costs. As with the other Common PCs other than leakage, we were not persuaded that there was sufficient evidence that the PC would represent an unreasonable improvement in performance relative to past achievement as to require an adjustment either to PCs or to the base cost assessment. Therefore, we have decided to keep the level of targets set by Ofwat for this ODI.

7.273 Yorkshire made a different submission about water quality contacts. In its SoC, it pointed out that water quality contacts are to some extent driven by factors outside the company's control, such as the nature of its water sources and the types of pipes that it has installed.<sup>2123</sup>

7.274 We agree that this is relevant to the achievability of the PC. However, the examples Yorkshire gave are factors that a company can control to some extent. It can develop new abstraction sources and manage carefully how it uses the ones it already has. Similarly, it can replace pipes to avoid water quality deteriorations from the cast iron pipes that it already has.

7.275 Moreover, Ofwat calibrated this ODI in terms of the percentage reduction, not each company's absolute performance. That is why Yorkshire has a 2024/25 target of 0.81 contacts per 1,000 population, compared with Anglian's 0.77 and Bristol's 0.68. We consider that this already reflects that different companies have different starting levels of performance, in part due to their existing asset base.

7.276 In response to Anglian's point about the challenge of improving on relatively good performance, we give weight to Ofwat's response that Anglian's proposed alternative PC levels would result in it dropping out of the upper quartile of performers by the end of AMP7. In that context, Ofwat's

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<sup>2122</sup> Yorkshire SoC, p56

<sup>2123</sup> Yorkshire SoC, p56

intervention appears to be consistent with delivering improved service to Anglian's customers.

7.277 Therefore, we decide not to change the water quality contacts PCs and ODIs set by Ofwat.

### ***Bathing water quality***

7.278 Bathing water quality is another comparable Bespoke PC. The measure is the number of bathing waters (beaches designated for swimming) rated 'excellent' by the Environment Agency. Ofwat set companies' PC levels based on numbers of bathing waters in each company's region, taking into account the levels the company had proposed.

7.279 Ofwat's FD set Anglian's PC levels (the number of beaches that should meet the 'excellent' standard) to rise from 33 to 36 beaches by 2024/25. The increments to meet the 2024/25 level began in 2022-23, the third year of AMP7.<sup>2124</sup>

7.280 Ofwat's FD was that:

- for this PC, the assessment would be made in 2024/25 and not in intervening years;
- the financial incentive would only apply for service delivery calculated for 2024/25;<sup>2125</sup>
- the assessment would use calendar years rather than financial years; and
- bathing water assessments would be based on three years of previous data plus the current year.<sup>2126</sup> This meant that the 2024/25 assessment would take into account performance in calendar years 2024, 2023, 2022 and 2021.

7.281 Anglian's underperformance ODI rate is £-0.2248 million per designated swimming beach below the PC level, and its outperformance ODI rate is £0.1154 million.<sup>2127</sup>

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<sup>2124</sup> Ofwat (2019), *PR19 final determinations: Anglian Water – Outcomes performance commitment appendix*, section 1.2.5, pp57-59

<sup>2125</sup> Ofwat's response to Anglian's SoC, p141

<sup>2126</sup> Ofwat (2019), *PR19 final determinations: Anglian Water – Outcomes performance commitment appendix*, section 1.2.5, pp57-59

<sup>2127</sup> Ofwat (2019), *PR19 final determinations: Anglian Water – Outcomes performance commitment appendix*, section 1.2.5, pp57-59

7.282 Table 7-15 shows Anglian’s proposed PC levels for AMP7, Ofwat’s PC levels set in its FD, and Anglian’s ODI rates.

**Table 7-15: Anglian’s bathing water quality PC levels and ODI rates**

	2020-21	2021-22	2022-23	2023-24	2024-25
Anglian proposed PC level	33				36
Ofwat PC level	33	33	34	35	36
Underperformance rate, £m	-0.2248	-0.2248	-0.2248	-0.2248	-0.2248
Collar	25	25	26	27	28
Outperformance rate, £m	0.1154	0.1154	0.1154	0.1154	0.1154
Cap	38	38	39	40	41

Source: Ofwat (2019) [PR19 final determinations: Anglian Water – Outcomes performance commitment appendix](#), section 1.2.5. pp57-59

### *Anglian’s position*

7.283 Anglian’s business plan forecast was for 33 beaches to meet the ‘excellent’ standard in 2019/20, the end of AMP6, and for 36 beaches to meet this standard in 2024/25. This number is out of Anglian’s total of 49 beaches designated for swimming. Anglian did not propose performance levels for the intermediate years of AMP7.

7.284 Anglian challenged the PC levels at draft determination, and in its SoC. It said it was concerned that Ofwat’s profile would require improvements to be underway before the beginning of AMP7. It said that the PC level profile would require it to improve outcomes (from 33 to 34) by 2022/23. Anglian said that its PC level profile should not include any increase in ‘excellent’ bathing waters until year 4 of AMP7, 2023/24.

### *Ofwat’s response*

7.285 In its response to Anglian’s SoC, Ofwat said that it had changed the application of the ODI, from each year in AMP7 to once, at the end of the AMP7 period. This followed representations after its draft determination.

7.286 This change meant that using the four-year average would not include any years before the start of AMP7.

7.287 Ofwat also said that using rolling averages for assessing performance against PCs was not unusual, mentioning the leakage and per capita consumption PCs.<sup>2128</sup>

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<sup>2128</sup> [Ofwat’s response to Anglian’s SoC](#), paragraph 4.43

## *Our assessment and decision*

7.288 We have reviewed the available detail about the application of this PC to Anglian. We note that Ofwat's change for its final determination means that performance before the beginning of AMP7 will not count towards the assessment for 2024/25. We also note that Anglian was planning to improve performance to have 33, rather than 32, 'excellent' bathing waters in 2019/20, before the beginning of the price control period. This suggests that it was already taking action in AMP6 to improve the quality of its bathing waters not yet at the 'excellent' standard.

7.289 We decide that Anglian's PC levels, ODI rates and ODI application and timing should not be changed.

## ***Yorkshire low pressure***

7.290 As part of its initial business plan, Yorkshire proposed a Bespoke PC and ODI for 'low pressure', which was adopted unamended by Ofwat.<sup>2129</sup> The purpose of this ODI is to incentivise the company to reduce the number of properties that are at risk of experiencing or experience their water supply having low pressure. Low pressure is a comparable Bespoke PC.<sup>2130</sup>

7.291 Yorkshire's PC level for this ODI is 14 properties taken out of the register of those experiencing or at risk of experiencing low pressure in 2020/21, 13 properties in 2021/22, and 12 properties in each year thereafter.<sup>2131</sup> Its PC level is the lowest (best outcome performance) of all companies with this PC, and considerably better than the industry good level as assessed by Ofwat as 0.5 properties per 10,000 connections receiving or at risk of receiving low pressure.<sup>2132</sup> The incentive is a reward as well as a penalty, with a symmetric incentive rate of £139,000 per property.

7.292 During AMP6, Yorkshire's performance was as follows:

(a) 2015/16: 11 properties;

(b) 2016/17: 8 properties;

(c) 2017/18: 11 properties;

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<sup>2129</sup> Ofwat (2019), [PR19 final determinations: Yorkshire Water – Outcomes performance commitment appendix](#), pp111-112

<sup>2130</sup> We note that this ODI corresponds to the DG2: low pressure metric that was used for June Returns in the past, and that was an element of Yorkshire's Asset Health ODI in PR14.

<sup>2131</sup> These are absolute numbers of properties, not proportionate rates, ie this refers to a very small number of properties.

<sup>2132</sup> Ofwat (2019), [PR19 final determinations: Delivering outcomes for customers policy appendix](#), p201

(d) 2018/19: 9 properties; and

(e) 2019/20: 14 properties.

7.293 We have considered the consumer engagement evidence that Yorkshire submitted with its business plan to justify its proposed incentive rate. This evidence consisted of a mixture of revealed preference evidence and stated preference (survey) evidence, with the latter typically coming out much higher. Despite the large differences in estimates produced by these different methods, Yorkshire and its advisers triangulated the figures to produce a willingness to pay estimate per customer of £0.11 for household customers and £0.15 for business customers. Multiplying by the number of customers and applying the formula that Ofwat proposed for calibrating ODIs produced the incentive rate of £139,000.

7.294 Our review of this evidence suggests this is a clear example of the difficulty that companies face when surveying customers about performance metrics with which they are unlikely to have personal experience. The fact that the stated preference results were so much higher than the revealed preference results should have cautioned Yorkshire against relying on them, or at least should have caused them to do further work.

7.295 We also note that whilst incentives for actions which benefit all or most customers (directly or indirectly) should reflect, with justified interventions by the regulator, the expressed willingness to pay of all customers, different concerns apply for actions which directly benefit a much smaller number of customers. In such cases, we consider that costs should play a part in setting incentives.

7.296 For example, only a small number of customers may be at risk of experiencing low pressure. However, every customer may place a small value on not experiencing low pressure (whether or not they are at risk of doing so). Multiplied across the customer base of the company as a whole, this would suggest that customers as a whole value not experiencing low pressure quite highly. However, if that value is then divided among the small number of properties experiencing low pressure, the derived 'value' of solving the problem may exceed the relevant cost. In such a case, an ODI derived in such a way is likely to overstate the value of the remedial action, and so over-incentivise it in comparison with other service improvements that could be made.

7.297 We consider that an ODI approach to service improvements that are extremely localised, for example to individual properties, risks over-rewarding (or over-penalising) outturn delivery. While the overall

willingness to pay is a useful reference point and could serve as a ‘ceiling’ for any rate, a cost and benefits analysis should be taken into account in determining the appropriate rate.

7.298 In these circumstances, and in light of the above consideration, we have decided to disallow the reward rate for low pressure that Yorkshire proposed, since there is insufficient evidence that customers are truly willing to pay these amounts for overperformance. Instead, we have decided to make this ODI penalty-only, consistent with the approach taken by a number of other companies that have similar ODIs.<sup>2133</sup>

### ***Northumbrian visible leaks PC***

7.299 During the process of the redeterminations, Northumbrian drew our attention to a point of implementation on this Bespoke PC. We did not mention it in our Provisional Findings as it seemed that this implementation issue could be resolved between Northumbrian and Ofwat. It has now been resolved, and we are reporting on this resolution to ensure it is reflected in our determination for Northumbrian.

7.300 Northumbrian proposed a PC for the length of time taken to respond to customer-reported visible leaks. It had proposed a PC level that would reduce this time over AMP7, from 10 days to 4 days, with ODI rates for under- and over-performance.

7.301 When Ofwat implemented this PC in its FD for Northumbrian, the definition of visible leaks included those from customer-owned pipes (customer-side leaks).

7.302 Northumbrian had not intended the definition to include these leaks, noting that 80 per cent of customer-side leaks are repaired under customers’ own home insurance, to a longer timetable. Companies are required to address customer-side leaks which are not repaired in a reasonable time, which involves giving notice of legal proceedings to effect access. On the grounds that customer-side leaks could reasonably take longer than ten days to resolve (either by the customer or the company), and certainly longer than 4 days, Northumbrian considered that customer-side leaks should be excluded from the definition for the PC.

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<sup>2133</sup> Among the companies that have ODIs related to low pressure in some way, Affinity Water, Hafren Dyfrdwy, Portsmouth, Southern, and Thames have penalty-only ODIs, whilst Anglian, Bristol and South East have a reward rate that is lower than their penalty rate. Only Severn Trent and United Utilities have a symmetrical ODI for low pressure.

- 7.303 Ofwat has confirmed to us and to Northumbrian that it is content for the definition of leaks counting towards this PC to be changed. We are therefore including this change in our determination for Northumbrian.
- 7.304 Our decision is that the definition of customer-reported visible leaks should exclude customer-side leaks for the purpose of assessing delivery of this PC.

### **Overall reward cap**

- 7.305 As noted at paragraph 7.43, Ofwat set a cap on the amount of aggregated outperformance payments a company can earn. This is intended to protect customers from excessive outperformance payments. This cap is set at 3% of the projected RoRE. The aggregated outperformance payments are calculated gross, that is, they are not offset by any underperformance penalties the company has incurred in the year.
- 7.306 Northumbrian had submitted that a better approach would be to have net rewards and penalties, rather than gross, and suggested that this be limited to 2% of RoRE for any net rewards earned.<sup>2134</sup> A net position is where the rewards and penalties are netted off before any caps or collar are applied, for example, 3.5% rewards and 1.7% of penalties results in a net position of 1.8%, and no cap is applied to the rewards. Under Ofwat's approach with a gross limit of 3%, the company would receive lower rewards than under a net approach. The extra 0.5% of rewards would be reduced, as at least half of the benefits above the cap are automatically returned to customers. Northumbrian proposed, on the basis of customer consultation, that there should be a threshold of 2% of RoRE based on net rewards.
- 7.307 Northumbrian had said its net proposal strengthened the protection against customer bill volatility, and a further benefit was that it reduced the likelihood that companies could earn large returns from factors outside of their control, which is not the intention of ODIs. The maximum reward that Northumbrian could receive in each year would be lower under Northumbrian's proposal. However, its net proposal would have the effect of reducing potential penalty rates as well as reward rates for companies.
- 7.308 Northumbrian said that in its view, the tightness of the settlement would mean that the difference between Ofwat's approach and its proposal was unlikely to affect companies in AMP7, as 'it is highly unlikely any company

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<sup>2134</sup> [Northumbrian SoC](#), paragraphs 544-562



will reach the cap'.<sup>2135</sup> However, it considered that the structure and application of any reward cap should be reviewed before PR24.

### *Our assessment and decision*

7.309 We noted the proposal for a net cap had only been supported by one of the four Disputing Companies. On balance, we decided that the benefits associated with a net cap are modest, and we were not persuaded that Northumbrian's proposal adequately addresses the risk that there might be unexpectedly high rewards arising from some ODIs. We therefore decide to retain Ofwat's approach of a gross cap for all the companies.

7.310 We note that the overall structure of PCs and ODIs is likely to be reviewed for PR24 – not least because of Ofwat's stated intention to increase the number of PCs with financial incentives (ODIs) attached over time. We expect that the structure and application of any caps – individual or overall – will accompany this review.

## **Overall package of incentives**

7.311 We have considered the overall package of PCs and ODIs in light of the decisions we have made on their design, including our revisions to the implementation of some of the Common and Bespoke PCs, and concerns expressed by the companies that the overall package increased the downside risk faced by companies due to asymmetric and penalty only ODIs.

7.312 We considered the effect of our decisions on the asymmetry of the package of incentives that we outlined in Table 7-3 and Table 7-4. We conclude that in most cases, Ofwat was justified in including asymmetric incentives, although we have included some moderation of the downside in mains repairs and asset health. The asymmetry of the Common PC ODI rates, following our determinations, are shown in Table 7-16. For comparison we also show the levels in Ofwat's FD.

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<sup>2135</sup> [Northumbrian's response to the provisional findings](#), p51

**Table 7-16: Indicative asymmetry of our package of common wholesale ODIs**

	<i>Northumbrian</i>		<i>Anglian</i>		<i>Yorkshire</i>		<i>Bristol</i>	
	<i>Penalty</i>	<i>Asymmetry</i>	<i>Penalty</i>	<i>Asymmetry</i>	<i>Penalty</i>	<i>Asymmetry</i>	<i>Penalty</i>	<i>Asymmetry</i>
£m per annum (Ofwat's FD)	-28.8	-15.2	-66.8	-35.0	-92.6	-47.1	-5.2	-2.6
£m per annum ( )	-27.1	-13.9	-72.9	-39.8	-94.2	-45.6	-4.9	-2.5
% RCV (CMA)	-0.8	-0.4	-1.1	-0.6	-1.2	-0.6	-0.9	-0.5
% RoRE (40% equity) (CMA)	-1.9	-1.0	-2.7	-1.5	-3.0	-1.5	-2.3	-1.2

Source: CMA analysis

Note: This analysis includes leakage, which is discussed further in section 8, and where Anglian and Bristol have higher asymmetric incentives under the CMA's approach, which are affected by the level of the cap and the collar, relative to the PC.

7.313 Our analysis suggests the sum of the exposure for the Disputing Companies to penalties in asymmetric ODIs is in the range of 1-2% of RoRE. We have estimated this by reference to collars and stated P10 downside scenarios. The expected loss will be lower: on the basis that these scenarios represent P10 estimates, the expected loss would be of the order of 0.1%-0.2% RoRE. This is only intended to be a broad estimate of the scale of downside risk for an averagely efficient company: in practice the risk of P10 downside across the package of PCs resulting in 1-2% downside will be small, but there is a greater likelihood than that of smaller penalties in respect of penalty-only ODIs. We outline in paragraphs 9.1334-9.1344 that we have had regard to this asymmetry as one of the considerations in choosing a point estimate for the cost of equity.

7.314 This analysis does not include Bespoke ODIs and is only intended to be indicative of the overall scale of risk associated with the package of ODIs. It does not include asymmetric ODIs relating to clawback of enhancement totex allowances, including for leakage, as these ODIs are intended to balance the risk to customers from under-investment.

7.315 In our view, overall (including taking account of our decisions on leakage in section 8) the package of PCs and ODIs is not inappropriately unbalanced. However, we note that some of the incentive rates nevertheless create a downside risk against expected performance, which should be considered as part of the overall balance of risk in the price control. Our conclusions on the cost of capital and financeability take into account the effects of the overall package of PCs and ODIs, including the scale of risk faced by the companies and the asymmetry of the package of ODIs.

## Summary of our final decisions

7.316 We consider that it is appropriate to set a package of challenging PC targets. Overall, we have not found evidence to suggest that the structure of the PCs and ODIs should be changed significantly. We broadly retain the same structure of caps, collars, deadbands and use of asymmetric rates as in Ofwat's FD, subject to some revisions below.

7.317 We have considered Ofwat's adoption of upper quartile PC standards for supply interruptions, pollution incidents and internal sewer flooding, and we conclude that the PC levels for the three common level PCs are appropriate. We reject any requests for cost allowances to be made to achieve the targets set except for Yorkshire for internal sewer flooding. We decide on a slightly higher penalty collar for Yorkshire in respect of internal sewer flooding, and a slightly higher penalty collar for Anglian in respect of pollution incidents.

7.318 We retain the same PCs and ODIs as proposed by Ofwat in PR19. We have decided on some minor changes to the detail of how six of the Common PCs have been implemented for the Disputing Companies.

7.319 We decide to:

- (a) increase Anglian's underperformance collar for pollution incidents;
- (b) increase Yorkshire's underperformance collar for internal sewer flooding;
- (c) make changes to ODI rates and to funding relating to leakage, set out in section 8;
- (d) reduce Bristol's per capita consumption ODI rates;
- (e) re-instate the Compliance Risk Assessment deadband levels that were in Ofwat's Draft Determination;
- (f) on unplanned outages and mains repairs, to set an underperformance deadband for each year for each of the four Disputing Companies; and
- (g) disallow the reward ODI rate for Yorkshire's low pressure PC;
- (h) not to change the overall reward cap; and
- (i) noting the resolution between Ofwat and Northumbrian on the definition of the metric for the Bespoke PC on customer-reported leaks, we adopt the definition of customer-reported visible leaks to exclude customer-side leaks for the purpose of assessing delivery of this PC.

7.320 Our decisions on the revisions to the PC arrangements set at PR19 (excluding leakage, see section 8) are summarised in Table 7-17.

**Table 7-17: Decisions on the revisions to the PC arrangements set at PR19**

<i>Category</i>	<i>PC</i>	<i>Change compared to Ofwat's FD</i>
Common performance measures	<b>Water supply interruptions</b> <b>Pollution incidents</b> <b>Internal sewer flooding</b>	no change Anglian: increase collar to 41.6 Yorkshire: increase collars in years 2,3,4 and 5
Reducing demand	<b>Leakage</b>  <b>Per capita consumption</b>	All four companies: remove enhanced ODI rates. For three companies: adjust funding and amend Tier 1 penalty rates Bristol: reduce ODI rates to £-0.03m and £0.025m
Statutory measures	<b>Compliance risk index</b> <b>Treatment works compliance</b>	Revert to Ofwat's DD deadband levels for all four companies no change
Asset health measures	<b>Mains repairs</b> <b>Unplanned outage</b> <b>Sewer collapses</b>	Deadband of 10 for all four companies Deadband of 1.2 x PCL for all four companies no change
Vulnerability measures	<b>Priority services register</b>	no change
Bespoke ODIs	<b>Low pressure</b> <b>Water quality contacts</b> <b>Bathing water quality</b> <b>Visible leaks</b>	Yorkshire: remove outperformance incentive no change no change Northumbrian: clarify definition to exclude customer-side leaks
Other	<b>Overall reward cap</b>	no change

Source: CMA analysis

## 8. Leakage

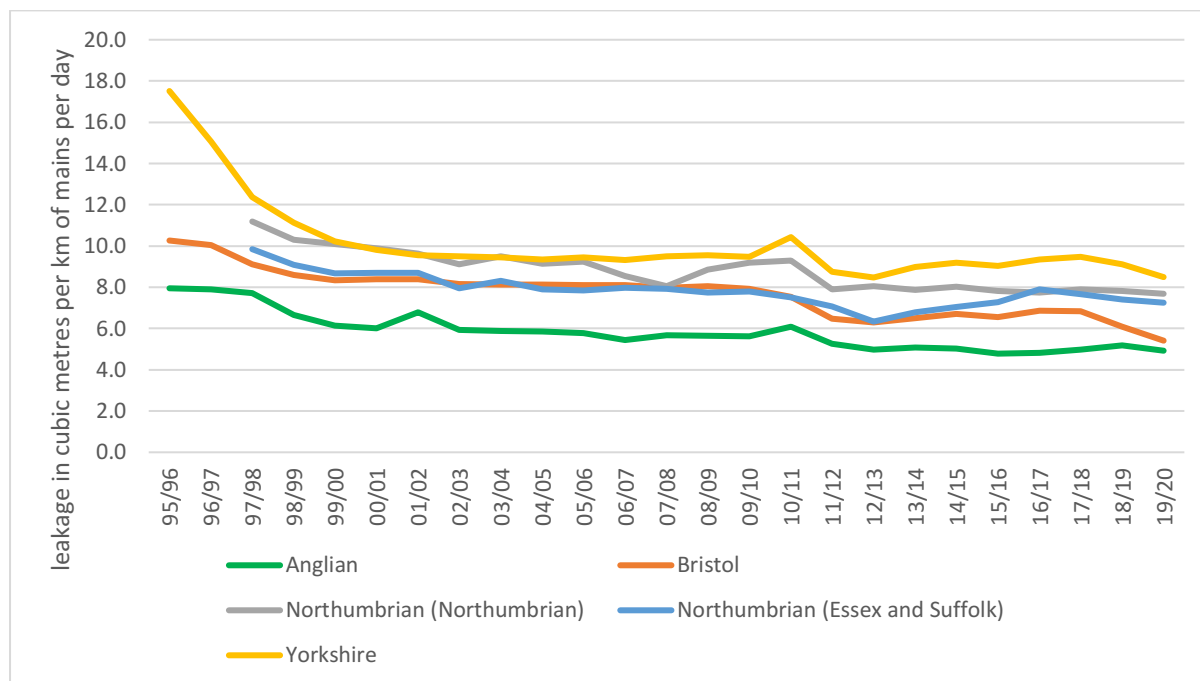
### Introduction

- 8.1 In this section we consider issues of funding and incentives in relation to leakage and set out our determinations on the appropriate adjustments to each Disputing Company's totex allowances for leakage costs and on the relevant PCs and ODIs for leakage.
- 8.2 We have treated leakage as a separate section due to the interaction of funding and outcome incentives in relation to reducing leakage, and because of the importance that has been given to leakage in the SPS and in Ofwat's determination. As noted at paragraphs 2.131 – 2.136, Ofwat attached significant weight to industry performance on leakage in forming its views on the need for a step change in its regulation.
- 8.3 The government's SPS for Ofwat emphasised the importance of reducing the industry's demand for water, met by abstraction of raw water and driven by consumption of clean water, wastage in water treatment and wastage in distribution (leakage). In order to achieve that goal, the government wrote that it expected Ofwat to 'promote ambitious action to reduce leakage and per capita consumption, where this represents best value for money over the long term, including exploring setting targets in future.'<sup>2136</sup>
- 8.4 The background to the government's and Ofwat's concern about leakage is the companies' performance since the start of the century. The four Disputing Companies' leakage rates (in terms of cubic metres per km of mains per day) since 1995 are shown in Figure 8-1. The Figure shows separate leakage rates for Northumbrian's Essex and Suffolk operating area and its Northumbrian area.

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<sup>2136</sup> Defra (2017), *The Government's strategic priorities and objectives for Ofwat* (SPS), paragraph 15

**Figure 8-1: Historic leakage performance of the Disputing Companies, cubic metres of leakage per km of mains per day**



Source: CMA analysis. Numbers show cubic metres of water lost per km of mains per day

8.5 As Figure 8-1 shows, the performance of the companies typically improved rapidly following privatisation. The rate of improvement has fallen markedly since the turn of the century, and in some years has failed to improve at all. This is despite continuing improvements in methods and technologies to pre-emptively prevent leaks and to detect and remedy leaks that do occur.

8.6 For example, Ofwat has referred to:

many ... leakage reduction solutions that are proven (such as pressure management, transient event identification and removal, targeted mains replacement and renewal, communication and customer side leakage activity). Companies identify other emerging capabilities (such as smart networks, 'calm networks' and innovative repair techniques) which could prove to be highly beneficial.<sup>2137</sup>

8.7 The Disputing Companies all told us about the techniques they employ to detect and prevent leaks. For example, Anglian said:

Anglian goes beyond using active leakage control which only targets visible leaks, to constantly innovating with new leak-detection technologies such as thermal imaging drones (which

<sup>2137</sup> Ofwat (2019), [PR19 final determinations: Delivering outcomes for customers policy appendix](#), p59

identify differences in soil temperature which could be caused by water escaping from a pipe), acoustic noise logging, satellite imagery and analytics and smart meters to help locate otherwise elusive leaks in a time- and cost-efficient way. Anglian also has a pressure calming programme to reduce leakage, reduce pressure transients and prevent mains bursts... Leak detection ...solutions are more costly in the short term but cheaper in the long-term.<sup>2138</sup>

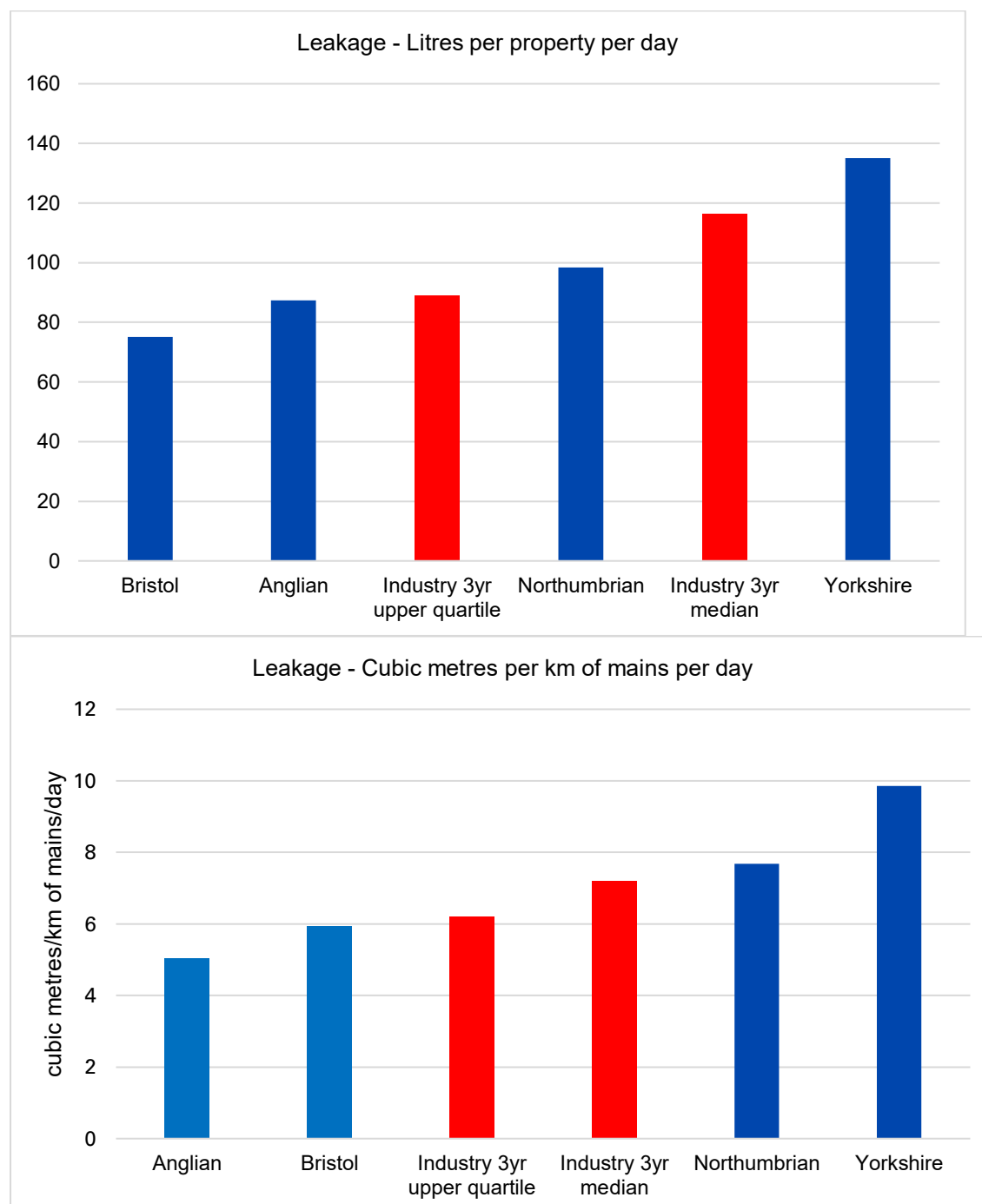
- 8.8 The four Disputing Companies (and all the water companies) have different levels of leakage. This reflects a number of factors, including companies' previous decisions on what level of leakage to pursue (those companies facing a threat of water shortages were likely to take more steps to reduce leakage than those with surplus water), and the particular circumstances of their operating area (for example, local operating conditions, that may be favourable or not, such as: the age of pipes and the materials they are made from; topography that may influence pressure levels; property density that affects the number of connections; soil conditions; local climatic variances; and the extent of traffic load). Prior to PR19 companies were set leakage targets according to a SELL approach, see paragraphs 8.11 to 8.15.
- 8.9 It is inevitable that water networks which are many years old such as those in England and Wales will have some leakage, and there is no suggestion that the sector should seek to remove all leakage. However, leakage remains at what appear to be very high levels. As shown in Figure 8-1, in 2019-20 the Disputing Companies still lost between 4.5 and 8.5 cubic metres of water to leakage per km of water mains each day, on average. This is equivalent to 15% to 22% of all water that enters their distribution networks.
- 8.10 As shown in Figure 8-2, based on a three-year average of leakage levels up to 2019/20 (measured by litres per property or cubic metres per km of mains), the Disputing Companies, apart from Yorkshire, have lower than industry average leakage levels. Bristol and Anglian's respective leakage performance is 15% and 16% better than upper quartile levels.<sup>2139</sup>

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<sup>2138</sup> [Anglian SoC](#), p259

<sup>2139</sup> The relative levels for Bristol and Anglian compared to the upper quartile are based on a geometric mean of both the litres per property and cubic metres per km of mains normalisation measures.

**Figure 8-2: 2019/20 (3-year average) leakage levels for the Disputing Companies relative to industry average and upper quartile levels**



Source: CMA analysis.

### ***Ofwat's approach to setting targets for leakage***

8.11 In the past, the objective for leakage has been that companies should reduce leakage where the benefits of doing so outweigh the costs, as assessed under an agreed economic framework.<sup>2140</sup> Prior to PR19, Ofwat used a SELL

<sup>2140</sup> For example see Ofwat, [Final Determinations Future Water and Sewerage Charges 2000-2005](#), p127



model.<sup>2141</sup> SELL is the level of leakage where the incremental costs and benefits of reducing leakage are exactly equal, taking into account both the costs and benefits to the company, and the costs and benefits to other affected parties.

- 8.12 This approach of assessing the wider costs and benefits of reducing leakage allows the target to be determined based on a measure which includes the social and economic costs of abstracting water and of leakage. For example, higher leakage means higher abstraction, and if that abstraction is from vulnerable sites, that imposes a particular cost on the environment. Similarly, if leakage is in urban areas both the leak and its repair may interfere with normal traffic flows, which imposes a social cost on the users of the streets.
- 8.13 Such an approach accepts that allowing a degree of leakage is efficient. It is difficult to apply in practice, in particular estimating these social and environmental costs is difficult. But this approach may also be flawed in the incentives it creates regarding continuous improvement.
- 8.14 Ofwat told us that it was concerned because the SELL concept starts from each company's own costs, meaning that an inefficient company that spends more money on detecting and repairing leaks would then have a higher SELL. Because of that, it said, the use of the SELL concept has led to stagnation in leakage performance. It removed the incentive to get more efficient at leakage prevention, detection, and repair, which would have led to improved leakage performance.<sup>2142</sup> The resilience objective, introduced in the Water Act 2014, and the SPS in 2017 both place increased attention on leakage reductions.
- 8.15 Ofwat therefore decided to move away from the SELL approach. Ofwat's approach moved to developing targets for leakage reductions. In designing targets, Ofwat said:

Leakage is a high profile and important issue for customers, companies and regulators. Reducing leakage levels is important for ensuring resilient future supplies as we are faced with challenges such as climate change and population growth. Many customers see reductions in leakage as a prerequisite to taking steps to reduce their own water consumption.<sup>2143</sup>

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<sup>2141</sup> SMC (2012), [Review of the calculation of sustainable economic level of leakage and its integration with water resource management planning](#)

<sup>2142</sup> See for example the results from the SMC 2012 review set out in Ofwat (2020), [Cost efficiency – response to common issues in companies' statements of case](#) p56

<sup>2143</sup> [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), paragraph 5.3

- 8.16 In July 2017 Ofwat published its methodology consultation, which included a challenge to the water companies. Ofwat suggested that water companies should include at least a 15% reduction in leakage in their PR19 business plans.<sup>2144</sup> Almost all companies took up this challenge.
- 8.17 In PR19, Ofwat set PCs for leakage as percentage reductions compared with the 2019/20 level, using three-year running averages (to reduce the impact of variability arising from events - typically extreme weather - outside management control). These percentage reductions were based on the companies' business plans, which were themselves influenced by Ofwat's stated target of a 15% reduction. Ofwat then adjusted some of the targets in a way that was comparable to its approach to other common PCs as described in section 7.
- 8.18 In PR19, Ofwat set the following PCs for leakage, see Table 8-1.<sup>2145</sup>

**Table 8-1: Disputing Companies' leakage PC levels**

Company	% reduction on 2019-20				
	2020-21	2021-22	2022-23	2023-24	2024-25
Anglian	1.4	5.6	8.5	12.4	16.4
Bristol	6.1	11.4	15.8	19.0	21.2
Northumbrian (Northumbrian)	1.0	3.0	6.0	9.0	12.0
Northumbrian (Essex and Suffolk)	1.3	3.7	7.2	10.5	14.1
Northumbrian (combined)	1.1	3.2	6.4	9.5	12.7
Yorkshire	3.4	7.4	9.4	11.7	15.0

Source: Ofwat Final Determinations

Note: The numbers differ from Ofwat's FD publication (by which we mean pages 11 and 15 of Northumbrian PCs annex). This change from Ofwat's FD reflects correspondence from Northumbrian and Ofwat in this determination about the appropriate figures to use for the leakage PC.

- 8.19 These PCs are broadly consistent with the WRMPs that the companies have developed in parallel to their business plans.<sup>2146</sup> The goal of WRMPs is to ensure that all water resources zones have an adequate supply-demand balance,<sup>2147</sup> and one way to do that is to reduce leakage. WRMPs typically have a long-term (25 years) and short-term (5 years) leakage target,

<sup>2144</sup> Ofwat (2017), [Delivering Water 2020: Consulting on our methodology for the 2019 price review](#), pp68-70

<sup>2145</sup> The percentage leakage reduction figures for Northumbrian's two regions have been updated from Provisional Findings to reflect the relevant Ofwat (2019), [PR19 final determinations: Northumbrian Water – Outcomes performance commitment appendix](#), p11 & p15. This change arises from [Ofwat's response to the provisional findings – cost and outcomes](#), p69.

<sup>2146</sup> See 'environmental improvements' in paragraph 5.7 of Section 5 on Enhancement. WRMPs are a statutory requirement. In its consultation - Ofwat (2017), [Delivering Water 2020: Consulting on our methodology for the 2019 price review](#), and in its final statement – Ofwat (2017) [Delivering Water 2020: Our final methodology for the 2019 price review](#), Ofwat said that water companies should integrate their WRMPs into their business plans for reducing leakage.

<sup>2147</sup> WIA91 [Part III, Chapter 1](#)

particularly when there is a supply-demand deficit. Since the 2019 WRMPs and the PR19 business plans were developed in tandem, they generally have the same or similar leakage targets.

- 8.20 In their submissions, all the companies and Ofwat have indicated that they agree that it is appropriate for AMP7 to undertake an additional challenge on leakage relative to performance in recent periods. Northumbrian raised concerns about the design of the leakage PC and suggested that the baseline for leakage reduction should be based on AMP6 targets, rather than 2019-20 actuals.<sup>2148</sup> However, we consider that Ofwat's response to this concern over the PC definition was sufficient to illustrate that this has not led to an error.<sup>2149</sup>
- 8.21 None of the Disputing Companies explicitly asked us to move away from Ofwat's approach to designing the PCs of requiring a material reduction in leakage. No other Parties disagreed with our approach at Provisional Findings of accepting Ofwat's leakage PC levels for the disputing companies, apart from CCWater, which proposed that where the Provisional Findings allowed an increased allowance for leakage funds (in this case for Yorkshire), there should be an enhanced PC target.<sup>2150</sup>
- 8.22 In its Final Submission, Ofwat suggested that Bristol's leakage PC may need to rise to nearly 24% to avoid outperformance rewards.<sup>2151</sup>

### ***Our decision on the leakage PCs***

- 8.23 We accept Ofwat's position that the average company should be able to deliver a substantial improvement in leakage performance by adopting the technologies and other best practices that have been developed in the last 20 years.<sup>2152</sup> The Disputing Companies showed us a variety of different approaches and technologies which they had introduced or were implementing at the 'virtual site visits'. Our engineering adviser, WRc, also told us that the PCs were achievable, but would be likely to require additional expenditure, at least for some companies. We discuss the costs associated with achieving improvements in leakage in the next section.
- 8.24 We are also conscious of the Secretary of State's statement about leakage in the SPS. We are required to carry out the determination in accordance with the SPS, in the same way as Ofwat. The SPS requires Ofwat to promote

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<sup>2148</sup> [Northumbrian SoC](#), section 6.5

<sup>2149</sup> See [Ofwat's response to the provisional findings – cost and outcomes](#), p69, which demonstrates why there is not an error.

<sup>2150</sup> [CCWater response to provisional findings](#), paragraph 2.14

<sup>2151</sup> [Ofwat's final submission](#), paragraph 2.91

<sup>2152</sup> Ofwat (2020), [Cost efficiency – response to common issues in companies' statements of case](#), paragraph 5.43

ambitious action to reduce leakage and per capita consumption, where this represents best value for money over the long term.

- 8.25 We saw a number of examples of best practice which illustrate why significant changes should be possible in AMP7. We therefore accept that an approach which imposes leakage targets that require all the companies to achieve significant reductions across the sector is likely to deliver net benefits and therefore to represent value for money at least in this period. The sector-wide challenge should provide opportunities to identify best practice and to act as a starting point in moving towards longer-term efficient levels of leakage.
- 8.26 We would expect that the development of leakage targets beyond AMP7 would build on the experience in developing a broader assessment of the benefits of leakage against the costs, including the longer-term environmental benefits. This would allow targets beyond AMP7 to be set in a way which promotes efficiency across the sector and is consistent with the value for money objective in the securing long-term resilience priority in the SPS.
- 8.27 We therefore consider that there are good reasons to put in place performance targets which require a material increase in the rate of leakage reduction by comparison to previous periods. We have not seen evidence to suggest that there are better alternatives available to determine leakage targets for AMP7, and the companies have agreed with Ofwat's substantial targets as part of the price control and WRMP processes.
- 8.28 As a result, we decide to retain the PCs for leakage reduction set by Ofwat in its Final Determination (as in Table 8-1, including use of the adjusted leakage PCs for Northumbrian as per that Table).
- 8.29 In response to CCWater's criticism (see paragraph 8.21), we do not agree that a change is appropriate; the calculation of allowances as set out in paragraphs 8.31 to 8.175 is explicitly based on the PC targets, the appropriate allowance is a function of the level of the PC, and any increases in funding relative to Ofwat's FD are there to better achieve those targets. We disagree with Ofwat's late request to reopen the leakage PC levels for Bristol. Bristol already has low leakage relative to the sector and an ambitious target at 21%.
- 8.30 In paragraphs 8.176 to 8.203 we consider the structure of ODIs attached to these PCs.

# Leakage Totex

## *Introduction*

8.31 In this section, we consider allowances for funding for leakage reduction measures. Reducing leakage rates will require companies to take measures both to detect and repair leaks, and also to reduce the risk of leakage in the first place.

## *Parties' submissions on the costs of reducing leakage*

8.32 The Disputing Companies submitted that they could not deliver the leakage levels they had committed to without more funding than was implied in the Ofwat base cost models. Northumbrian initially told us that it proposed to cover the shortfall from the total costs it was seeking in its Business Plan, but changed its position to request an enhancement cost allowance following a review of our Provisional Findings. The other companies asked us to make a variety of base cost adjustments and enhancement cost allowances.<sup>2153</sup>

8.33 Anglian said:

Anglian is unable to deliver on the plans its customers have consistently supported as Ofwat has: (i) allowed a level of base costs that is far below what is required to maintain Anglian's current frontier performance; (ii) compounded the problem by allowing insufficient Enhancement costs to shift the leakage frontier further during AMP7 in line with Anglian's performance commitment level, a task already made impossible by the insufficient level of base costs to maintain current performance...<sup>2154</sup>

8.34 Anglian said the supply-demand balance was at risk during AMP7 from pressures such as reductions to Anglian's existing licenses to abstract water, population growth, and increased household demand for water (it said there had been a 12% increase in household consumption as a result of COVID-19<sup>2155</sup>). It said leakage control, along with smart metering,<sup>2156</sup> were the only options available to Anglian to effectively manage the supply demand

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<sup>2153</sup> While Northumbrian did not ask for a base cost adjustment or for enhancement totex, it did say that 'a consistent approach would be appropriate'. Our analysis focuses on the amounts that Northumbrian and the other Disputing Companies told us they would need to spend, rather than the adjustments they asked us to make to Ofwat's approach.

<sup>2154</sup> [Anglian SoC](#), paragraph 83

<sup>2155</sup> [Anglian's response to the leakage enhancement totex allowances working paper](#), paragraph 1

<sup>2156</sup> [Anglian's response to the provisional findings](#), paragraph 268 said for AMP7, leakage control was expected to contribute around 30MI/d of the 43MI/d demand reduction targeted in the WRMP.

balance during AMP7 as supply enhancement schemes will not begin to deliver significant improvements until AMP8.<sup>2157</sup>

8.35 It also said that pushing Anglian's frontier position on leakage is crucial to ensuring security of water supply for Anglian's customers in AMP7,<sup>2158</sup> and the Provisional Findings severely underestimated the base costs required to maintain Anglian's current frontier performance. It said that the conditions in its region created a more challenging environment for leakage.<sup>2159</sup>

8.36 Anglian said that in the absence of leakage explanatory variables within the Botex models we included in our Provisional Findings, the models did not reflect the costs of maintaining leakage at industry-leading levels, or the higher costs of reducing leakage in Anglian's region. It proposed a cost adjustment claim of £132.5 million (after frontier shift efficiency of 1% pa less RPEs) to address these issues. It estimated base leakage costs at an annual cost of around £46.3 million (£232 million over the course of AMP7). It considered that £95 million was implicitly allowed within Ofwat's base cost models for leakage, and therefore the cost adjustment claim value represented the incremental costs of leakage maintenance, at the level reached at the start of AMP7, relative to maintaining the SELL.<sup>2160</sup>

8.37 Bristol said:

In the Final Determination, Ofwat only made allowances for the marginal cost of leakage reduction activities that take companies beyond the upper quartile level of performance, classed as enhancement expenditure. However, Ofwat has made no specific cost allowance for leakage expenditure below the upper quartile level of performance, and these activities must be funded from base expenditure. In our case, the base cost allowance is insufficient to fund these activities.<sup>2161</sup>

8.38 Bristol said its estimates of the cost of leakage were substantially higher than those proposed in our Provisional Findings, reflecting the increase in marginal costs as leakage rates fall, increasing the difference to average costs.<sup>2162</sup>

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<sup>2157</sup> [Anglian's response to the provisional findings](#), p47

<sup>2158</sup> [Anglian response to leakage consultation](#) paragraph 1.

<sup>2159</sup> In [Anglian's response to the provisional findings](#), p47, Anglian referred to evidence from academic experts and economic analysis which it said demonstrated that soil conditions, weather patterns, levels of soil moisture deficit, and the pipe materials prevalent in the region add up to a more challenging environment for leakage.

<sup>2160</sup> In [Anglian's response to the provisional findings](#), paragraphs 304-310, Anglian revised its base cost adjustment claim after our Provisional Findings to (£132million) making a total base claim of £227.5 million (see Table 14 of its response).

<sup>2161</sup> [Bristol SoC](#), paragraph 370

<sup>2162</sup> [Bristol's response to the provisional findings](#), paragraphs 194-195

8.39 Northumbrian said:

This unprecedented reduction in leakage may be possible, but will require sustained investment in new technology and infrastructure. This will be a significant challenge given the other elements of the PR19 framework which set a tough cost challenge. These stretching targets have not been accompanied by the additional funding for the investment required to deliver them.<sup>2163</sup>

8.40 Yorkshire had proposed a more stretching 25% leakage reduction target to Ofwat, but sought more funding to meet that target.<sup>2164</sup> It told us:

Ofwat relies upon econometric models using an implausibly low estimate for the additional cost for an efficient company of meeting Ofwat's stretching leakage performance commitment.<sup>2165</sup>

8.41 The Disputing Companies raised several concerns with both Ofwat's approach and that proposed in our Provisional Findings to setting allowances for the cost of reducing leakage. For example, Bristol said that our Provisional Findings recognised that maintaining leakage at lower levels results in higher costs, but our approach only provided funding where performance was beyond upper quartile. However, it argued that the base cost models only reflect the industry average position. It said this meant that the we had implicitly assumed that there is zero cost of maintaining leakage at the upper quartile level of performance.<sup>2166</sup>

8.42 In their submissions, the Disputing Companies have typically adopted a distinction with respect to the costs of leakage: that base cost adjustments are meant to cover any unusual costs associated with maintaining current levels of leakage while enhancement costs are meant to cover the cost of reducing leakage relative to the status quo level which is based on actual leakage levels in 2019/20. In their SoCs, Anglian, Bristol and Yorkshire requested additional funding in the form of a base costs adjustment and/or for enhancement expenditure.

8.43 Northumbrian did not request a base cost adjustment nor an enhancement cost adjustment in its SoC, but it did later request £15.6 million for an additional leakage enhancement allowance in response to our Provisional Findings. Northumbrian said its decision not to seek additional funding in its

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<sup>2163</sup> [Northumbrian SoC](#), paragraphs 539-540

<sup>2164</sup> [Yorkshire SoC](#), paragraphs 162-163

<sup>2165</sup> [Yorkshire SoC](#), paragraph 142b

<sup>2166</sup> [Bristol's response to the provisional findings](#), paragraph 190



business plan or in the SoC should be seen in the context of the prevailing guidance from Ofwat during the PR19 process, and also reflected its desire to stretch itself, and in the context of the overall package put forward where it had sought additional totex allowances. It said it chose to look at the package in the round before deciding to 'cover the shortfall from [our] own resources'.<sup>2167</sup> It said had the level of challenge in the Provisional Findings been anticipated it would have sought additional costs to deliver its leakage reduction targets.<sup>2168</sup>

8.44 Ofwat's policy position was that its 15% baseline challenge should be funded from existing base cost allowances.<sup>2169</sup> Ofwat's rationale for this approach was that:<sup>2170</sup>

- (a) In recent AMPs, there had been virtually no improvement in leakage, suggesting that the companies had not invested sufficiently in leakage improvements. As such, it considered it would be fair that they should now start to reallocate monies for the 'catch-up' that they were now being asked to undertake.
- (b) There was ample scope for innovative approaches, which should allow the companies to achieve significant leakage reductions at little or no cost.<sup>2171</sup>
- (c) The companies could fund part of any additional costs associated with meeting the leakage target through the cost sharing mechanism. Moreover, if they overperformed their targets, the costs of doing so would be met through ODI rewards as well.

8.45 In response to Anglian's cost adjustment claim and the evidence it submitted, Ofwat agreed that there was a supply-demand challenge in the region, and noted that the company had identified factors that influence the leakage challenge it faces in its region. However, it said these are likely to influence the challenge for a number of companies in the South East of England, and it applied a high evidential bar for any company specific adjustments. It disagreed with a larger base adjustment as it said Anglian did not

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<sup>2167</sup> [Northumbrian's response to the provisional findings](#), paragraphs 235 - 240

<sup>2168</sup> [Northumbrian's response to the provisional findings](#), paragraph 243

<sup>2169</sup> [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), paragraphs 5.20, 5.45 & 5.53, in particular

<sup>2170</sup> For example, the bullets listed in [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), paragraphs 5.53-5.54

<sup>2171</sup> For example, [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), paragraph 5.43



demonstrate the efficiency of its proposals and substantially underestimated the implicit allowance already provided in base funding.<sup>2172</sup>

- 8.46 Ofwat therefore rejected any increased base cost allowances for leakage expenditure at PR19 for the four Disputing Companies, with the exception of Anglian. Anglian was allocated an extra £50.2 million from the results of Ofwat's alternative econometric model specifications, some of which included models with leakage performance as a cost driver.<sup>2173, 2174</sup> Anglian told us that £24.5 million of this £50.2 million base cost adjustment related to leakage.<sup>2175</sup> In response to Provisional Findings, Ofwat suggested Anglian's base adjustment allowance (for use if the CMA concludes one is necessary) should be in the range of £4.6 million to £32.5million (after efficiency challenge, RPE and frontier shift). The wide range reflected different measures of how far Anglian was beyond upper quartile, with a range of 2% to 16% assumed by Ofwat.<sup>2176</sup>
- 8.47 Table 8-2 sets out the Disputing Companies' final business plan claims for base and enhancement allowances for leakage as set out in their SoCs at the start of the redetermination, and their revised claims after publication of our Provisional Findings. It also shows the position at Ofwat's FD and its revised position after reviewing the supporting evidence we had requested from the Disputing Companies after the Provisional Findings. The highlighted cells indicate where positions changed during the course of this redetermination.

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<sup>2172</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), p14

<sup>2173</sup> Ofwat said 'For final determination we make an adjustment of £50.2 million to our base allowance, based on evidence from alternative model specifications, including models with leakage as an explanatory variable.... Anglian Water was funded to achieve its low leakage levels of 2019-20 through totex allowances and the outcomes delivery incentives framework in previous price reviews. We expect Anglian Water to maintain its low leakage levels through our base costs allowance, which includes the £50.2 million uplift, without additional funds, in particular given the rest of the industry is required to reduce leakage without additional allowance.' Source: Ofwat (2019), [PR19 final determinations: Anglian Water Cost efficiency additional information appendix](#), paragraph 2.4.1

<sup>2174</sup> Further detail on the alternative model specifications is provided in Section 4.

<sup>2175</sup> [Anglian SoC](#), paragraph 900

<sup>2176</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), Table A.3.2, p68

**Table 8-2: Base and enhancement costs for leakage – company claims and Ofwat's PR19 determinations**

£m in AMP7

		Companies' claims		Ofwat's views	
		<i>Statement of case</i>	<i>Revised submission post-PFs</i>	<i>Ofwat's FD19</i>	<i>Ofwat post-PFs</i>
Anglian	Base	137.5	132.5	24.5	4.6-32.5
	Enhancement	76.7	76.7	74.5	54.2-58.1
	Totex	214.2	209.2	95.9	78.7-82.6
Bristol	Base	13.0	6.2	0	0
	Enhancement	4.8	4.8	4.8	4.6
	Totex	17.8	11	4.8	4.6
Northumbrian	Base	0	0	0	0
	Enhancement	0	15.6	0	0
	Totex	0	15.6	0	0
Yorkshire	Base	0	0	0	0
	Enhancement	94.7	94.7	0	0
	Totex	94.7	94.7	0	0

Source: CMA analysis

### **Assessment of base costs for leakage**

8.48 This section considers the potential need for changes in base cost allowances to reflect differentials in the current level of leakage between the different water companies. We propose base allowances by considering the following logic:

- (a) We assessed whether leakage could be included as a variable in the base cost models that were discussed in section 4. As discussed in 8.49-8.51, we do not consider this is a reliable way to measure the costs of leakage;
- (b) We assessed whether high-performing companies should be allowed a separate adjustment for the additional costs of managing lower levels of leakage. As discussed in 8.52-8.59, we concluded that it is appropriate to allow additional base costs for those companies performing beyond upper quartile (Anglian and Bristol);
- (c) We assessed Anglian's cost adjustment claim for £132.5 million. As discussed in 8.60-8.66, we rejected the cost adjustment claim; and
- (d) We then calculated an allowance for the companies performing beyond upper quartile, based on the assumption that a proportion of total costs will relate to this performance and will not be funded by base. We outline our decisions on the allowances in 8.67-8.81.

8.49 Anglian, Bristol and Yorkshire have argued that leakage should be included as a variable in our base cost models. They said that if we were to include leakage in the base models, then the models could be used to directly determine any additional costs associated with improvement in leakage

between AMP6 and AMP7. For the reasons set out in paragraphs 4.225-4.229, we have decided not to do so, nor to retain the alternative modelling approaches developed by Ofwat that included leakage as a cost driver.

- 8.50 Our decision on the Disputing Companies' totex results in a change to Anglian's totex allowance. Part of this change is the removal of the £50.2 million that Anglian received from the alternative econometric modelling specifications, which were influenced by Anglian's lower leakage rate (and where £24.5 million related to leakage, see paragraph 8.46). The reasons for removing this £50.2 million are explained in paragraph 4.257.
- 8.51 However, this decision does not rule out an adjustment to base costs altogether. It simply means that any such adjustment cannot be based on econometric modelling of costs. Instead, we consider the case for a company-specific adjustment to reflect different cost allowances and performance in leakage relative to the outputs of the base cost models.
- 8.52 We next considered therefore whether there was evidence that companies with lower leakage were likely to incur higher costs than allowed by the base cost models. At a high level, Anglian, Bristol, and Yorkshire all argued that maintaining lower leakage levels was more expensive than maintaining higher leakage levels.<sup>2177</sup> Our engineering adviser was of a similar view. To maintain a lower level of leakage, a company needs to spend more money on both capex (such as noise sensors to find the leaks) and Opex (such as staff to repair the leaks). Given the limited asset life of the capex involved, these expenditures needed to be made on an ongoing basis.
- 8.53 In our view, since all companies incur these costs, and have incurred these costs throughout the period covered by the base cost models, an allowance for them is implicit in the base cost allowances. However, there is no direct way of observing the level of leakage performance implied by the base costs models, which are based on actual expenditure in AMP5 and AMP6.
- 8.54 Ofwat told us that its approach to leakage allowances assumes the base cost model should provide an allowance which would have been sufficient to deliver upper quartile performance, rather than a lower target, such as average leakage performance. This is consistent with the broader incentive framework of expecting companies with performance below the upper quartile to move towards industry-leading levels without additional cost allowances to do so. In addition, those companies with better leakage performance may also

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<sup>2177</sup> For example Bristol referred to Assessing Ofwat's Funding and Incentive Targets for Leakage Reduction commissioned from NERA by a number of water companies (including Anglian and Yorkshire) to assess Ofwat's funding and incentive targets for leakage reduction. NERA showed that the marginal cost of leakage reduction rises as companies reduce leakage to lower levels. Source: [Bristol SoC](#), paragraph 386

gain from some of the wider benefits of reduced leakage, such as lower pumping and abstraction costs.

- 8.55 In this assessment of leakage costs, we have considered Ofwat's assessment that base costs funds upper quartile performance separately to its additional challenge to all the companies to improve leakage by 15%. The 15% is an industry-wide challenge to improve leakage levels below those observed during the previous periods. We have, like Ofwat, considered claims for the cost of achieving this reduction as enhancement costs. As discussed further in the enhancement section below, Ofwat provided enhancement funding only to the current upper quartile companies (including Anglian and Bristol) to go beyond the current upper quartile levels and deliver the additional 15% reduction.
- 8.56 The assumption that base costs are sufficient to fund current upper quartile performance cannot be observed directly from the base cost models, and we found that there was no way directly to model the leakage levels implied by the base cost models. It is therefore a matter of judgement what level of leakage is implied by the base cost models, and therefore under what circumstance it is reasonable for companies to request additional costs for performance which diverges sharply from the performance of other companies.
- 8.57 The overall approach to benchmarking implies that all firms should be expected to move towards upper quartile performance, and that the base cost allowance should represent a sufficient allowance for them to do so, see paragraphs 4.491 to 4.494.
- 8.58 We conclude that companies at or below upper quartile should therefore be able to maintain their current level of leakage without any need for an adjustment to base costs. This would therefore imply that, of the four Disputing Companies, only Anglian and Bristol could potentially require an adjustment to base cost allowances, as their leakage performance is beyond upper quartile.
- 8.59 Since we conclude that there is a link between current performance on leakage and the costs to achieve that level of leakage, then those companies currently performing better than upper quartile are likely to be incurring more cost than will be reflected in the base cost models. In order to maintain their current level of performance, these high performing companies would be expected to incur costs that exceed the implicit allowance for leakage costs that is included in the base cost allowance. This is consistent with the principles followed by Ofwat in allowing Anglian a base cost adjustment. Given that these are high performing companies on a metric where Ofwat is

encouraging sector-wide improvement, we therefore agree with Anglian's position.<sup>2178</sup> that this should be recognised in setting an adjustment to base costs.

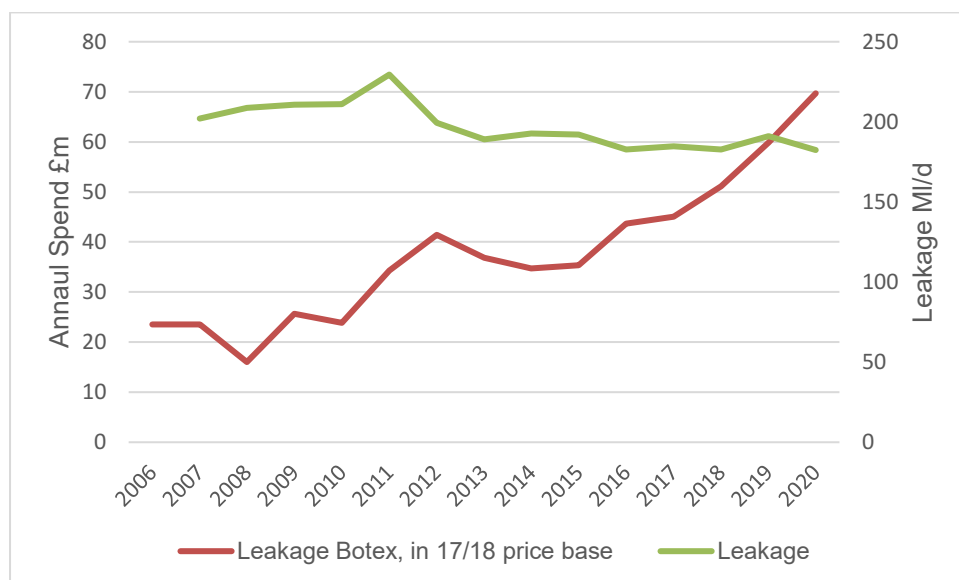
- 8.60 We then considered Anglian's cost adjustment claim of £132.5m for leakage, which was submitted as part of the business plan process and in this redetermination. Whilst we agree that Anglian is likely to have to spend more than implied by the base cost models, we concluded that Anglian's cost adjustment claim was based on a limited and therefore unconvincing analysis of the allowance for leakage expenditure within the base cost models. Ofwat identified a number of limitations with Anglian's cost adjustment claim in its response to our Provisional Findings, many of which we agree with.<sup>2179</sup>
- 8.61 First, Anglian's cost adjustment claim suggested that the implicit allowance was based on the historic expenditure it incurred when its leakage was at its legacy SELL. However, Anglian's assumption that the base cost allowances were consistent with SELL was based on this being its own historical target level, rather than any statistical analysis of the relationship within the base cost models of the level of leakage implied by those models for the different companies. Anglian accepted that there was no precise way to determine the leakage component of the overall base cost models, so the implicit allowance for leakage could not be calculated accurately. Anglian's cost adjustment claim therefore relies on the assumption that it has an implicit allowance based on SELL, which is itself a number that has not been updated for a number of years. We concluded that this was insufficient evidence to support the scale of additional costs requested in the cost adjustment claim.
- 8.62 Second, Anglian's cost adjustment claim was based on a simple regression of its actual spend against its actual leakage, which it said demonstrated that, for leakage 27 MI/d below SELL, it would expect to spend £135m more on managing leakage. We illustrate in Figure 8-3 the relationship between Anglian's leakage levels and its investment on leakage (at constant 2017/18 prices) over time, using the data provided in Anglian's cost adjustment claim.

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<sup>2178</sup> [Anglian SoC](#), paragraphs 1036-1039

<sup>2179</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), Appendix 3, pp65-66

**Figure 8-3: Anglian's historic spend on leakage activities and the relationship to reported leakage levels**



Source: CMA analysis

- 8.63 In our view, all that this analysis shows is that Anglian has been increasing spend on leakage, and at the same time, over a 15 year period, leakage has reduced. Figure 8-3 indicates that leakage spend increased during AMP6 when the level of leakage was largely constant, and previously Anglian reduced leakage sharply between 2011 and 2013 with a modest change in spend, corresponding to a level well below the £5 million unit cost implied by its cost adjustment claim. We expect that many other factors influence the level of leakage and the costs spent to manage leakage: these are not included in Anglian's modelling. We also noted that Anglian did not provide adequate assurance that its reporting of leakage costs over time was on a consistent basis.
- 8.64 We asked our engineering adviser to review the information provided by Anglian in support of its claim. Its advice was that the evidence of local conditions and high existing leakage performance leading to higher costs was not sufficiently credible and that it should have been presented more robustly. The local conditions included asbestos cement pipes that may be problematic, corrosive soil conditions and climatic variables. It confirmed that these were likely to contribute to leakage challenges, but all companies face different challenges and Anglian had not demonstrated the reasons for its high costs relative to others. There was no direct evidence provided to demonstrate that a greater proportion of Anglian Water's pipe network is subject to these particularly aggressive environments.
- 8.65 Our engineering adviser recognised that some of the local conditions would be a challenge, but importantly the evidence showing how this related to cost

variances was not sufficiently clear or convincing to support any particular relationship between its costs and changes in leakage. Our adviser thought that spatial variances for specific geographic areas within Anglian's region could have been demonstrated, but Anglian did not present such analysis. Also, it noted that the evidence provided by Anglian tended to relate to burst rates rather than leakage levels or flow rates. Hence our adviser told us that it considered Anglian had not provided sufficient evidence that it needed to spend more than others to achieve the same level of leakage performance.

- 8.66 We therefore reject Anglian's cost adjustment claim, primarily because we consider that the calculation of the implicit allowance is unreliable, and also because of limitations in the unit cost modelling. We also cross-checked this finding that there was insufficient evidence to support the size of cost adjustment claim against the review by our engineering adviser. Whilst we accept that Anglian is likely to have higher base costs than allowed by the base cost models, our assessment is that more detailed modelling would be required to justify a base cost adjustment claim of the size proposed in its business plan.
- 8.67 Having rejected Anglian's cost adjustment claim, we then considered the most appropriate approach to determine a potential base cost adjustment for Anglian and Bristol, both of which are high performers on leakage.
- 8.68 In our Provisional Findings, we provided an allowance for base costs for Anglian and Bristol based on the extent to which they had demonstrated outperformance of upper quartile leakage levels. We calculated an allowance based on the percentage outperformance relative to upper quartile, multiplied by the size of cost adjustment claim requested by the parties. This approach was based on the assumption that the base models would be sufficient to fund the costs of achieving current upper quartile levels in AMP7, and therefore that funding would be needed to go beyond these levels.
- 8.69 In response, both Anglian and Bristol said that they considered that the base cost models allowed expenditure to cover only average historic performance, rather than upper quartile levels. As described in paragraph 8.54, Ofwat told us that the base cost allowances allowed for efficient companies to meet current levels of upper quartile performance, but did provide additional enhancement funding to the current upper quartile firms to reduce leakage by a further 15%.
- 8.70 As described in paragraph 8.61, although there is no direct link between the base cost models and a particular level of leakage, we agree with Ofwat's position that there should be sufficient allowances in base costs for an efficiently run company to prioritise leakage activity sufficiently to target upper

quartile levels of performance. This is consistent with other service levels, such as the three Common PCs at PR19 that have upper quartile as the basis of their targets. However, for companies which have accepted PCs beyond upper quartile, it is appropriate to conclude that they will incur additional costs.

- 8.71 Therefore, as also discussed above, we conclude that it is appropriate to consider an additional base costs allowance for Anglian and Bristol for the costs of maintaining leakage levels below upper quartile.
- 8.72 Anglian and Bristol also told us that the marginal costs of leakage control rise as lower leakage levels are reached, meaning it becomes more expensive to maintain leakage at a steady state. Whilst we accept the logic of this, some of the reasons for high performance are likely to arise from a combination of regional differences that may include some favourable operating conditions or adoption of new assets in response to growth. Low starting levels of leakage may also reflect previous levels of investment. We also further note the difficulties in determining a marginal cost for steady state leakage and note that Anglian itself did not present this information clearly.
- 8.73 In our Provisional Findings we decided companies should have an additional allowance for leakage performance above upper quartile levels, based on the percentage outperformance multiplied by the total costs planned to be incurred. For Anglian the calculation of planned expenditure was based on its cost adjustment claim. Whilst this approach is relatively simplistic, we have not seen any more effective ways to accurately measure the additional costs associated with lower leakage levels.
- 8.74 We continue to find companies should have an additional allowance for leakage performance above upper quartile levels, but having considered submissions since our Provisional Findings, we have concluded that a more accurate approach is to base this on company projections of efficient future base expenditure needs, which are £227.5 million for Anglian and £20.7 million for Bristol. We consider this to be a more accurate approach since these company expenditure projections should already reflect the higher marginal cost.
- 8.75 Anglian, Bristol and Ofwat all asked us to review the calculations of the outperformance gap from upper quartile. Bristol suggested that this should also reflect leakage normalised on a per property basis. Ofwat agreed with this. Anglian disagreed, and for Anglian the effect of this approach is to reduce the amount by which it is outperforming the upper quartile. We have reviewed the evidence provided of the approach taken by Ofwat in its own analysis and agree that it would be more consistent to adjust on the basis of both leakage per km and per property measures. This is so that the measure



is appropriate both to rural areas and urban areas. Hence the distance companies are past upper quartile is now based on a combination of leakage levels normalised by length of mains and property numbers.

8.76 Ofwat also suggested that we should use the outperformance at the end of AMP7 rather than the starting point, to reflect stretch in the leakage PCs that reflect the relative ambition of companies in AMP7. Bristol responded by noting that a compromise would be to adopt the mid-point of outperformance between 2019/20 and 2024/25. We have decided to adopt this mid-point suggestion, because future stretch is also a relevant consideration in assessing the costs that the companies are likely to incur in AMP7. Anglian and Bristol both have targets greater than 15%, and they will be further past the upper quartile level (at 22% and 25%) than at present (16% and 15%). As our adjustment is on the basis that the base models fund upper quartile levels only, this greater stretch requires additional funding as it is more expensive to maintain steady state leakage where companies have reached lower leakage levels. As a result, the additional allowance will increase in proportion to how far the companies are beyond upper quartile and therefore how challenging it is likely to be to maintain leakage at these lower levels.

8.77 Taking this together, we have decided that:

- (a) the high performing companies should be allowed a share of their stated base expenditure to achieve leakage targets, on the basis that much but not all of this expenditure will already be included in an efficient level of base costs; and
- (b) that the share to be allowed should correspond to the percentage by which each company outperformed the upper quartile in 2019/20 and is projected to in 2024/25, which accounts for the relative levels of stretch in AMP7;<sup>2180</sup>

8.78 Anglian outperformed the 2019/20 upper quartile by 15.7% in 2019/20 and based on the stretch in its relative leakage PC it is expected to be 21.7% past the upper quartile at the end of AMP7, in 2024/25.<sup>2181</sup> Under our approach, it will receive an adjustment equal to 18.7% of the £227.5 million base cost amount it said it was going to spend on maintaining current levels of leakage (£42.6 million). This percentage is the average outperformance gap from

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<sup>2180</sup> For the purposes of this exercise, we have normalised leakage performance in terms of leakage per length of mains per day and in terms of leakage per connected property per day.

<sup>2181</sup> Based on CMA analysis of the performance of each firm relative to the upper quartile performance, using the 3 year geometric mean level of leakage (2017-18 to 2019-20). Leakage was assessed based on two measurements - cubic metres per km of water main per day and also cubic metres per connected property per day.

upper quartile in the AMP7 period, taking the mid-point. Our view is that, together with the implicit allowance for leakage costs in the base cost allowance, this provides a total cost allowance which appropriately balances the need to allow companies to recover leakage costs with consumers' interests. We conclude that this is more appropriate than allowing Anglian's cost adjustment claim, which in our view would have involved a significant risk of double counting other existing allowances, most notably from base cost models allowances.

- 8.79 Applying the same approach to Bristol as it outperforms the upper quartile by 19.9%,<sup>2182</sup> it would receive 19.9% of the £20.7 million it said it was going to spend, which equates to £4.1 million. However, the changes we have made to the calculation of base cost allowances (see paragraphs 4.39-4.44) mean that there is no longer a material funding gap for leakage and so no additional amount is required. Bristol told us that the overall totex funding gap for all areas of its business, including but not limited to leakage, was £30 million relative to Ofwat's FD.<sup>2183</sup> We have now included 2019/20 data in the base cost modelling and this results in an increased overall allowance for Bristol that almost bridges this full totex expenditure gap. After our additional enhancement allowances (see paragraphs 8.148-8.149), the residual difference is less than 1% of Bristol's projected spend needs of £435.4 million in AMP7. This totex gap is by far the smallest of the four Disputing Companies.
- 8.80 We therefore consider that a further adjustment of up to £4.1m base leakage spend is not necessary or appropriate for Bristol. The funding for leakage is effectively resolved through the combination of this different overall base cost adjustment that includes 2019/20 data and our enhancement allowance for leakage. Bristol is the only one of the four Disputing Companies who will receive a leakage enhancement allowance very close to its request, and it has already reduced leakage by 10% in 2019/20, which are two factors that provide us with further comfort that its overall funding position to meet the leakage challenges in AMP7 is appropriate.

#### *Decision on base cost allowances for leakage*

- 8.81 Our decision is that Anglian will receive an adjustment to base costs for leakage of £42.6 million for AMP7. We decide not to make any base cost allowance adjustment for Bristol specific to leakage as we conclude that this is not necessary as Bristol's totex gap is already largely covered by our

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<sup>2182</sup> Based on the same approach as for Anglian, with Bristol being 15.1% ahead of the 2019/20 upper quartile and projected to be 24.7% ahead in 2024/25, hence a mid-point of 19.9%.

<sup>2183</sup> [Bristol's response to the provisional findings](#), paragraph 22

calculation of base cost allowances, meaning its overall allowance is almost in line with its view of the efficient costs needed in AMP7.

- 8.82 We decide that Northumbrian and Yorkshire will not receive an adjustment to base costs for leakage, as they have leakage levels higher than the industry upper quartile level. This is shown in Table 8-3.

**Table 8-3: Our determination of adjustments to base costs for leakage**

	<i>AMP7 Base Cost Adjustment for Leakage Expenditure: CMA</i>	<i>Difference to Ofwat FD19</i>
Anglian	£42.570m	+£18.1m
Bristol	-	-
Northumbrian	-	-
Yorkshire	-	-

Source: CMA analysis

Footnote: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

### ***Assessment of Enhancement Costs adjustments for leakage***

- 8.83 This section considers the need for additional cost allowances to reflect the reductions in leakage beyond the level which should be achievable through the base cost allowances. Any additional cost allowances above base are included within enhancement costs.
- 8.84 When we issued our Provisional Findings, we noted that for leakage, the enhancement totex allowances would be reviewed and we would consider further evidence as we had insufficient information available to come to a firm view on this issue.<sup>2184</sup> We issued a [consultation paper](#) on the right approach towards enhancement allowances for leakage, in which we set out provisional views and invited responses. We set out below our decisions in light of the further evidence and views we have received.
- 8.85 Ofwat's policy position in respect of enhancement costs for leakage was that a company should not receive enhancement funding for leakage reduction unless their forecast absolute level of leakage for 2024/25 was in the upper quartile of forecasts for that year.<sup>2185</sup> Its rationale was that otherwise customers of such companies would have to pay to reduce leakage to a level that other companies have already comfortably surpassed without additional customer funding.<sup>2186</sup> It said providing funding to these companies would undermine its challenge to the sector to turn around two decades of poor performance on leakage, and it considered that there was an especially strong case for stretching the sector to make significant reductions in leakage

<sup>2184</sup> [Provisional findings report](#), section 8, paragraphs 8.74 & 8.100 (c)

<sup>2185</sup> [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), paragraph 5.23

<sup>2186</sup> [Ofwat's response to the provisional findings – overview](#), p2

over the 2020-25 period.<sup>2187</sup> It said its 15% leakage reduction was a challenge to poorer performing companies to improve their performance from within base funding and not simply to do more using the same processes and techniques they used historically.<sup>2188</sup>

8.86 In respect of the Disputing Companies, the decisions in Ofwat's FD were:

- (a) For Anglian, which was an upper quartile performer, Ofwat allowed £71.4 million compared to the Company final business plan position of £76.9 million;
- (b) For Bristol, which was also an upper quartile performer, Ofwat allowed the full £4.8 million that the Company had requested;
- (c) Northumbrian had no allowance; it did not request any leakage enhancement totex in its business plan;
- (d) Yorkshire's performance on leakage was not upper quartile, so it did not qualify under Ofwat's approach for consideration for additional leakage enhancement expenditure.

8.87 Ofwat allowed enhancement costs related to leakage as part of its supply-demand balance feeder model. However, it did so only for the companies whose forecast performance for 2024/25 was in the upper quartile (Anglian and Bristol among the Disputing Companies).

8.88 Ofwat told us that the Disputing Companies had had ample opportunity after its FD to provide additional information regarding their leakage reduction proposals and associated costs, but had failed to provide sufficient evidence to justify them. It revised its view on efficient enhancement expenditure allowances to a range of £54.2 million to £58.1 million for Anglian, and £4.59 million for Bristol. These revisions downwards by Ofwat compared to its FD reflected its review of the additional detailed evidence the CMA requested from the companies during the course of the redetermination.

8.89 Our assessment of the Disputing Companies' submissions on enhancement costs for leakage reduction proceeded on the basis of two initial questions:

- (a) Is there already an implicit allowance for leakage reduction costs in our base cost allowances?

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<sup>2187</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), paragraph 2.17

<sup>2188</sup> [Ofwat's reply to responses to the provisional findings – costs and outcomes](#), paragraph 2.20

(b) If not, is there a reason why a company should not be able to recover these costs from customers?

- 8.90 With regard to the former question, the Disputing Companies have pointed out that there was, on average, little improvement in leakage performance during the eight-year period considered by our base cost models (see section 4). Instead, during this period each company continued to make investments in leakage equipment, and in ongoing operating costs, whilst only broadly maintaining or slightly improving leakage. As discussed above, we have concluded that for most companies, the base cost models can be assumed to allow sufficient costs to achieve upper quartile leakage performance.
- 8.91 The Disputing Companies contrasted this with the approximately 15% reduction in leakage they are being asked to deliver during AMP7, which they considered constituted an enhancement in their performance which needs to be funded separately.
- 8.92 We agree that there will be an additional cost associated with this level of leakage reduction. The Leakage PC target represents a step change in expectations compared to the previous decades. Therefore, it cannot be said that the Disputing Companies can achieve this leakage reduction goal by following the same practices to address leakage performance as during the nine-year period considered by our base cost models. They will have to do substantially more. This may include exploring and adopting new approaches to reduce leakage. We expect that this will mean additional cost and our engineering advisors confirmed that this was likely to be the case. We also recognise that there are a variety of possible approaches to reducing leakage, the effectiveness and cost of which may vary between companies. However, as companies will tend to initially favour those solutions which offer the greatest impact at least cost, the marginal cost of incremental leakage reductions for companies is likely to increase.
- 8.93 This distinguishes leakage from the other PCs discussed in section 7, where the targets, even where set at upper quartile, represent the continuation of existing trends of improvement in industry performance.
- 8.94 On the basis that the costs of the whole sector achieving a 15% leakage reduction target will not be included in base cost models, the question remains whether the Disputing Companies should be allowed to recover these costs from customers. The most obvious reason why we might refuse this is if the companies had voluntarily chosen to underperform in the past. If the companies are consistently challenged to improve their leakage performance, and consistently funded to do so, they should not be funded for that same leakage reduction again if they do not deliver it the first time.

8.95 Throughout the redetermination process, Ofwat has made statements from which we infer that it viewed the situation in this way. For example, Ofwat told us:

(a) 'Performance on leakage has stagnated for considerably longer. Over the past two decades, despite material technological progress, the sector has achieved no overall reduction in leakage at the sector level. (...) This trend has masked some large reductions in leakage from individual companies – showing that considerable reductions are possible – and substantial deterioration in other companies.'<sup>2189</sup>

(b) 'We consider the targeted efficiency challenge well justified, given the poor performance by most of the sector over leakage over the last 20 years and the central importance of the issue to customers. And the scale of technological change over recent years should allow companies to reduce leakage efficiently.'<sup>2190</sup>

8.96 Ofwat told us that other non-disputing companies had confirmed that they could rise to the new leakage challenge without additional allowances.<sup>2191</sup> It noted that Yorkshire and Northumbrian had relatively high levels of leakage and said that this might reflect past under-investment.

8.97 Ofwat said that the sector had not taken leakage seriously enough, and that some companies had 'simply not stepped up'.<sup>2192</sup> It also argued that previous performance assessments against SELL did not indicate that companies were efficient, as there were recognised flaws in the SELL methodology, and Ofwat had moved away from it as a methodology for setting performance levels.<sup>2193</sup> It suggested that there were technological advances now available to companies to drive down leakage that the sector could adopt at no or very little additional cost.

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<sup>2189</sup> Ofwat (2020), [Reference of the PR19 final determinations: Overview](#), paragraph 2.9, as well as Ofwat (2020), [Reference of the PR19 final determinations: Introduction and overall stretch on costs and outcomes – response to cross-cutting issues in companies' statements of case](#), paragraph 5.17, which is in identical terms.

<sup>2190</sup> Ofwat (2020), [Reference of the PR19 final determinations: Introduction and overall stretch on costs and outcomes – response to cross-cutting issues in companies' statements of case](#), paragraph 7.16

<sup>2191</sup> This was disputed, eg by South Staffs Water which said 'Our decision to accept the determination without an explicit leakage allowance was taken in the round, and leakage was one of many factors in this decision. We do not agree with Ofwat that this means non-disputing companies automatically agree with Ofwat's policy on this. Our lack of an enhancement allowance for leakage will mean we have to make other expenditure trade-offs to fund leakage improvement during this period, in order to meet our 15% improvement targets. This is not a sustainable approach going forward.' [South Staff's response to leakage consultation](#).

<sup>2192</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), paragraphs A3.8 & A3.10-A3.13. See also, for example, the results from the SMC 2012 review set out in [Ofwat's response to common issues in companies' SoCs: Cost efficiency](#), p56.

<sup>2193</sup> SELL: sustainable economic level of leakage – an assessment of the economics of reducing leakage compared with other demand management options or resource increments considering a Company's supply demand balance position as per WRMPs.

- 8.98 Ofwat said that the companies had secured performance improvements in year 5 of AMP6 which represented a large part of the 15% AMP7 challenge. It said that the delivered leakage reductions of around 7% for the sector in 2019/20 showed that companies can rise to the regulatory challenges set without needing additional funding.<sup>2194</sup>
- 8.99 These statements from Ofwat indicated that it held the view that the companies should have been spending money on new technologies that would have allowed them to continue to improve their leakage performance (to upper quartile levels), but had prioritised other things instead. If we accept that view, it would follow that there would be no need for leakage enhancement costs now, because the companies would have already been allowed that funding in the past.
- 8.100 The four Disputing Companies suggested that the industry progress in 2019/20 in reducing leakage was reflective of favourable weather conditions, recovery from the 2018 ‘Beast from the East’ which had caused exceptional leakage impacts, and that it was normal for companies to make an early start to meeting high profile regulatory targets.
- 8.101 Northumbrian responded to our Provisional Findings by making a new request for us to allow it enhancement totex for leakage (see paragraph 8.42). It explained that this funding request was not previously made due to the wider context of PR19 and said that it was important that we took a consistent approach for all Disputing Companies.<sup>2195</sup>
- 8.102 However, our analysis of the leakage targets that were set in the past, and the totex allowances that were given, suggests that historically both were set in tandem. As Ofwat explained to us, the leakage targets were set based on the SELL approach,<sup>2196</sup> and accordingly there was little need for additional funding related to leakage. That is, different companies were set different targets based on how (supposedly) efficiently they were able to reduce leakage, but also based on other factors such as their supply-demand balance. For a company such as Yorkshire this would have typically meant a leakage target that was not very challenging compared with those of other companies (because it was not as water constrained as some other companies), but with no built-in opportunities to earn outperformance rewards.
- 8.103 The evidence suggests that the leakage targets that Ofwat set in the past were appropriately funded, and that the companies generally met those

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<sup>2194</sup> Ofwat’s response to the provisional findings – cost and outcomes, paragraphs 2.20 & A3.8

<sup>2195</sup> Northumbrian’s response to the provisional findings, paragraph 252

<sup>2196</sup> Ofwat (2020), *Reference of the PR19 final determinations: Introduction and overall stretch on costs and outcomes – response to cross-cutting issues in companies’ statements of case*, fn 250

targets. We have not seen any evidence that the Disputing Companies specifically profited by underperforming their leakage targets, or by obtaining excessively generous funding for those targets.

8.104 Because the new leakage reduction targets represent a very substantial deviation from the previous SELL-based approach, we conclude that it is reasonable that some of the companies may need to incur additional enhancement spend to move from the AMP6 targets based on SELL assessments, to the new targets of 15% or more below previous levels.<sup>2197</sup> Therefore, we consider that where Disputing Companies' business plans or SoCs identified that further enhancement allowances were needed to meet the ambitious leakage PCs, they should be allocated an allowance for the efficient costs of these enhancements.

8.105 We now set out our assessment of the appropriate leakage enhancement allowances.

8.106 We have found that because of differences in the individual circumstances and the evidence available for the four Disputing Companies, rather than a 'one size fits all' approach, it is appropriate to tailor our approach to reflect their very different positions. The relevant differences between the four Disputing Companies include:

- the strategies they have adopted to achieve the leakage reduction. Some are proposing to focus on expanding the scope of existing Active Leakage Control (ALC)<sup>2198</sup> activities as their main mechanism for achieving leakage reduction, whilst others are investing in assets and more innovative techniques which are intended to secure long term benefits;
- the level of enhancement totex they consider necessary;
- current levels of leakage, PCs and varying local conditions;
- early start (2019/20) leakage reduction and investment;
- their explanations of whether all leakage options have been adequately considered (optioneering), and extent of assurance that least cost options have been identified; and
- the efficiency assurance and external scrutiny of the unit costs of activities aimed at reducing leakage.

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<sup>2197</sup> [Provisional findings report](#), paragraphs 8.57 to 6.64

<sup>2198</sup> ALC activities are ongoing leak detection and repair techniques traditionally used in the water sector.



8.107 We have followed an overall structure of assessment as outlined below, employing both top-down and bottom-up approaches, and then tailoring the application of that assessment to each of the four Disputing Companies according to their individual circumstances and the company-specific analysis.

8.108 The top-down approach is based on:

- (a) The target leakage reduction applicable, in MI/d; multiplied by
- (b) A measure of the unit cost of leakage reduction expressed in £m per MI/d of leakage reduction.

8.109 The product of these two variables determines a top-down leakage enhancement allowance. By comparing the unit cost across companies, we can cross-check whether the proposed investment programme looks expensive compared to other companies.

8.110 The bottom-up approach to determining allowances first identifies the types of leakage enhancement planned, together with their submitted costs, adjusted as appropriate to give an efficient cost for each. Combining this activity cost with estimates of the leakage savings anticipated from each specific activity, it is possible to arrive at a 'bottom-up' assessment of the correct allowance.

8.111 The top-down approach has the advantage that it does not require a detailed individual assessment of the appropriateness and efficiency of all the elements in the companies' business plans. This is problematic where the evidence required may not be fully available. It is simpler to apply, but it can be challenging to identify the appropriate unit cost.

8.112 The bottom-up approach has the benefit over a top-down assessment that it allows more effective assessment of the companies' individual proposals for the right category of investment, for example where different types of spend have different cost/benefit considerations beyond AMP7.

8.113 In the remainder of this section we describe first our approach to applying the top-down and bottom-up methodologies. We then go on to the individual assessments applying them to each of the Disputing Companies.

#### *Top-down*

8.114 Although the PC target for leakage is not in dispute, we received different submissions on what level of leakage reduction towards that PC target should be reflected in enhancement expenditure.

- 8.115 We have set the applicable leakage reduction at the level specified in the Performance Commitments of the four Disputing Companies, namely, the full leakage reduction planned from 2019/20 to 2024/25 based on three-year rolling averages, rather than basing it on 2019/20 results.
- 8.116 This three-year approach takes account of varying weather impacts. Whilst 2019/20 leakage performance was strong, there is a risk that this is not permanent and at least partly results from favourable weather influences in that single year. We recognise that some of the improvements in leakage in 2019/20 across the Disputing Companies may have arisen from the companies bringing forward some investment or other mitigating actions from AMP7 to address the leakage targets in advance. However, as discussed in paragraphs 4.39-4.44, our assessment of the 2019/20 cost data suggests that it is suitable for use in modelling efficient costs. We therefore conclude that it remains appropriate to maintain the three-year average which has been followed throughout the AMP7 process. These are the values in the right-hand column of Table 8-4.

**Table 8-4: Full leakage reduction in AMP7**

	<i>2019/20 3yr rolling level MI/d</i>	<i>Performance Commitment</i>	<i>2024/25 3yr rolling level MI/d</i>	<i>Full leakage reduction in AMP7 MI/d</i>
Anglian	194.1	16.4%	162.2	31.8 <sup>2199</sup>
Bristol	40.7	21.3%	32.0	8.7
Northumbrian	200.0	12.7%	174.7	25.3
Yorkshire	313.4	15.0%	266.4	47.0

Source: CMA analysis based on Ofwat (2019), PR19 final determinations, Yorkshire Water – Outcomes performance commitment appendix Ofwat (2019), PR19 final determinations, Anglian Water – Outcomes performance commitment appendix Ofwat (2019), PR19 final determinations, Northumbrian Water – Outcomes performance commitment appendix Ofwat (2019), PR19 final determinations, Bristol Water – Outcomes performance commitment appendix.

- 8.117 We considered a range of alternative options for the leakage reduction, including reduction from the annual level of leakage in 2019/20, rather than the three-year rolling average. This approach would account for the early progress in leakage reduction made by companies (notably in 2019/20), recognising that the remaining levels of leakage reduction needed are lower than the headline PR19 PC. We also considered using the reduction from the best performance year to date (if lower than the reduction in the AMP7 PC), to remove the need for customers to pay for performance improvements that the company has shown it can achieve in the past, and the reduction from the AMP6 PC (if lower than the 2019/20 level), as achieving the AMP6 PC has potentially already been funded in AMP6 allowances.
- 8.118 Ofwat agreed with using the three-year average to 2019/20 for companies performing better than upper quartile, but not for other companies as this

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<sup>2199</sup> 8.7 MI/d of savings at Anglian are from smart meters, which are subject to a separate totex allowance. Hence the full leakage reduction we are considering for the potential enhancement allowance is 23.1 MI/d.

could imply customers would pay for all of this improvement towards upper quartile performance.<sup>2200</sup>

- 8.119 Our final position, consistent with our Provisional Findings and January consultation, is that it is not appropriate to make the adjustments made by Ofwat or the Disputing Companies to the level of leakage reduction which is assumed to be funded through enhancement. The AMP7 leakage challenge is significant (it was characterised by Ofwat as a 'step change') and we decide that this will require companies to incur enhancement expenditure to support this.
- 8.120 Those companies with leakage levels above upper quartile are not receiving base expenditure allowance adjustments, but were not targeted to achieve upper quartile performance in previous periods as the approach to leakage at PR09 and PR14 was based on company specific SELL assessments. Our view is that it is appropriate for customers to fund an efficient level of costs associated with a one-off reduction in leakage during AMP7, and that this is proportionate, given the challenge to the companies and the relative starting points from which they are being expected to reduce leakage.
- 8.121 The next element is to identify the appropriate unit cost of achieving a target leakage reduction, measured in £ per MI/day. This unit cost could be company specific, an industry average, an estimate of efficient costs over all activities, or for specific activities. We now set out possible approaches (our decisions on which to use are set out in the individual company assessments).
- 8.122 In order to avoid funding inefficient investments, we can compare unit cost data across the industry to derive a reasonable unit cost, and challenge the higher cost companies to achieve that level of cost. Taking the upper quartile of Ofwat's PR19 leakage enhancement feeder model that reviewed the cost projections of the seventeen water companies, the unit cost is £0.6 million per MI/d.<sup>2201</sup> This is broadly consistent with the unit costs associated with Bristol and Northumbrian.
- 8.123 In response to our Provisional Findings, Ofwat suggested an alternative unit cost measure for active leakage control (ALC) activities such as leak detection and repair; pressure management; deployment of sensors; mains renewals; and IT systems to improve the early identification of hidden leaks. Ofwat suggested that the CMA consider this unit cost in considering Yorkshire's allowance. Ofwat estimated this ALC for Yorkshire at £1.2 million per MI/d.<sup>2202</sup>

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<sup>2200</sup> [Ofwat's response to the leakage enhancement totex allowances working paper](#), paragraph 2.11

<sup>2201</sup> [Ofwat's response to the provisional findings – costs and outcomes](#), paragraph A3.46

<sup>2202</sup> [Ofwat's response to the provisional findings – costs and outcomes](#), paragraph A3.48

8.124 The use of an upper quartile-based unit cost measure may not allow for differences in circumstances between companies, which could be significant as companies are starting with different leakage levels and have different scope for pursuing low cost options. We have therefore looked at the company specific estimates of leakage reduction unit rates based on their requested enhancement allowances. This provides one way of comparing the efficiency of each company across the sector, or across the four Disputing Companies, in terms of the cost incurred to reduce leakage.

8.125 Table 8-5 summarises the implied unit rates of the four Disputing Companies from their submissions. The average value is £1.6 million per MI/d, but there is a wide variation between the companies. Ofwat also presented the unit costs of leakage reduction across the 17 companies. However, our view is that there is too wide a range of unit costs and of local conditions for a simple unit cost approach based on an average of the Disputing Companies or of the industry overall to be sufficient.<sup>2203</sup>

**Table 8-5: Implied unit rates from Company submissions**

	<i>Leakage Enhancement Spend – Company projection</i>	<i>Leakage reduction in AMP7 to meet PC</i>	<i>Unit Rate</i>
Anglian	£76.7m	23.1 MI/d <sup>2204</sup>	£3.3m per MI/d
Bristol	£4.8m	8.7 MI/d	£0.6m per MI/d
Northumbrian	£15.6m	25 MI/d	£0.6m per MI/d
Yorkshire	£94.7m	47 MI/d	£2.0m per MI/d

Source: CMA analysis.

8.126 Nonetheless, the unit cost is useful as a starting point in understanding the relative costs of the different approaches taken by the companies.

8.127 We have also considered whether we could split costs into categories and derive efficient unit rates for each of these, to reflect whether companies were fully exploiting the scope for some low-cost activities, such as pressure management. However, the evidence available was not in a form that would have allowed this approach.

### *Bottom-up*

8.128 We asked the Disputing Companies to identify the types of leakage enhancement they had planned, to provide estimates of the leakage savings

<sup>2203</sup> [Provisional findings report](#), paragraph 8.65

<sup>2204</sup> Whilst Anglian's PC is to reduce leakage by 31.8 MI/d in AMP7, 8.7 MI/d of this will arise from its investment in smart metering. This figure excludes that as the smart metering costs are not included in their leakage enhancement totex request.

anticipated from each specific activity, evidence that their cost projections were efficient and for reassurance that least cost plans had been identified.

8.129 This evidence allowed us to compare and contrast each Disputing Company's proposals. The types of expenditure included ALC activities (to detect and repair leaks); deployment of pressure or noise sensors; new or optimisation of pressure management options; mains replacements; and various IT system and software upgrades to support more advanced leakage management techniques. The responses showed that the different companies had different leakage control options planned and available. This affected the cost of achieving them, including depending on whether low cost options had already been pursued extensively.

8.130 In reviewing the Disputing Companies' evidence and Ofwat's response, we consider that there are a variety of reasons why we might make changes to what the parties' submitted by way of a bottom-up assessment of enhancement requirements. These changes may arise from:

- poor explanations of efficiency assurance, for example where companies compare their costs internally to historic levels and not to any external benchmarks;
- inclusion of activities that appear likely to be already covered by base expenditure allowances rather than a genuine enhancement cost: examples include maintenance of existing assets;
- use of generic headings with very little detail provided to explain intended activities, particularly if the planned expenditure was substantial;
- where there is evidence that an activity had been allowed for in previous price reviews and where the company had failed to progress it; and
- poor evidence that companies had properly considered all available options. If companies appear to be focused on existing activities rather than open to innovation or adoption of best practice adopted by others, this does not provide comfort that a least-cost plan has been identified.

8.131 We reviewed the individual plans from the four Disputing Companies. We considered whether any adjustments to the allowed expenditure should be made, based on a review of these potential weaknesses in the evidence presented, and on advice received from our engineering advisers. The headline results are summarised in Table 8-6. The CMA bottom-up column sets out the raw calculation of a bottom-up enhancement allowance using this approach. However, for the reasons set out in paragraphs 8.132 to 8.173

different final approaches have been used for each of the Disputing Companies.

**Table 8-6: Assessments of Leakage Totex Enhancement by Bottom-up Approach**

	<i>Company Request</i>	<i>Ofwat bottom-up</i>	<i>CMA bottom-up (raw)</i>
Anglian	£76.7m	£54.2m-£58.1m	£64.1m
Bristol	£4.8m	£4.59m	£4.59m
Northumbrian	£15.7m	£6.27m	£6.27m
Yorkshire	£94.7m	£27.9m	£27.9m

Source: CMA analysis.

### *Overall Leakage Enhancement assessment*

8.132 A bottom-up assessment is in theory more accurate, as it allows the company's individual plans to be reviewed in depth, and therefore is a better assessment approach than the top-down option. However, it is difficult to implement effectively if companies provide only a limited breakdown of the activities associated with reducing leakage. Some companies grouped activities together into general headings and did not provide detail around the activities and how they would drive leakage reduction. Yorkshire's submission was the most limited in terms of the information provided about the link between activities and leakage reduction. A bottom-up approach alone may also result in allowances being too high for companies that choose leakage reduction techniques which are equally effective in reducing leakage, but inefficient in that they are more expensive than appropriate alternatives.

8.133 By contrast, a top-down assessment may not work well where it is very difficult to identify an appropriate unit cost to utilise for that company. This was the case for Anglian. Whilst it has a higher submitted unit cost rate than the other three Disputing Companies, this may be justified by its low leakage position already, which suggests it may already have exhausted low-cost leakage control options. At the same time, Anglian's rate was very different to others and this was also highlighted by Ofwat's comparison of the total unit costs of each of the firms. Anglian did not fully explain this to us or demonstrate that it had fully reflected on the scale of its unit costs. For example, Anglian's submission included a number of investment categories which appeared to be technically justified, but where Anglian had not provided an assessment of the link between the AMP7 spend and the AMP7 leakage reduction. Anglian's presentation of evidence had categories of spend that had no leakage benefit assigned, which makes it difficult to assess if it is needed. We do however recognise that this may sometimes be appropriate if allocating a specific leakage reduction from a single activity would be arbitrary if several expenditure streams were needed to deliver that leakage reduction.

8.134 As a result, we consider in the assessment below both the bottom-up and the top-down approaches, and for each of the companies we give more weight to the assessment which appears to be more reliable given their particular circumstances during AMP7 and the specific evidence available.<sup>2205</sup>

### *Individual Company Assessments*

#### *Anglian*

8.135 Anglian has already achieved relatively low levels of leakage, being 16% better than the upper quartile of the industry and 23% better than the median. Anglian has requested a high leakage enhancement totex allowance compared with two of the other Disputing Companies, Bristol and Northumbrian.

8.136 We do not consider it appropriate to apply a top-down approach in Anglian's case, largely due to the challenges in finding an appropriate unit rate. This is because:

- (a) Anglian's rate is much higher than others, but this does not necessarily mean there are major inefficiencies. Comparing this with companies with higher levels of leakage and/or less challenging conditions is not always appropriate, for example if there are increasing marginal costs to leakage reduction.
- (b) As a frontier company, it may need to make investments and explore innovation that others do not need to meet their higher leakage PCs. We recognise that an appropriate unit rate for Anglian may be higher than others because it may already have exhausted low-cost options.
- (c) However, Anglian has not fully justified the efficiency of its proposed unit rate of £3.32 million per MI/d, so we do not have reasonable certainty that it represents an efficient unit cost.

8.137 Point (a) also suggests using an upper quartile unit cost rate or Ofwat's suggested unit rate of £1.2 million per MI/d for Yorkshire would not be appropriate.

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<sup>2205</sup> Ofwat agreed with our approach. It said for high performing companies demonstrating efficient unit costs in comparison to their peers, the approach can be a combination of top-down and bottom assessments. For companies with higher unit costs than their peers it is appropriate to instead focus on the bottom-up assessment. Where there is insufficient evidence provided to justify company costs, but an allowance is still considered appropriate then the use of sector-wide top-down benchmarks is the only viable option. Source: [Ofwat's response to the leakage enhancement totex allowances working paper](#), paragraph 2.9

8.138 We have therefore based our assessment for Anglian solely on the bottom-up assessment.

8.139 For the bottom-up assessment, we have followed a similar approach to Ofwat<sup>2206</sup> We have carefully considered Anglian's evidence on its intended investment proposals, option evaluations and cost assessments.

8.140 Our view is that it is not feasible to precisely assess the extent to which proposed expenditure would already be covered by base totex allowances. There is no precise distinction as base allowances cover a multitude of factors and leakage spend is not ring-fenced in the regulatory regime that Ofwat uses. Hence, we have made an adjustment based on judgement from the descriptions of the expenditure provided.

8.141 Our proposed allowance of £64.085 million was slightly higher than Ofwat's recommendation of £54.2 million to £58.1 million,<sup>2207</sup> due to two adjustments compared with Ofwat's bottom-up assessment:

- For pressure sensors, we assumed 20% base and 80% enhancement allocation. Ofwat had assumed 25% to 50% was already in base.
- For five other components, we assumed 50% of the projected spend was enhancement, with the other 50% covered by base allowances. For these same five categories, Ofwat had assumed it was all covered by base spend. The applicable categories of planned expenditure are:
  - Intelligent Network Systems - automated network assets;
  - District Meter Area (DMA) splits;
  - Intelligent Network Systems - advanced flow sensing;
  - ILPM leakage reporting software; and
  - MADB/config log DMA and meter management software.

8.142 Given that Anglian has a 16.4% leakage PC to achieve from an already low level of leakage, it seems reasonable that some of its future activities will be to a much higher specification than would otherwise be the case. So even if

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<sup>2206</sup> Ofwat's bottom-up position for Anglian is shown in [Ofwat's response to the provisional findings – costs and outcomes](#), Table A3.3 on p69.

<sup>2207</sup> Ofwat's bottom-up position for Anglian is shown in [Ofwat's response to the provisional findings – costs and outcomes](#), Table A3.3 on p69. Ofwat said it had applied a higher challenge as it considered Anglian Water had provided insufficient evidence to justify specific activity levels and efficiency of costs identified in its breakdown of proposed leakage activities. Source: [Ofwat's response to the leakage enhancement totex allowances working paper](#), paragraph 3.8



the spend may appear to relate to 'business as usual' activities, the sophistication of these is likely to be greater given the change to a significant leakage reduction now needed. Given this and also the range of views of parties, with Ofwat suggesting this was base spend, whereas Anglian saying it was enhancement, we consider the percentage allocations we have made to be reasonable.

8.143 Anglian said that none of its proposed enhancement costs were in fact base costs, as proposed by Ofwat<sup>2208</sup> On balance, we have accepted that some of this investment would not be covered by existing base allowances, and therefore have allowed 50% within the enhancement allowances. It also said the CMA's 10% efficiency challenge to Anglian's costs, which it said was intended as a light-touch efficiency challenge, was not appropriate where detailed assessment has been undertaken on enhancement costs (as was the case here). However, as discussed above, our detailed assessment found that there was insufficient evidence in support of some of Anglian's cost assumptions, and in that context, we consider that the 10% challenge remains appropriate. This is consistent with other enhancement deep dives in this redetermination. We have not made further adjustments for frontier shift or for RPE adjustments given that Anglian had already made these two changes.

8.144 Our updated decision on an enhancement allowance of £64.085 million is lower than the allowance Ofwat made in its FD (although higher than the allowance Ofwat has now recalculated as representing its judgement based on the further information supplied). This reflects the further evidence now available to us and our critical review of Anglian's proposals.

### *Bristol*

8.145 Bristol has already achieved relatively low levels of leakage, being 15% better than the upper quartile of the industry and 24% better than the median. Bristol has requested a low leakage enhancement totex allowance compared with two of other Disputing Companies, Anglian and Yorkshire. It said that it had already set itself a challenging target for enhancement spend, and its £4.8 million request was based on having already applied Ofwat's PR19 assessment approach, with its gross enhancement cost estimate being £5.66 million<sup>2209</sup> We do not accept this as companies are required to submit the best view of their efficient costs, and then Ofwat (or the CMA as

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<sup>2208</sup> Anglian challenged Ofwat's rejection of some or all enhancement costs under the categories of Advanced pressure sensors; Automated network asset; DMA splits; Intelligent Network Systems; Leakage reporting software/ DMA; and meter management software. Ofwat had largely considered these were already activities covered by implicit base allowances, whereas Anglian said these were innovative measures or additional activities to further reduce leakage beyond existing activities.

<sup>2209</sup> [Bristol's response to the leakage enhancement totex allowances working paper](#)

appropriate) will take a view on whether any further efficiency challenge is necessary.

- 8.146 For the top-down assessment, we have used Bristol's own rate of £0.55 million per MI/d. This is similar to the upper quartile from Ofwat's PR19 feeder model containing data for all seventeen water companies. We have therefore accepted this as an efficient unit cost estimate in making our updated determination. For the leakage reduction we have used the AMP7 PC leakage reduction of 8.7 MI/d.
- 8.147 The top-down calculation is hence £0.55 million x 8.7 MI/d = £4.8 million.
- 8.148 For Bristol's bottom-up assessment, we reviewed the evidence provided on both the nature of the investment to reduce leakage and also the unit costs. We did not find any significant evidence indicating unnecessary costs or any enhancement which appeared to be potentially also included in base expenditure, and therefore we mirrored the approach proposed by Ofwat following our Provisional Findings,<sup>2210</sup> applying a 5% efficiency that yields an allowance of £4.59 million.<sup>2211</sup> Taking an average of the top-down and bottom-up assessments gives a leakage enhancement totex value of £4.7 million for Bristol. This is similar to the £4.8 million allowance made by Ofwat in its FD for Bristol, which was effectively equal to the company request. It is slightly higher than Ofwat's latest view.
- 8.149 Whilst we conclude that Bristol will not receive a base allowance for leakage as explained in paragraph 8.73, we consider that an enhancement allowance is needed. There are various reasons for this. The inclusion of the 2019/20 data in base cost model allowances is by definition an amendment to base costs only, and has no direct impact on enhancement allowances. By allowing Bristol £4.694 million for leakage, the CMA's overall totex allowance for this redetermination is still within the £435.4 million overall totex that Bristol has consistently said is required to efficiently operate the business in AMP7. Also, the PC that Bristol faces in AMP7 is significant, requiring a 21% leakage reduction from a level that is already low relative to the sector. We therefore consider that enhancement spend is required to support this transition to lower leakage. Furthermore, when we considered Bristol's detailed leakage evidence for its enhancement spend requirements, we found it unnecessary in this bottom up assessment to reallocate spend as being already covered by base spend, and Ofwat took the same view. Hence Bristol's plans appeared

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<sup>2210</sup> Ofwat's bottom-up position for Bristol is shown in [Ofwat's response to the provisional findings – costs and outcomes](#), Table A3.5 on page 74

<sup>2211</sup> Our latest allowances are currently expressed pre any adjustments that may be made for RPE adjustments and frontier shift.

to be a suite of measures to reduce leakage, rather than to maintain steady state leakage. Finally, the enhancement spend is subject to clawback arrangements within the ODIs, whereas base spend is not. Hence there is customer protection should the Company fail to meet its leakage PCs.

### *Northumbrian*

- 8.150 Unlike the other Disputing Companies, Northumbrian submitted a business plan at PR19 that did not require any leakage enhancement totex allowance. It did not put forward a need for an allowance for leakage enhancement totex in its SoC. Only after we issued our Provisional Findings, with allowances made for the other three companies, did Northumbrian suggest an allowance was needed. At its post-Provisional Findings hearing, Northumbrian confirmed it had changed its position in response to the methodology we adopted in our Provisional Findings.
- 8.151 Our view is that it is not appropriate for Northumbrian to now be allocated specific leakage enhancement totex. This is for two reasons, the first of which is the principal reason:
- The Ofwat business plan process and CMA redetermination process require companies to identify a single and internally coherent business plan and SoC. In both these submissions, Northumbrian made the decision that it did not require an enhancement allowance for leakage, suggesting that its Business Plan totex allowance would be sufficient. The lack of a claim being made in either case is evidence that the management then considered Northumbrian did not need a separate allowance.
  - Northumbrian's leakage levels are 10% above the upper quartile in 2019/20 (although it is in line with the industry median level for 2019/20) and its PC is lower than the 15% indicated in the PR19 methodology.
- 8.152 Northumbrian said that it will incur enhancement costs of around £15.57 million in AMP7 and that its costs are efficient. It said its presentation of those costs in its business plan and SoC must be seen in the context of the PR19 regulatory framework which was very clear that all leakage costs should be treated as base costs (with very limited exceptions for enhancement costs for upper quartile performers) and its PR19 proposals as an overall package. It said therefore putting forward its claim after Provisional Findings was reasonable and proportionate in light of the evolution from Ofwat's FD19 policy and methodology rather than opportunistic, and that as this was a

redetermination process the CMA can and should take decisions on matters not raised by the Main Parties themselves.<sup>2212</sup>

- 8.153 Northumbrian had the opportunity during the business plan and SoC processes to identify a need for any enhancement expenditure to enable it to meet the targets for leakage which Ofwat was proposing to set. It did not identify any such need. This we consider is because Northumbrian's board believed that the allowances it would receive would be sufficient, in the round, to address its leakage targets.
- 8.154 Following sight of Ofwat's FD, we would have expected Northumbrian to have identified in its SoC that it would now need an explicit leakage enhancement allowance as the 'in the round' outcome was no longer sufficient. It did not do this. Whilst a party may change its view on an issue during the process of a redetermination, we believe that if it is to do so, it needs to put forward cogent evidence and reasoning for doing so. We are not persuaded that Northumbrian has done this.
- 8.155 We examined Northumbrian's new request for enhancement funding. We accept that there may be circumstances where changes to a company's expectations, such as a decision to impose a significant challenge to the business plan costs, may justify a change in the company's requests for funding. However, we did not find that its submissions established a persuasive case for the expenditures it was planning to be considered as different to the package it had previously said could be funded through base funding. Northumbrian's late request for leakage enhancement totex appears to be a change in position in response to our Provisional Findings and its concern that there is an overall totex gap.<sup>2213</sup> Northumbrian told us that if its overall cost gap of around £85 million were to be met by other means then it would not seek further funding from customers for leakage or any other cost pressure.<sup>2214</sup> In this case, as discussed in paragraph 14.29, our decision in respect of totex results in Northumbrian's totex allowances being much closer to its business plan. We therefore conclude that it is appropriate that Northumbrian's enhancement allowance should be zero.
- 8.156 We therefore conclude that no allowance is appropriate for Northumbrian.

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<sup>2212</sup> [Northumbrian's response to the leakage enhancement totex allowances working paper](#), paragraph 6

<sup>2213</sup> [Northumbrian's response to the provisional findings](#), paragraphs 10 -11

<sup>2214</sup> [Northumbrian's response to the leakage enhancement totex allowances working paper](#), paragraph 9

## Yorkshire

- 8.157 Yorkshire has relatively high leakage levels. Its leakage levels in 2019/20 were 47% above the industry upper quartile level and 33% above the industry median.
- 8.158 Yorkshire's requested totex implies a unit cost for leakage reduction (of £2.0 million per MI/d) that is more than three times higher than the industry upper quartile level Ofwat identified on the basis of PR19 requested totex for leakage enhancement.
- 8.159 Even after delivering its planned 15% leakage reduction, Yorkshire's 2024/25 leakage level would still be higher than the 2019/20 industry median level, on a normalised basis. This is relevant because a range of submissions – including from Yorkshire<sup>2215</sup> – have emphasised the extent to which the costs of additional leakage reduction increase as the level of leakage reduces. This implies that the unit costs of Yorkshire's planned leakage reduction should be expected to be 'low' relative to most other companies, other things being equal.
- 8.160 Yorkshire in contrast said it had the median unit cost in the industry, being neither unusually 'high' nor unusually 'low' in any objective sense, especially in view of the large variation in the industry unit costs.<sup>2216</sup> We do not agree. We consider that its leakage rates, as shown in paragraph 8.157, are high such that it should still have low cost options available to address leakage. Whilst we accept there is a high level of variation in average unit costs across the industry, Yorkshire's unit cost of £2.0m per MI/d is high in this context, and Yorkshire did not provide us with compelling reasons to justify this level of cost.
- 8.161 We are not satisfied – in the light of these points – that Yorkshire has provided sufficient detailed evidence to justify its requested totex of £93.3m, and the unit cost of £2.0 million per MI/d this implies. We evaluated the updated information provided by Yorkshire in response to the working paper consultation and although this information was clearer in that some more detail was now forthcoming, the justification remained inadequate.
- 8.162 We were concerned about the extent to which Yorkshire's forecasts have been based on sufficient consideration of the scope for alternative lower cost options and approaches, and have taken sufficient account of its productivity improving investments in AMP6. The evidence from Yorkshire was not

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<sup>2215</sup> [Yorkshire's reply to responses to the provisional findings](#), p72

<sup>2216</sup> [Yorkshire's response to the leakage enhancement totex allowances working paper](#), paragraph 1.2.10

sufficiently detailed to allow us to undertake a robust bottom-up assessment. Despite having several opportunities to do so, it failed to provide convincing evidence that the proposed expenditure was efficient, and there was insufficient detail to indicate that adequate optioneering had been considered by Yorkshire to identify a least cost delivery plan.

- 8.163 In response, Yorkshire said it was unreasonable to expect it to be able to reliably compare its company-specific reasons for its 'high' unit cost with others in the industry, as it did not have access to sufficient industry-wide data to be able to replicate unit cost calculations for other companies.<sup>2217</sup> It said its evidence was of a directly comparable quality to that of Anglian.<sup>2218</sup>
- 8.164 It is consistent with the use of benchmarking and comparative regulation to expect relatively high-cost companies to be able to explain, with reference to company-specific circumstances, why their costs might be higher than comparators. In this case, the evidence that we have seen suggests that Yorkshire, as a company with leakage well above industry comparators, should be able to reduce leakage more cheaply than other comparators. For this reason we are not persuaded that customers should be required to pay a cost above a level determined from such comparators.
- 8.165 As such, we adopted a top-down approach only for calculating the updated enhancement allowance for Yorkshire.
- 8.166 We considered whether Ofwat's (top-down) proposal of applying a unit cost of £1.2 million per MI/d should be used. This figure takes account of both Yorkshire's own cost forecasts, and the upper quartile level. We do not think it is appropriate to base this unit cost on Yorkshire's own forecast costs given the quality of evidence Yorkshire has provided on whether its expenditure plans were efficient.
- 8.167 We therefore applied a unit cost of £0.6 million per MI/d for Yorkshire; this figure represents the upper quartile of cost submissions for the AMP7 leakage PC from the business plans of the seventeen water companies at PR19. We would expect that Yorkshire should have relatively low leakage costs given its starting position of having high leakage levels.
- 8.168 In response, Yorkshire said that it was inappropriate to use an industry upper quartile unit cost because the variation in industry leakage unit costs is several times larger than the equivalent variation in efficiency scores that emerge from Ofwat's base cost modelling. It said the scale of the discrepancy

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<sup>2217</sup> [Yorkshire's response to the leakage enhancement totex allowances working paper](#), paragraph 1.2.11

<sup>2218</sup> [Yorkshire's response to the leakage enhancement totex allowances working paper](#), paragraph 1.3.3

showed the use of an upper quartile unit cost as a point of comparison in this context would go far beyond setting a stretching efficiency challenge.<sup>2219</sup> However, in our view a company with high leakage would still be expected to have scope remaining for low cost solutions and Yorkshire has failed to justify its projected expenditure and hence unit cost.

8.169 We then considered the level of leakage reduction that should be subject to the top-down assessment.

8.170 In response to the Provisional Findings, Ofwat said that if the CMA were to make an award to Yorkshire, at most, 23.9 MI/d of the reduction should be funded as enhancement, due to progress in leakage reduction made in 2019/20<sup>2220</sup> (although in response to our consultation paper it set out a range of alternative approaches to establishing a leakage enhancement expenditure allowance for Yorkshire on a volume reduction of between 23.9 and 34.0 MI/d)<sup>2221</sup>. Ofwat said that Yorkshire, in its September 2018 business plan, had targeted a substantial reduction in leakage to 235 MI/d by 31 March 2020 without additional customer funding, and said this was a direct parallel with Northumbrian's position. It also pointed to statements Yorkshire had made in its September 2018 business plan that it intended to reduce leakage by 62 MI/d over 2018-20 through investing £119 million from PR14 outperformance.<sup>2222</sup>

8.171 Yorkshire confirmed to us that it had indeed invested significantly in leakage reduction late in AMP6, including through active leakage control and pressure management, assisted by the installation of acoustic loggers, and has noted that these investments have the effect of increasing the productivity of leakage reduction activity.<sup>2223</sup>

8.172 We have used the AMP7 PC leakage reduction of 47 MI/d. Whilst Yorkshire has already made a strong start to achieving the AMP7 leakage PC through its 7.2% leakage reduction in 2019/20, we believe that the 3-year rolling-average PC is the appropriate measurement to base decisions on given the impact of weather patterns on leakage levels. It is reasonable that the expenditure allowance reflects the PC of 15% without adjustment, which is 47 MI/d, and that a consistent approach is taken for all four Disputing Companies.

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<sup>2219</sup> Yorkshire's response to the leakage enhancement totex allowances working paper, paragraph 1.2.2-1.2.3

<sup>2220</sup> Ofwat's response to the provisional findings – costs and outcomes, paragraph A3.29

<sup>2221</sup> Ofwat's response to the leakage enhancement totex allowances working paper, Table 3.2

<sup>2222</sup> Ofwat's response to the provisional findings – costs and outcomes, paragraph A3.50

<sup>2223</sup> Yorkshire's reply to responses to the provisional findings, p74



8.173 We therefore conclude that Yorkshire's AMP7 leakage enhancement allowance should be £28.2 million. This allowance compares to Ofwat's FD enhancement allowance of zero.

### *Enhancement adjustments summary*

8.174 Table 8-7 summarises the enhancement allowances made for leakage.

**Table 8-7: Our determination of adjustments to enhancement costs for leakage**

	AMP7 Enhancement Cost Adjustment for Leakage Expenditure	Difference to Ofwat FD19
Anglian	£64.085m	(£7.3m)
Bristol	£4.694m	(£0.1m)
Northumbrian	-	-
Yorkshire	£28.200m	+ £28.2m

Source: CMA analysis

Note: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

### **Summary of overall totex adjustments**

8.175 The combined effects of our adjustments for base and enhancement cost allowances for leakage are shown in Table 8-8 (being the sum of Tables 8-3 and 8-7).

**Table 8-8: Our determination of adjustments to base and enhancement costs for leakage**

	AMP7 Totex Cost Adjustment for Leakage Expenditure by CMA (rounded)	Difference to Ofwat FD19
Anglian	£106.7m	+£10.8m
Bristol	£4.7m	(£0.1m)
Northumbrian	£0m	No change
Yorkshire	£28.2m	+ £28.2m

Source: CMA analysis

Note: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

## **Leakage incentives**

### ***Incentive rates***

#### *Standard ODIs*

8.176 In order to set ODIs for leakage, and consistent with its overall methodology, Ofwat instructed companies to propose incentive rates that reflected customers' willingness to pay and their incremental costs of improving performance.<sup>2224</sup> Company proposals were then reviewed and adjusted in an

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<sup>2224</sup> Ofwat (2017), [Delivering Water 2020: Our methodology for the 2019 price review, Appendix 2: Delivering outcomes for customers](#), paragraph 3.6



iterative process. The penalty and reward rates in Ofwat's FD are shown in Table 8-9.

**Table 8-9: Ofwat's Final Determination standard ODI penalty and reward rates for leakage**

	<i>Penalty Rate (Tier 1)</i>	<i>Penalty Rate (Tier 2)</i>	<i>(£m/MI/d/year)</i> <i>Reward Rate</i>
Anglian	-0.28	-0.365	0.219
Bristol	-0.064	-0.191	0.164
Northumbrian (NR)		-0.175	0.150
Northumbrian (ESK)		-0.180	0.154
Yorkshire		-0.167	0.139

Source: Ofwat

8.177 Two penalty rates apply to Anglian and Bristol. The Tier 1 penalties applied only to companies that had been awarded enhancement spending. If a company maintained its 2019/20 level of performance, but did no better, it would have to return its enhancement costs allowance to customers. This would act as a clawback mechanism for the enhancement totex they received.

8.178 The Tier 2 penalty rate applied to all companies. If a company dropped below its status quo level of performance, it would be penalised.

### *Enhanced ODIs*

8.179 Enhanced incentive rates were introduced in PR19 to incentivise outperformance that genuinely surpasses frontier performance. As discussed in section 7, the objective of Enhanced ODIs was to provide incentives for performance improvements which would benefit all customers in all regions, as the outperformance can be used to set more challenging performance commitments in the next period. Enhanced penalty rates also apply to discourage excessive risks taken in pursuit of Enhanced ODIs.

8.180 Bristol did not propose any Enhanced ODIs for leakage. The other three Disputing Companies have Enhanced ODIs for leakage with symmetric penalty and reward rates. These are shown in Table 8-10.

**Table 8-10: Ofwat's Final Determination Enhanced ODI penalty and reward rates for leakage**

	<i>Penalty Rate</i>	<i>Reward Rate</i>
	<i>(£m/MI/d/year)</i>	
Anglian	-0.782	0.782
Northumbrian (NR)	-0.266	0.266
Northumbrian (ESK)	-0.488	0.488
Yorkshire	-0.702	0.702

Source: Ofwat

8.181 Enhanced ODIs are triggered at performance levels set to reflect an estimate of frontier performance.

8.182 Ofwat's approach to setting the enhanced rewards thresholds was:<sup>2225</sup>

- (a) Starting point: the best of outturn 2017/18 and 2018/19 and forecast 2019/20.
- (b) Upward shift: estimate the average annual shift in the upper quartile of performance since 2014/15. Because these annual shifts turned out to be quite volatile, a single shift factor was set for all ODIs, based on the lowest shift estimate of all of them, which was 1.4%, for per capita consumption.
- (c) Profile: Extrapolate from the last year of AMP6 to each subsequent year to set a threshold that shifts by 1.4% each year
- (d) Adjust: Companies that proposed thresholds that were more stretching than the Ofwat-calculated threshold, keep the ones they proposed. Companies that had proposed less stretching thresholds were given the Ofwat-calculated threshold.

8.183 The enhanced penalty thresholds were set at the level of the lower quartile of outturn performance in 2018/19.<sup>2226</sup>

8.184 Caps apply to leakage ODIs, including the Enhanced ODIs for the three Disputing Companies with Enhanced ODIs, however, these are generally set at levels which are distant from PC levels. The Disputing Companies have not raised concerns regarding their leakage ODI caps.

### ***Analysis of leakage incentives***

8.185 In this section we consider the ODIs proposed by Ofwat and the Disputing Companies submissions on the structure and level of these ODIs.

#### ***Standard penalties for ODIs and the Tier 1 / Tier 2 structure***

8.186 Anglian submitted that the Tier 1 part of its incentive structure should be removed, effectively creating a deadband. That is, it proposed that the penalties should not be effective unless it underperforms relative to its current performance.<sup>2227</sup> Anglian's submission was that it was not reasonable that it might incur a penalty, even if its actual performance is better than its current performance and better than the upper quartile of the sector.

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<sup>2225</sup> Ofwat (2019), [PR19 final determinations: Delivering outcomes for customers policy appendix](#), pp120-121

<sup>2226</sup> Ofwat (2019), [PR19 final determinations: Delivering outcomes for customers policy appendix](#), p121

<sup>2227</sup> [Anglian SoC](#), paragraph 1069(iv)

- 8.187 Ofwat told us in response that Anglian failed to produce convincing evidence of customer support for this feature of its plan,<sup>2228</sup> and that in any event the Tier 1 penalty is not a proper penalty but a clawback.<sup>2229</sup>
- 8.188 We agree; in our view Anglian's submission misunderstands the purpose of the Tier 1 penalty, as it is a clawback mechanism to ensure that consumers do not pay for quality improvements that do not materialise. Given that the Tier 1 arrangements only recover this additional funding, this 'penalty' would not in fact penalise Anglian, Bristol, or the other companies that received enhancement totex for leakage reduction if they fail to make the investment required. These companies therefore effectively benefit from a deadband before the Tier 2 penalty comes into force at the status quo level of performance.
- 8.189 In its response to our Provisional Findings, Anglian suggested<sup>2230</sup> that the penalty rates should be lower since there was a greater risk of underperformance. It noted its frontier performance on leakage, weather impacts outside of management control and potential under-funding of leakage allowances were three reasons that meant there was a greater risk that it could underperform. We disagree with this as the penalty rates are linked to the clawback of additional leakage expenditure allowances that we consider are appropriate to meet the AMP7 leakage performance commitment levels.
- 8.190 Bristol agreed with the revisions to the ODI framework for leakage as proposed in our Provisional Findings. It said it agreed with the principle that the leakage Tier 1 underperformance penalty rate should reflect the Tier 2 rate plus recovery of the company share of leakage enhancement expenditure.<sup>2231</sup> Yorkshire agreed with the clawback element of the Tier 1 penalty, but considered it was unnecessary to also apply an additional penalty for underperformance.<sup>2232</sup>
- 8.191 Our decision is that the Tier 1 incentive should be increased, so that it covers both the penalty element of underperformance, and also the clawback of any enhancement totex for those companies which request and are granted enhancement totex allowances. Any risk that the companies might incur penalties due to factors outside their control is already mitigated by the use of a 3-year rolling average. We therefore apply the Tier 2 standard penalty to all

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<sup>2228</sup> [Ofwat's response to Anglian's SoC](#), paragraphs 4.56-4.74

<sup>2229</sup> [Ofwat's response to Anglian's SoC](#), paragraph 4.60

<sup>2230</sup> [Anglian's response to the provisional findings](#), paragraphs 323-326

<sup>2231</sup> [Bristol's response to the provisional findings](#), paragraph 223(b)

<sup>2232</sup> [Yorkshire's response to the provisional findings](#), paragraphs 6.7.10 to 6.7.12

underperformance, and add the clawback increment to arrive at the revised Tier 1 standard penalty.

8.192 As shown in Table 8-7, we have allowed Anglian, Bristol and Yorkshire funding for enhancement costs to achieve leakage reductions. Northumbrian has not been allocated any enhancement funding, and we retain Ofwat's penalty rates.

8.193 Using this approach, we find that the Disputing Companies should have the following underperformance penalty rates, shown in Table 8-11:

**Table 8-11: Leakage underperformance ODI rates for the Disputing Companies**

<i>Company</i>	<i>(£m/Ml/d/ year)</i>	
	<i>Tier 1 penalty</i>	<i>Tier 2 penalty</i>
Anglian	-0.700	-0.365
Bristol	-0.262	-0.191
Northumbrian (Northern Region)	-0.175	-0.175
Northumbrian (Essex & Suffolk)	-0.180	-0.180
Yorkshire	-0.253	-0.167

Source: CMA analysis

8.194 In all five cases, the Tier 1 penalty applies to underperformance between the PC and the status quo level of performance,<sup>2233</sup> and the Tier 2 penalty applies to any additional underperformance. Northumbrian does not have an enhancement allowance, and therefore its targets are in practice the same.

8.195 In response to the Provisional Findings, Ofwat and Yorkshire<sup>2234</sup> both suggested that the incentives should reflect the reduction from the three-year average leakage level in 2019/20, rather than the annual level. We accept this amendment. At the time of our Provisional Findings, we used a 50:50 cost sharing ratio to calculate the leakage ODIs. In their response to the Provisional Findings, Ofwat, Anglian and Yorkshire noted this was inconsistent with other parts of the redetermination.<sup>2235</sup> We have now used a 55:45 cost sharing ratio, with 45% being with the ODI. This is consistent with the cost sharing ratio applied to totex.

<sup>2233</sup> The Tier 1 penalties are based on the difference between 2019-20 three year average leakage performance and target leakage performance based on the performance commitment levels. The Tier 1 penalty reflects our allowances for enhancement totex, and is based on a clawback mechanism which would recover a 45% share, comparable to the totex underspend which would be retained by the companies if they do not make the enhancement investments.

<sup>2234</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p69; [Yorkshire's response to the provisional findings](#), paragraph 6.7.13

<sup>2235</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), pp69-70; [Anglian's response to the provisional findings](#), p61; [Yorkshire's response to the provisional findings](#), paragraph 6.7.11

8.196 We received no evidence to suggest that the other aspects of Ofwat's standard ODIs are inappropriate, nor have we identified concerns with their operation and levels. We therefore retain the standard ODI reward rates.

#### *Enhanced ODIs*

8.197 Enhanced ODIs are intended to drive frontier shifting outperformance. The incentive payment rates shown in Table 8-10 are substantially greater than the standard rates in Table 8-9. These rates can be set above customer willingness to pay (because the benefits of frontier shift accrue to more than just the company's customers). This could induce companies to substantially increase expenditure on leakage reduction measures.

8.198 We have agreed that Enhanced ODIs appear to be appropriate as a policy tool and have retained them for the ODIs which we have assessed in section 7. However, we have concerns about their role in leakage.

8.199 We are concerned that neither the companies nor Ofwat have adequately analysed the wider costs and benefits of further reductions in leakage. As discussed above, leakage targets have in the past been set relative to an economic level, with the assumption that there will be a level of leakage reduction beyond which there may be additional costs which offset the benefits of further reduction.

8.200 None of Ofwat's PR19 documents or its submissions to us contain estimates of the incremental costs and benefits of reducing leakage, either for individual companies or for the sector as a whole. However, we have concluded that leakage improvements will require additional funding, and so will impose costs on customers.

8.201 There will be a level of leakage below which the costs of further reduction will outweigh the benefits, including wider social and environmental costs and benefits. While Ofwat had good reasons for moving away from the previous SELL measure and for targeting reductions in leakage in accordance with its statutory objectives and the SPS, we consider that robust economic analysis of the optimal level of leakage reduction is necessary to justify incentivising additional leakage reduction through Enhanced ODIs. This is consistent with the intention of the SPS, which supported ambitious targets for leakage reduction only where this represents best value for money over the long term.

8.202 We note that Ofwat estimated the efficient costs of a wide range of activities as part of its PR19 price control process. In future, Ofwat should seek to estimate each company's efficient costs of leakage prevention, detection, and

repair.<sup>2236</sup> An estimate of efficient leakage costs would form the basis for alternative analysis. However, in the absence of evidence for the cost-benefit trade-off of further leakage reductions, we consider it is not appropriate to expect customers to fund a more challenging target by including potentially large rewards for substantial outperformance through Enhanced ODIs.

8.203 In our Provisional Findings we proposed to remove the Enhanced ODIs for leakage. In response, Ofwat said it agreed with this, noting the progress made in reducing leakage by the companies in 2019/20.<sup>2237</sup> Northumbrian also agreed with the proposal to remove Enhanced ODIs for leakage, noting these could be inappropriate as it may become uneconomical to reduce leakage to very low levels.<sup>2238</sup> Anglian did not agree with the proposal to remove Enhanced ODIs, stating that it should be rewarded for stretching the frontier performance in the sector.<sup>2239</sup>

8.204 Having weighed up the issues and evidence, we decide:

- (a) to maintain the standard rewards for leakage reduction, but to remove the enhanced rewards and penalties;
- (b) to adopt the caps and collars set by Ofwat for the leakage ODIs. For the companies which had Enhanced ODIs, these caps and collars will now act as caps and collars for the standard rewards and penalties; and
- (c) to amend the standard penalties to reflect the changes to Tier 1 rates, see Table 8-11.

## Summary of our decisions on leakage

8.205 Our decisions on leakage are:

- (a) to retain the PCs for leakage reduction set by Ofwat, as shown in Table 8-1;
- (b) the Disputing Companies are allocated funding for maintaining and reducing their leakage levels for AMP7, with the following allowances:

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<sup>2236</sup> As with other cost items considered in PR19, and depending on data availability and reliability, such analysis could be econometric or more akin to unit cost model, it could set an upper quartile benchmark or an average cost benchmark, it could include a frontier shift or not, etc.

<sup>2237</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), paragraph 3.10

<sup>2238</sup> [Northumbrian's response to the provisional findings](#), paragraph 224

<sup>2239</sup> [Anglian's response to the provisional findings](#), paragraph 327

- (i) Anglian: £42.6 million adjustment to base costs, £64.085 million enhancement totex. Overall our allowance of £106.7 million compares to Ofwat's FD allowance of £95.9 million;
  - (ii) Bristol: no allowance is provided for base, £4.694 million for enhancement totex, whereas Ofwat had allowed £4.8 million at PR19;
  - (iii) Yorkshire: no allowance is provided for base, £28.2 million for enhancement totex, whereas Ofwat did not make an allowance at PR19; and
  - (iv) Northumbrian: no allowance for base nor enhancement, consistent with Ofwat's position at PR19.
- (c) to provide new underperformance penalty rates, as shown in Table 8-10; and
- (d) to remove Enhanced ODIs for leakage.

## 9. Cost of Capital

### Introduction

- 9.1 This section outlines our approach to calculating the cost of capital allowance for the four Disputing Companies, including our decisions on Bristol's request for a company specific uplift to its cost of capital, the use of a retail margin adjustment and the use of a gearing outperformance sharing mechanism.
- 9.2 The cost of capital is an input to the calculation of the companies' allowed revenue and is used to calculate the profit that the companies need to earn to repay their investors within the PR19 price control.
- 9.3 Ofwat and the Disputing Companies had very different views on the right level of cost of capital allowance, which contributed significantly to their different views on overall allowed revenues. Ofwat chose a 2.96% appointee level cost of capital allowance, a figure that is materially lower than their PR14 allowance of 4.67%<sup>2240</sup> due to both changes in Ofwat's calculation methodologies and as a result of lower market prices (which form the inputs to many elements of the cost of capital).
- 9.4 Ofwat's 2.96% cost of capital allowance was also significantly below the cost of capital allowances suggested by the Disputing Companies during this redetermination, which we review in Table 9-1.<sup>2241</sup>

**Table 9-1: Ofwat PR19 appointee WACC versus Disputing Company estimates.**

<i>CPIH-real point estimate or midpoint of range</i>	<i>Anglian</i>	<i>Bristol (industry level)</i>	<i>Bristol (inc. CSA)</i>	<i>Northumbrian</i>	<i>Yorkshire</i>	<i>Ofwat PR19</i>
Appointee WACC	3.62%	3.32%	4.04%	3.54%	3.78%	2.96%

Source: Anglian SoC, paragraph 1221 (based on midpoint of an RPI-real range of 2.5% to 2.9%), Bristol SoC, paragraph 150 (industry estimate based on nominal point estimate of 5.35%, Bristol SoC, paragraph 24 (including SCA estimate based on a nominal point estimate of 6.08%), Northumbrian estimated figure relates to KPMG expert report for Northumbrian, section 8.1 and an RPI-real range of 2.49% to 2.75%), Yorkshire estimate is based on KPMG's metrics other than Yorkshire's specific requests on cost and proportion of debt.

Note: Where no overall point estimate or range was explicitly presented, we have estimated the company's view from either component metrics or other sources such as commissioned expert analysis. This table should be read as indicative only.

<sup>2240</sup> Ofwat's PR14 cost of capital allowance was 3.74% in RPI-real terms. For comparison we have inflated this number by 0.90% to quote it in CPIH terms. Please see paragraphs 9.15 to 9.36 for our discussion of the inflation metrics used in our determination.

<sup>2241</sup> In this determination we conduct our cost of capital analysis and set our determination of the cost of capital allowance at the 'appointee' level. This is the cost of capital allowance awarded to each water or sewage licence holder. In Ofwat's final determination, it distinguishes between appointee WACC and the WACC earned by a company's wholesale operations, which is calculated by deducting a retail margin adjustment from the appointee WACC to account for earnings in a company's retail operations. The CMA does not adopt this methodology - see paragraphs 9.1104 – 9.1149 for the CMA's approach to accounting for a retail margin adjustment.



- 9.5 We have used the Capital Asset Pricing Model (CAPM) to determine the cost of equity. The CAPM is an established methodology with well-understood theoretical foundations and which makes use of observable market data as far as possible. The CAPM is used by all UK regulators when calculating the cost of capital, and was the framework used by Ofwat in its PR19 final determination. We perform our own assessment of each of the parameters of this model, using up-to-date market data.
- 9.6 After considering the relevant evidence, we estimate a cost of capital allowance that we believe appropriately balances our duties under the Water Industry Act 1991. The cost of capital used in a price control can have a material impact on the level of customer bills. Our aim is to provide a cost of capital allowance that ensures appropriate levels of investment within the sector without overcompensating investors at the expense of customers.
- 9.7 In this chapter we first explain how the weighted average cost of capital is calculated, using the CAPM. We then set out our analysis of the appropriate ranges of estimates for the components of the cost of equity and cost of debt. We then consider the range of values for an overall cost of capital allowance for the Disputing Companies and provide our point estimate of the cost of capital allowance for the PR19 price control.

## **The Weighted Average Cost of Capital and the Capital Asset Pricing Model**

- 9.8 The cost of capital applied in our determination is a WACC, which is based on three inputs:
- (a) cost of equity;
  - (b) cost of debt; and
  - (c) gearing.<sup>2242</sup>
- 9.9 The WACC is multiplied by each Disputing Company's RCV to calculate the allowed return within the price control. The RCV is also indexed by inflation in each year, and therefore the cost of capital is expressed in real terms. In PR19, Ofwat is transitioning its inflation indexing process, and so is using a

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<sup>2242</sup> Gearing is defined as  $g = \frac{D}{(D+E)}$ , where  $D$  is Debt and  $E$  is Equity.

combination of RPI and CPIH indexing. For consistency, all of our WACC estimates will be quoted in CPIH real terms.<sup>2243</sup>

- 9.10 The CAPM relates the cost of equity ( $K_E$ ) to the risk-free rate ( $R_{rf}$ ), the expected return on the market portfolio ( $R_m$ ), and a firm-specific measure of investors' exposure to systematic risk (beta<sup>2244</sup> or  $\beta$ ) as follows:

$$K_E = R_{rf} + \beta(R_m - R_{rf})$$

- 9.11 If a business were entirely funded by equity, the expected return on equity could be considered to be its 'cost of capital'. However, most firms are funded by a combination of both debt and equity, such that the appropriate cost of capital to consider is the weighted average cost of debt and equity.
- 9.12 We calculate the cost of debt by using actual water company costs of debt and estimates based on external benchmarks. When calculating the total cost of debt, we separately consider the costs of existing (embedded) debt, the likely costs of new debt raised during the price control, the appropriate average weights of embedded and new debt over the price control and any allowances for costs associated with issuance and liquidity fees.
- 9.13 The WACC combined the costs of equity and debt according to the following formula:<sup>2245</sup>

$$WACC = K_E \times \frac{E}{(D + E)} + K_D \times \frac{D}{(D + E)}$$

- 9.14 The return on capital for investors should also take into account the effects of tax on returns to capital providers. The returns to debt holders take the form of interest payments which are usually tax-deductible. The returns to equity holders (dividends), on the other hand, are taxed. Hence, where the cost of capital is expressed 'pre-tax', the cost of equity used must reflect the fact that the actual return to shareholders will be reduced by the rate of tax.

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<sup>2243</sup> CPIH became Ofwat's preferred measure of inflation in PR19. As of 21 March 2017, the Consumer Prices Index including owner occupiers' housing costs (CPIH) became the Office of National Statistics' lead inflation index; it is the most comprehensive measure of inflation as it includes owner occupiers' housing costs and Council Tax, which are excluded from the CPI. For more info please see [ons.gov.uk](https://ons.gov.uk)

<sup>2244</sup> We will discuss the concept of beta in paragraphs 9.398–9.407.

<sup>2245</sup> Where  $K_E$  is the cost of equity,  $K_D$  is the cost of debt,  $E$  is weight to equity within the capital structure and  $D$  is weight to debt within the capital structure.

## **Inflation and estimating ‘real’ levels of the cost of capital**

- 9.15 In the following sections, many of our estimated metrics are presented in CPIH-real terms. In order to calculate these metrics, we are variously required to deflate nominal input data and inflate RPI-real input data.
- 9.16 This requirement predominately impacts the cost of debt, which are incurred by companies (and estimated by us) in nominal terms but compensated through the price control in ‘real’ terms. There is also an impact on our measurement of the risk-free rate, where most market metrics are quoted in either RPI-real or nominal terms, and on our measurement of the total market return, where the available historic data is quoted in nominal terms.
- 9.17 In order to make these adjustments we are required to take a view on the most appropriate inflation assumptions to use for the price control. In the following paragraphs we will consider the evidence presented on this issue.

### ***Inflation – Parties’ views***

#### ***Ofwat***

- 9.18 Ofwat’s PR19 approach assumed that:
- (a) CPIH is 2.0%, based on the assumption that the Bank of England will hit its 2.0% CPI inflation targets over the long-term, and that CPIH will not systematically be higher or lower than this.
  - (b) RPI is 3.0%, based on the assumption that the OBR estimate of the long-term RPI-CPI wedge is 1.0%<sup>2246</sup>
- 9.19 At the final determination stage, Ofwat considered recent (pre-final determination and so pre-COVID) data and considered that there was no basis for changing its long-term assumptions.
- 9.20 In its response to the Disputing Companies’ statements of case, Ofwat stated that there could be a short-term mismatch between fixed inflation compensation paid to bondholders in the nominal interest rate and variable indexation of allowed revenues received by water companies. However, in Ofwat’s view this was of limited relevance at long investment horizons, which ‘logically’ must reflect inflation assumptions at the same horizon.

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<sup>2246</sup> Ofwat (2019), [PR19 final determinations: Allowed return on capital technical appendix](#), section 2.1-2.3

- 9.21 Ofwat stated that CPIH inflation had tracked the Bank of England's 2.0% target remarkably closely over the past two decades, as 'would be expected' given the Bank of England's inflation targeting framework.
- 9.22 Ofwat stated that the response to Covid-19 could result in higher rather than lower inflation, with HM Treasury August average of forecasts suggesting an overshoot of targets in the medium term – with inflation lower than the target in 2020 and 2021 but higher for 2022–2024. Ofwat expressed concern that if the CMA lowered its inflation assumption, this could be followed by higher-than-expected inflation, which would involve customers 'paying twice'.
- 9.23 Based on input from Europe Economics, Ofwat also argued that this type of inflation risk was fundamentally systematic and reflected in water betas. Ofwat stated that it could not be right that water companies should have this risk mitigated while having a return set using historical betas that implicitly assumed such a risk remained.<sup>2247</sup>

### *The Disputing Companies*

- 9.24 Northumbrian and Yorkshire raised objections to Ofwat's approach and suggested that the CMA should use the latest economic outlook to set its inflation assumption. Yorkshire argue that the updated OBR figures suggest that inflation would be 1.88% (CPI) and 2.77% (RPI) (over the period) and that this will impact the setting of real metrics.<sup>2248</sup>
- 9.25 In response to the CMA's Provisional Findings, Yorkshire stated that there was no separate process in which deviations from long-term inflation targets during AMP7 can be considered and dealt with by Ofwat at the industry level. As a result, Yorkshire considered it incumbent on the CMA to calibrate the cost of capital allowance based on the current outlook for CPIH and RPI inflation over the price control.
- 9.26 Yorkshire stated that the current outlook had both CPIH and RPI inflation below the 1% per annum during 2020/21, before recovering towards long-term equilibrium values in the later years of the AMP7 period. Yorkshire stated that this lower inflation environment would mean that RCV growth in 2020/21 and 2021/22 would be worth less than Ofwat had assumed in its FD and lower than the CMA had modelled in its Provisional Findings. This in turn would mean that companies' debt-to-RC and interest cover ratios would be weaker than the CMA's modelling had suggested, and that companies would not be

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<sup>2247</sup> Ofwat's reply to responses to the provisional findings – risk and return, pp13–14

<sup>2248</sup> Northumbrian SoC, paragraph 882, Yorkshire SoC, paragraphs 242–244

able to recover the CMA's nominal cost of capital in full. Yorkshire estimated a 200bps shortfall in interest cost recovery in 2020/21 as a result.<sup>2249</sup>

### ***Inflation – CMA assessment***

- 9.27 The price control for water is set by reference to inflation – with elements of the determination assumed to vary in line with inflation. Therefore, in theory the choice of inflation has no effect on the price control – it is expected that low inflation will be mirrored by low costs and vice versa.
- 9.28 In practice, it is likely to be the case that low inflation may depress water company returns. Whilst 100% of revenue falls with inflation, in reality some costs are more 'sticky' to changes to inflation, and therefore in times of low inflation, water companies will often earn lower profits. One example is fixed-rate debt, which is assumed to be 66% of the notional company debt, and which has constant interest in nominal terms. The effect of changes in inflation can also result in volatility of returns, as inflation is introduced into revenues with a lag. For example, 2021–22 charges will be based on inflation in the year ending November 2020, ie around a 16-month lag.
- 9.29 Whilst inflation volatility is a challenge for water company management and investors, it is typically assumed in the price control to be a symmetric risk and that the effect of inflation volatility should balance out over time. By setting the price control based around the Bank of England target, there is a built-in mean reversion, as the Bank has a duty to return CPIH inflation to 2% over time, and sets monetary policy to ensure this happens whenever inflation rises above this equilibrium level or falls below it. While rarely at exactly the 2% inflation target, historical evidence does suggest that UK inflation mean reverts to an average of 2% over time.<sup>2250</sup> As a result, while inflation volatility is one of the systematic risks faced by investors, the reversion of inflation to mean by policy design means that inflation does not normally form part of the price control settlement.
- 9.30 In the recent NATS (En Route) Plc (NERL)/CAA Regulatory Appeal (from here referred to as NATS/CAA), the CMA used HM Treasury's summary of independent forecasts for this exercise, while the CAA and NATS used their

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<sup>2249</sup> [Yorkshire's response to the provisional findings](#), paragraphs 3.3.3–3.3.8

<sup>2250</sup> ONS data on CPIH inflation available [here](#). Average CPIH inflation between 1997 and 2020 inclusive has been 1.96%.

own estimates of inflation.<sup>2251</sup> This was broadly uncontroversial at the time, as forecasts closely matched long-term inflation assumptions.<sup>2252</sup>

- 9.31 The current redetermination faces an unusual situation where inflation is known to be below target in the first year, and therefore in theory we have better information that inflation is likely to be below target over the five years. Although inflation could increase above target as the economy recovers, the latest HM Treasury's summary of forecast suggests it will not recover enough that the average reaches the CPI target of 2%.<sup>2253</sup>
- 9.32 Yorkshire told us that the consequence of this should be a higher cost of capital. Yorkshire said that, in real terms, its cost of capital would be higher due to lower inflation, and this should be allowed to ensure it could cover its costs.
- 9.33 We agree with Yorkshire that its costs are likely to increase in the early part of the period due to the low inflation. As a result, the consequence of the low inflation that results from COVID-19 would, other things being equal, increase the required return in the first year of the price control if the companies are to cover total costs in real terms. If the price control were to be adjusted to reflect under-recovery of nominal interest costs as a result of lower inflation in the first year, this would result in an additional allowance of around £100m across the four companies.<sup>2254</sup>
- 9.34 We also agree with Ofwat's assessment that inflation risk is systematic and is already reflected in the beta assumptions that underpin our cost of equity allowance. In addition, Ofwat and Water UK commissioned [an initial report](#) on the broader effects of the pandemic on water companies, based on 4 months of data to July 2020. It confirms that the most likely scenarios suggest that low inflation will drive lower RORE over AMP7. However, the report also confirms that low inflation is one of many potential effects of COVID-19 on Yorkshire and the other companies in the first year or two years of the current control. Capital programmes are likely to be seriously disrupted, and at the time it was not clear at what pace this would recover, as the possibility of a 'second wave' was quoted as a major risk to the ability to 'catch up' during AMP7.

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<sup>2251</sup> CMA (2020) [NATS \(En Route\) Plc/CAA Regulatory Appeal – Final Report \(NATS/CAA\)](#), paragraph 13.160

<sup>2252</sup> Note that the particular circumstances of the NATS/CAA appeal meant that evidence submitted received no further consideration following the publication of the provisional findings. As a result, conclusions reached in the provisional findings should not be considered as the definitive view of the CMA at the time. For further details see [NATS/CAA](#), paragraphs 9–15

<sup>2253</sup> HM Treasury (February 2021) Forecasts for the UK economy: a comparison of independent forecasts, p16

<sup>2254</sup> 1.3% shortfall in inflation (2% target vs 0.7% actual), applied to 66% of gearing assumed to be at nominal rates, converts to around 0.86% on the cost of equity or 0.5% on the WACC. The RCV for the four companies is around £20 billion.

- 9.35 In our assessment, it would not be appropriate to base our real cost of capital estimates for the entire price control on what could prove to be temporarily distorted figures. We have decided to match Ofwat's approach to estimating CPIH at 2.0%, basing our assumption on the Bank of England's long-term CPI target of 2.0% (and assuming that CPIH inflation will not be systematically different). We update Ofwat's 1.0% RPI-CPI wedge assumption for the OBR's new estimate, and instead use a 0.9% wedge in our calculations involving RPI-real data.<sup>2255</sup> We have also retained the inflation used in Ofwat's FD in our modelling.<sup>2256</sup>
- 9.36 We consider that using a longer-term estimate is the fairest way to calculate the real cost of capital at this time. We have paid particular attention to both the Bank of England's stated objective of achieving 2% CPIH inflation over time and the evidence that periods of higher and lower inflation have been met with corrective actions that pushed average inflation back towards the long-term target within a short time-frame. We would suggest that if actual inflation deviates from the long-term inflation target to the extent that it has a material impact on the operations or financeability of water companies, that this is considered and dealt with by Ofwat at the industry level.<sup>2257</sup>

## Gearing

### Background

- 9.37 Gearing refers to the amount of debt within a company's capital structure. In the case of water companies, it is defined as net debt (debt minus cash) divided by the RCV of the company. In more general terms, gearing can be thought of as debt divided by the total capital base (debt plus equity).
- 9.38 Gearing determines the proportion of the cost of debt (and by implication the proportion of the cost of equity) within the overall cost of capital.
- 9.39 Both Ofwat and the CMA calculate allowed return on capital with reference to a notional company with a predetermined level of gearing. This notional approach allows companies to make their own choice about their financial structure whilst ensuring that customers only pay for costs associated with the efficient cost of capital for a notionally structured company.

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<sup>2255</sup> Office for Budget Responsibility (December 2019) [Forecast evaluation report](#), pp20–21 Box 2.3

<sup>2256</sup> Ofwat's model, which we used to calculate allowed revenues and K, relies primarily on inputs in real terms. As a result, changing the inflation used in the calculation of K should not in principle have any effect on the choice of K, and any changes that do occur will be related to modelling assumptions rather than genuine changes to the 'right' level of prices.

<sup>2257</sup> For further details of our approach to COVID-19 see paragraph 3.86

## ***PR19 Decision***

- 9.40 Ofwat reduced their notional gearing from 62.5% at PR14 to 60% at PR19. Ofwat stated that this was appropriate given the greater share of revenue at risk associated with service performance and its proposals to make greater use of markets on a forward-looking basis.
- 9.41 Ofwat noted that it did not receive representations on its notional gearing assumption in advance of its final determination.<sup>2258</sup>

## ***Gearing – CMA assessment***

- 9.42 Most submissions we received related to gearing focused on the impact on beta, the gearing outperformance sharing mechanism and financeability, rather than the notional level of gearing itself. We address these issues in the relevant sections of this report.<sup>2259</sup>
- 9.43 We note that Ofwat has reduced notional gearing from 62.5% in PR14 to 60% in PR19, but that this relatively small move does not appear to have been contentious. We also note that the vast majority of the sector operates at levels of gearing in excess of the 60% notional level. Using Ofwat's data, average sector gearing was approximately 69% in 2019.<sup>2260</sup>
- 9.44 We received no evidence that another notional level of gearing would better serve customers (other than in the specific areas discussed in paragraph 9.42).
- 9.45 We choose a 60% notional gearing as the basis of our WACC calculations and financeability assessment.

## **Risk-Free Rate**

### ***Introduction***

- 9.46 The RFR is the representation of the return required on a 'zero beta' asset within the CAPM. It is a measure of the rate of return that an investor can expect to earn without taking any systematic risks. In the CAPM, it is assumed

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<sup>2258</sup> Ofwat (2019), [Allowed return on capital technical appendix](#), section 3

<sup>2259</sup> See paragraphs 9.502–9.506 and 9.529–9.530 for discussion of gearing within beta, 9.1150–9.1225 for discussion of the gearing outperformance sharing mechanism and 10.99 for gearing within the financeability assessment.

<sup>2260</sup> Ofwat (January 2020), [Monitoring financial resilience](#), p6 (also associated excel data tables).



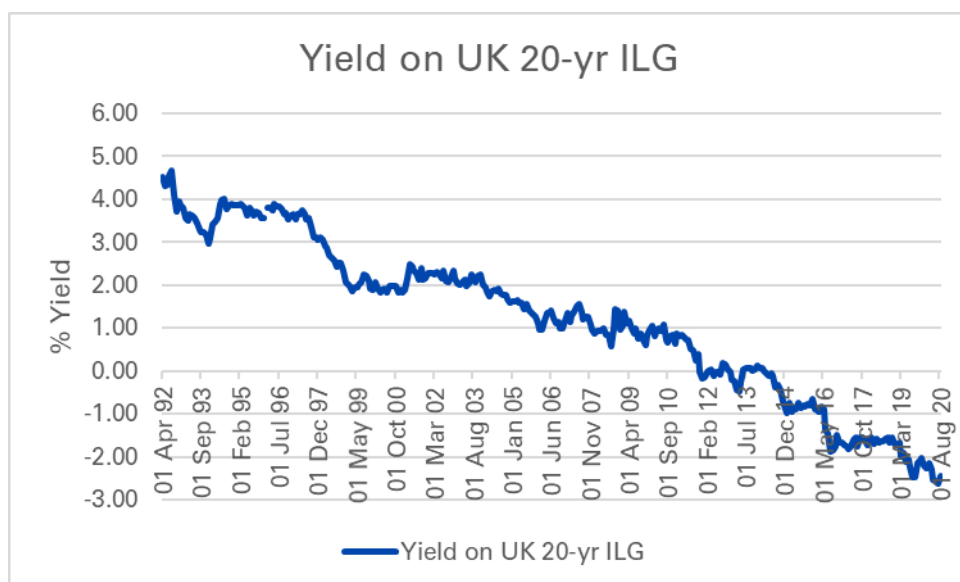
that a 'zero beta' asset will earn the same as a risk-free asset, as non-systematic risk is fully diversifiable by investors.

- 9.47 The RFR is a hypothetical number as no investment has absolutely zero risk. As a result, it has become common practice to use the interest received (usually termed 'yield') on very high-quality debt instruments, often government bonds with strong credit ratings, as the best proxy for a risk-free investment rate. In the UK, this has traditionally meant using the yield on an RPI index-linked government gilt (ILG) at a relevant maturity (time until redemption).
- 9.48 In recent years there has been significant debate about the correct way to estimate the RFR, with falling and subsequently negative yields on government bonds causing concern that government bond yields may be distorted. In practice, due to this and other factors, regulatory decisions have often used rates which vary from the prevailing yield on government bonds.

### ***Background***

- 9.49 The majority of regulatory precedent is based around the use of government bonds (UK gilts) as the RFR, often with a small uplift to reflect the expectation that currently low yields may revert to the longer-term mean over time. In recent reviews, this approach has been brought into question, as the yields have been persistently low for such a long period.
- 9.50 Although it is often suggested that the recent levels of gilt yields have been influenced by government policy, particularly quantitative easing, Figure 9-1 shows that real rates have been falling for an extended period. These falling rates, and in particular the move below zero, has led some experts to question whether gilt yields remain the right proxy for the RFR. The extended period over which gilt yields have remained low has also led regulators to suggest that, even if they are the right proxy, an approach of assuming some form of mean reversion may no longer be sustainable and that it is more appropriate to accept low gilt yields without adjustment. The trend in government gilt yields can be seen in Figure 9-1.

**Figure 9-1: Yield on government gilts since 1992**



Source: CMA analysis of Bank of England data.

- 9.51 Some recent regulatory decisions have also included equity betas materially below one, which increases the importance of the decision on the RFR, by comparison to regulatory precedent. In the context of both this practical consideration and the theoretical analysis of the consequences of current low interest yields, we received more lengthy submissions on the RFR than in previous regulatory reviews. The approach to setting the RFR should be based on similar considerations for different sectors, and therefore we received submissions from Third Parties in other sectors, as well as from Ofwat and the Disputing Companies.
- 9.52 In the following paragraphs we note Ofwat's approach at PR19, as well as recent Ofwat and CMA precedent on this issue. We then examine submissions from the parties. The submissions covered the following options in terms of potential inputs into the estimation of the RFR:
- (a) UK ILGs, as used by Ofwat and recommended by the UK Regulators Network (UKRN) report;
  - (b) high-quality UK corporate bonds;
  - (c) nominal UK government bonds;
  - (d) non-UK government bonds; and
  - (e) estimates of the long-run equilibrium rate of interest; and
  - (f) other financial metrics, such as the SONIA swap rate.

- 9.53 For the reasons below, we consider that (a) and (b) above are the instruments which are most relevant to the choice of RFR in this Determination. We then address arguments as to the best way to measure the market instruments chosen as the most appropriate proxies for the RFR in order to set an appropriate estimate range.

### ***Ofwat PR19 Decision and past precedent***

#### ***Ofwat's PR19***

- 9.54 Ofwat followed the trend of regulators since 2018 of adopting the approach advocated in the 2018 UKRN cost of equity report by Wright et al (from here referred to as the UKRN report).
- 9.55 Ofwat's chosen approach focused on RPI index-linked UK government bonds, known as ILGs. In coming to its final determination, Ofwat chose to use UK government bond market data as the basis of its RFR estimate. Ofwat's FD:
- (a) used the 1-month (September 2019) average of yields on the 15-year ILG, giving a figure of -2.61%;
  - (b) adjusted this figure for average market-implied rate rises over PR14 of 0.26%, bringing its estimate to -2.35%
  - (c) inflated this number using an assumed 100bps 'wedge' between RPI and CPI, to give a CPIH figure of -1.39%.

#### ***Ofwat's PR14***

- 9.56 In its PR14 Risk and reward guidance,<sup>2261</sup> published in January 2014, Ofwat noted that current yields on 10-year ILGs were close to zero, in part due to exceptional monetary policy. Ofwat set a range based on current yield adjusted for forward looking expectations of 0.75%–1.25%, with a point estimate of 1.25%.
- 9.57 Ofwat noted that, by comparison, using a 10-year historical average of ILG yields would give a similar 0.9% figure to the approach of using spot yields and forward rates.
- 9.58 Ofwat's PR14 draft determination, published in September 2014, noted that subsequent to the publication of its risk and reward guidance, the CC's NIE

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<sup>2261</sup> Ofwat (2014), [Setting price controls for 2015-20 – risk and reward guidance](#), section A1.5

Determination and Ofgem's ED-1 draft determination had used an RFR of 1.50%.<sup>2262</sup>

- 9.59 Ofwat's FD, published in December 2014, confirmed the use of the 1.25% estimate.<sup>2263, 2264</sup>

### CMA – NATS/CAA

- 9.60 The CMA's provisional findings in the NATS/CAA appeal, published in 2020, based its RFR estimate on 10-, 15- and 20-year ILG data, measured over spot, 3-month and 6-month averages. The CMA picked an estimate of -2.40% from a range of -2.2% to -2.6%, a figure that roughly equated to the 6-month average of the 15-year ILG (-2.39%).<sup>2265</sup> It is important to note, however, that the particular circumstances of the NATS/CAA appeal<sup>2266</sup> meant that the RFR received no further consideration following the publication of the provisional findings, and so cannot be considered as the definitive view of the CMA at the time. Some of the arguments presented below were also presented (but not considered) in response to the NATS/CAA provisional findings. We specifically note that the CMA NATS/CAA final report states that:

We have not updated the market data or made changes to the methodology that we applied in calculating the WACC based on the responses to our provisional findings or to our COVID-19 consultation. As a result, the approach in our final report does not reflect any assessment of the merits of the points raised in these responses.<sup>2267</sup>

As such, it would be inappropriate to conclude the approach taken in the provisional findings in the NATS/CAA appeal would have been applied in the final determination.

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<sup>2262</sup> Ofwat (2014), [Setting price controls for 2015-20 – Draft price control determination notice: technical appendix A6 -risk and reward](#), section AA1.2

<sup>2263</sup> Ofwat (2014), [Final price control determination notice: policy chapter A7 – risk and reward](#), Table A7.10

<sup>2264</sup> We note that 10-year ILGs were -0.44% in October 2013 and -0.32% in November 2013, yields in October 2014 had fallen to -0.60% while in November 2014 had fallen to -0.9%. This suggests that Ofwat did not consider it appropriate to update its estimate despite a fall in market rates between the setting of its risk and return guidance and its PR14 Final Determination. We also estimate an appropriate forward rate adjustment in November 2014 would have been 30–40bps, suggesting a contemporary estimate may have been as low as -0.50% versus the 1.25% figure chosen.

<sup>2265</sup> CMA (2020), [NATS \(En Route\) Plc/CAA Regulatory Appeal – Final Report \(NATS/CAA\)](#), paragraph 13.265

<sup>2266</sup> [NATS/CAA](#), paragraphs 9–15

<sup>2267</sup> [NATS/CAA](#), paragraph 61

## *CC NIE 2014 and CMA Bristol 2014 Determinations*

- 9.61 The CC's NIE Determination was published in March 2014. Here the CC regarded index-linked gilts as in principle the most suitable source for estimating the RFR, since index-linked gilts have negligible default and inflation risk. The CC noted that nominal gilts had negligible default risk, but were subject to inflation risk. The CC also considered long-run measures of returns on different asset classes such as short-term Treasury Bills and cash.
- 9.62 The CC noted that long-dated index-linked yields had remained below 1% for at least the last five years, and that this may suggest grounds for assuming an RFR in line with market yields. However, in adopting a range for the RFR of 1.0%–1.5%, which was considerably above ILG yields of approximately 0%, the CC allowed for the possibility that rates might rise over the price control.<sup>2268</sup>
- 9.63 In addition, the CC noted that the lower end of the 1–1.5% range was well above current short-term interest rates and the upper end of the range was well above the long-term rate of interest on Treasury Bills.
- 9.64 In the CMA's Bristol 2014 Determination, which was published in October 2015, the CMA noted that gilt yields had remained close to zero, but chose to place weight on the NIE assessment, and as a result used an estimate of 1.25%.<sup>2269</sup>
- 9.65 As we will discuss further below, there is a clear pre-PR19 precedent of both Ofwat and the CMA adopting an RFR estimate higher than prevailing market rates.

### ***UK ILGs as the basis of the RFR***

#### *Arguments for ILGs as the sole estimate of the RFR:*

- 9.66 Ofwat based its estimate of the RFR solely on the short-term average of a 20-year UK ILG yield. The use of ILGs as the basis of an RFR estimate was supported by Ofwat's advisers Europe Economics and UKRN report authors, Professors Wright and Mason, as well as Ofgem, Citizens Advice and CCWater.

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<sup>2268</sup> Competition Commission (2014), *NIE RP5 final determination*, paragraphs 13.120–13.131

<sup>2269</sup> CMA (2015), *Bristol Water plc. A reference under section 12(3)(a) of the Water Industry Act 1991 (Bristol PR14 Determination)*, paragraphs 10.166–10.174

- 9.67 Use of spot (current) ILG yields is supported by the UKRN report,<sup>2270</sup> where Wright et al suggest that the market price of indexed debt (and hence its implied yield) is simply what it is, and that the reason why it is this price is irrelevant. They explain this view by including a quote from Cochrane:

...when you shop for a salad, all you care about is the price of tomatoes. Whether tomatoes are expensive because the trucks got stuck in bad weather or because of an irrational bubble in the tomato futures market makes no difference to your decision...<sup>2271</sup>

As a result, the UKRN approach is now commonly referred to as the 'price of tomatoes' approach to estimating the RFR.

- 9.68 As a result of this view, the UKRN states that regulators should use the (zero coupon) yield on inflation-indexed gilts at their chosen horizon to derive an estimate of the risk-free rate at that horizon.
- 9.69 The authors discuss and dismiss concerns that the ILG yield is distorted. They also dismiss arguments that suggest the negative rate implied by spot ILG yields is either irrational or unsustainable. However, the authors note that their recommendation is not in line with the approach taken by regulators over 'the past decade or so', where the decline in RFRs chosen has been slower than the decline in the market rate 'leaving an increasingly large gap between what markets say is the return on risk-free assets, and what regulators assume'.
- 9.70 The authors note the potential role for the 'dragging anchor' approach in regulatory decisions, with regulators not responding to every movement in the market rate in the interest of regulatory stability. However, they suggest that this approach should be taken to the whole of the regulated expected return, not just the RFR, and that 'the rope on the anchor cannot have infinite elasticity' (suggesting that even if short-term fluctuations are ignored or smoothed, the metrics used by regulators eventually have to catch-up with the observed realities).
- 9.71 Ofwat also commissioned Europe Economics to review the academic literature on this topic. Europe Economics stated that it takes an 'observed asset approach',<sup>2272</sup> in which it treated the notion of an RFR as an approximation, with models deploying the idea of an RFR being more or less

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<sup>2270</sup> UK Regulators Network (UKRN) (2018), *Estimating the cost of capital for implementation of price controls by UK Regulators. A report by Wright, Burns, Mason and Pickford*, section 4.3

<sup>2271</sup> John H Cochrane (2011), 'Discount Rates', *National Bureau of Economic Research*, p38

<sup>2272</sup> Europe Economics (2019), *The Allowed Return on Capital for the Water Sector at PR19 – Final Advice*, section 2.6.

representative of reality partly according to how close to risk-free some actual asset in fact was. It noted that the usual proxy chosen is a government bond.

- 9.72 Europe Economics submitted that as a result it is not strictly necessary to consider how credible or otherwise a particular value (positive or negative) is for the RFR. The bond yield simply is what it is, and regulators do not need to defend it as being 'plausible' when it is at that level, because it is observably so and market prices imply that it is expected to remain so.
- 9.73 Europe Economics also stated that under the CAPM model, investors need to be able to borrow and lend at the RFR. It also stated that it was noted that in a well-known paper by Black (1972) it is proved that if investors can lend at an RFR but not borrow at that RFR, then the return on a zero-beta portfolio is higher than the RFR. However, it does not follow from this that any investor needs to be able to create new risk-free assets in their own account. It would be enough for them simply to be able to go short or long in a pre-existing risk-free asset to whatever extent they choose. Europe Economics stated that in shorting a government bond, the investor takes on a negative obligation of government bonds instead of being owed an amount of money. Europe Economics stated that what is required by the CAPM is that investors can owe risk-free assets as well as hold risk free assets.
- 9.74 Europe Economics stated that there is a range of ways that investors can short government debt, including shorting a bond exchange-traded fund (ETF), purchasing ETF put options or government bond put options, or trading in bond futures.

*Arguments against ILGs as the sole estimate of the RFR:*

- 9.75 Ofwat's approach was criticised by the Disputing Companies and their advisers, including KPMG and Professor Alan Gregory, as well Third Parties such as, the Energy Network Association (ENA) and Heathrow Airports Limited (HAL), including analysis by their advisers, Oxera, South East Water,<sup>2273</sup> National Grid<sup>2274</sup> and Western Power Distribution.<sup>2275</sup> It should be noted that arguments against ILGs tend to focus on avoiding the exclusive use of ILGs, or similar arguments in relation to the use of adjusted ILGs, rather than arguing that they should not form any part of the estimation process.
- 9.76 ENA submitted that Ofwat had set an erroneously low RFR by failing to uplift the spot rate of ILGs to account for the unique characteristics of sovereign

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<sup>2273</sup> [South East Water's response to the provisional findings](#), p9

<sup>2274</sup> [National Grid's response to the provisional findings](#), paragraphs 3.12–3.13

<sup>2275</sup> [Western Power Distribution's response to the provisional findings](#), p2

bonds and the gap between corporate and sovereign risk-free financing rates. In its submission, ENA referenced Oxera analysis that examined the issue of whether sovereign yields are the RFR for the CAPM.<sup>2276</sup>

- 9.77 HAL resubmitted its views previously stated as part of the CMA NATS/CAA appeal, including Oxera analysis of corporate bond spreads over sovereign yields.<sup>2277</sup>
- 9.78 In these documents, Oxera submitted that the CMA's approach to estimating the RFR in the NATS/CAA appeal (a similar approach to Ofwat's methodology - using ILG market data as the basis for its RFR estimate but with a longer estimation horizon) was inappropriate, and that this error led to some of the issues the CMA had identified in WACC increasing with gearing.<sup>2278 2279</sup>
- 9.79 Oxera stated that the RFR assumed by sell-side analysts covering utilities in the UK are almost always higher than the spot yields on government bonds. Oxera told us that this data suggested that sell-side analysts take a range of factors into account when setting their estimate of the RFR, and do not (typically) use the spot market rate on ILGs. Oxera provided the following chart showing rates used by sell side analysis.<sup>2280</sup>

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<sup>2276</sup> [ENA second submission](#)

<sup>2277</sup> [Heathrow Airports Ltd submission](#)

<sup>2278</sup> Oxera, (2020) [Are sovereign yields the risk-free rate for the CAPM?](#) prepared for the Energy Networks Association, section 2

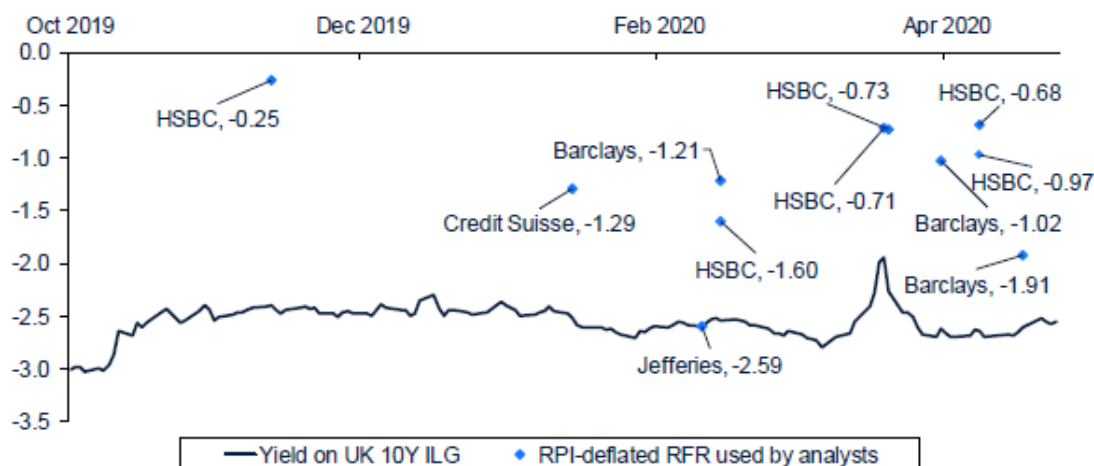
<sup>2279</sup> Oxera reference a scenario where WACC strictly rises with gearing, whereas standard finance theory would suggest that WACC (without taxes or other frictions) should be largely invariant to gearing. For further discussion of this effect, see CMA – NATS/CAA, Appendix D: Technical note on betas and gearing

<sup>2280</sup> Oxera (2020), [Are sovereign yields the risk-free rate for the CAPM?](#) Figure 4.1



Figure 9-2: Chart from Oxera showing RFR assumptions used by sell side analysts

Figure 4.1 Daily yields on 10Y ILGs and RPI-deflated risk-free rates adopted by sell-side analysts on the Oxera UK comparators



Note: Oxera UK comparators include National Grid, Pennon, United Utilities, Severn Trent and SSE. We used the 10-year tenor of the ILGs as Jefferies and HSBC explicitly disclose using this maturity in their analysis. Barclays and Credit Suisse do not disclose the maturity for the risk-free rate assumed in their analysis.

Source: Jefferies (2020), 'Utilities. When the Facts Change...Upgrade UU to Buy', 10 February; HSBC (2019), 'Pennon Group. Buy: Capital allocation – a point of inflection', 12 November; (2020), 'Pennon Group. Buy: FD accepted, waste purchasers queue up', 14 February; (2020), 'National Grid. Upgrade to Buy: A truly defensive play', 19 March; (2020), 'Pennon Group. Pure play company with Viridor sale', 20 March; (2020), 'SSE. Dividend disruption premium', 8 April; (2020), 'United Utilities. Upgrade to Buy: Financial prudence, high visibility', 8 April; Credit Suisse (2020), 'National Grid. Risk discount dissipating', 14 January; Barclays (2020), 'Pennon Group / Severn Trent. Happy Valentine's Day Ofwat – and could CMA referrals be a match for Ofgem?', 14 February; (2020), 'Severn Trent. Severn Trent in line for 2020 but 2021 may see some downgrades', 31 March; (2020), 'Severn Trent / United Utilities. Ofwat consults on providing temporary liquidity', 17 April.

Source: Oxera, Are sovereign yields the risk-free rate for the CAPM?

9.80 Oxera submitted that the CAPM assumes that investors can borrow and lend at the RFR, and that even with the best available credit rating, non-government investors cannot access debt at the rate of ILGs. Oxera suggested that in order to be used as a proxy for the RFR, the spot yields on government bonds needed to be adjusted for the following:<sup>2281</sup>

- (a) A convenience ('money-like') premium attached to government bonds that pushes down government yields relative to the RFR; and
- (b) The gap between corporate and sovereign risk-free financing rates.

<sup>2281</sup> Oxera (2020), *Are sovereign yields the risk-free rate for the CAPM?* section 2

- 9.81 Oxera submitted that a convenience yield is present for reasons including:<sup>2282</sup>
- (a) Treasury (government issued) securities are an important instrument for hedging interest rate risk;
  - (b) Treasury securities must be purchased by financial institutions to fulfil regulatory requirements;
  - (c) Collateral requirements faced by banks are significantly lower for Treasury securities versus other instruments with negligible default risk;
  - (d) Superior liquidity than other negligible default risk instruments; and
  - (e) The increased ability to use Treasury securities as collateral when raising finance.
- 9.82 Oxera pointed to analysis by Feldhütter and Lando (2008) which suggested that yields on government bonds embed a convenience yield ranging from around 30bps to 90bps for US Treasuries between 1996 and 2005.<sup>2283</sup> Oxera recommended that an ILG-based RFR used in the calculation of WACC should be adjusted upwards by 50-100bps to control for the yield impact of the convenience premium and the gap between corporate and sovereign ‘risk free’ financing rates.<sup>2284</sup>
- 9.83 Oxera submitted that the lack of previous debate on the issue of ILG spot rates giving an inappropriately low estimate of the RFR is a function of the historic regulatory approach. Oxera suggested that, prior to 2019, the issue of an underestimated RFR in the CAPM framework did not occur as the regulatory allowance for the RFR was consistently set above the spot yields on government bonds. Oxera stated that the average gap was 149bps over 10yr ILGs and 131bps over 20yr ILGs. The gap, created by what has sometimes been described as the ‘dragging anchor’ approach, had previously masked the ILG’s underestimation of the RFR.
- 9.84 Oxera noted that these allowances were not explicitly set to compensate for the convenience yield or the gap between the corporate and sovereign risk-free financing rates. However, they happened to ensure that the imperfection of the spot sovereign yields as a proxy for the RFR was mitigated.<sup>2285</sup>

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<sup>2282</sup> Oxera (2020), [Are sovereign yields the risk-free rate for the CAPM?](#) section 3.1

<sup>2283</sup> Oxera (2020), [Are sovereign yields the risk-free rate for the CAPM?](#) section 3.1.

<sup>2284</sup> Oxera (2020), [Are sovereign yields the risk-free rate for the CAPM?](#) section 7, including Figure 7.1

<sup>2285</sup> Oxera (2020), [Are sovereign yields the risk-free rate for the CAPM?](#) section 5

- 9.85 Further analysis by Oxera suggested evidence that UK government bonds are not zero-beta assets, stating that there is an overwhelming amount of evidence that points to the negative correlation between government bond returns and equity returns. For example, as documented by Campbell, Sunderam, and Viceira (CSV) (2017) and Campbell, Pflueger, and Viceira (CPV) (2020), the empirical correlation between US bond and stock returns changed sign in the late 1990s from positive to negative. Oxera stated that the CPV paper shows that the negative correlations are driven by the flight-to-safety effect of government bonds, a concept that is consistent with its emphasis on the convenience premium attached to government bonds, and that when bonds' real returns have hedging value to consumers, the model implies that bond and stock risk premia are negatively correlated. Oxera noted that the US Federal Reserve acknowledged both the CSV and the CPV papers, stating that the empirical correlation between bond and stock returns has typically been negative since the late 1990s, with an average beta of -0.2.
- 9.86 Anglian,<sup>2286</sup> Bristol,<sup>2287</sup> Northumbrian and Yorkshire agreed that the CMA should avoid exclusive reliance on ILGs when estimating the RFR.<sup>2288 2289</sup> Anglian, Bristol and Northumbrian also submitted evidence from KPMG that suggested that the estimation of the RFR should take other market and non-market data into account.
- 9.87 Anglian,<sup>2290</sup> Northumbrian and ENA-commissioned analysis by Oxera disagreed with Europe Economics' statement that investors can borrow at the RFR by short-selling government bonds.<sup>2291</sup> These parties argued that such an approach is not feasible in practice, and highlight significant costs, collateral requirements and an inability to reinvest the funds raised as key issues not considered by Europe Economics.
- 9.88 Oxera noted that Black's model is meant to show that in markets with the ability to short any asset in an unlimited amount and no frictions (such as transaction costs and short-selling constraints), a unique market equilibrium can be achieved without a risk-free asset. The model is theoretically elegant, but it does not mean that government bonds themselves are a good proxy for an RFR.

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<sup>2286</sup> [Anglian's response to the provisional findings](#), section 4.3

<sup>2287</sup> [Bristol's response to the provisional findings](#), paragraphs 60–64

<sup>2288</sup> [Northumbrian's response to the provisional findings](#), section 7.2

<sup>2289</sup> [Yorkshire's response to the provisional findings](#), p63

<sup>2290</sup> [Anglian's response to the provisional findings](#), paragraph 397

<sup>2291</sup> [Northumbrian's response to the provisional findings](#), section 7.2

9.89 Oxera stated that the ability to theoretically mimic the RFR via limitless short selling has nothing to do with the claim that that government bonds are a good measure of the RFR in practice. In reality, the empirical proxy for the RFR must be a rate that investors can utilise. Oxera stated that in practice, it is much more expensive to short-sell than to borrow. Such an imperfect short selling mechanism implies that, taking short positions in practice does not satisfy the risk-free borrowing requirement in the standard CAPM.

*ILGs as the sole estimate of the RFR – CMA assessment:*

9.90 As articulated in our Provisional Findings, when assessing the suitability of ILGs as the sole estimator of the RFR, we start with the view that the RFR is the representation of the return required on a 'zero beta' or zero risk asset within the CAPM. If we accept this premise, then the RFR must be a hypothetical number as we consider no investment can provide return with absolutely zero associated risk. This implies that regulators should look to use a proxy metric, or range of metrics, which as closely as possible match the required characteristics of the RFR.

9.91 The development of the standard CAPM included a series of simplifying assumptions. One assumption that is particularly important in considering the RFR is that all market participants can both borrow and lend without risk and at the same price.<sup>2292</sup>

9.92 We note that ILGs have traditionally been considered as the best proxy for the RFR. However, analysis of the current and historic yields associated with these instruments demonstrates that the government can borrow at rates significantly lower than would be accessible by even the highest-rated private investor. The Oxera report described above provided a long list of reasons why this may be the case.<sup>2293</sup> However, we note that it is not necessary to explain why government bond yields may be lower than other high-quality bonds, as there is evidence that they are lower in practice.

9.93 This issue is discussed by corporate finance specialists such as Berk and DeMarzo, who note that, while most discussion of the CAPM assumes that investors face the same RFR of interest whether saving or borrowing, in practice non-government investors cannot borrow at the same low rates as are achieved by the government. To address this issue, Berk and DeMarzo

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<sup>2292</sup> For examples of the examination of the assumptions required within the CAPM approach, see Sharpe, WF (1964) 'Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk', *The Journal of Finance*, pp425–442, Linter, J (1965), 'The Valuation of Risk Assets and the Selection of Risk Investments in Stock Portfolios and Capital Budgets', *The Review of Economics and Statistics*, pp13–37, and Fama, EF (1968), 'Risk, Return and Equilibrium: Some Clarifying Comments', *The Journal of Finance*, pp29–40.

<sup>2293</sup> Oxera (2020), [Are sovereign yields the risk-free rate for the CAPM?](#) section 3.1

suggest that the different market participants will invest on the basis of different securities market lines (SMLs)<sup>2294</sup> depending on the rate at which they can borrow and invest. Berk and DeMarzo state that the ‘market rate’ of interest (in this case the RFR) sits on the efficient frontier at the point where different SMLs meet, suggesting that the market rate sits between the borrowing rates achievable by the government and relevant market participants.<sup>2295</sup>

- 9.94 Our interpretation of Berk and DeMarzo analysis is that in order to achieve an accurate estimate of the ‘market rate’ for the RFR, we need to find proxies that best match the key requirement discussed in paragraph 9.91 and by implication are available to relevant market participants. We can then best estimate the RFR by using a level that takes account of rates suggested by these close proxies. We consider below the relevance of ILGs and high quality corporate bonds as proxies on that basis.
- 9.95 There are several factors to consider in the assessment of ILGs as a suitable proxy for the RFR, including:
- (a) regulatory precedent;
  - (b) ILGs’ match to the key requirements of an RFR;
  - (c) evidence of distortion as a result of negative rates; and
  - (d) consistency with the assumptions in the CAPM.
- 9.96 We observe a long history of UK regulators using the yield on government ILGs as at least the starting point of their estimate of the RFR. However, we also note a long history of regulators making adjustments to market rates when setting their estimate of the RFR, either through extended averaging of historic data or more ‘manual’ assumptions of likely future rates.
- 9.97 As noted above in paragraphs 9.54 - 9.59, Ofwat’s estimation approach in PR19 is substantially different from the approach taken in PR14. In PR19, Ofwat based its RFR estimate on the 1-month average spot yield of the 20-year UK ILG, uplifted by a 26bps forward rate adjustment. In PR14, Ofwat picked an estimate of 1.25% from a ‘reasonable range’ of 0.75% to 1.25%.

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<sup>2294</sup> The securities market lines (SML) are the visual representation of the outcomes generated by the CAPM. It is thus an efficient frontier representing the trade-off between return and exposure to systematic risk. In this example, the rate of return achievable for a unit of risk is impacted by the rate at which an investor can borrow. An investor who could borrow at the government’s lower interest rate would be able to achieve more return for a unit of risk (would have a steeper SML) compared to an investor who had to borrow money at the rate available to non-government market participant.

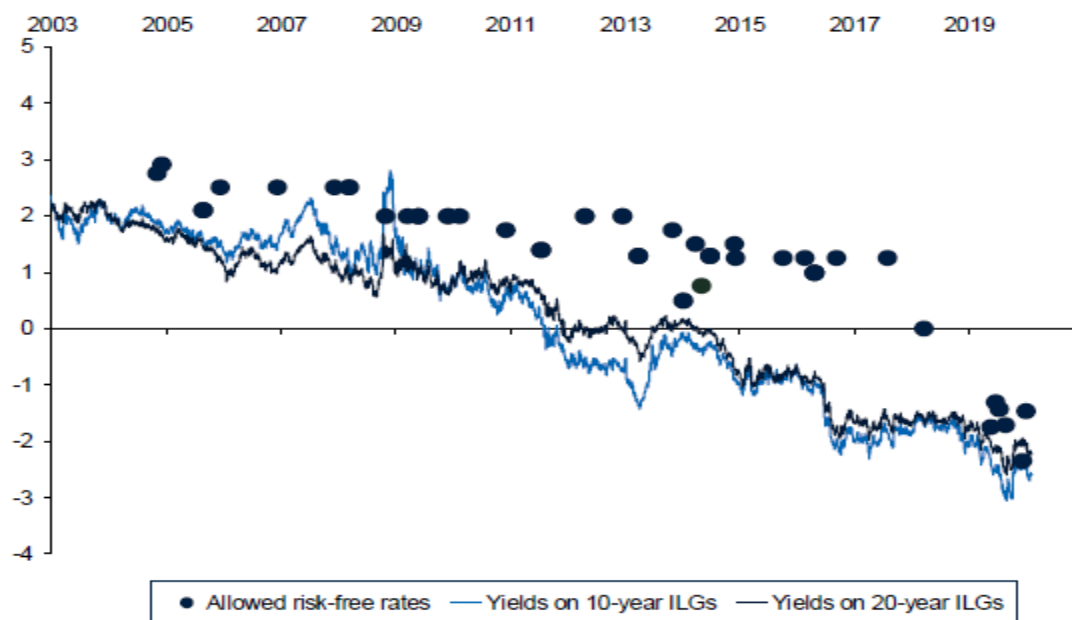
<sup>2295</sup> Berk, J and DeMarzo, P (2014), *Optimal Portfolio Choice and the Capital Asset Pricing Model*, Chapter 11 Appendix, pp398–399

This range was unchanged from the draft determination stage (using market data from January 2014), and included a 115bps uplift from market data which suggested rates at the time were approximately zero.<sup>2296</sup>

- 9.98 Oxera provided a chart, shown in Figure 9-3, demonstrating that Ofwat was far from alone in setting point estimates for the RFR that were substantially higher than the rates implied by market data on ILG yields.

**Figure 9-3: Oxera chart showing a history of regulatory RFR decisions**

**Figure 5.1 Regulatory precedents on the risk-free rate**



Source: Oxera analysis based on past regulatory determinations.

Source: Oxera (2020), *Are sovereign yields the risk-free rate for the CAPM?*, May 2020.

- 9.99 As we can see from the chart above, there was a consistent precedent of setting the RFR above the level implied by ILG yields. We can also see the marked change in approach brought about, it appears, by the publication of the UKRN report. As discussed in paragraph 9.69, this report addressed and dismissed the approach suggested by regulatory precedent. Regulators in subsequent price reviews have used this report's findings as justification for setting their estimate of the RFR based on market data with minimal adjustment.
- 9.100 The UKRN report argues that the market price of government bonds is freely observable and should be considered as appropriate when measuring ILG yields (the 'price of tomatoes' argument). We agree that the UKRN report provides compelling reasons why there is nothing intrinsically irrational about

<sup>2296</sup> Ofwat (2014), [Setting price controls for 2015-20 – risk and reward guidance](#), section A1.5

negative interest rates, and specifically negative yields on government bonds. Supported by the evidence presented by Europe Economics on policy rates from several developed market countries,<sup>2297</sup> it does appear clear that there is now a strong body of evidence that government yields can remain negative for a significant period of time.

- 9.101 On this basis, the UKRN report does appear to effectively question the need for the upward adjustments to market data that regulators have made in the determinations prior to the publication of the report, to the extent that these adjustments reflect, at least in part, regulators concerns that negative RFRs are unsustainable or inconsistent with the CAPM.
- 9.102 However, we also consider the corporate finance theory discussed above which supports the CAPM and suggests that ILGs are not a perfect proxy for the RFR that should be used in the CAPM for relevant market investors.
- 9.103 It appears clear to us that ILGs closely match part of our key requirement of the RFR, that the bonds are risk free. The UK government enjoys a very strong credit rating (although AA/Aa2 not the top AAA/Aa1 rating following downgrades in 2016 and 2017<sup>2298</sup>), and as a sovereign nation has monetary and fiscal levers to support debt repayment that are not available to commercial lenders.
- 9.104 What is also clear is that ILGs do not completely meet our requirement of the RFR as applied in the CAPM, that all market participants can borrow at the same rate. UK government can borrow at rates considerably lower than those that can be achieved by even higher-rated non-government issuers.
- 9.105 We are also not convinced that the ability to short ILGs is an indicator of ILG rates representing a common RFR. This condition may hold true in theory, and we acknowledge that there are a range of simplifying assumptions used throughout the estimation of the cost of capital. However, excluding the costs and collateral requirements from such a transaction make it an impractical consideration when trying to assess a reasonable level of the RFR in the 'real world'.
- 9.106 These considerations suggest that a CAPM based on the ILG rate alone may understate the return required by investors on equities, if it underestimates the return associated with a 'zero-beta' asset.

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<sup>2297</sup> Europe Economics (2019), [The Allowed Return on Capital for the Water Sector at PR19](#), section 2.6.8

<sup>2298</sup> S&P [downgraded](#) the UK from AAA to AA in June 2016. Moody's [downgraded](#) the UK from Aa1 to Aa2 in September 2017.



9.107 We acknowledge that the UKRN report may have correctly identified previous upward adjustments to market rates as being inappropriate on the basis of ‘distortion’ to ILG rates or a concern that rates may significantly ‘correct’ during the price control, and as a result discouraging this practice in subsequent price controls. However, we consider that there is merit in Oxera’s argument (see paragraph 9.84) that this may have removed an inadvertent mitigation to problems associated with the standard regulatory approach of sole reliance on the potentially imperfect RFR proxy of government bond yields.

9.108 As a result, we conclude that appropriate maturity ILGs remain a useful input to the RFR estimation process, but that they are unlikely to provide a perfect (or wholly sufficient) proxy for the RFR in isolation. We will discuss arguments on any adjustment required when using ILGs to set an RFR estimate range at paragraphs 9.209 - 9.240.

### ***High quality non-government bonds as the basis of the RFR***

#### ***Arguments for the inclusion of high-quality non-government bonds within the estimate of the RFR:***

9.109 Analysis conducted by Oxera for ENA suggested an alternative approach to calculating the RFR. Rather than making an upward adjustment to ILG yields to adjust for the existence of a ‘convenience yield’, Oxera proposed adjusting AAA corporate bond yields downwards to reflect default risk. Oxera considered work by Elton et al (2001), Berk and DeMarzo (2013) and Feldhütter and Schaefer (2018) in suggesting a cumulative default probability for AAA bonds of 0.87% over a 10-year horizon and 1.71% over a 20-year horizon. Oxera noted that a Black-Cox structural model (as used by Feldhütter and Schaefer) would suggest 0.54% and 1.18% over 10 and 20-year horizons respectively. On the basis of this data, Oxera estimated that at a 20-year investment horizon, AAA corporate bond yields with a downward adjustment of 5-20bps could be used as a reasonable proxy for the RFR within the CAPM.

9.110 Oxera further suggested that Ofwat’s practical concerns regarding the liquidity and risk premiums present in AAA bonds could be addressed by the application of two separate adjustments. Oxera estimated that a suitable liquidity premium would be 13bps, a figure that corresponded to evidence presented by Van Loon (2015) of a premium between zero and 20bps.<sup>2299</sup>

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<sup>2299</sup> van Loon, P, Cairns, A, McNeil, A and Veys, A (2015) ‘Modelling the liquidity premium on corporate bonds’, *Annals of Actuarial Science*, pp264–289



Oxera also estimated a downward adjustment of 13bps for expected loss on AAA yields over a long-term investment horizon (based on the rounded midpoint of an estimate range of 5-20bps).

- 9.111 Oxera also noted that most of the financial bonds included in the CMA's preferred indices (the iBoxx £ non-Gilt AAA 10-15 and 15+indices) are subsovereign bonds issued either by government-backed agencies such as KfW (Germany) and Temasek (Singapore), or by supranational organisations with multiple sovereign sponsors, such as the European Investment Bank and the Nordic Investment Bank. Oxera stated that these sub-sovereign bonds are likely to be less risky than those issued by private financial institutions.
- 9.112 In addition, Oxera recommended addressing inflation risk premium by deflating nominal bonds by the breakeven inflation rates implied by the Bank of England published yield curve. Oxera also recommended a forward rate adjustment of 26bps. Combined these figures suggested a (AAA-starting point) RFR estimate of -0.68% (CPIH-real).
- 9.113 Starting instead with ILG yields and adding a convenience premium of 50bps and a forward rate adjustment of 26bps, Oxera estimated an RFR of -0.64% (CPIH-real).
- 9.114 Anglian agreed with the CMA that ILG yields are likely to sit below the true RFR.<sup>2300</sup> This is because the significant difference between AAA-rated non-gilt and ILG yields suggests that even the highest-rated investors cannot borrow at the rates of the UK government. Placing sole weight on ILG evidence would therefore underestimate the true RFR.
- 9.115 Anglian stated that Ofwat's claim that placing significant weight on AAA-rated bonds in its calculation of the RFR is unprecedented in the UK is misleading. Ofwat ignores the fact that the reason why evidence on AAA-rated bonds is required to assess the RFR in the CAPM is that Ofwat made a significant change in methodology at PR19 by following the UKRN report recommendation to use spot rates on ILGs as a proxy for the RFR. Anglian stated that this change was a significant departure from the standard UK regulatory practice of adopting headroom over the ILGs rate. Furthermore, nothing in CAPM theory or empirical evidence states that the RFR should be based on spot rates of ILGs. Anglian stated that recognising a headroom over spot rates is a standard and appropriate practice in regulation.<sup>2301</sup>

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<sup>2300</sup> [Anglian's response to the provisional findings](#), section 4.3

<sup>2301</sup> [Anglian's reply to responses to the provisional findings](#), paragraphs 83–84

- 9.116 Bristol agreed with the CMA's approach of recognising the importance of other benchmarks in the RFR. However, it remained of the view that the range should be broadened to include estimates from other benchmarks, such as nominal gilts. This is because market distortions impact all available RFR benchmarks and there is no clear reason to consider that ILGs and AAA bonds are more or less impacted by distortions than nominal gilts.<sup>2302</sup>
- 9.117 Northumbrian welcomed the decision by the CMA to avoid exclusive reliance on ILGs, and agreed that weight should be placed on high-quality non-gilt bonds that better reflect the lowest-risk rate that is available to all relevant market participants.
- 9.118 Northumbrian disagreed with Europe Economics' conclusions, agreeing with the CMA that all proxy risk-free assets are subject to distortions to some degree, and arguing that ILGs were no closer to satisfying the CMA's RFR requirements than AAA-rated non-gilt bonds. Northumbrian also rejected the notion that investors could short-sell government bonds as not feasible in practice.<sup>2303</sup>
- 9.119 Northumbrian stated that the CMA's provisional approach was neither novel nor irrational. Rather, Ofwat and other regulators had recently departed from precedent by setting the RFR at ILG spot yields rather than a point estimate above prevailing yields. Northumbrian noted that this change was, in large part, a result of the UKRN report.
- 9.120 Northumbrian stated that rather than revert to previous CMA/CC precedent (ie the dragging anchor or through cycle approach), the CMA had followed the approach of moving to current yields. However, it said that the CMA had recognised that strictly the current RFR has to be somewhere between the ILG and AAA yields in order to be consistent with CAPM theory. Northumbrian stated that novelty in and of itself was not necessarily irrational as suggested by Ofwat – and that it can be part of the regulatory process which allows for adjustment over time. It said that the CMA reaching the conclusion that it should adjust the RFR to recognise the fact that no corporates can finance at the gilt rate was not irrational, it was correcting Ofwat's regulatory mechanism which did not adequately reflect the RFR for corporates in a world where ILGs were moving into negative territory and there had been no adjustment. Northumbrian suggested that the CMA is doing just what Ofwat argued it had the regulatory discretion to do in its SoC.<sup>2304</sup>

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<sup>2302</sup> [Bristol's response to the provisional findings](#), paragraphs 60–64

<sup>2303</sup> [Northumbrian's response to the provisional findings](#), section 7.2

<sup>2304</sup> [Northumbrian's reply to responses to the provisional findings](#), section 1.3

- 9.121 Yorkshire noted that in the calculation of the RFR, the CMA had departed in a relatively small way from the UKRN recommendations by widening the basket of proxies for the riskless asset to include AAA non-government bonds. Yorkshire stated that the reasons for this approach were explained very clearly in the CMA's PFs and reflected compelling evidence in this area which was not considered by the UKRN authors three years ago.<sup>2305</sup>
- 9.122 In response to arguments that the AAA non-government bond yields may suffer from distortions, Yorkshire argued that the prices of all traded assets are affected to some degree by market distortions. Yorkshire considered that the distortions affecting AAA non-government bonds were no greater than the distortions affecting government gilts. Yorkshire stated that regulators, including the CMA, have previously been hesitant to take readings from gilt markets due to the distorting influence of pension funding rules and the resulting inelastic demand for gilts from pension fund investors.<sup>2306</sup>

*Arguments against the inclusion of high-quality non-government bonds within the estimate of the RFR:*

- 9.123 Ofwat, its advisers Europe Economics, Wright and Mason, the academics commissioned by Ofwat, Ofgem, Citizens Advice and CCWater disagreed with the inclusion of high-quality non-government bonds in the estimation of the RFR. The UKRN noted that such an approach would be a departure from regulatory precedent and previous CMA decisions and would ordinarily be expected to require wider consultation.<sup>2307</sup>
- 9.124 Ofwat stated that 'conceptually' it understood the CMA's concern with the lack of a link between the use of gilts and the intuitive explication of the CAPM. However, it considered including higher-quality non-government bonds risked overstating required returns.<sup>2308</sup>
- 9.125 Ofwat stated that placing weight on AAA-rated bonds was novel and without precedent in UK regulated sectors, and that the CMA should not place any weight on this measure because:<sup>2309</sup>
- (a) The practical application of the CAPM does not require that all participants must be able to issue debt at the chosen RFR; and

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<sup>2305</sup> [Yorkshire's response to the provisional findings](#), paragraph 3.4.13

<sup>2306</sup> [Yorkshire's reply to responses to the provisional findings](#), p63

<sup>2307</sup> [UKRN's response to the provisional findings](#), p2

<sup>2308</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 5.15

<sup>2309</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 5.16

(b) AAA bonds include significant distortions which may well outweigh distortions from imperfections in gilts as a risk-free rate proxy.

- 9.126 Wright and Mason, in analysis commissioned by Ofwat noted that, in addition to being different to the approach used in the CMA NATS/CAA appeal, the CMA's approach is the first time (that they were aware of) of a UK regulator implicitly advocating the CAPM be implemented with a distinction between the lending and the borrowing rates of the marginal investor. Wright and Mason suggested that if this distinction were to be made, then it would need to be done so carefully, rather than approximated by an upward adjustment in the estimate.
- 9.127 Wright and Mason reviewed the Berk and DeMarzo approach highlighted by the CMA. They suggested that while the CAPM was an equilibrium model, the important investor in the CAPM framework is the marginal investor (as they have the most influence on the price) and that greater care had to be taken about the marginal investor when borrowing and lending rates were taken to be different, since different types of investors faced different capital allocation lines.
- 9.128 Wright and Mason stated that the marginal investor relevant to this water sector price control appears to be institutional, acting on behalf of noninstitutional savers. Hence, the marginal investor for these companies was effectively a net lender. As a result, the capital allocation line (in the Berk and DeMarzo approach) would suggest that the ILG rate was the most appropriate. and that the CMA had strictly over-estimated the cost of equity capital facing the marginal investor in UK water companies.
- 9.129 Wright and Mason cautioned against moving away from the 'standard' CAPM. Firstly, they argued that such a move allowed many complications to arise, all of which would have to be worked through consistently and carefully. Secondly, they argued that if all the identified qualifications to the CAPM were allowed, the model would 'simply be abandoned'. Wright and Mason stated that practitioners continued to use the CAPM because of necessity and because there was no viable alternative. Wright and Mason stated that bringing these two points together suggest that the desire for simplicity suggests not 'tinkering around the edges' of the model.
- 9.130 Wright and Mason rejected Oxera's arguments relating to negative betas associated with ILGs. They also disputed Oxera's arguments relating to a 'convenience premium' associated with ILGs, noting that this feature may apply at shorter horizons but not when an investor matches their investment horizon to the duration of the ILG.

- 9.131 Europe Economics stated that there was no general rule that low-risk corporates are always unable to issue bonds at yields below those of governments, and that firms such as McDonalds have been regarded by financial markets as less risky than the US government. Insofar as there were any non-trivial wedge at present between the borrowing rate on the lowest risk corporate bonds and the yield on government bonds, it would arise precisely because of the combination of macroeconomic conditions and macroeconomic policies that made the government the marginal investor.<sup>2310</sup>
- 9.132 Europe Economics also stated that it does not in principle object to the concept of using highly rated corporate bonds to provide indications about the RFR. That might not only take the form of a basis for estimating yield levels but might also be helpful in other ways such as indicating how much the RFE has changed over time (highly rated corporate bonds might in principle provide a better indication of changes than of levels). This approach may be more relevant when the task is to assess the equilibrium RFR, and in that context AAA corporate bonds might be one amongst several alternative sources of evidence.
- 9.133 Europe Economics stated that under its ‘observed asset’ approach it was simply taking government bonds as an empirical approximation to a real-world risk-free asset. That asset just is the risk-free asset proxy, hence the yields on that asset just are the risk-free yields. Europe Economics stated that there were a number of pros and cons for this approach versus the ‘equilibrium concept’ approach, and that there were three particularly important points that the CMA might usefully reflect on: <sup>2311</sup>
- (a) That the observed asset approach means the risk-free return is concrete and relatively easy to measure. It is by no means clear that a ‘zero beta asset’ approach shares this feature.
  - (b) That the observed asset approach ‘lets the data speak’ transparently, without requiring extensive manipulation or the application of extensive judgement.
  - (c) That any alternative to the observed asset approach of necessity involves correcting for some purported distortion in the observed data. But there is no guarantee that the correction for a distortion does not create a larger distortion of its own. It is widely believed (and the CMA would appear to acknowledge) that the widespread practice of regulatory correction for

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<sup>2310</sup> Europe Economics (2020), [Reponses to the CMA's Provisional Findings regarding WACC in the Water Appeals](#), section 1.4.1

<sup>2311</sup> Europe Economics (2020), [Reponses to the CMA's Provisional Findings regarding WACC in the Water Appeals](#), section 1.4.2

‘distortions’ over the decade or so leading up to 2015 resulted in systematic and material over-statement of regulatory WACCs.

9.134 Europe Economics pointed out some key issues arising with AAA bond indices:<sup>2312</sup>

- (a) Around 87% (by number) of the bonds from the 10+ index and all the bonds index 10-15 index are from the financial sector. So, not only are they exposed to financial sector-specific risk plus and debt beta for the financial sector, but also the scope for diversifying within AAA bonds to hedge this risk is limited. In the past, many financial sector AAA bonds have been significantly downgraded.
- (b) The bonds do not satisfy standard liquidity tests. For example, the bonds’ bid-ask spreads are typically much higher than those of the comparable gilt benchmark – in most cases at least in the tens of basis points higher and in some cases hundreds of basis points higher. This creates transaction costs and liquidity risks that will clearly upwards-distort yields.

9.135 Europe Economics also disputed ENA’s evidence of analysis by Oxera which suggested that ILGs were negative rather than zero beta assets. Europe Economics argue that in addition to difficulties associated with this type of regression analysis that the premise of the analysis may be flawed. Daily returns on long-term gilts are not risk-free, rather the gilt is zero beta over its maturity. Speculation regarding the short-term movements of long-term bonds is a risk-taking activity, exposed to paradigmatically systematic risks such as interest rate movements. The view that a 15- or 20-year gilt is a risk-free asset at a 15- or 20-year horizon does not imply that such assets are risk-free when subject to short-run trading. Indeed, the need to lock in funds for a period (and thus bear a liquidity cost) to secure a risk-free return rather than being able to trade in and out at will is typically interpreted as one key reason for the normal (non-inverted) yield curve being upwards-sloping.

9.136 Ofgem<sup>2313</sup> did not consider it appropriate to distinguish between lending and borrowing rates for CAPM without also considering whether marginal investors in regulated utility companies are net lenders or net borrowers. Its analysis of the investors in the Disputing Companies was that they are institutional investors, investing on behalf of pension funds and other long-term investors. Assuming these institutions represent the marginal investor,

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<sup>2312</sup> Europe Economics (2020), [Reponses to the CMA’s Provisional Findings regarding WACC in the Water Appeals](#), section 1.4.3

<sup>2313</sup> [Ofgem’s response to the provisional findings](#), paragraphs 19–28

they are therefore effectively lenders for whom the ILG rate is the most appropriate RFR.

- 9.137 Ofgem stated a belief that the use of the AAA non-gilt bond index risks introducing new inaccuracies in an attempt to correct the factors that Oxera suggests may make the market yield of the 20-year ILG too low (but admits by how much is unquantifiable). Ofgem would expect these AAA non-gilt bonds to be quite illiquid and contain some element of default risk. These factors can contribute towards higher yields, more so than ILGs being depressed by a convenience yield. The non-gilt bonds which constitute the AAA non-gilt 10-15 year index are also in the 10 year+ index. So, combining the 2 indices appears to be double counting, compounding potential reliability issues with those data points.
- 9.138 Ofgem stated that some of the bonds seemed to be so specialised that using them as a measure of RFR would be problematic. In particular Ofgem noted that the Broadgate Financing bond (due 2033, 2.33% of the AAA 10+ year index and 6.74% of the AAA 1015yr index), which is a commercial property securitisation and although rated 'AAA' has a 'structured finance' suffix to the rating which means it trades with a significant complexity premium compared to a 'natural' AAA; the Oxford University bond (due 2117, 6.3% of the AAA 10+ index); and the Wellcome Trust bond (due 2118, 4.9% of the AAA 10+ index). The latter two bonds are of 100-year maturity and are likely to be highly illiquid.
- 9.139 Ofgem also considered that using nominal bonds risks introducing further errors. Nominal bonds will have an inflation risk premium embedded in their yield, leading to a higher yield than an equivalent inflation linked bond, which is otherwise identical as to yield and tenor. Given the uncertainties of investment over such a long time period, Ofgem believed that nominal bonds, including the ones used in the index (given their long-term nature), will have an inflation risk premium.
- 9.140 Ofgem argued that use of the AAA non-gilt IHS iBoxx index yields for the RFR would be a departure from past regulatory practice in water and the overwhelming majority of academic, practitioner and finance textbooks. Ofgem agreed with Ofwat that making any such departure ought to be subject to wider consultation on the merits of taking such a position.
- 9.141 Citizens Advice stated that it agreed with the CMA that 'it would be consistent ... to assume that the cost of borrowing by low-risk investors therefore forms a 'lower bound' for equity returns'. However, it strongly disagreed with 'the CMA's assertions and findings that the Modigliani-Miller CAPM/WACC

theorem requires that all market participants can both borrow and lend at the same price'.<sup>2314</sup>

9.142 Citizen's Advice stated that, 'according to the Modigliani-Miller theorem', debt is just another asset – like equities – and therefore only 'risk-free' borrowers such as the UK government will be able to borrow at the risk-free rate. Further, Citizens Advice stated that a 'zero-beta' equity is a theoretical but in practice non-existent asset as, 'as commonly agreed', only index-linked government gilts approximate to being risk-free – hence nonzero-risk investors that borrow to finance ILGs should necessarily expect a lower return on those ILGs than the corresponding cost of borrowing to finance that return. Citizen's Advice stated that the cost of borrowing by low risk investors forms a lower bound for equity returns because the lowest-risk equities should be expected to have small but non-zero betas.

9.143 Citizen's Advice stated that the cost of borrowing by low-risk investors is thus not 'another' way of estimating the return on a zero-beta asset. On the contrary, it will always over-estimate the return on a zero-beta asset, ie the RFR. Hence, in conclusion, Citizens Advice strongly disagreed with any assessment of the RFR on the basis of AAA bond yields, and stated that the CMA should have determined the same RFR as Ofwat.<sup>2315</sup>

9.144 CCWater stated that the inclusion of AAA bonds would be a move away from regulatory precedent where the RFR was set by reference to government index-linked gilts merely using this as a lower bound for the RFR. It also noted that such an approach would be at odds with the CMA NATS/CAA assessment, which looked instead at a variety of ILG maturities/spot rates and averages.<sup>2316</sup>

*The inclusion of high-quality non-government bonds within the estimate of the RFR – CMA assessment:*

9.145 In considering whether highly-rated, non-government bonds may assist the estimation of the appropriate RFR in a regulatory price control, we conducted our assessment based on the yields of the IHS iBoxx UK non-gilt AAA 10+ index (which has an average maturity of approximately 28 years) and the IHS iBoxx UK non-gilt AAA 10-15 index (which has an average maturity of approximately 12 years).<sup>2317</sup>

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<sup>2314</sup> [Citizens Advice's response to the provisional findings](#)

<sup>2315</sup> [Citizens Advice's response to the provisional findings](#)

<sup>2316</sup> [CCWater's response to the provisional findings](#), paragraph 5.7

<sup>2317</sup> iBoxx data. Non-gilt index used as data quality appears to be improved by a greater number of constituent issuances versus alternative AAA non-government issuers benchmarks.



- 9.146 These bonds are not ‘risk-free’ in the same way as government bonds denominated in the home country’s currency, as investors still take country risk, as well as the additional risk of default associated with the issuer. However, the risk of loss resulting from default on these bonds is exceptionally low, and evidence from actual performance suggests that the expected loss is significantly lower than the debt premium.
- 9.147 In addition to the Oxera evidence referenced in paragraph 9.109, we note that S&P Global Ratings suggest that between 1981 and 2019, 15-year cumulative average corporate default rates amount to only 0.91% in aggregate over 15 years.<sup>2318</sup> These low-risk bonds trade at a premium to government bonds for a wide range of reasons, including the requirements placed on certain investors, including some pension funds, to purchase government bonds to meet certain liabilities.
- 9.148 Although there is no perfect mechanism for calculating the size of the effect, the cost of equity for private sector investors would therefore also be expected to diverge from a notional equity return calculated by reference to government bond yields to reflect the absence of such a premium. In other words, the CAPM should not assume that investors would accept a lower return on zero beta (or very low beta) equities than the cost of financing that return by borrowing. It would be consistent with the CAPM to assume that the cost of borrowing by low-risk investors therefore forms a ‘lower bound’ for equity returns, and that this could therefore be another way of estimating the return on a zero-beta asset.
- 9.149 Returning to the key characteristics for the RFR highlighted in paragraph 9.91, we note that non-government bonds with the highest possible credit rating provide an input that is both very close to risk free (issuers with a higher credit rating than the UK government, but with some inflation and default risk) and is at least closer to representing a rate that is available to all (relevant) market participants.
- 9.150 We note and agree with the assessment of Ofwat and its advisers that the AAA non-government index approach is not a perfect proxy for the RFR. We note Ofgem’s comments on diverse characteristics of the bonds within the AAA indices and Ofwat’s comments on the skew to financial sector issuers. However, we also note Oxera’s evidence that most of the ‘financial sector’ bonds in the indices are sub-sovereign bonds issued either by government-backed agencies or by supranational organisations with multiple sovereign sponsors. While the global financial crisis of the 2000s may have tainted the

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<sup>2318</sup> S&P Global Ratings (2019), *Default, Transition, and Recovery: 2019 Annual Global Corporate Default And Rating Transition Study*, Table 26

reputation of both credit ratings agencies and the ratings on 'financial' instruments in particular, we still consider that the yield on these indices provides information on the lowest risk borrowing costs available to non-government market participants today.

- 9.151 That said, we acknowledge that illiquidity premiums, some default risk and the unavailability of a 'perfect match' average maturity benchmark all suggest that the yield on AAA nongovernment indices is likely to be a) an imperfect proxy for and b) slightly above the 'true' level of the RFR.
- 9.152 We received a wide range of evidence on the requirements of the CAPM and role of the marginal investor in any model with more than one representation of the RFR. Academics and highly-qualified finance professionals made differing, sometimes diametrically opposed, arguments about the correct use of the model.
- 9.153 Wright and Mason, two of the authors of the UKRN report that has had such a large impact on this particular WACC metric in recent regulatory settlements, questioned the introduction of a lending and borrowing rate into discussion of the RFR estimate. Nevertheless, they argued that, if taking such an approach, it is the investor who is most likely to be trading actively at the margin that matters. Wright and Mason suggested that in this methodology, the marginal investor is an institutional investor of funds, and thus is a marginal lender, and that this meant that the ILG rate is the correct proxy for the RFR in either approach. However, Wright and Mason accepted that this was not strictly in accordance with the CAPM theory – highlighting the difficulties of navigating financial theory, standard application of the theory and the practical experience of investors in the market.
- 9.154 On the practical use of the RFR in the market, we note Oxera's evidence that investment bank analysts, advisers to the marginal investors discussed in this debate, often use RFR's within their modelling that are significantly higher than ILG yields (see paragraph 9.79)
- 9.155 Similarly, Europe Economics acknowledged that it did not in principle object to the concept of using highly rated corporate bonds to provide indications about the risk-free rate. Rather, Europe Economics stated that under its 'observed asset' approach it was simply taking government bonds as an empirical approximation to a real-world risk-free asset – which was different to identifying the yield of a zero-beta RFR.
- 9.156 We recognise the value in the UKRN report in addressing the consistent over-estimation of the RFR in the face of (subsequent) falling market-implied rates. We note that the UKRN report clearly identifies that the yield on ILGs should

not be considered irrational and that large manual adjustments to match historic averages are unhelpful. However, we are less convinced that the UKRN report conclusively establishes that the ILG yield is the only metric that could be useful when estimating the theoretical RFR used in CAPM calculations.

- 9.157 We also note criticism that including AAA non-government bonds is a variation on the approach used by the CMA in the NATS/CAA appeal provisional findings. As discussed in paragraph 9.60, the CMA's NATS/CAA final report did not reach a final decision on the RFR – with circumstances preventing further analysis in response to evidence. In that case, a lot of the evidence submitted before the CMA reached its provisional findings focused on distortions to the ILG rate and the potential to use nominal bond yields, non-UK bond yields or long-term equilibrium estimates as alternatives (issues we will discuss below). HAL's evidence on the impact of gearing and a 'too low' RFR was submitted in response to the provisional findings on the NATS/CAA appeal, and may have led to a change in the final determination if there had been the opportunity for the CMA to fully consider it.<sup>2319</sup>
- 9.158 On balance, the CMA has accepted arguments and evidence that the ILG rate available to the government is unlikely to be a perfect proxy for the RFR, and that the 'true' rate of RFR in the market is likely to be above this level.
- 9.159 We are not convinced of the need to conclude on the exact nature of the marginal investor when deciding which measures may assist our estimation of the RFR. Rather, we are trying to calibrate our estimate of the RFR acknowledging that the ILG rate is available to all lenders but only one borrower, and that even the highest quality borrowers in the country could not access this rate. On the assumption that market participants in the CAPM model are both borrowers and lenders, we consider it unlikely that the highest quality borrowers, who could presumably borrow at the lowest rates, would accept an equity return, even a zero-beta equity return, that was lower than their borrowing cost. We discuss the role of the marginal investor in our assessment further at paragraph 9.246.
- 9.160 Rather than following the pre-2018 precedent of making a manual adjustment to ILG yields or applying a long-term average (for example a 10year average ILG yield as used in the PR14 approach), which do not appear to improve the accuracy of the RFR estimate, we have instead looked for a helpful marker of the likely ceiling to any potential RFR estimate. Returning to the key characteristics for the RFR highlighted in paragraph 9.91, we note that non-

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<sup>2319</sup> Heathrow Airport Limited (2020), [Response to the CMA Provisional Findings in the NERL RP3 redetermination](#)

government bonds with the highest possible credit rating provide an input that is both very close to risk free (issuers with a higher credit rating than the UK government, but with some inflation and default risk) and is at least closer to representing a rate that is available to all (relevant) market participants

9.161 In picking AAA bonds as a suitable upper bound of any estimate of the RFR, we are deviating from both the longer-term precedent of regulators picking an estimate higher than the prevailing ILG yield and the shorter term precedent that has been influenced by the work by the UKRN arguing against the rationality of large upward adjustments based on a ‘dragging anchor’ approach.

9.162 As a result, we consider the yield on AAA-rated non-government bonds to be a suitable input into our estimate of the RFR. We discuss arguments relating to any adjustment required when using AAA yields to set an RFR estimate range below at paragraph 9.224.

### ***Other metrics as inputs into the RFR calculation***

*Arguments suggesting that other metrics should be included within the RFR calculation:*

#### ***Nominal Bonds***

9.163 Ofwat chose to use only ILGs and excluded nominal government bonds from its analysis. In making this choice, Ofwat submitted that including nominal yields would knowingly add inaccuracy (in the form of inflation risk premium) into an estimate of an RFR. It also suggested that it would be inappropriate to provide water companies with compensation for inflation risk (as is present in nominal bonds) when they already enjoy an extremely high level of inflation protection to both revenues and their RCV.<sup>2320</sup> It noted that this approach was in line with that taken by the UKRN report and recent estimates published by Ofgem, Ofcom and the Civil Aviation Authority.<sup>2321</sup>

9.164 Ofgem stated that once the inflation risk premium had been taken into account that the yields on nominal and inflation-linked government bonds should give numerically similar estimates of the RFR. It also suggested that the CMA should consider the ‘price of tomatoes’ argument proposed by the UKRN cost of equity report.<sup>2322</sup>

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<sup>2320</sup> Ofwat (2019) [Allowed return on capital technical appendix](#), section 5.2.3

<sup>2321</sup> Ofwat (2019) [Allowed return on capital technical appendix](#), section 5.2.1

<sup>2322</sup> [Ofgem submission](#)

- 9.165 Yorkshire stated that it agreed with many of the points put forward on behalf of regulatory companies as part of the CMA NATS/CAA appeal. In particular, it endorsed the use of nominal UK government bonds in addition to ILGs.<sup>2323</sup>
- 9.166 Anglian, Bristol and Northumbrian agreed with the CMA's assessment that no single instrument was likely to satisfy the requirements of a truly risk-free asset.<sup>2324 2325 2326</sup> The companies also noted that other metrics, such as nominal gilts, could also be used as inputs into the estimation process.
- 9.167 Economic Insight worked on behalf of the Disputing Companies, as well as other water companies during PR19. In a report for Bristol, Economic Insight argued that the RFR is a theoretical concept and cannot be directly observed, and that as a result neither ILGs nor deflated nominal bonds provide a perfect measure of the RFR. Specifically it/the report stated:
- (a) Nominal gilts will embed an inflation risk premium (as noted by Ofwat);
  - (b) ILGs will embed a liquidity premium; and
  - (c) ILGs may be further affected by market distortions which may or may not persist.
- 9.168 Economic Insight submitted that even using Ofwat's own interpretation of inflation risk premium and inflation, there is a difference evident between ILG yields and deflated nominal yields.
- 9.169 Economic Insight noted Bank of England analysis of the liquidity risk premium on ILGs between 2004 and 2013 which suggested that estimates had averaged 15bps, but that before the global financial crisis this figure was essentially zero (averaging -0.02%). The same report noted that estimates of the inflation risk premium on nominal gilts varied considerably over time, averaging 15bps but peaking at 150bps and troughing at below zero. The pre-crisis period averaged only 0.09%.
- 9.170 Economic Insight recalculated its estimate using Bank of England estimates of inflation and liquidity risk premia, finding that the results suggest greater divergence between deflated nominal and ILG yields than was suggested by Ofwat. Economic Insight found that on this basis the RFR implied by ILGs was 40-51bps lower than the RFR that would be implied by the use of deflated nominal yields.

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<sup>2323</sup> [Yorkshire SoC](#), paragraph 7.1.2

<sup>2324</sup> [Anglian's response to the provisional findings](#), paragraph 394

<sup>2325</sup> [Bristol's response to the provisional findings](#), section 8

<sup>2326</sup> [Northumbrian's response to the provisional findings](#), section 7.2

## *Non-UK government bonds and other potential measures*

- 9.171 KPMG, including input from Gregory, worked on behalf of Anglian, Bristol and Northumbrian during PR19, while Yorkshire referenced Gregory in its representations in response to the CMA NATS/CAA provisional findings.<sup>2327</sup> Anglian, Northumbrian and Wessex Water also commissioned a report from Gregory in order to ‘assist the CMA in its redetermination of the price control for NERL’.<sup>2328, 2329</sup>
- 9.172 KPMG submitted that the rates on the instruments traditionally used to estimate the RFR (such as government bonds and commercial bank liabilities) may currently be an unreasonable basis for setting the RFR (and so the cost of capital) in a regulatory price control. As the RFR is a fixed (not indexed) allowance, setting the RFR based on current gilt yields would assume that negative yields will prevail over the long run. KPMG submitted that there are several reasons why sustainably negative rates are unlikely:
- (a) The time preference for consumption now rather than consumption in the future would ensure a positive real interest rate, and that the ‘neo-classical’ assumption is that this rate would be close to the long-run steady-state GDP growth rate (as suggested by Taylor 1993).
  - (b) The International Fisher Effect suggests that real interest rates should be the same across countries (also known as purchasing power parity, PPP), and that whilst at present PPP theory has not translated into equivalent rates in the US and the UK, the theory brings sustainably negative rates into question.
  - (c) The UK is currently in a volatile and unusual situation, with the COVID-19 outbreak causing high levels of market volatility. The significant spending plans announced by the government might reasonably be expected to lead to an increase in interest rates, while the Brexit debate continues to provide uncertainty about the Bank of England’s future interest rate decisions.
- 9.173 KPMG suggested that instead of relying on potentially distorted and volatile market rates, the RFR should be set on the basis of a glide path from current market data to a forward-looking equilibrium rate for the UK. One estimate of such an equilibrium rate is the Bank of England’s Inflation Report of August

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<sup>2327</sup> Yorkshire (2020), [Representations to the CMA on the NATS En-route Limited Price Determination Provisional Findings](#)

<sup>2328</sup> The ‘price control for NERL’ refers to the CMA NATS/CAA appeal

<sup>2329</sup> Gregory (2020), [Setting the Cost of Equity in UK Price Controls](#), submitted to the CMA by Anglian, Northumbrian and Wessex Water on the NATS En-route Limited Price Determination

2018 estimate, which suggested that the rate is lower than previously estimated but still positive at +0.5% real CPI. Another potential reference point could be US Treasury Inflation-Protected Securities, which have remained positive, on average, for the ten years preceding Ofwat's FD.

- 9.174 Following the publication of the CMA's Provisional Findings, Anglian, Bristol and Northumbrian submitted KPMG's updated estimate of  $R^*$  as -0.3% (CPI-real), based on the model used by the Bank of England.
- 9.175 Ofwat responded to the arguments from the Disputing Companies on the use of KPMG's updated estimate of  $R^*$ , by arguing that the significant uncertainty about the timeline of bond yield convergence towards this rate meant that it was not robust enough to be a primary source of data for an RFR estimate. Ofwat noted that November 20-yr ILG yields were 3.41%, highlighting that recent data did not suggest a reversal of the post 2016 trend for divergence from the estimated equilibrium rate.<sup>2330</sup>
- 9.176 KPMG/Gregory (in evidence prepared for the CMA NATS/CAA appeal) stated that in addition to the Bank of England's  $R^*$  estimate, the CMA should look to evidence from US TIPS, which at the time of writing had remained slightly above zero over the last 10 years.
- 9.177 In a subsequent report commissioned by Anglian, KPMG/Gregory stated that the 'International Fisher Effect' suggests that long-run expectations for real interest rates in the UK will be influenced by those of other countries. Data from yields on US TIPS illustrates that rates on UK riskless assets (after adjusting for the different methods of indexation) are significantly beneath those of the US and therefore that they may be expected to rise over the long term. KPMG/Gregory noted that 70% of the common shares outstanding in the two major listed water companies were held by owners headquartered outside of the UK.
- 9.178 KPMG/Gregory also argued that potential drivers of divergence between US and UK government bond yields, such as changes to US monetary policy or the Brexit process, were exceptional events – the effects of which may be temporary in nature.
- 9.179 Ofgem provided further possible alternatives or cross checks for the RFR including: the 20-year ILG; the SONIA 20-year swap rate;<sup>2331</sup> the AAA non-gilt yield; and the 20-year Nominal Gilt. Ofgem stated that SONIA is the Bank of England's preferred measure of risk-free interest rates. Ofgem stated that a

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<sup>2330</sup> Ofwat's submission following the second main party hearings – risks and return, p55

<sup>2331</sup> SONIA is the Sterling Overnight Index Average. Further details can be found at the Bank of England's website [here](#).



20yr SONIA swap rate would provide a maturity equivalent rate to those being considered by the CMA. Ofgem stated that the July 2020 20yr SONIA swap rate was 0.45%, which equated to -1.52% using the CMA's 2% CPIH inflation assumption.<sup>2332</sup>

- 9.180 Professor Mason, an academic who was commissioned by Ofwat to provide evidence, stated that there were other proxies which may indicate what the convenience yield in more recent times and for the UK marks looks like. Mason stated that SONIA swap rates were very close to ILG yields, which may question the alleged size of any current convenience yield.
- 9.181 In relation to Ofgem's suggested use of SONIA swap rates, Oxera stated that a variety of swap-specific factors have been explored in the academic literature on negative swap rates, and that these swap-specific factors distort swap rates as a suitable proxy for the risk-free rate for use in the CAPM. Oxera stated that these effects are more pronounced for long-maturity swaps, and that (as suggested by the Bank of England) while SONIA rates are likely to be the superior short-term RFR in sterling markets, such data is unreliable over long horizons. Oxera further noted that the negative swap rate implies even lower yields based on 20-year SONIA swaps than for 20-year government bonds, when the latter are already biased downward due to the convenience premium. Oxera did not consider the 20-year SONIA swap rates, which are derivatives subject to capital market imperfection and supply-demand imbalances, to be the appropriate long-term RFR proxies for the CAPM.
- 9.182 In addition, KPMG noted that SONIA swaps are typically collateralised and the market rates quoted relied on this collateralisation to be as low as suggested. This collateralisation on the part of the borrower requires ongoing cash flows backward and forward to the value to the market of the swap. As a result, they are not a true risk-free borrowing rates for a long-run investment horizon.

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<sup>2332</sup> [Ofgem's response to the provisional findings](#), Table 1



## ***Submissions in favour of using alternative data as a proxy for the RFR – CMA assessment***

### ***Nominal Bonds***

- 9.183 After considering the evidence presented on the use of nominal bonds within the estimation of the RFR, we remain unconvinced that the use of nominal bonds is likely to materially improve our estimate.
- 9.184 We note that any assessment of ‘divergence’ between the price of ILGs and the price of deflated nominal bonds is intrinsically linked to the inflation assumption and liquidity premium that is used in the comparison. As we cannot exactly know the inflation assumptions used or liquidity premium required by market participants when pricing the two instruments, we do not believe that we can accurately assess the presence of any distortions to either price.
- 9.185 In addition, as deflated nominal government bonds are unlikely to have any features over and above ILGs that would allow them to better meet the desired characteristics of the RFR (as discussed in paragraph 9.91), but do have greater risks in terms of inflation risk, we do not believe that the inclusion of deflated nominal bonds is likely to materially improve our estimate of the RFR.

### ***Bank of England long-run equilibrium estimate ( $R^*$ )***

- 9.186 Addressing KPMG’s suggestion of including (or ‘gliding’ towards) the Bank of England’s  $R^*$  estimate of the UK’s long-run equilibrium interest rate, we note both the original estimate from August 2018 and KPMG’s subsequent update.<sup>2333</sup> As stated in the Provisional Findings, in considering both demographics and productivity trends, we consider the Bank of England’s  $R^*$  methodology to offer a useful and independent assessment of long-term interest rates.
- 9.187 However, we note the inherent uncertainties involved in creating the estimate and the significant uncertainty about the timeline of trend towards this rate. In addition, the updates to the model suggest a significantly lower (0.3% versus +0.5%) current estimate of  $R^*$ , and thus may actually suggest that this is a lagging rather than leading indicator of the market RFR. As a result, we do not consider this metric to be suitable either as a direct input or as a target for a ‘glide path’ to replace or replicate a forward rate adjustment.

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<sup>2333</sup> Bank of England (August 2018), [Inflation Report](#), pp 39–43, Box 6; Bank of England yield curve [data](#)

## Non-UK Government Bonds

- 9.188 In addressing the use of non-UK government bond yields, we acknowledge that US Treasury Inflation-Protected Securities currently offer higher yields than ILGs. However, we note that US Treasury Inflation-Protected Securities yields are negative at all durations. At the start of 2021, 20-year US TIPS traded at a yield of -0.63%.<sup>2334</sup>
- 9.189 We also note that, outside of the peak of the global financial crisis, UK bonds offered approximately a 0.50% higher yield than US bonds during the decade between 2004 and 2014. Following the period associated with the result of the Brexit referendum there was a significant shift to US bonds offering a higher yield, with the 'inflation adjusted' premium sitting at roughly 1.50% in recent years.<sup>2335</sup>
- 9.190 We remain reluctant to give significant weight to an expectation that purchasing power parity should lead real rates to equalise over the period of our price control. We note that real rates are likely to be a function of a complicated range of inputs, including domestic demographic trends and productivity growth. We also note that significant stock market outperformance by the US over the UK may also reflect differences in trend growth between the two countries.
- 9.191 At the last datapoints that we have, 39% of US government debt was held by foreign owners while 28.5% of UK gilts were held by foreign owners. The value of UK gilts in issuance has increased by approximately 250% since 2007 (pre-global financial crisis), while the share of foreign ownership has remained roughly flat at 28% (and is significantly higher than in the early 2000s).<sup>2336</sup> While there may be arguments for certain sovereign foreign investors to need to hold sterling assets for balance of payment reasons, international trade levels are unlikely to have increased by the same magnitude as the size of the gilt market over this period.<sup>2337</sup> Therefore, this data does not seem to suggest that (presumably rational) international investors see UK yields as distorted relative to other international yields (arbitrage theory suggesting that they would sell UK gilts and buy US Treasuries if so). The data also appears to imply that UK gilts may remain a

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<sup>2334</sup> US Department of the Treasury [website](#). Rates measured on 04/1/2021.

<sup>2335</sup> This is CMA analysis comparing historic 10- and 20-year maturity US Treasury Inflation-Protected Securities yields to UK 10 and 20yr ILG plus 100bps (as an approximate way to convert UK ILGs to a similar basis and US Treasury Inflation-Protected Securities). This is superficial analysis only, as inflation measures in the UK and US are not directly comparable and the traditional 100bps 'wedge' may not be a useful tool in this instance.

<sup>2336</sup> Congressional Research Service (2019), [Foreign Holdings of Federal Debt](#); HM Treasury (2020), [Debt Management Report 2020-21](#)

<sup>2337</sup> ONS [data](#) suggests that total UK imports were 46% higher in 2000 versus 2007, while imports were 37% higher (all measured in Dec 2020 prices).

suitable input into our estimation of the RFR, even for internationally mobile investors such as those invested in UK water companies.

- 9.192 We also acknowledge Europe Economics' evidence of negative policy rates from important international institutions such as the European central bank and individual countries such as Japan, Sweden and Switzerland (see paragraph 9.100), and note that there are a range of factors that can impact domestic lending and government bond rates. With US real rates now also having negative yields, we do not consider there to be strong evidence that UK rates are irrational or that our RFR estimate would benefit from factoring in international data.
- 9.193 We note that all parts of the cost of equity calculation could incorporate non-UK inputs. We could measure water company beta against a global index and measure the total market return of world markets rather than the total return of the UK market. However, in our view, the most appropriate approach in this case is to focus on pricing a UK asset (water sector equity) with pound sterling cashflows through the use of domestic, sterling denominated metrics. It is not clear to us that bringing in non-UK data would add significantly to the accuracy of our calculations, while the properly considered application of such an approach would likely bring its own complications. In our view, as overseas investors are already significant holders of UK water companies, UK equity and UK bonds, the views and needs of foreign investors are already sufficiently factored-in to UK asset prices. Companies in UK equity and debt markets also have significant international revenue streams, on average, further heightening the risks of increasing rather than decreasing inaccuracy if picking and choosing when international data should and should not be included in our calculations.

#### *SONIA swap rate*

- 9.194 We note the suggestion from Ofgem and Ofwat that we could use the SONIA swap rate as a cross check on our RFR estimate, and that such an approach would suggest that spot ILG yields are a good estimate of the RFR.
- 9.195 We note that the SONIA is the Bank of England's preferred benchmark for the transition to sterling risk-free rates from the previously used LIBOR index.<sup>2338</sup> In addition, we note arguments that SONIA swap rates are close to ILG rates, and that this may question the presence of any meaningful convenience yield in ILG rates.

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<sup>2338</sup> LIBOR is the London Inter-Bank Offered Rate, is an appropriately benchmark for short-term interest rates. For further details, please see the ICE website [here](#).

9.196 However, both SONIA and LIBOR are inherently short-term rates, while we are attempting to assess a long-term (20-year horizon) RFR of return. As noted by Oxera, swap (derivative) instruments that attempt to extend the horizon to longer periods appear to suffer from distortions (negative swap rates), which suggests that SONIA 20-year swaps may not be an appropriate benchmark for our purpose.

9.197 We also note KPMG's evidence that the long-term swap rates quoted by Ofgem are likely to require the posting of collateral, which again would make the suggested rates unsuitable for use in our CAPM. In our judgement, it is not sufficiently clear that SONIA swaps rates are a suitable input into or cross check for our long-term RFR estimate.

#### *Summary of alternative estimates*

9.198 In summary, we judge UK government ILGs and UK AAA non-government bonds to be the most appropriate inputs into our RFR estimate. We do not consider it to be useful or appropriate include other measures suggested by the Parties that have made representations during the redetermination.

#### ***Setting an appropriate estimate range***

9.199 After deciding on UK ILGs and UK AAA non-government debt indices as our preferred instruments to use as a guide when estimating the RFR, we must then consider the practicalities of setting an estimate range and point estimate. This requires:

- (a) considering the most appropriate way to measure these instruments; and
- (b) considering any appropriate adjustments to the current market price of these instruments; and
- (c) considering whether it is appropriate to favour the high or the low end of the range.

#### *Measurement of instruments*

##### *Arguments for a short-horizon average*

9.200 Ofwat used a month as an appropriate trailing average in order to mitigate temporary volatility. Ofwat submitted that longer-averages risk large gaps opening up between the trailing average of yields and recent evidence

provided by spot (current) rates.<sup>2339</sup> Ofwat stated that there was no evidence of mean-reversion to historical levels and offered the view from Brattle that the best predictor of future RFRs was the current yield and that longer averaging periods risk including out-of-date data that is not relevant to the future.<sup>2340</sup>

#### *Arguments for a longer-horizon average*

- 9.201 Anglian suggested that rather than consider an average over a defined period, Ofwat had effectively used the spot estimate from 30 September 2019 – a non-trivial change from previous regulatory practice. Anglian stated that Ofwat’s approach provided no allowance for the recent volatility in government bond yields.<sup>2341</sup>
- 9.202 Bristol stated that Ofwat’s chosen measurement period was a time where rates were volatile and in disequilibrium, as evidenced by the significant change in estimate between Ofwat’s draft determination (1.54% nominal) and Ofwat’s FD (0.58% nominal). Bristol stated that this approach risked setting a rate that was inappropriately low for the whole price control period.<sup>2342</sup>
- 9.203 Northumbrian submitted that Ofwat’s use of market yields from only September 2019 was not appropriate for estimating market conditions throughout the control period. Northumbrian accepted that the RFR could be determined at the time of a regulatory decision with ‘minimal error’, but submitted that a company’s investment decisions occur throughout the 5-year period, and that setting allowed returns based on spot rates on a particular day may lock in inappropriately low rates that ultimately impact investment decisions.<sup>2343</sup>
- 9.204 South East Water also agreed with the use of a longer trailing average.<sup>2344</sup>
- 9.205 KPMG flagged that UK market data movements led to a 0.93% change in Ofwat’s estimate between its draft and final determinations which is a significant movement over a 6-7-month period.

#### *Measurement of instruments – CMA assessment*

- 9.206 The Brattle report referenced by Ofwat (see paragraph 9.200) states that ‘in theory’ the most recent rate or yield available will give the best prediction of

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<sup>2339</sup> Ofwat (2019), [Allowed return on capital technical appendix](#), section 5.2.2

<sup>2340</sup> The Brattle Group (2016), [Review of approaches to estimate reasonable rate of return for investments in telecoms networks in regulatory proceedings and options for EU harmonization](#), section VI.A.4

<sup>2341</sup> [Anglian SoC](#), paragraphs 1142–1145

<sup>2342</sup> [Bristol SoC](#) paragraph 286

<sup>2343</sup> [Northumbrian SoC](#), paragraph 853

<sup>2344</sup> [South East Water’s response to the provisional findings](#), p9

the future rates. However, we also note that the report goes on to say that longer-term averaging is defensible from a policy perspective and that spot yields risk introducing an element of randomness and volatility into the WACC decision. Brattle further submits that using a longer-term average yield ‘smooths’ changes in the yields, makes the WACC less dependent on timing issues and means that changes in the WACC are easier to predict, which is itself desirable from the perspective of regulatory stability and minimisation of regulatory risk.

9.207 Based on Brattle’s analysis, the ‘error’ from stale data starts to increase at a greater rate when the averaging period exceeds one year, and that in their view a reasonable balance is for a regulator to set the RFR by taking an average yield over a period of up to one year.<sup>2345</sup>

9.208 We agree with the Disputing Companies and with the Brattle report that averaging periods that are too short risk the introduction of inappropriate levels of volatility into the estimation process. We acknowledge that Ofwat’s use of 1-month averaging attempts to address this issue but in our view this is potentially still too short to reasonably mitigate the risk of short-term market fluctuations. We consider that a 6-month period would provide a suitable balance of ensuring the use of up-to-date data while avoiding the issues of short-term market volatility. As a result, we adopt the approach of measuring average market data over a 6-month look back period.

### *Appropriate adjustments*

#### *Forward rate adjustments*

9.209 In Ofwat’s FD it adjusted its -2.61% estimate of the RFR for market-implied rate rises over RP3 of 0.26%, bringing its estimate to -2.35%.<sup>2346</sup> Ofwat’s consultants, Europe Economics, described this adjustment as using yields on different maturity gilts so as to estimate the forward rates for relevant length gilts, thus capturing the implied future yield on an investment made in a certain number of years’ time.<sup>2347</sup>

9.210 Following publication of the Provisional Findings, Ofwat noted that the CMA’s decision not to deploy forward rate adjustments was ‘logical and defensible’, being based on the principle that adjustments should be viewed with suspicion if there is no evidence that they improve forecast accuracy. Ofwat

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<sup>2345</sup> The Brattle Group (2016), [Review of approaches to estimate reasonable rate of return for investments in telecoms networks in regulatory proceedings and options for EU harmonization](#), pp41-43

<sup>2346</sup> Ofwat (2019), [PR19 final determinations: Aligning risk and return technical appendix](#), section 5.2.3

<sup>2347</sup> Europe Economics (2019), [The Cost of Capital for the Water Sector at PR19](#), section 3.4

stated that its use of a forward rate adjustment was in conjunction with a 1-month average ILG figure, and that this was not required given the CMA's 6-month average approach.<sup>2348</sup>

9.211 Anglian,<sup>2349</sup> Bristol,<sup>2350</sup> Northumbrian<sup>2351</sup> and Yorkshire<sup>2352</sup> argued that failure to apply a forward rate adjustment set the RFR at 'today's' rate and made no allowance for the possibility that the RFR might be expected to change over the course of the charge control.

9.212 Anglian<sup>2353</sup> and Bristol<sup>2354</sup> suggested two approaches to allowing for the evolution of market rates over the charge control:

- (a) First, a market driven approach which would involve implying a forward uplift; or
- (b) Second, the CMA could place weight on the Bank of England's estimate of the UK long-run equilibrium interest rate ( $R^*$ ), with the updated figure being -0.3%.

9.213 Northumbrian acknowledged that the analysis by CEPA suggests that forward rates have, at times, tended to overestimate future spot rates. However, Northumbrian stated that this does not mean that it is appropriate to discard forward rates altogether, and in doing so the CMA's actions may imply that:

- (a) The CMA has better information than the market regarding future spot rates; or
- (b) There is riskless arbitrage available in the market.

Northumbrian did not believe that either scenario was likely to be correct and suggested that the CMA's estimate should be uplifted for the average forward rate adjustment between 1 October 2019 and 31 March 2020, which was 26bps.<sup>2355</sup>

9.214 Yorkshire stated that the extra information that forward curves provide about the expected value of the return on riskless assets during AMP7 has worth and should not be discarded.<sup>2356</sup>

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<sup>2348</sup> Ofwat's reply to responses to the provisional findings – risk and return, p9

<sup>2349</sup> Anglian's response to the provisional findings, paragraphs 399–401

<sup>2350</sup> Bristol's response to the provisional findings, paragraph 63

<sup>2351</sup> Northumbrian's response to the provisional findings, section 7.2.2

<sup>2352</sup> Yorkshire's response to the provisional findings, p29

<sup>2353</sup> Anglian's response to the provisional findings, paragraphs 403–404

<sup>2354</sup> Bristol's response to the provisional findings, paragraph 63–65

<sup>2355</sup> Northumbrian's response to the provisional findings, section 7.2.2

<sup>2356</sup> Yorkshire's response to the provisional findings, p27



- 9.215 National Grid stated that the CMA was correct to propose a substantial revision to Ofwat's RFR, as the latter is demonstrably too low. However, it stated that the CMA had made two errors in its Provisional Findings when setting the RFR range: (a) the incorrect use of unadjusted government bond yields for the bottom end of the range; and (b) the unjustified decision not to apply a forward rate uplift to spot yields. It claimed that these errors artificially skewed the CMA's RFR range downwards, and therefore incorrectly reduced the CMA's proposed cost of equity.<sup>2357</sup>
- 9.216 Western Power Distribution agreed with the CMA's general approach, which is aligned with the submissions made by ENA. However, it submitted that the CMA appears to have stopped short of applying forward rate uplifts to spot risk-free rate estimates which it considered is merited on the basis of best practice corporate finance principles.<sup>2358</sup>
- 9.217 ENA argued absence of specific representations on the efficacy of a forward rate adjustment was not a basis on which to reverse Ofwat's decision, since Ofwat did use a forward rate adjustment in Ofwat's FD. ENA noted that the CMA's Approach Document made it clear that the CMA has only finite resources to undertake this redetermination and that it would prioritise issues raised by Main Parties and Third Parties. It said that it is likely that the absence of representations received by the CMA on the application of forward rate adjustment reflects broad agreement with the approach taken in Ofwat's FD, and cannot be used as a basis to reverse Ofwat's decision.<sup>2359</sup>
- 9.218 In a report for ENA, Oxera stated that: 'The academic literature has long considered forward rates as unbiased predictors of future spot rates. The forward rate fully reflects available information about the exchange rate expectations and has been viewed as an unbiased predictor of the future spot rate since at least in the theoretical work of Siegel (1972) and the empirical work by Edwards (1982, 1983), Kohlhagen (1975), Longworth (1981), and Cornell (1977).' Oxera recommended that a forward rate uplift of 26bps should be applied to both the bottom and top ends of the RFR range.

*A 'convenience yield'*

- 9.219 As discussed in paragraphs 9.81, Oxera's analysis suggested that ILG's may be too low to represent the 'true' RFR due to the presence of a 'convenience yield' associated with the special properties and potential uses for ILGs. Oxera recommended that an ILG-based RFR used in the calculation of

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<sup>2357</sup> [National Grid's response to the provisional findings](#), paragraphs 3.12–3.13

<sup>2358</sup> [Western Power Distribution's response to the provisional findings](#), p2

<sup>2359</sup> [ENA second submission](#), paragraphs 5.11–5.12



WACC should be adjusted upwards by 50-100bps to control for the yield impact of the convenience premium and the gap between corporate and sovereign 'risk free' financing rates.<sup>2360</sup>

- 9.220 ENA stated that the CMA's acknowledgement that 'analysis of the current and historic yields associated with these instruments demonstrates that the government can borrow at rates significantly lower than would be accessible by even the highest-rated private investor', meant that government bond yields cannot therefore meet the first requirement of the RFR as applied in the CAPM. Given this, it stated that the CMA was incorrect to use unadjusted government bond yields for the bottom end of the range for the RFR as this artificially reduced the bottom of the range and therefore erroneously reduced the CMA's cost of equity determination.<sup>2361</sup>
- 9.221 National Grid stated that the CMA's incorrect use of unadjusted government bond yields for the bottom end of the range artificially skewed the CMA's RFR range downwards.<sup>2362</sup>
- 9.222 Europe Economics submitted that it is not strictly necessary to consider how credible or otherwise a particular value (positive or negative) is for the RFR. The bond yield simply is what it is, and regulators do not need to defend it as being 'plausible' when it is at that level, because it is observably so and market prices imply that it is expected to remain so.
- 9.223 Wright and Mason disputed Oxera's arguments relating to a 'convenience premium' associated with ILGs, noting that this feature may apply at shorter horizons but not when an investor matches their investment horizon to the duration of the ILG.

#### *Risk premia in AAA bonds*

- 9.224 In analysis commissioned by Ofwat, Europe Economics set out some key issues arising with the AAA bond indices used by the CMA in its Provisional Findings:
- (a) Around 87% (by number) of the bonds from the 10+ index and all the bonds index 10-15 index are from the financial sector. So, not only are they exposed to financial sector-specific risk plus and debt beta for the financial sector, but also the scope for diversifying within AAA bonds to

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<sup>2360</sup> Oxera (2020), [Are sovereign yields the risk-free rate for the CAPM?](#) section 7, including Figure 7.1

<sup>2361</sup> ENA second submission, section 5

<sup>2362</sup> National Grid's response to the provisional findings, paragraphs 3.12–3.13

hedge this risk is limited. In the past, many financial sector AAA bonds have been significantly downgraded.

- (b) The bonds do not satisfy standard liquidity tests. For example, the bonds' bid-ask spreads are typically much higher than those of the comparable gilt benchmark – in most cases at least in the tens of basis points higher and in some cases hundreds of basis points higher. This creates transaction costs and liquidity risks that will clearly upwards-distort yields.<sup>2363</sup>

- 9.225 In response to arguments that the AAA non-government bond yields may suffer from distortions, Yorkshire stated that the prices of all traded assets are affected to some degree by market distortions. Yorkshire considered that the distortions affecting AAA non-government bonds are no greater than the distortions affecting government gilts. Yorkshire stated that regulators, including the CMA, have previously been hesitant to take readings from gilt markets due to the distorting influence of pension funding rules and the resulting inelastic demand for gilts from pension fund investors.<sup>2364</sup>
- 9.226 As noted in paragraph 9.137, Ofgem stated that the use of the AAA non-gilt bond index risked introducing new inaccuracies in an attempt to correct the factors that Oxera suggested may make the market yield of the 20year ILG too low (but admitted that by how much was unquantifiable). Ofgem stated it would expect these AAA non-gilt bonds to be quite illiquid and contain some element of default risk. Ofwat stated that these factors could contribute towards higher yields, and more so than ILGs being depressed by a convenience yield.
- 9.227 Oxera suggested that Ofwat's practical concerns regarding the liquidity and risk premiums present in AAA bonds could be addressed by the application of two separate adjustments. Oxera estimated that a suitable liquidity premium would be 13bps (see paragraph 9.110) and also estimated a downward adjustment of 13bps for expected loss on AAA yields over a long-term investment horizon (based on the rounded midpoint of an estimate range of 5-20bps). In addition, Oxera recommended addressing inflation risk premium by deflating nominal bonds by the breakeven inflation rates implied by the Bank of England published yield curve.

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<sup>2363</sup> Europe Economics (2020), [Reponses to the CMA's Provisional Findings regarding WACC in the Water Appeals](#), section 1.4.3

<sup>2364</sup> [Yorkshire's reply to responses to the provisional findings](#), p63

*Forward rate adjustments*

- 9.228 We acknowledge that it has become convention (when using market data as the basis for the RFR estimate) to adjust this figure to reflect rate increases that are anticipated through the price control period. The forward curve is typically used to calculate this increase, or it can equivalently be found using the ‘expectation hypothesis’ calculation as deployed by Europe Economics.<sup>2365</sup> However, we note analysis by CEPA for Ofwat and the Civil Aviation Authority which demonstrates a distinctly poor relationship between forward curves and future spot rates.<sup>2366</sup>
- 9.229 We acknowledge the theoretical underpinnings of the forward rate adjustment. However, we disagree with Oxera’s assessment that the academic research it cites fully supports the use of forward rates as effective predictors of future spot rates. For example, we note that Siegel’s 1972 paper concludes:
- ...even for the special case of risk neutrality, the forward price of a currency does not bear a simple relationship to the expected future spot price. Fuller analysis would have to take into account not only the risk preferences (utility functions) of individuals, but the correlation of the price of foreign exchange with other assets in an economy.<sup>2367</sup>
- 9.230 In addition, while Kohlhagen (1975) argues that ‘the forward rate has been an unbiased predictor of the future spot rate for the floating rate period’,<sup>2368</sup> and Cornell (1977) indicates that ‘the forward rate can be used as a proxy of the market’s expectations’,<sup>2369</sup> these statements appear to focus on whether forward rates represent unbiased expectations, not whether these expectations have any predictive power in relation to future spot rates.
- 9.231 Rather, Edwards (1983) notes, ‘The empirical analysis indicates that “new information” plays an important role in explaining the market forecasting error,

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<sup>2365</sup> The expectation hypothesis suggests that future interest rates can be calculated from current yields (interest rates) at relevant maturities. In a simple example, to estimate the 1-year spot rate in 1 years’ time, we would note the return available from a 1-year bond bought today and held to maturity, and calculate what interest rate this would have to be reinvested at in 1-years’ time in order to match the total return from a two-year bond bought today and held to maturity.

<sup>2366</sup> CEPA (2016), [Alternative approaches to setting the cost of debt for PR19 and H7 for Ofwat and the Civil Aviation Authority](#), section 4.1.1 including Figure 4.1

<sup>2367</sup> Siegel, J (1972), ‘Risk, Interest Rates and the Forward Exchange’, *The Quarterly Journal of Economics*, pp303–309.

<sup>2368</sup> Kohlhagen, S (1975), ‘The Performance of the Foreign Exchange Markets: 1971–1974’, *Journal of International Business Studies*, pp33–39

<sup>2369</sup> Cornell, B (1977), ‘Spot rates, forward rates and exchange market efficiency’, *Journal of Financial Economics*, pp55–65

or difference between the spot rate and the forward rate'.<sup>2370</sup> The practical implication of this can perhaps be summarised by Longworth (1981), who noted in their study that 'For almost every year the current spot rate provided a better forecast of the future spot rate than did the current forward rate.'<sup>2371</sup>

- 9.232 The dynamic noted by Longworth closely matches the contemporary analysis by CEPA (see paragraph 9.228), which suggests to us that current spot rates have been more accurate predictors of future spot rates than the forward curve, and that the use of a typically upwards sloping forward curve has led to unnecessary upward adjustments throughout what is now decades of generally falling rates.
- 9.233 We observe that there is a long history of regulators (including the CMA) using forward rate adjustments. However, in a similar approach to the UKRN's 2018 reassessment of large 'dragging anchor' upward adjustments to RFR estimates, we take this opportunity to reassess and update the historic approach to the use of forward rate adjustments.
- 9.234 On the basis of the evidence above, we consider forward rates do not offer a better assessment of future spot rates than current spot rates. In fact, the evidence suggests that in subsequently flat or falling markets they are likely to give an actively misleading input into any estimate. As such, we now consider that until evidence to the contrary is presented, it would not be appropriate to use forward rate adjustments in our estimates.

#### *Convenience yield adjustments*

- 9.235 When considering the need to add a convenience yield to ILGs, it is important to ensure that we do not apply an inappropriate double correction. It would seem that if we consider that ILGs are as close to risk free as possible, but that their yields likely sit below the market's 'true' RFR due to special uses and properties of ILGs, we could base our estimate on either an uplift to yields or the introduction of a range.
- 9.236 If we were to uplift yields to compensate for a convenience yield and then pick a number from a range, this would potentially lead to an overestimation of the RFR. As a result, and as outlined in our Provisional Findings, we do not apply any adjustment to the ILG yield that forms the lower bound of our estimate range.

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<sup>2370</sup> Edwards, S (1983), 'Floating exchange rates, expectations and new information', *Journal of Monetary Economics*, pp321–336

<sup>2371</sup> Longworth, D (1981), 'Testing the Efficiency of the Canadian-US Exchange Market under the Assumption of no Risk Premium', *The Journal of Finance*, pp43–49

### *Risk premia in AAA bonds*

- 9.237 The decision on whether to adjust AAA bonds appears slightly more nuanced. One option would be to take the same approach as described immediately above, and state that in picking from a range bounded at the top by the yield on AAA bonds – we are implicitly adjusting our estimate downwards.
- 9.238 An alternative view would be to acknowledge that AAA bonds are likely to have more easily recognisable risk premia embedded in yields. AAA corporate debt may reasonably be considered higher risk than debt issued by a sovereign borrowing in its own currency, despite the higher credit rating (the UK is ‘only’ AA-rated). Oxera’s estimates of 13bps for expected losses is a little higher than the 1981-2019 experience as noted by S&P Global (see paragraph 9.147), while the 13bps adjustment for liquidity risk also seems broadly reasonable.
- 9.239 We acknowledge the likely presence of both credit and liquidity premia in the market price of AAA bond indices. In our view AAA yields are a close but imperfect approximation of the market RFR, and consider the ‘true’ rate as likely to be below the level implied by AAA yields. As with ILGs, in setting AAA yields as the edge of the range, we are making a downward adjustment when picking any estimate other than the 100<sup>th</sup> percentile of the range. As with ILG yields, we consider that adjusting market yields and then picking from a range would logically risk a double-count of the required adjustment.
- 9.240 As we are setting a rate that is suitable for the whole price control, we continue to consider that it is most appropriate to use our long-term 2% CPIH inflation assumption when converting nominal yields to real for the purposes of this determination. This is in line with using our RPI-wedge assumption in order to inflation ILGs.

### ***Setting the RFR range***

- 9.241 On the basis of the decisions noted above, we set the bottom of the RFR estimate range as the 6-month average of the UK 20-yr ILG. We set the top of the range as the 6-month average of the IHS iBoxx £ Non-Gilt AAA 10+ and 10-15 indices.

- 9.242 The 6-month average to end December 2020 of the UK 20-yr ILG is -2.50%.<sup>2372</sup> Inflating this number from RPI-real to CPIH-real by our 0.90% 'wedge' assumption suggests an updated CPIH-real estimate of -1.63%.
- 9.243 The 6-month average to end December 2020 of the IHS iBoxx £ Non-Gilt AAA 10+ is and 10-15 indices is 0.93%. Deflating this number from nominal to CPIH-real by our 2% inflation assumption suggests a CPIH-real estimate of -1.05%
- 9.244 The midpoint of the range suggested by these two instruments would be -1.34%.

***Picking a point estimate from within the range***

- 9.245 We note the discussion (see paragraphs 9.93) on CAPM that include the presence of differing 'risk-free' borrowing and lending rates for leveraged market participants, and the implication that the market RFR was likely to sit between such rates.
- 9.246 There have been extensive submissions on the nature of the CAPM and the relevant marginal investor. Some submitted that the marginal investor must be a net lender, so the ILG end of our estimate range would provide the most appropriate estimate of the RFR for our CAPM. Those who disagreed with this view generally suggested that either it was not clear whether the marginal investor was a borrower or a lender, or that this distinction was either not necessary or not appropriate when using the CAPM to estimate the cost of equity.

***Arguments that the marginal investor is a net lender***

- 9.247 Ofwat stated that the CMA should not place any weight on metrics other than ILGs because:<sup>2373</sup>
- (a) By design, the regulatory determination requires that we set an allowed equity return that is reasonable for an equity investor in the sector and, as such, the marginal investor is a lender, not a borrower; and

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<sup>2372</sup> Our estimate of -2.50% is the average of the daily 20yr ILG yield between 1 July 2020 to 31 December 2020. The approach adopted in the Provisional Findings labelled the estimate as a 180 days (6 months) average. Upon further consideration, this description and approach is misleading. 180 days of trading data is actually significantly longer than 6 calendar months. The methodology used in this final determination is a more accurate interpretation of our view that 6-months of data is an appropriate average in order to mitigate the potential for short-term market volatility.

<sup>2373</sup> [Ofwat's reply to responses to the provisional findings – risk and return](#), paragraph 5.16

(b) The practical application of the CAPM does not require that all participants must be able to issue debt at the chosen RFR.

- 9.248 Wright and Mason addressed KPMG's arguments that the relevant marginal investor related to the market portfolio rather than the particular stock being priced. Wright and Mason noted that there was some agreement within this argument that it is the marginal investor that matters in the CAPM. As a result, they questioned the CMA's criterion that the RFR used should be available to 'all (relevant) market participants' unless the qualifier 'relevant' takes a very specific meaning. Wright and Mason stated that the relevant market participant is the marginal investor.
- 9.249 Wright and Mason stated that there also seemed to be some agreement that if borrowing and lending rates are assumed to be different, then a distinction needs to be drawn between the marginal and the average investor. This distinction does not arise in the standard implementation of the CAPM, in which there is no distinction between borrowing and lending rates.
- 9.250 Wright and Mason argued that attempting to distinguish between the marginal investor in the market and the marginal investor in a UK water company was 'something of a red herring'. They argued that in Brennan's model essentially all investors are marginal in the sense that each investor optimises its portfolio at the margin to maximise its risk-adjusted expected rate of return. Wright and Mason stated that it is this modelling feature that leads Brennan to define the market-equivalent RFR as a weighted average of the various borrowing and lending rates faced by the different investors. Interpreting Brennan's model strictly, there is no single marginal investor.
- 9.251 However, Wright and Mason argued that, in practice, it is the investor who is most likely to be trading actively at the margin, and therefore who has the most influence on price, that matters. Wright and Masons stated that this is not strictly in accordance with the CAPM theory, but it is a commonly-accepted principle when applying the theory. Wright and Mason cite Damodaran (2011) as an example of this.
- 9.252 Europe Economics stated that even if 'capital' is considered as a single aggregate across the economy, it is by no means obvious that the state is not the marginal investor in 'capital' as a whole, for the economy as a whole, under the macroeconomic conditions that have prevailed in recent years. Europe Economics stated that at various points in recent years the Federal Reserve's policy had been explicit in seeking to shift capital market yields across a range of capital assets (not simply government bonds) – and thus was acting as the marginal agent. Europe Economics stated that policy in the UK has not, in the main, had that goal as explicitly, but both the Bank of

England (in respect of quantitative easing) and the UK government (in respect of borrowing) appear to respond to market signals, in terms of bond yields, in determining their financial policies. Europe Economics stated that the aspiration to act as the marginal investor can be seen as one characterisation of macroeconomic demand management via fiscal policy.

- 9.253 Europe Economics stated that given the incomplete nature of the theoretical case upon which the use of AAA corporate bonds lies and the weaknesses in the specific AAA corporate bonds available, it suggests that even if AAA corporate yields feature in the RFR range they should not be considered as having equal weight with government bonds - as the CMA's Provisional Findings 'aiming-up'<sup>2374</sup> methodology gives them even before 'aiming-up' (and after 'aiming-up' these bonds de facto carry much more than equal weight). Europe Economics stated that government bonds were clearly a superior evidence point (even if they are imperfect) and as such should carry materially greater weight.<sup>2375</sup>
- 9.254 Ofgem did not consider it appropriate to distinguish between lending and borrowing rates for CAPM without also considering whether marginal investors in regulated utility companies are net lenders or net borrowers. Its analysis of the investors in the Disputing Companies was that they are institutional investors, investing on behalf of pension funds and other long-term investors. Assuming these institutions represent the marginal investor, they are therefore effectively lenders for whom the ILG rate is the most appropriate RFR.<sup>2376</sup>

*Arguments against the marginal investor being strictly a net lender*

- 9.255 Anglian suggested that Ofwat's claim that the RFR should be close to the ILG rate based on marginal investors is a surprising assertion with no theoretical foundation. Anglian stated that the theoretical literature on the CAPM suggests that RFR should be based upon the marginal investor in the market portfolio, not the identity of the marginal investor for the partial asset being priced.
- 9.256 Anglian stated that Ofwat's claim that placing significant weight on AAA-rated bonds in its calculation of the RFR is unprecedented in the UK is misleading. Anglian said that Ofwat had ignored the fact that the reason why evidence on AAA-rated bonds is required to assess the RFR in the CAPM is that Ofwat

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<sup>2374</sup> 'Aiming-up' refers to the practice of picking a point estimate above the midpoint, either at the WACC metric level or at an overall level. We discuss this further from paragraph 9.1226.

<sup>2375</sup> Europe Economics (2020), [Reponses to the CMA's Provisional Findings regarding WACC in the Water Appeals](#), section 1.4.4

<sup>2376</sup> [Ofgem submission](#), paragraph 20



itself made a significant change in methodology at PR19 by following the recommendation in the UKRN report to use spot rates on ILGs as a proxy for the RFR. This change was the significant departure from the standard UK regulatory practice of adopting headroom over the ILGs rate. Furthermore, Anglian stated that nothing in CAPM theory or empirical evidence states that the RFR should be based on spot rates of ILGs. Anglian said that recognising a headroom over spot rates is a standard and appropriate practice in regulation.<sup>2377</sup>

- 9.257 A report for Bristol by KPMG and Northumbrian<sup>2378</sup> also quoted from the Brennan paper highlighted by Wright and Mason, but suggested that this implies that Brennan's paper consistently considered the RFR on the market portfolio and not the RFR for investors in individual stocks

Thus the only difference in the market equilibrium condition introduced by divergence of borrowing and lending rates is that the intercept of the capital market line is shifted. This intercept represents the expected rate of return on a security with a return which has zero covariance with the return on a value-weighted market portfolio of all securities and may be referred to as the market's equivalent risk-free rate.

It is apparent...that this market equivalent risk-free rate of interest is a weighted average of the individual investor's equivalent risk-free rates...Thus the market equivalent risk-free rate is constrained to lie between the borrowing rate  $b$  and the lending rate  $l$ .

- 9.258 Yorkshire stated that CAPM is a market equilibrium model and that Ofwat, and Wright and Mason, have made a fundamental error in preoccupying themselves with the identity of the marginal investor in water companies when CAPM actually seeks to explain portfolio allocation choices made by a marginal investor that invests across the whole universe of available investment opportunities. Yorkshire stated that Ofwat's speculation on the question of whether water companies are net lenders or net borrowers was therefore irrelevant. Yorkshire stated that the appropriate question is whether the marginal stock market investor is a net lender or a net borrower? Since it is impossible to answer this with any certainty, Yorkshire considered that the CMA should construct a range for the RFR that gives recognition to both gilt and AAA non-government yields.

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<sup>2377</sup> [Anglian's reply to responses to the provisional findings](#), paragraphs 83–84

<sup>2378</sup> [Northumbrian's response to the provisional findings](#), section 1.3.2

9.259 Oxera, in a report for ENA, stated that Berk and DeMarzo's work suggested that the capital market equilibrium should take into account all savers and borrowers, and not just the marginal investor in the water sector. Oxera also reference Brennan and conclude that the RFR at the market equilibrium depends on the proportion of savers and borrowers in the economy, not on the risk-free borrowing or lending rates of the marginal investors in a particular sector.

*Picking from the range – CMA assessment*

9.260 In considering the arguments above, it is apparent once again that the CAPM is a simple model used extensively and interpreted differently by various academic and practitioners.

9.261 In arguing that the marginal investor is a lender, Wright and Mason acknowledge that in Brennan's model essentially all investors are marginal and that the market rate is thus defined as a weighted average of the various borrowing and lending rates faced by the different investors. They also note that it is commonly accepted that the investor who is most likely to be trading actively at the margin matters most, but that this is not strictly in accordance with the CAPM theory.

9.262 If there are commonly acknowledged variations between standard investment practice and strict theory, we do not consider any party can claim to know the definitively correct approach that the CMA must take. As with all elements of the cost of capital, the CMA must weigh the available evidence and apply judgement when deciding upon its approach.

9.263 We consider that our interpretation of the CAPM in a situation of different borrowing and lending rates takes account of both investment practice and academic research, and is in principle in line with Brennan's (1971) often quoted finding that the market equivalent RFR is a weighted average of the RFR of all individual investors. We acknowledge that we have not tried to undertake the exercise of assessing all investor borrowing and lending rates, or the precise balance of current and potential borrowers and lenders, in our target market. We consider that such an exercise would be impractical within a redetermination process. Rather, we have applied a highly-simplified but, in our opinion, reasonable assumption that we can gain sufficient insight into the market RFR by assessing the likely RFR of interest applicable to two appropriate market participants: 1) the government and 2) the highest rated (lowest cost) nongovernment borrowers.

9.264 We note that evidence provided on both the presence of a convenience yield within ILG yields and on market RFRs with different borrowing and lending

rates suggest that the appropriate RFR for our CAPM is likely to sit above the ILG yield. On this basis of this evidence, we consider it unlikely that the yield on ILGs is a perfect representation of a theoretical RFR (or the average market participant rate in the Brennan approach). We consider that, on balance, it is likely that the RFR appropriate for a range of relevant investors sits above the return available from ILGs, but below the level suggested by the return on AAA bonds.

9.265 In this determination we are required to identify a single cost of capital assumption as a fair return on water assets. We do not consider it is clear that defining the marginal investor (or the balance of marginal investors) is necessary, or in more practical terms would likely provide anything more than a spuriously accurate estimate of the RFR. As a result, we continue to believe that the midpoint of our 'ILG – AAA' range (-1.34%) presents a reasonable estimation of the market RFR.

### ***RFR – CMA assessment***

9.266 Based on the analysis above, our RFR range and point estimate decisions are shown in Table 9-2.

**Table 9-2: Summary of RFR range and midpoint**

<i>CPI-real</i>	<i>Low Estimate</i>	<i>Midpoint</i>	<i>High Estimate</i>	<i>Ofwat PR19 FD</i>
RFR	-1.63%	-1.34%	-1.05%	-1.39%

Source: CMA Analysis and Ofwat PR19 final determination

## **Total Market Return**

### ***Introduction***

9.267 The TMR is the total return that investors require for investing in a diversified basket of equities. It is the sum of the RFR and the equity risk premium (ERP), which is the part of this return that compensates investors for the additional risk associated with investing in equities, rather than in risk-free assets. The risk-free rate and resultant ERP are inputs to the CAPM formula in the calculation of cost of equity. Hence, its calculation impacts the WACC.

9.268 There is no universally accepted method for deriving the TMR, because it is concerned with investors' ex-ante expectations of returns, which are largely unobservable. The academic literature on the subject is large and can be categorised into three types:

- (a) studies that assume that historical realised returns are equal to investors' expectations (so-called 'historical ex-post' approaches);

- (b) studies that fit models of stock returns to historical data to separate out ex-ante expectations from ex-post good or bad fortune (so-called ‘historical ex-ante approaches’); and
- (c) studies that use current market prices and surveys of market participants to derive current forward-looking expectations (so-called ‘forward-looking approaches’).

### **Ofwat’s PR19 Decision<sup>2379</sup>**

9.269 In coming to its final determination of a TMR of 6.5% in CPIH terms, Ofwat took into account evidence from all three potential approaches (historic ex-post, historic ex-ante, and forward-looking).

9.270 In terms of the historic ex-post approach, Ofwat used the Bank of England’s composite historical CPI series to deflate long-run nominal returns (as sourced from the 2019 Credit Suisse Global Investment Returns Yearbook<sup>2380</sup>) into real-terms equivalents, giving a TMR of 6.5 to 6.6% (CPIH). Ofwat assumed a holding period of between 5 and 10 years and placed most weight on two averaging approaches:

- (a) the Jacquier, Kane and Marcus (JKM) estimator, a holding period-weighted average of geometric and arithmetic averages, which is designed to minimise mean-squared error when forecasting future returns based on their historical distribution; and
- (b) adjusting the whole-period geometric average return for the UK for different holding periods and serial correlation. This follows the UKRN’s recommended approach to assessing the TMR for regulatory purposes. The size of the adjustment was based on PwC’s analysis for the CAA<sup>2381</sup>.

9.271 ‘Ex-ante’ analysis for final determinations indicated a range of 5.6% to 6.6%, based on Ofwat’s own Fama & French-style Dividend Growth Model and the 2019 Yearbook’s ‘decompositional approach’<sup>2382</sup>, which seeks to adjust the historic world return for ‘good luck’ or ‘bad luck’ and unrepeatable events.

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<sup>2379</sup> Ofwat (2019), *PR19 final determinations: Allowed return on capital technical appendix*, Section 5.3

<sup>2380</sup> Dimson, E, Marsh, P and Staunton, M (2019), ‘*Credit Suisse Global Investment Returns Yearbook 2019*’, Credit Suisse, February 2019

<sup>2381</sup> PwC Economics (2019), *Estimating the cost of capital for H7 and PR3* - Response to stakeholder views on total market return and debt beta: A report prepared for the Civil Aviation Authority (CAA)

<sup>2382</sup> Dimson, E, Marsh, P and Staunton, M (2019), ‘*Credit Suisse Global Investment Returns Yearbook 2019*’, p37

9.272 'Forward-looking' analysis for final determinations was based on multi-stage<sup>2383</sup> dividend discount model (DDM) outputs from PwC and EE,<sup>2384</sup> as well as estimates of TMR expectations from nine finance practitioners and analysis of Market-to-Asset Ratios covering the period March 2016 – March 2017. Ofwat concluded that, on the basis of this forward-looking evidence, an appropriate range for the TMR was between 6.0% and 6.8%.

9.273 Ofwat noted that the area of overlap from these approaches lay in the range 6.5% to 6.6% in CPIH terms, from which it picked a point estimate of 6.5%.

### ***Key arguments***

9.274 In this section we consider the evidence available under each of the three approaches to estimating the TMR set out in paragraph 9.268 above.

9.275 Parties presented arguments in several areas relating to estimating the TMR, including:

- (a) the relevant time period and data set from which to draw historic returns information;
- (b) the appropriate inflation series to use when deflating historic nominal returns in order to identify historical real returns;
- (c) the approach used to average historic returns; and
- (d) the balance of the forward-looking evidence available to Ofwat.

We consider each of these arguments (as relevant) in our discussion of each of the three potential approaches for estimating the TMR.

9.276 Throughout our analysis, we have stated whether the figures derived are 'RPI-real' or 'CPI-real'. In making our overall assessment, we have used the RPI-real figures and then converted our chosen range to CPIH for inclusion in our overall cost of capital calculation.

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<sup>2383</sup> Multi-stage refers to there being a different dividend growth assumption for short term and long-term projected returns.

<sup>2384</sup> The models used to inform these ranges variously used income yield growth (ie average yield including both dividends and buybacks) as well as (UK) GDP growth to inform estimates of TMR.

## ***Historic ‘ex-post’ approach***

### ***Choice of time period and dataset***

- 9.277 The historic ex-post approach is based on the assumption that expected (real) returns remain constant over time and that historic returns provide a reliable indicator of expected returns in the future. Therefore, in order to estimate the TMR, in our provisional findings we drew on the Dimson, Marsh and Staunton (DMS) 2020 dataset<sup>2385</sup>, which spans 1900 to 2019 inclusive.
- 9.278 We received submissions from both Citizens Advice and ENA regarding our choice of the DMS returns dataset as the basis for our historic analysis.
- 9.279 Citizens Advice<sup>2386</sup> told us that to be fully consistent with the CAPM, the TMR should not just be based on the average returns on UK equities, but on the average returns on a wider and more diversified asset portfolio, including bonds, property, infrastructure, private equity, and other such assets that are readily available to the typical investors in UK water companies.
- 9.280 Citizens Advice referred to the research of economist Thomas Piketty<sup>2387</sup>, who finds that the real return on capital across a diversified portfolio of assets is currently in the range of 3 to 4%. Citizens Advice suggested that this figure was more appropriate both because it was based on a diversified portfolio of assets and because it was based on data drawn from a much longer time period – 1770 to 2010 – than the CMA’s analysis (which was based on the 1900 to 2019 period).
- 9.281 On this basis, Citizens Advice argued that Ofwat’s TMR of 6.50% (real-CPIH basis) and 5.47% (real RPI basis) is too high, and should be closer to 4%. This would result in a reduction of the allowed water company cost of capital of 0.4% to 0.7%.
- 9.282 In contrast, ENA told us that National Grid’s report<sup>2388</sup> provides evidence that the use of the DMS dataset results in a downwards biased TMR range as a result of the 1900 starting point of that dataset. ENA explains that there is nothing special about 1900 as a starting point and that the use of an earlier or later starting date generally leads to higher values of realised average (real)

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<sup>2385</sup> E. Dimson, P. Marsh, M. Staunton (2019), ‘[Credit Suisse Global Investment Returns Yearbook 2019](#)’

<sup>2386</sup> [Citizens Advice’s response to the provisional findings](#), Annex B, section on Total Market Return.

<sup>2387</sup> Piketty, Thomas (2013), *Capital in the 21st century*, section entitled The Return on Capital in Historical Perspective

<sup>2388</sup> National Grid (2020), [Total Market Return: The consistency of long-run CPI and RPI inflation series in the UK, and their relative suitability for use in calculating the actual historic long-run average equity market return in the UK on a ‘real’ basis](#)

return. Furthermore, the DMS dataset for the period 1900-1950 is based on the returns for only the 100 largest companies each year (FTSE 100). This will underestimate the average realised return for the UK equity market (TMR) as larger companies tend to have lower returns than small companies.<sup>2389</sup>

9.283 We considered both of these submissions. While we agree, in principle, with Citizens Advice that the relevant return under the CAPM is that on the whole portfolio of investible assets, we do not find their proposed approach to be practicable or robust. First, we note that Piketty's data and analysis is contested<sup>2390</sup> and has necessarily been assembled from a broad range of historical sources, some of which are incomplete. Second, an approach which used Piketty's dataset of returns would also need to use the same returns information in order to calculate beta. However, for other asset classes (ie not equities), there simply does not exist the granularity of data to undertake such beta calculations.<sup>2391</sup> Further, we are not persuaded that it would be robust, as Citizens Advice suggests,<sup>2392</sup> to use our (existing) beta estimates derived from equity market returns with Piketty's estimates of returns derived from a broader portfolio of assets. We do not agree that betas derived from a broader asset portfolio would necessarily be lower than those derived from stock market return data since the actual impact on water company beta estimates would depend on the extent to which returns on non-equity assets were correlated with the returns on equity assets. For some types of assets, eg bonds, their returns may exhibit a low/inverse correlation with stocks, but for other asset classes, such as property, this may not be the case. In the absence of more robust evidence in this respect, we believe it is more appropriate to maintain the existing, established approach of using equity market returns and betas to calibrate the CAPM.

9.284 Finally, we considered ENA's submissions regarding the 1900 start point and the composition of the DMS dataset for the period 1900 to 1950. We recognise that choosing an alternative start date and/or a different composition might yield different returns, although as the above discussion highlights, there are significantly different estimates of the likely impact of doing this. However, we consider the DMS data set to be the most robust and

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<sup>2389</sup> [ENA third submission](#), paragraph 2.28

<sup>2390</sup> For example, see: [Piketty defends best-selling book from criticism | Financial Times \(ft.com\)](#)

<sup>2391</sup> For example, we are not aware of any data sources that provide information on returns on assets such as agricultural land, buildings, infrastructure etc on a daily, weekly or monthly basis in order to allow for the estimation of betas for these assets.

<sup>2392</sup> Citizens Advice states that: "...estimation of water company betas with respect to UK equities alone is likely to result in overestimation of the relevant non-diversifiable risk. This is because the risk associated [with] equities – assumed by the UKRN report as having a beta of 1 – itself represents a diversifiable risk, especially from the perspective of highly sophisticated global investors. Hence, water company betas estimated with respect to UK equities should represent at most an upper bound estimate." [Citizens Advice's response to the provisional findings](#), p28.

widely-used source of information on market returns. We believe that it is appropriate to use the longest available dataset that is also robust. Therefore, we have chosen to continue to use the full DMS dataset (from 1900 to 2019) as the basis of our analysis.

### *Methodological considerations*

9.285 When considering historic evidence on returns, there are two key methodological considerations:

- (a) how to control for inflation when seeking to identify expected real returns; and
- (b) the appropriate averaging method – arithmetic or geometric – and the relevant time period over which to consider returns. This is often also called the holding period, ie the period investors would hold equity in the firm.

We consider each of these methodological issues in turn.

### *Deflating historic returns – choice of inflation series*

#### *Parties' views:*

9.286 Ofwat explained that it had chosen to use the Bank of England's CPI series, which combines actual CPI data from 1988 onwards, with 'backcast' (or estimated) CPI data between 1948 and 1987, and the implied consumption expenditure deflator (CED) prior to 1948, to deflate historical returns. It did this because it considered that changes in the composition and measurement of RPI over time have caused latter-day RPI to be structurally higher than in historical periods due to the higher RPI 'formula effect'. This makes using unadjusted historical RPI-deflated returns an unreliable guide to prospective RPI-deflated returns required by investors. As a result, Ofwat considered that the Bank of England's CPI series (which does not suffer from this problem) is a better index to use. Ofwat noted that the Bank of England's CPI and RPI series use the same underlying series between 1914 and 1947 – the implied consumption expenditure deflator. It found this approach to be justified as the only alternative series available for this period (the Cost of Living Index, 'COLI') is clearly rated as lower quality by the Office for National Statistics.<sup>2393</sup>

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<sup>2393</sup> [Ofwat's further submission on cross-cutting issues in companies' responses](#), paragraph 5.36



9.287 Anglian,<sup>2394</sup> Bristol,<sup>2395</sup> Northumbrian,<sup>2396</sup> and Yorkshire,<sup>2397</sup> as well as Third Parties (Energy Networks Association and Heathrow Airport Limited),<sup>2398</sup> disagreed with this approach submitting (variously) that:

- (a) Ofwat should have either focussed primarily on RPI inflation, or should at least have also considered RPI-deflated returns alongside CPI-deflated returns, in coming to a view on TMR expectations for the following reasons:
- (i) RPI was the actual measure of inflation that was being collected and reported as the official rate of inflation and acted on by investors. If reported inflation had been measured differently in the past, it is possible that investors may have made different asset allocation decisions, which in turn could have impacted returns. Hence, for internal consistency the most appropriate inflation series to use is the one that was the reported National Statistic for the longest part of the historical period.
  - (ii) RPI is available for the longest part of the period, in the form of reported, actual data and, as a result, it does not have to be estimated using data and assumptions made today. The RPI series is therefore not as heavily influenced by practitioner assumptions, current day data inadequacies and possible hindsight bias in interpretation.
  - (iii) It is not clear, when considering the full time period of the RPI series, to what extent the increase in the formula effect in 2010 makes RPI an inconsistent measure as there may be other, offsetting biases, in earlier historic data.<sup>2399</sup>
  - (iv) The CPI data used for the period 1947 to 1987 is uncertain as it is modelled rather than actual data<sup>2400</sup> and, as such does not meet the

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<sup>2394</sup> [Anglian SoC](#), pp253-260

<sup>2395</sup> [Bristol SoC](#), section 8.1

<sup>2396</sup> [Northumbrian SoC](#), section 8.8

<sup>2397</sup> [Yorkshire submission](#) (NATS/CAA appeal), April 2020. This evidence was resubmitted to the CMA for consideration in the context of the PR19 price redeterminations.

<sup>2398</sup> [ENA submission](#) (NATS/CAA appeal) and [Heathrow Airport Limited submission](#) (NATS/CAA appeal), April 2020. This evidence was resubmitted to the CMA for consideration in the context of the PR19 price redeterminations.

<sup>2399</sup> Heathrow submitted analysis by Oxera which sought to control for structural breaks in the RPI series over the period from 1990 onwards. Oxera concluded that the maximum upward adjustment that would be required to make the long-run average of historical RPI inflation consistent with how RPI is calculated today was 30bps. Moreover, under some specifications of the structural break test, the net effect of all the changes was zero, implying that no adjustment should be made to the long-run average of RPI inflation. In other words, the long-run average of RPI inflation could be used to deflate the long-run average equity return without making any further adjustments for the forecast wedge between RPI and CPI inflation.

<sup>2400</sup> Robert O'Neill and Jeff Ralph (2013), [Modelling a Back Series for the Consumer Price Index](#), ONS

ONS' criteria to be considered National Statistics. Moreover, the ONS has recognised that there are errors, which have not yet been corrected, in this modelled data series.<sup>2401</sup> Some parties highlight that the pattern of the 'wedge' between the CPI and the RPI series over time suggests that the CPI data series is unreliable.<sup>2402</sup>

- (b) When using the CED inflation series for the first half of the twentieth century, this should be combined with RPI inflation and not CPI inflation as it is more similar to the former. ENA explained that a deflator series may include a formula effect where the underlying constant price expenditure series used in its construction does and noted that analysis by National Grid<sup>2403</sup> demonstrated that, for the period for which all data series are available, the CED shows greater alignment to RPI than CPI, and that the average differential between CED and RPI is relatively small for the full period that both data sets are available. On this basis, ENA submitted that it is likely that the CED series has been constructed using a methodology comparable to RPI and thus includes an element of the formula effect. As a result, the use of CED in both RPI and CPI series can be expected to artificially increase CPI data for the years 1900 to 1947, and hence artificially reduce estimated CPI real returns.<sup>2404</sup>

#### *CMA approach for Provisional Findings*

- 9.288 In our Provisional Findings, we concluded that it was appropriate to place weight on market returns deflated by both CPI and RPI inflation, albeit placing less weight on the upper end of the RPI-deflated range due to our view that the RPI series was likely to have been inconsistent over time and, if applied unadjusted, was likely to overstate returns. Moreover, we concluded that it was reasonable to combine both the CPI and RPI inflation series with the CED inflation series for the pre-1947 period.<sup>2405</sup>

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<sup>2401</sup> Office for National Statistics (2018), [Consumer prices Index including owner occupiers' housing costs \(CPIH historical series: 1988 to 2004\)](#)

<sup>2402</sup> Since 1989, this wedge has been, on average around 73 basis points, while the further back in time one goes, the smaller the wedge becomes. Some parties have noted that there is a negative wedge observed between 1915 and 1949, although this arises due to the use of COLI with RPI and CED with CPI. As a significant proportion of the wedge results from different averaging approaches, which create a positive 'formula effect', the existence of a negative wedge would suggest that CPI inflation is overestimated and TMR underestimated.

<sup>2403</sup> National Grid (2020), [Total Market Return: The consistency of long-run CPI and RPI inflation series in the UK, and their relative suitability for use in calculating the actual historic long-run average equity market return in the UK on a 'real' basis](#)

<sup>2404</sup> ENA submission (NATS/CAA appeal), paragraph 3.4

<sup>2405</sup> [Provisional findings report](#), paragraphs 9.158-9.169.

## *Responses to our Provisional Findings*

- 9.289 Ofwat submitted that to the extent that the CMA takes into account RPI-deflated returns, it should make an adjustment for changes in the ‘formula effect’<sup>2406</sup> across the full range of estimates and not just discount the upper end of those estimates as all real returns derived using historical RPI are affected by this issue.<sup>2407</sup>
- 9.290 Ofgem submitted that the CMA does not appear to have taken an explicit view on whether RPI or CPI/CPIH is the best ex-ante measure, relying instead on the wedge to infer what real returns should be. Under the CMA’s methodology, inferred real returns will move up and down with the forecast RPI-CPI/H wedge, embedding ex-ante RPI evidence going forward, which Ofgem considers is not consistent with best practice. An alternative is to use a reliable and credible measure of inflation, such as CPI or CPIH going forward and the best available measures looking backwards, whether that be CED, RPI, CPI, CPIH or some other measure. This avoids RPI complications and is more in line with the Johnson Report (2015) and the proposed approach by HM Treasury, to move away from RPI going forward.<sup>2408</sup>
- 9.291 Anglian,<sup>2409</sup> Bristol,<sup>2410</sup> Yorkshire<sup>2411</sup> and Northumbrian<sup>2412</sup> told us that they agreed with the CMA’s assessment that the CED/CPI series has significant flaws and that some weight should be placed on estimates derived using the CED/RPI. However, they submitted that the CMA has in effect continued to place very little weight on the CED/RPI results (see Figure 9-4) and that it should extend the upper end of the range to include a greater number of the CED/RPI data points. In particular, the CMA should not adjust an ONS inflation series (RPI) to arrive at an inflation series that it deems more robust than the ONS series, in order to take into account the formula effect.

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<sup>2406</sup> CPI and RPI are calculated using different aggregating formulae. RPI uses the Carli formula, while CPI(H) uses the Jevons formula. The difference in inflation estimates that results from the application of these formulae is what is known as the “formula effect”.

<sup>2407</sup> [Ofwat’s response to the provisional findings – risk and return](#), paragraph 5.9

<sup>2408</sup> [Ofgem’s response to the provisional findings](#), paragraph 38

<sup>2409</sup> [Anglian’s response to the provisional findings](#), section 4.1

<sup>2410</sup> [Bristol’s response to the provisional findings](#), section 7.2

<sup>2411</sup> [Yorkshire’s response to the provisional findings](#), Table 1

<sup>2412</sup> [Northumbrian’s response to the provisional findings](#), section 7

**Figure 9-4: Bristol's analysis of the CMA's CED/CPI and CED/RPI estimates compared to its TMR range, real RPI terms<sup>2413</sup>**



Source: Bristol Water analysis of CMA PFs Table 9-3

Source: Bristol

9.292 ENA emphasised two further points in relation to our analysis:

- (a) The CMA incorrectly ignores the top end of the CED/RPI distribution due to concerns that RPI-deflated returns are likely to overstate expected total market returns on an RPI-real basis going forward. ENA submitted that Oxera's analysis demonstrates that there is no basis for concluding that the historical RPI series systematically overstates expected RPI returns going forward, and that the upward trend in the formula effect over the period 1989 to 1997 cannot be relied upon as estimates of the formula effect are likely to be underestimated for the period prior to 1997; and
- (b) The CMA bases its decision to treat CED equally in both CPI and RPI series on erroneous analysis, which fails to use CED deflators after 1950 that are calculated in a manner consistent with the pre-1950 CED deflators. Oxera's analysis confirms the results of the earlier analysis undertaken by National Grid that, contrary to the CMA's conclusion, the CED is a closer proxy for RPI than CPI.<sup>2414</sup>

### *Deflating historic returns – CMA assessment*

9.293 The various potential approaches to estimating the TMR are described as adopting either 'CPI' or 'RPI' as the inflation series with which to deflate

<sup>2413</sup> This chart shows the various TMR estimates set out in Table 9-3 in the CMA's Provisional Findings, quoted in RPI-real terms. These figures are derived from various different estimators calculated over 10- and 20-year time horizons. The shaded area represents Bristol's view of the range that the CMA should have considered, while the blue and green lines show the range that the CMA did consider.

<sup>2414</sup> ENA's response to the provisional findings, p8

nominal historical returns. However, for the period from 1900 to 1947, neither RPI nor CPI data exists: the two main inflation measures available are the COLI and the CED. Whereas, in the period after 1947, the choice is between RPI or CPI, including the 'backcast' for the latter, in the period 1947 to 1988.

9.294 For the period prior to 1947, we consider that the CED dataset should be used as this is the most reliable available source of inflation data. The Office for National Statistics has stated its preference for using the implied deflator, due to the COLI's relatively limited coverage in terms of both products and population, and concerns about the quality of the weights.<sup>2415</sup>

9.295 For the period from 1947 onwards, we have estimated historic returns using both the RPI and the CPI (actual plus 'backcast') inflation series. This reflects our conclusion that both these data series have relevant strengths and weaknesses in the context of estimating real historic returns<sup>2416</sup>. In particular:

- (a) CPI is a more reliable measure of inflation in the economy due to its use of the Jevons rather than Carli formula<sup>2417</sup>, its weighting based on all private expenditure (rather than the Living Costs and Food Survey only, as it is the case for RPI) and its broader coverage of the population;
- (b) In contrast, RPI is no longer a national statistic due to its heavy reliance on the Carli formula, as well as various issues with the source data for weights and its coverage;<sup>2418</sup>
- (c) In addition, RPI is likely to be an inconsistent measure of inflation insofar as changes to the underlying methodology used to calculate the RPI mean that it is not comparable over time. The clearest example of this was the significant increase in the formula effect in 2010 as a result of a change to the way that clothing prices were collected. This increase in the formula effect, from around 0.45 percentage points to 0.75 percentage

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<sup>2415</sup> Office for National Statistics, [Consumer Price Indices Technical Manual, 2007 edition](#), p73

<sup>2416</sup> We recognise that RPI is no longer a National Statistic and that the ONS discourages its use, preferring CPIH for all purposes going forward.

<sup>2417</sup> In 2015, the independent [Review of UK Consumer Price Statistics](#) by Paul Johnson explored the Carli and alternatives including the Jevons and concluded that: 'Carli should not be used in any index aiming to achieve a good estimate of changes in consumer prices' and further that it 'is not suitable for use'.

The [United Nations Practical Guide to Producing Consumer Price Indices](#) says: 'A key result is that the Carli formula for the arithmetic average of price relatives has an upward bias relative to the trend in average item prices. In particular the Carli suffers from lack of transitivity i.e. when prices return to an earlier level the chained index doesn't. Consequently, it is a formula to be avoided and some judge that it should be prohibited.'

<sup>2418</sup> For example, the [Johnson Review](#) states that: 'As we stressed above it is generally hard in this area to come to absolute conclusions. But it is our strong view that the use of the Carli is inappropriate and that the RPI is upwardly biased because of its use. In light of this, ONS has introduced an additional inflation measure – RPIJ – which is essentially the same as the RPI except that it uses the Jevons method wherever the RPI uses the Carli... But it is not just the use of the Carli which is problematic in the construction of the RPI as a measure of consumer price inflation. Issues with the data source of the weights, population coverage and treatment of some goods (like insurance and owner occupiers housing costs) make the RPI less suitable as a measure of overall inflation.'

points, an increase of approximately 30 basis points, is shown in Figure 9-5. We note that in December 2019, the OBR forecast that the formula effect will be around 0.8% on a forward-looking basis.<sup>2419</sup>

- (d) However, over the last 70 years – the period for which both CPI and RPI figures are available – the CPI inflation numbers are modelled for around 40 of those years, more than half the period. While this ‘backcast’ has been estimated using a sophisticated econometric approach<sup>2420</sup>, it is impossible to know how accurate the figures are, which gives us reason to be cautious about the robustness of these figures.
- (e) In contrast, the relevant data has been collected and actual RPI figures produced for the whole of the last 70 years, providing greater certainty over the actual figures (albeit recognising the data issues set out above).

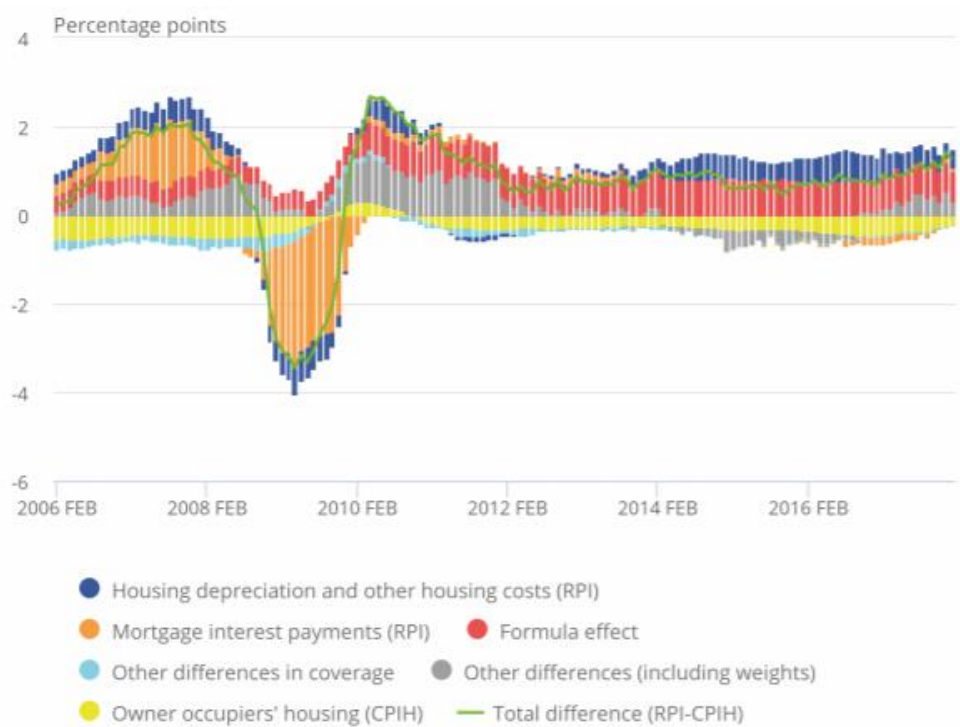
9.296 Therefore, in interpreting the results of our analysis, we have taken into account the level of historic returns produced using both measures of inflation. However, due to our concerns that, on balance, RPI-deflated returns are likely to overstate expected total market returns on an RPI-real basis going forward, we have adjusted the RPI figures for the 30bps increase in the formula effect observed in 2010.

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<sup>2419</sup> OBR (December 2019) [Forecast evaluation report](#)

<sup>2420</sup> The authors state that: ‘The method provides only approximate results and there is no way to determine how accurate our method is as sufficient data to calculate the CPI do not exist prior to 1987.’ Robert O’Neill and Jeff Ralph (2013), [Modelling a Back Series for the Consumer Price Index](#), report for the Office of National Statistics

**Figure 9-5: Causes of the difference between the RPI and CPIH inflation rates, 2006 to 2018**



Source: ONS 2018

### *Discussion of parties' views*

9.297 We have considered Oxera's work, which seeks to identify structural breaks in the RPI series and control for these, and its conclusion that the evidence supports a finding that the (average) RPI-CPI wedge historically is likely to be similar to the size of the wedge currently, with an upward adjustment to historical average inflation of at most 30bp to account for the cumulative impact of all changes to the RPI series over time.<sup>2421</sup>

9.298 In principle, we consider that Oxera's approach represents a reasonable means of addressing the inconsistencies in the RPI series over time. We recognise that there have been various changes in the RPI methodology and that pre-2010 changes may have either reduced or increased the formula effect. In our analysis, we have adjusted the RPI series by 30bps to reflect the change in the formula effect in 2010. This is consistent with the upper end of Oxera's range. However, as explained below, our approach is based on the known change in the formula effect around 2010 rather than Oxera's analysis as we are not persuaded that the latter is sufficiently robust to support the conclusions which they have drawn from it. In this respect, we note:

<sup>2421</sup> Oxera (2019), *Estimating RPI-adjusted equity market returns*, prepared for Heathrow Airport Limited



- (a) First, contrary to ENA's submission, Oxera's analysis has not been applied comprehensively across the whole of the relevant period (1950 onwards).<sup>2422</sup> Further, there is a lack of clarity as to the underlying causes of structural breaks and the expected impact of such changes, which suggests that the analysis may not be robust.<sup>2423</sup> Finally, we note that Oxera identifies a structural break in 1992 which it attributes to a range of changes made to the RPI series between 1993 and 1995, such as the inclusion of foreign and domestic holidays, housing depreciation and the council tax. We are not persuaded that a methodological change which took place in 1995 (introduction of housing depreciation) can credibly be considered the cause of a structural break identified in the data three years earlier. In summary, therefore, we do not believe it is appropriate to place weight on Oxera's analysis in identifying the impact of changes in the formula effect over time.
- (b) Second, during the early 1990s period when Oxera's analysis suggests that the size of the formula effect would have reduced due to various methodological changes, there is some other evidence from the ONS suggesting that the opposite effect may have been taking place.<sup>2424</sup>

9.299 We have considered Oxera's arguments that the upward trend in the formula effect over the period 1989 to 1997 cannot be relied upon as its method of calculation was inexact<sup>2425</sup> with the result that differences between inflation based on the constructed CPI series (used in the relevant O'Donoghue paper) and the RPI data could not be fully explained by the formula effect estimated. Oxera highlight that the upward trend in the size of the formula effect over the

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<sup>2422</sup> For example, Oxera states that its revised analysis explicitly controls for known macro-economic shocks, such as GDP, oil price, mortgage interest payments and exchange rate movements, allowing it to more systematically control for economic shocks and making it easier for the indicator saturation approach to identify methodological changes. However, as data on mortgage interest payments extends only back to 1987, at this stage it is only able to identify breaks that appear in the period 1988-2018. This indicates, contrary to ENA's submission, that breaks prior to that period have not been identified and/or quantified in Oxera's analysis. Oxera (2020), [Response to the CMA on estimating RPI-adjusted equity market returns, prepared for Heathrow Airport Limited](#), p4

<sup>2423</sup> For example, Oxera identifies a structural break in 1992. In its initial analysis, it notes that there is a "trend decrease" in 1992, which is likely to be attributable (inter alia) to the introduction of domestic and foreign holidays into the RPI series. It separately identifies a "trend increase" in 1997, which it suggests is the result of the introduction of housing depreciation into the RPI series in 1995. However, in its revised analysis, Oxera suggests that the 1992 structural break (a trend decrease) is consistent with several consecutive changes made to the RPI series between 1993 and 1995, such as the inclusion of foreign and domestic holidays, housing depreciation and the council tax. See Oxera (2019), [Estimating RPI-adjusted equity market returns](#), prepared for Heathrow Airport Limited, table 3.1 and Oxera (2020), [Response to the CMA on estimating RPI-adjusted equity market returns](#), prepared for Heathrow Airport Limited, p5

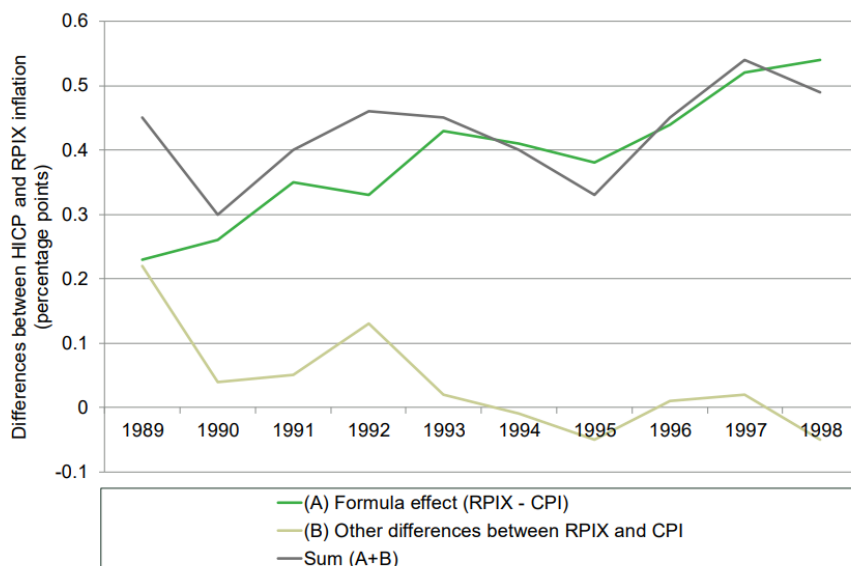
<sup>2424</sup> O'Donoghue, J (1998), [Harmonised Index of Consumer Prices: Historical Estimates](#)

<sup>2425</sup> Oxera explains that the formula effect was calculated from adjusted RPI indices involving aggregation using the Carli as well as Dutot formulae, rather than from individual raw price quotes aggregated with the Jevons formula.



period was largely offset by a downward trend in the scale of 'other differences' (see Figure 9-6).

**Figure 9-6: Estimates of the formula effect**



Note: The chart presents estimates of the contributions to differences in inflation rates based on estimates of the Harmonised Index of Consumer Prices (HICP) for the years 1988–96 and the published values for 1997 and 1998.

Source: Oxera analysis based on O'Donoghue, J. (1998), 'Harmonised Index of Consumer Prices: Historical Estimates', *Economic Trends*, 541, Office for National Statistics, December, Table 4.

Source: Oxera

9.300 However, we find that this evidence, if one accepts Oxera's interpretation of it, at best supports a finding of no material change in the formula effect in the early 1990s. This still contradicts the results of Oxera's model which suggests a decrease in the formula effect in that period sufficient to offset the later (2010) increase in the formula effect.

9.301 We continue to find, therefore, that the available evidence, when taken in the round, suggests that RPI is likely to have been an inconsistent measure of inflation over time, given the well-documented increase in the formula effect in 2010, and that the overall size of the formula effect is likely to have increased over time. We recognise that there is uncertainty over the extent of this inconsistency and the change in the formula effect, and we consider that the

approach we have taken in our assessment (of discounting the RPI range<sup>2426</sup> by around 30 basis points,<sup>2427</sup> is relatively conservative.

9.302 We considered the argument regarding RPI being the measure of inflation that was generally used by businesses and investors over the second half of the twentieth century. While this is clearly the case, under the assumption of the historic ex-post approach that historic realised returns represent the best reference point for what can be expected to happen in the future, the challenge remains to identify historic returns most accurately, regardless of the measure of inflation reported over the historic period and what investors and businesses used at that time.<sup>2428</sup> We consider that our estimate of TMR, which is to be used on a forward-looking basis, should reflect the best available information, including on the actual real returns realised in the past.

9.303 From our review of the available CPI data, we were not persuaded that the errors identified by the ONS in the input data for the backcast, were likely to have an appreciable impact on the overall level of the backcast series given how small the adjustments made to the original data are.<sup>2429</sup> However, we observe that the CPI data series has some issues in terms of its coverage of goods and services, notably its exclusion of housing costs, and, more importantly, is comprised of a mix of actual and modelled data. With respect to the latter, we note that the researchers who carried out the backcast highlighted that '[t]he method provide[d] only approximate results and there is no way to determine how accurate [it]... is as sufficient data to calculate the CPI do not exist prior to 1987'.<sup>2430</sup>

9.304 As a result of these reservations about the CPI data available to us over the historic period, and taking into account the fact that actual RPI inflation data has been collected and an inflation series produced on this basis over the whole post-1950 period, we believe it is appropriate to take into account both CPI- and RPI-deflated estimates of the TMR.

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<sup>2426</sup> We note Ofwat's point that the whole of the RPI range should be adjusted for the impact of the change in the formula effect and not just the upper end. We agree with Ofwat's logic, although we note that the lower end of the RPI range has no particular impact on the overall range for TMR as the lower bound is determined by the CPI-deflated estimates.

<sup>2427</sup> This approach adjusts for those changes in the formula effect which are clearly evidenced, ie the change which took place in 2010 but does not seek to adjust for any other potential changes in the formula effect for which we find there is unclear evidence.

<sup>2428</sup> For example, we would expect investors today, when seeking to understand what real returns were in the past and hence, what they might expect them to be in the future, to deflate historic returns by the most accurate measure of historic inflation available regardless of what was available at the time.

<sup>2429</sup> Office for National Statistics (2018), *Consumer prices Index including owner occupiers' housing costs (CPIH historical series: 1988 to 2004*

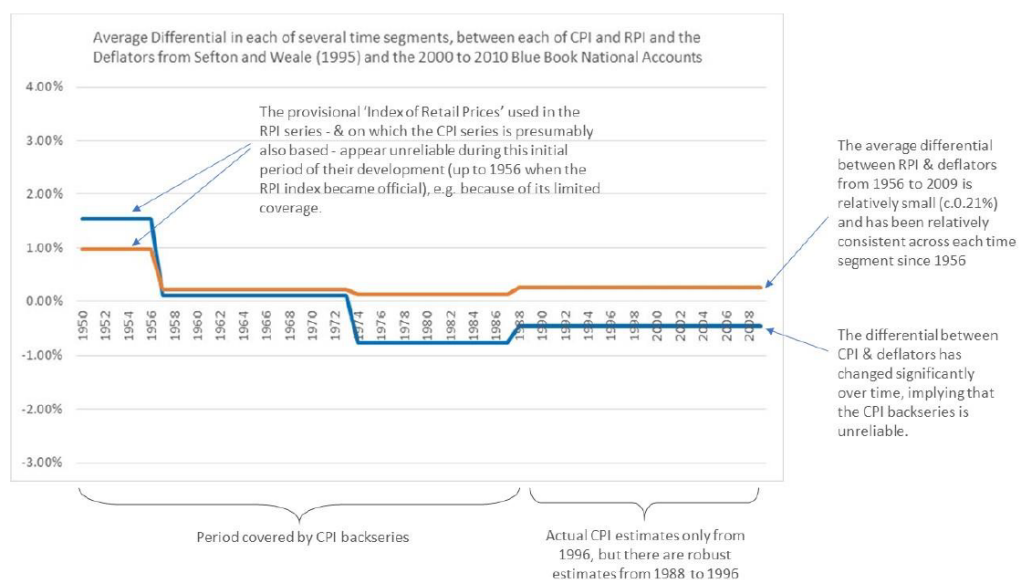
<sup>2430</sup> Robert O'Neill and Jeff Ralph (2013), *Modelling a Back Series for the Consumer Price Index*, report for the Office of National Statistics pp2–3

9.305 We considered Ofgem’s criticism that our approach meant that inferred real returns will move up and down with the forecast RPI-CPI/H wedge, embedding ex-ante RPI evidence going forward. However, we do not agree that this is the approach we have adopted. As explained in paragraph 9.296, we have not simply used both CPI- and RPI-deflated returns without considering the relative strengths of each measure. Rather, for the final determination we have made a 30bp adjustment to the latter to take into account the changes in the size of the wedge around 2010. Our view is that the remaining differences between the deflated returns estimates given using the two series, reflect genuine uncertainty over the level of historic returns and we have taken this into account in our overall assessment.

9.306 Next, we considered the argument as to whether the CED is more similar to RPI or CPI inflation, and hence how the available inflation series should be combined over the full period from 1900 to 2019/20 to assure consistency as far as possible.

9.307 We reviewed the evidence submitted by ENA and Oxera (drawn from analysis undertaken by the National Grid), as set out in Figure 9-7. This shows that between 1956 and 2009 (the last year for which comparable CED data is available) the average differential between RPI and the CED averages +0.21%, while the average differential between the CED and the back-cast of CPI averages -0.32%.

**Figure 9-7: Differentials between RPI, CPI and CED, 1950 to 2009**



Source: National Grid (2020), *Total Market Return: The consistency of long-run CPI and RPI inflation series in the UK, and their relative suitability for use in calculating the actual historic long-run average equity market return in the UK on a 'real' basis*

- 9.308 We note that these figures are slightly different from the average differentials that we derived in our provisional findings from a comparison of the implied consumption deflator, as measured by the Bank of England<sup>2431</sup>, with both RPI and CPI from 1950 onwards. That analysis suggested that RPI exceeded CED by around 0.4% over the 1950 to 2016 period, while CPI was around 0.1% lower than CED over that same period.<sup>2432</sup>
- 9.309 We note that there is material disagreement as to the appropriateness of National Grid's analysis in this respect. For example, Ofwat told us that this analysis uses a bespoke composite implied consumption deflator which is not recognised by the ONS. Ofwat disagrees with Oxera's submission that this is more consistent with how the Feinstein (1972)<sup>2433</sup> CED has been calculated, noting that its own comparison of the latter-day CED equivalent -the ONS implied deflator for household final consumption expenditure (HHFCE) – suggests that it behaves more like CPI.<sup>2434</sup>
- 9.310 We do not believe it is necessary for the CMA to come to a view between these two positions. Even if we accept that ENA's analysis is more accurate, this still suggests that CED sits between RPI and CPI. It does not, therefore, give us reason to change our overall conclusion that CED cannot be said to be more like RPI or more like CPI. Therefore, we find that it is reasonable to combine CED data with both CPI and RPI, respectively, when deflating historic returns, on the basis that CED represents the most reliable measure of inflation available for the first half of the twentieth century.
- 9.311 We consider the various representations on how we have weighed the overall CED/CPI and CED/RPI evidence in paragraphs 9.389 to 9.395.

### *Averaging historic returns*

#### *Parties' views*

- 9.312 Ofwat explained that it did not agree with the water companies' arguments that it should use the direct arithmetic average returns, since this is vulnerable to distortion from exchange rate effects and is an upwardly-biased estimator of returns for holding periods of longer than one year and in the presence of serial correlation. Rather, Ofwat focussed on the estimator that it considered

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<sup>2431</sup> Bank of England (2017), [A millennium of macroeconomic data](#)

<sup>2432</sup> See [Provisional findings report](#), paragraph 9.169

<sup>2433</sup> Feinstein, Charles (1972), *National Income, Expenditure and Output of the United Kingdom, 1855–1965*, Cambridge University Press

<sup>2434</sup> [Ofwat's reply to responses to the provisional findings – risk and return](#), p.7

would give the most accurate estimate in constructing its 'ex-post' range. This was the 'JKM efficient estimator' as described by Jacquier et al (2005).<sup>2435</sup>

- 9.313 In response to parties' submissions that the Cooper estimator<sup>2436</sup> was more appropriate for averaging historic returns in a regulatory determination, Ofwat told us that it saw the ex-post approach as a thought experiment in which investors expect the future to look like the past, such that the appropriate approach to averaging historic data was to consider all the historic 15-year periods and make an inference based on a reasonable expectation for the return you could expect in future. Ofwat explained that it did not recognise the need to see things through the lens of capital budgeting. It highlighted that if one were to use the whole period arithmetic estimate (which is by construction lower than the Cooper estimator) to compound returns over a 15-year period, the result would be a terminal value which would be much higher than the terminal value actually achieved by investors over each of the 15-year periods in the historic data. This indicates that the arithmetic average and Cooper estimators are both upwardly biased estimators.
- 9.314 Ofwat submitted that its approach in this respect was supported by several academic studies,<sup>2437</sup> which found that for holding periods of more than one year, particularly in the case of serial correlation, the use of the arithmetic average would produce an upward bias. Conversely, unless one were using the entire historical span as the holding period, the geometric estimator will understate the required return. Therefore, Ofwat has taken into account horizon-weighted averages in the form of the JKM and Blume estimators, with greater weight given to the former because it focuses on efficiency; it provides a more precise estimate of the true terminal value, which Ofwat considers to be more important than unbiasedness.
- 9.315 Ofwat considered its 5 to 10-year assumption of holding periods to be reasonable, being consistent with a 5-year control with a fixed TMR assumption, as well as with the advice to regulators from the UKRN report (which endorses a 10-year holding period), investor surveys, and regulatory decisions.<sup>2438</sup>

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<sup>2435</sup> Ofwat (2020), [Reference of the PR19 final-determinations: Cross-cutting-issues](#), paragraph 5.36 and [Ofwat's response to common issues in companies' SoCs: Risk and return](#), paragraph 3.25

<sup>2436</sup> Cooper, I (1996), *Arithmetic versus geometric mean estimators: Setting discount rates for capital budgeting*, European Financial Management, Vol. 2, No. 2

<sup>2437</sup> Indro, D & Lee, W (1997), *Biases in Arithmetic and Geometric Averages as Estimates of Long-Run Expected Returns and Risk Premia*, Financial Management, Vol. 26, No. 4 and Jacquier, E, Kane, A, & Marcus, AJ (2005), *Optimal Estimation of the Risk Premium for the Long Run and Asset Allocation: A Case of Compounded Estimation Risk*, Journal of Financial Econometrics, Vol. 3, No. 1

<sup>2438</sup> Ofwat (2020), [Reference of the PR19 final-determinations: Cross-cutting-issues](#), paragraphs 5.36-5.37

- 9.316 Anglian,<sup>2439</sup> Bristol and Northumbrian submitted that Ofwat should not have focussed on a single estimator (the JKM efficient estimator) to such an extent but rather should have taken into account average returns calculated using a range of estimators, in line with previous CMA and regulatory practice.
- 9.317 In addition, Anglian, ENA and Heathrow submitted that investors would require a discount rate at least as high as the arithmetic mean, highlighting the work of Cooper (1996)<sup>2440</sup> in proving analytically that an unbiased estimate of the discount rate to use in capital budgeting will be at least as high as the arithmetic average. ENA submitted two expert reports from Professor Schaefer (together with Oxera) in support of this view.

### *Responses to our Provisional Findings*

- 9.318 Ofwat submitted that:

- (a) In applying the 'Mason Miles & Wright' (MMW) approach of adjusting the whole-period geometric average return for different holding periods and serial correlation, the CMA should consider the full range of the uplift proposed by the PwC analysis of 0.3% to 1.2%, rather than just focussing on the upper bound figure. Ofwat argued that this decision in the CMA's Provisional Findings introduced an upward skew to the range of TMR estimates produced by this analysis, and was an example of implicit additional 'aiming up';<sup>2441</sup> and
- (b) In considering TMR ex-post ranges, the CMA should focus on holding periods of 20 years in order to be consistent with its approach for other parameters (eg risk-free rate and embedded debt).<sup>2442</sup>

- 9.319 Wright and Mason, in analysis commissioned by Ofwat, highlighted that there were two separate issues to consider: first, whether the estimated arithmetic mean should be adjusted for parameter uncertainty when setting allowed returns and second, how best to estimate the true arithmetic mean market return.
- 9.320 With respect to the first point, Wright and Mason explained that in the presence of uncertainty about the true mean, it may be appropriate to adjust the arithmetic mean down or up, depending on a) which problem one wants to solve, and b) what the relevant loss function is. However, Wright and Mason

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<sup>2439</sup> [Anglian SoC](#) pages 271 to 279

<sup>2440</sup> Cooper, I (1996), *Arithmetic versus geometric mean estimators: Setting discount rates for capital budgeting*, European Financial Management, Vol. 2, No. 2

<sup>2441</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 5.9

<sup>2442</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 5.9

submitted that no-one has ever fully specified, let alone solved, the regulator's decision and that to do so would be complicated, requiring a full specification of the stochastic properties of the *actual* return earned by regulated companies, conditional upon any allowed return.<sup>2443</sup> Therefore, Wright and Mason argued, in the absence of a properly specified model, simply assuming away parameter uncertainty at least has the merit of simplicity and familiarity.

9.321 In relation to the question of how we should estimate the true arithmetic mean, Wright and Mason recommended working in terms of the geometric mean return, and adjusting *upwards*, rather than working from the arithmetic mean return, and adjusting *downwards*. They explained that:

- (a) All the academic papers cited in this debate (including Schaefer's reports submitted to the CMA) take an approach that is consistent with this, since all work on the assumption that returns data are generated by an underlying process for the *log* return (often, but not invariably, assuming log returns are normally distributed). The log return model has the advantage both of plausibility (since returns themselves are bounded below) and simple time aggregation. This means that annualised mean log returns (and hence geometric returns) are invariant to the frequency of data used. The same feature only applies to annualised arithmetic mean returns if returns are serially uncorrelated at any given frequency.
- (b) Under the assumption of log returns, there is nothing special about the arithmetic mean of annual returns. Annualised returns can be calculated from data at any frequency (shorter or longer). Wright and Mason highlight that using daily stock market data to estimate annualised returns does not have an impact on the geometric mean return but significantly increases the arithmetic mean, while noting that using estimates at longer (than annual) horizons tends to reduce the estimated annualised arithmetic mean due to some negative serial correlation in returns.
- (c) As there is broad consensus that it is appropriate to work on the basis of an investor horizon that is of the order of 10 to 20 years, one approach is to consider taking arithmetic averages over a 10 to 20 year period. The

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<sup>2443</sup> Wright and Mason further explain that a minimal requirement to even begin on this process, as they argued in the UKRN report, would be that regulators should explicitly account for the difference between the regulatory *allowed* return and the regulatory *expected* return, by taking into account (strong) historic evidence of outperformance. Wright and Mason contend that what would be needed to capture this more fully is a model of how a rational investor compares the prospective returns offered by regulated companies, conditional upon an allowed return set by the regulator, to the returns offered on competing investments. Consistent with the approach of all the contributions to this literature, this model would need to take into account that such a rational investor would not know the true WACC, and presumably would have the same parameter uncertainty as the regulator. The regulator's problem would then condition upon the investor's problem, and would need to take into account both parameter uncertainty, and a loss function due to asymmetric social costs of over- vs under-investment (hence the solution could presumably involve an element of conditional aiming-up).



overlapping and non-overlapping averages set out in the CMA's Table 9-3 represent such an approach and these indicate that taking arithmetic averages over longer horizons does indeed bring down the estimated annualised arithmetic mean.

- (d) Wright and Mason concluded by observing that, in both MMW and the UKRN report, they suggested a quite broad range of *upward* adjustments, of 1 to 2 percentage points, to the geometric average return. In the CMA's table the gap between the arithmetic and geometric annual averages is 1.8 percentage points (on Wright and Mason's preferred consistent CPI/CED basis). Simply using the twenty-year average of overlapping returns would bring this down to 1.5 percentage points (ie, 6.7% to 5.2% on the same CPI/CED basis), thus, in the centre of Wright and Mason's proposed range. Wright and Mason considered whether, in theory, a larger adjustment for volatility – derived from estimates of serial correlation – may be required but concluded that there is considerable controversy regarding the reliability of the estimates arising from this approach and hence regulators should rely on historic averages rather than predictive models.<sup>2444</sup>

9.322 Anglian<sup>2445</sup>, Bristol<sup>2446</sup>, Yorkshire<sup>2447</sup> and Northumbrian<sup>2448</sup> submitted that the CMA should not have excluded the 'non-overlapping returns' results from its range as these contain important information as non-overlapping returns may be considered to be independent observations, resulting in TMR estimators that are assumption-free regarding the distribution of annual returns and serial correlation. Further, it is inconsistent to exclude non-overlapping returns on the grounds of sample size, whilst also including overlapping returns. This is because overlapping returns are highly dependent data points (as they are rolling 10 and 20-year averages).

9.323 Oxera (on behalf of ENA) told us that our approach to averaging historic returns, as set out in the Provisional Findings, introduced a downward bias

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<sup>2444</sup> Wright and Mason explain: 'Is there a case for an estimate being closer still to the geometric mean? In logic yes. If we see evidence of negative serial correlation of returns (which we do), then this is indirect evidence of potential predictability of returns using a bigger information set. There is indeed an extensive literature that claims to find evidence of such predictability. In MMW we showed that allowing for this could in principle result in more precise (and lower) estimates of the arithmetic return (since the adjustment is driven by a lower estimate of the conditional variance of returns). We would not wish to draw strong conclusions from the estimates that arise from this approach (see for example, PwC 2019) since the same extensive literature also points to considerable controversy as to the reliability of evidence of return predictability. It was for this reason, and on the grounds of implementability and defensibility, we advocated in the UKRN report that, despite evidence of predictability, regulators should rely on historic averages, rather than predictive models.'

<sup>2445</sup> [Anglian's response to the provisional findings](#), section 4.1.

<sup>2446</sup> [Bristol's response to the provisional findings](#), section 7.2.

<sup>2447</sup> [Yorkshire's response to the provisional findings](#), Table 1.

<sup>2448</sup> [Northumbrian's response to the provisional findings](#), section 7.



that should be remedied either by including the Cooper estimator<sup>2449</sup> in the range of estimates for the same investment horizons that the CMA has assumed for the JKM<sup>2450</sup> and Blume<sup>2451</sup> estimators, or by adopting the arithmetic average. Oxera further states that Professor Schaefer's submissions to the CMA have highlighted that it is incorrect to focus on the role of serial correlation and that the empirical evidence does not justify deviating from the arithmetic mean based on arguments concerning serial correlation. Instead, the requirement to make adjustments to expected returns is created by the presence of uncertainty in the estimate of expected returns, not serial correlation.

- 9.324 Oxera submitted that PwC's estimate<sup>2452</sup> of the appropriate uplift to the geometric mean of 1.2% appeared to be based on overlapping periods and questioned whether PwC had applied a variance formula which made appropriate adjustment for the fact that the observations were not independent of each other. Oxera noted that failing to do this would result in an under-estimate of variance.

#### *Averaging historic returns – CMA assessment*

- 9.325 We found Wright and Mason's submission to provide a useful framework for considering the key points of principle in determining how best to average historic returns. Therefore, we have separated the following discussion into two parts: first, whether to adjust for parameter uncertainty when estimating the arithmetic mean and, second, how to best estimate the arithmetic mean.

- *Whether to adjust for parameter uncertainty*

- 9.326 We note that Oxera agreed with Wright and Mason's key argument on this point, ie that in the absence of clear modelling of the regulator's decision, the most appropriate estimate to use is the arithmetic mean. The consequence of that would be to give no weight to the other estimators, either JKM and Blume which are lower, or Cooper, which is higher.
- 9.327 We reasoned that there were two potential approaches that we could adopt in relation to parameter uncertainty when estimating the TMR:

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<sup>2449</sup> Cooper, I (1996), 'Arithmetic versus geometric mean estimators: Setting discount rates for capital budgeting', *European Financial Management*, Vol. 2, No. 2

<sup>2450</sup> Jacquier, E, Kane, A, and Marcus, A (2005), *Optimal Estimation of the Risk Premium for the Long Run and Asset Allocation: A Case of Compounded Estimation Risk*, *Journal of Financial Econometrics*, Vol. 3, No. 1, pp. 37-55

<sup>2451</sup> Blume, M (1974), 'Unbiased Estimators of Long-Run Expected Rates of Return', *Journal of the American Statistical Association*, Vol. 69, No. 347, pp. 634-638

<sup>2452</sup> As set out in PwC Economics (2019), [Estimating the cost of capital for H7 and PR3](#)

- (a) We could assume away parameter uncertainty and just use the arithmetic mean; or
- (b) We could consider the full range of estimators, including those put forward by JKM, Blume and Cooper in deriving a TMR range.

9.328 On balance, we consider that using the arithmetic mean is preferable due to its simplicity and transparency, and also given that at the current time, there is no reason to conclude that one perspective, either that of the capital budgeter or of the portfolio investor, is 'correct'. We note that approach (b) would give a similar mid-point estimate to the simple arithmetic average (as some estimators produce higher figures and others lower) but a significantly broader range of values. In the absence of compelling evidence to support the ends of this broader range, we prefer to use the arithmetic mean point estimate. As a result, we have revised our analysis (as set out in Figure 9-3) to focus on estimates of the arithmetic mean calculated over various time horizons.<sup>2453</sup>

- *Estimating the arithmetic mean*

9.329 As set out above, we consider that the theoretically correct measure of a return to use in deriving the cost of capital is the arithmetic mean. However, we agree with Wright and Mason that there is no particular reason to focus on estimates of the arithmetic mean of *annual* returns. Where returns are serially correlated and investors have a holding period of more than a year, the arithmetic mean return for a single year will be an upwards biased estimator of returns.

9.330 We consider that it is appropriate to consider returns over a relatively long time-horizon, reflecting both the relatively long holding periods of investors in UK water companies, as well as to ensure consistency with the other elements of the cost of capital, such as the maturities of ILGs used to benchmark the risk-free rate. Therefore, we have considered returns over a 10 to 20 year holding period.

9.331 We set out below two approaches that we have considered when averaging historic returns:

- (a) The first approach is to estimate arithmetic returns over a longer holding period, using the DMS data set. The results of this analysis are set out in Table 9-3.

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<sup>2453</sup> We have no longer presented the annual averages calculated using the various estimators put forward by Blume (1974) or Jacquier, Kane & Marcus (2005).

- (b) The second approach is the one adopted by PwC<sup>2454</sup> and based on MMW, who argue for a methodology of looking at evidence from compound average returns, ie geometric returns, and then making an adjustment for the impact of arithmetic averaging, which takes into account the volatility of returns, rather than measuring arithmetic returns directly.<sup>2455,2456</sup>

**Table 9-3: CMA estimates of returns, 1900 to 2019: figures quoted in ‘RPI-real’ terms**

	Holding period	Inflation series		CED/RPI less change in formula effect (30bps)
		CED/CPI	CED/RPI	
Arithmetic mean	1 year	6.0%	6.7%	6.4%
Geometric mean	120 years	4.3%	5.0%	4.7%
Overlapping	10 years	5.6%	6.4%	6.1%
	20 years	5.7%	6.4%	6.1%
Non-overlapping	10 years	5.8%	6.5%	6.2%
	20 years	6.2%	6.8%	6.5%

Source: CMA analysis

Note: With a holding period of 10 years, the non-overlapping average comprises 12 observations, which reduces to 6 observations for a holding period of 20 years.

9.332 Focussing on 10 to 20 year holding periods, Table 9-3 suggests a TMR range of around 5.6% to 6.2% (RPI-real) based on CPI-deflated returns, and around 6.4% to 6.8% (RPI-real) based on RPI-deflated returns (before making any adjustment for the increase in the formula effect).

9.333 We considered what weight we should place on the non-overlapping averages in light of the submissions that we received from the parties on this matter. While we recognise that the independence of these data points is an advantage, we note that the sample sizes used to estimate them are very small: 12 observations in the case of 10-year averages and just 6 observations in the case of 20-year averages. With such few observations, a single outlier can have a disproportionate impact on the averages measured, which may explain why the 20-year non-overlapping estimates exceed the simple annual arithmetic average. On balance, however, we think it is more appropriate to take into account all of the above estimates, ie both 10- and 20-year overlapping and non-overlapping estimates, in coming to a view on the

<sup>2454</sup> PwC Economics (2019), [Estimating the cost of capital for H7 and PR3](#)

<sup>2455</sup> Mason R, Miles D, Wright S (2003), [A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K \(MMW\)](#)

<sup>2456</sup> In the 2018 UKRN report, the authors estimate the geometric return on the UK (and World) market to have been (just over) 5% and consider an uplift of 1% to 2% for arithmetic averaging to be reasonable given that long-horizon returns have lower volatility than would be the case in a random walk stock market. Using this approach, they estimate a TMR of 6-7% (CPI real). UK Regulators Network (UKRN) (2018), [Estimating the cost of capital for implementation of price controls by UK Regulators. A report by Wright, Burns, Mason and Pickford](#) pE-125

range of reasonable TMR estimates, rather than to exclude some of these estimates as to do so may risk 'cherry-picking' data.

- 9.334 The analysis set out in Table 9-3 suggests an overall RPI-real range of between 5.6% and 6.8%. However, the upper end of this range, which is taken from RPI-deflated returns, makes no adjustment for the increase in the formula effect over time. Taking this into account reduces the upper end of this range to approximately 6.5%.
- 9.335 Drawing on the MMW approach, PwC used the actual variance in UK returns to estimate the extent of serial correlation and, therefore, a more precise estimate of the uplift required to the geometric mean.<sup>2457</sup> It estimated this to be between 0.3% and 1.2% over a 15 year holding period.<sup>2458</sup> Applying the upper end of this range to the geometric estimates set out in Table 9-3 gives a TMR range of 5.5% to 5.9% (RPI real).<sup>2459</sup>
- 9.336 We considered both Ofwat's submission that we should consider the full range of PwC estimates, ie the 0.3% figure, and not only the upper bound of 1.2%, as well as both Wright and Mason's views on this approach and Oxera's point regarding the variance formula applied. Having reviewed PwC's analysis, we note that their 1.2% estimate has been calculated using a standard variance formula which does not take into account the fact that the overlapping observations are not independent of one another. As a result, as Oxera submitted, this can be expected to be an under-estimate of the actual required uplift.

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<sup>2457</sup> PwC applies this approach by assuming that returns are log normally distributed such that the arithmetic average return exceeds the geometric average return by  $(1/2) * \sigma^2$ , where  $\sigma^2$  is the variance of the log of returns. They calculate the variance of log real returns in the UK from the DMS data set over holding periods from 1 year to 15 years, divide their estimate by the holding period in years, and use half this figure as the uplift to the geometric mean.

PwC also seeks to account for the presence of serial correlation by plotting variance in UK equity returns from an autoregressive econometric model, in which it regressed logged annual equity returns on 1-period lagged returns for each holding period. This model was designed to test whether actual equity returns follow a random walk model or otherwise. PwC submits that its regression results for each holding period show that the lagged equity returns are statistically significant, indicating that equity returns are indeed autocorrelated (ie not random walk). As the holding period increases, the predictability (as indicated by the adjusted R-squared) also increases. This suggests actual equity returns variance decreases as holding period increases, even when they control for autocorrelation. The decline in variance is even steeper for longer holding periods.

<sup>2458</sup> PwC (2019) *Estimating the cost of capital for H7 – Response to stakeholder views*, pp41-45. We note that this range is broadly consistent with the conclusions of MMW that: *'the gap between the arithmetic mean return and geometric return would fall to only around one percentage point over a five-year horizon, and even less over a ten-year horizon.'* MMW, p26.

PwC applies the MMW approach by assuming that returns are log normally distributed such that the arithmetic average return exceeds the geometric average return by  $(1/2) * \sigma^2$ , where  $\sigma^2$  is the variance of the log of returns. They then calculate the variance of log real returns in the UK from the DMS data set over holding periods from 1 year to 15 years, divide their estimate by the holding period in years, and use half this figure as the uplift to the geometric mean.

<sup>2459</sup> The 5.5% figure is based on a CED/CPI-deflated geometric mean of 4.3% (RPI real) uplifted by 1.2% to an arithmetic mean. The 5.9% figure is based on an RPI-deflated geometric mean of 5.0% uplifted by 1.2% to give the arithmetic mean, and then adjusted by 30 basis points for the change in the formula effect over time.

9.337 PwC submitted revised analysis using the same data but looking only at non-overlapping periods. This produced estimates of the required uplift to the geometric mean of between 0.9% and 1.8% for holding periods of between 5 and 10 years, based on actual historical variance, and 0.9% to 1.2% based on the CVAR model for 10 years and 5 years, respectively. We observed that the figures produced using the actual historical variance fluctuated significantly as the holding period lengthened<sup>2460</sup> and the data provided largely covered shorter holding periods than the 10 to 20 years we have focussed on in coming to a view on an appropriate cost of capital for the water companies. As a result, we do not find these estimates to provide a robust basis for our assessment of TMR.

9.338 Furthermore, with respect to both sets of estimates produced by PwC (using both overlapping and non-overlapping data), we recognise the controversy over the reliability of modelling these uplifts as highlighted by Wright and Mason. Therefore, we have not placed weight on PwC's estimates of the required uplift to the geometric mean but have focussed on the estimates set out in Table 9-3.

### ***Historic 'ex-ante' approach***

9.339 The historical ex-post method has drawn significant criticism in finance literature and many studies have concluded that it does not provide a reliable indication of the ERP. Mehra and Prescott (1985) observed that the high historical returns provided by equities relative to government bonds are inexplicable in the context of standard economics models that describe risk. Similarly, Blanchard, Shiller and Siegel (1993) concluded that the ex-post ERP appears far in excess of what is justified by standard asset-pricing models with reasonable levels of risk aversion.

9.340 The historic ex-ante approach seeks to identify investors' reasonable TMR expectations by using historic data but making adjustments to take into account one-off good or bad 'luck' that investors might not expect to be repeated in the future.

9.341 We have considered two approaches to deriving the expected total market return on a historic ex-ante basis:

- (a) Fama and French<sup>2461</sup> use a dividend growth model to break-down historic returns into an underlying expected return, equal to the average dividend

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<sup>2460</sup> For example, PwC's analysis suggests an uplift of just under 1% for a holding period of 8 years and around 1.6-1.7% for a holding period of 10 years.

<sup>2461</sup> Fama and French (2002), '[The Equity Premium](#)', *Journal of Finance* Vol 57, No 2

yield plus the average dividend growth rate, and an unexpected return, (comprising capital gain in excess of the rate of dividend growth);

- (b) Dimson, Marsh and Staunton seek to infer the TMR by breaking down the historical equity premium<sup>2462</sup> into elements that correspond to investor expectations and elements of non-repeatable good or bad luck. These elements are the mean dividend yield, the growth rate of real dividends, the expansion of the price/dividend ratio, and change in real exchange rate. The latter two elements are considered to be 'non-repeatable', at least in expectation, while the first two elements are taken to inform investors' expectations.

### *Parties' views*

- 9.342 Ofwat adopted two historic ex-ante approaches and, on the basis of these, concluded that an appropriate range of TMR estimates was 5.5% to 6.6% (CPI-real). Ofwat did not apply a volatility adjustment in coming to this range.
- 9.343 Ofwat explained that the need for a volatility adjustment to the output of its DDM is usually justified by the historically higher volatility of capital price growth over volatility in dividend growth. Analysis provided by PwC<sup>2463</sup> and EE<sup>2464</sup> suggested such an adjustment was not necessary because (a) PwC's analysis shows that the volatility of the income yield has exceeded that of capital price over the period 2006 to 2017, reversing the historical relationship which justifies making the adjustment; and (b) EE submits there is no reason why GDP growth should not be considered as a direct proxy for capital growth (instead of just dividend growth).<sup>2465</sup>
- 9.344 The Disputing Companies did not challenge the basic historic ex-ante approaches adopted by Ofwat. However, Anglian<sup>2466</sup> and Bristol submitted that Ofwat had incorrectly – and in a departure from precedent – removed the bias-adjustment (of 1.0 to 1.3%) to historical average dividend yields to account for the higher volatility of share price growth relative to dividend growth.
- 9.345 Anglian noted that KPMG's analysis applying the historic ex-ante approach with this bias adjustment, gives a range of TMR estimates of between 6.35% and 6.9% (RPI, real).

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<sup>2462</sup> This is calculated as the geometric difference between the equity return achieved over the period and the risk-free rate over that same period. Credit Suisse Global Investment Returns Yearbook 2019, page 28.

<sup>2463</sup> PwC (2017), *Updated analysis on the cost of equity for PR19*, p16

<sup>2464</sup> Europe Economics (2017), *PR19 Initial Assessment of the Cost of Capital*, pp31-32

<sup>2465</sup> Ofwat (2020), *Reference of the PR19 final determinations: Cross cutting issues*, p43

<sup>2466</sup> *Anglian SoC*, pp259-260

## *Responses to our Provisional Findings*

9.346 Ofwat submitted that:

- (a) The CMA erred in using an estimate of the volatility bias uplift of 130bps, taken from a paper by Gregory (2011) which in turn cites Dimson et al. (2002) as the source of the 130bps assumption, as this figure is likely to be based on outdated (and potentially non-UK) data. Ofwat suggested that the CMA should instead use the 2018 Barclays Equity Gilt Study dataset if it was minded to use a volatility adjustment and that the appropriate adjustment to make in that case is 63bps;<sup>2467</sup> and
- (b) The volatility bias adjustment converts a geometric return estimate to a fully arithmetic one but some adjustment to the arithmetic ex-ante return (post-bias adjustment) to place weight on geometric returns is warranted in order to reflect long holding periods and serial correlation.

9.347 Northumbrian<sup>2468</sup> and Anglia submitted that Ofwat was incorrect in its argument about the source of the 130bp volatility uplift used by the CMA, which is taken from Gregory (2011). Rather, this uplift is calculated directly, from the data in Table 1 in Gregory (2011) using data up to 2009. They noted that, depending on how the ex-ante returns model is to be estimated (various alternative models are presented), the correct bias adjustments range between 1.3% and 1.7%, and so the CMA had used the smaller uplift in its discussion.

9.348 Ofwat responded to Northumbrian and Anglian's submission by highlighting that Gregory (2011) used data from 1925 onwards rather than data relating to the full 1900 to 2009 period and proposed that the CMA should use an estimate taken from the whole series of the Barclays source data, which suggested an uplift of 63 basis points.<sup>2469</sup>

### *CMA assessment*

9.349 We have considered both of the approaches set out in paragraph 9.341.

9.350 Fama and French highlight that the average stock return is equal to the average dividend yield plus the average rate of capital gain. They then note that, assuming that the price-dividend ratio is stationary, (mean-reverting) over a long period of time the compound rate of dividend growth can be expected to approach the compound rate of capital gain, such that the

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<sup>2467</sup> Ofwat's response to common issues in companies' SoCs: Risk and return, pp74-75

<sup>2468</sup> Northumbrian's reply to responses to the provisional findings, paragraphs 121-122

<sup>2469</sup> Ofwat's response to common issues in companies' SoCs: Risk and return, p.56.



expected stock return would be equal to the average dividend yield plus the average growth rate of dividends.<sup>2470</sup> They use this model to break-down historic returns into an underlying expected return, equal to the average dividend yield plus the average dividend growth rate, and an unexpected return, (comprising capital gain in excess of the rate of dividend growth).

- 9.351 Data from the 2018 Barclays Equity Gilt Study<sup>2471</sup> suggests that the average dividend yield has been 4.5% over the period 1900 to 2017 in the UK, with average real dividend growth rates of around 1.2% (arithmetic mean). On this basis, the Fama & French model suggests a TMR of around 5.7%. We note that these figures have been deflated using COLI/RPI inflation.
- 9.352 Gregory (2011) estimates a 'Fama and French bias-adjustment' of 1.3% on data from 1925 to 2009 based on data drawn from the Global Financial Data database and from the Barclays Equity Gilt Study data. This uplift effectively converts a geometric mean to an arithmetic mean. Gregory explains that this uplift has been calculated as half the difference between the historical price growth variance and the historical dividend or earnings growth variance.<sup>2472</sup> We noted that a consistent approach was to follow Ofwat's suggestion of recalculating the bias adjustment using the full Barclays dataset, ie covering the period 1900 to 2017. This gives a bias adjustment of 62bps. Including this bias adjustment uplift would give an expected TMR of around 6.3%.
- 9.353 Using DMS' approach and data for the UK from 2019<sup>2473</sup> indicates a geometric mean dividend yield of 4.58% and a growth rate of real dividends of 0.83%, which would indicate an expected return of 5.41%. We note that these figures have been calculated using a composite price index, comprising the 'Retail Price Index'<sup>2474</sup> up until 1949 and then CPI data (actuals and the 'backcast') from then onwards.
- 9.354 DMS uplifted their geometric mean returns by 150bps to give an arithmetic mean risk premium, which they explain is their estimate of the expected long-run ERP for use in asset allocation, stock valuation, regulatory and capital budgeting applications.<sup>2475</sup> The inclusion of this uplift suggests an expected TMR of around 6.9%.

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<sup>2470</sup> Fama and French (2002), 'The Equity Premium', *Journal of Finance Vol 57, No 2*

<sup>2471</sup> Barclays (2018) *Equity Gilt study*

<sup>2472</sup> Gregory A (2011), *Expected Cost of Equity and the Expected Risk Premium in the UK*, Review of Behavioural Finance.

<sup>2473</sup> E. Dimson, P. Marsh, M. Staunton (2019), '*Credit Suisse Global Investment Returns Yearbook 2019*', p34, Table 10. We note that DMS focus on decomposing the historical equity risk premium, whereas our analysis focuses on decomposing the historical equity return. This is consistent with our assumption that total equity returns are more stable over time than equity risk premia.

<sup>2474</sup> We understand that this is the Cost of Living Index referred to in Appendix E, paragraphs 19 to 23.

<sup>2475</sup> E. Dimson, P. Marsh, M. Staunton (2019), '*Credit Suisse Global Investment Returns Yearbook 2019*', p37



### *Inclusion of volatility adjustment*

9.355 We considered the evidence from PwC and EE regarding the need (or not) for including a volatility adjustment. We do not agree that such an adjustment should be excluded from our estimate of the TMR. The historic approaches to estimating the TMR (both ex-post and ex-ante) are based on the assumption that investors expect that the future will look (more or less) like the past. In applying this approach, it has been standard to follow DMS' advice to use the longest run of available data (usually returns since 1900) in order to balance out periods of good and bad luck. As DMS explains:

To understand risk and return, we must examine long periods of history. This is because asset returns, and especially equity returns, are very volatile... The 21<sup>st</sup> century began with one of the most savage bear markets in history. The damage inflicted on global equities began in 2000 and, by March 2003, US stocks had fallen 45%, UK equity prices had halved, and German stocks had fallen by two-thirds. Markets then staged a remarkable recovery, with substantial gains that reduced, and in many countries eliminated, the bear market losses.

'World markets hit new highs at the end of October 2007, only to plunge again in another epic bear market fuelled by the Global Financial Crisis. Markets bottomed in March 2009 and then staged another impressive recovery... Global equities then rose, with relatively few set-backs for almost nine years, while volatility remained remarkably low. However, 2018 saw several volatility spikes... The enduring picture, however, is one of volatility. When markets are calm, we know there will be a return to volatility, and more challenging times; we just cannot know when.'<sup>2476</sup>

9.356 Therefore, while the relative volatility of income yield and capital prices may have been different in the last 20 years, we do not think it is appropriate to assume that such a pattern will continue in the future, rather than this relative volatility reverting to a longer-term norm. For this reason, we believe that a volatility adjustment should be included, albeit with the estimate based on data from the full 1900 to 2017 period as set out in paragraph 9.352.

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<sup>2476</sup> E. Dimson, P. Marsh, M. Staunton (2019), '[Credit Suisse Global Investment Returns Yearbook 2019](#)', p11

### *Adjusting for inflation and serial correlation*

- 9.357 The historic ex-ante TMR estimates set out above are not directly comparable to the historic ex-post estimates in Table 9-3 or to one another due to differences in the series used to deflate historic nominal returns in each case.
- 9.358 In both cases, the figures quoted are based on the use of COLI, rather than CED, in the first half of the twentieth century. The impact of this is that the estimates will be overstated by around 35 basis points.<sup>2477</sup>
- 9.359 In the case of the Fama & French model estimated with data from the Barclays Equity Gilt Study, the adjusted RPI-real TMR estimate would be 6.0% (arithmetic average), calculated as 5.7% (geometric mean) plus 0.62% (volatility adjustment) less 0.35% for the COLI/CED difference. Taking into account the 2010 change in the formula effect reduces this figure further to approximately 5.7%.
- 9.360 In the case of the DMS estimate, the inclusion of the volatility adjustment gives a CPI-real average of 6.9% (arithmetic). Adjusting this for the CED/COLI difference in inflation reduces this figure to 6.55%. Applying the forward-looking wedge of 90 basis points between RPI and CPI further reduces this figure to 5.6% RPI-real. As the DMS returns data is CPI-deflated, no further adjustment is required in relation to the change in the formula effect.
- 9.361 Finally, we note that the arithmetic averages estimated using this approach do not take into account the effects of serial correlation in returns over longer holding periods as they are based on annual returns rather than longer holding periods. We note that the analysis set out in Table 9-3 suggests that this effect could reduce these estimates by up to a further 40 basis points, although the 20-year non-overlapping averages suggest that no further adjustment would be required. Therefore, we conclude that the historic ex-ante evidence suggests a TMR range of between 5.2% and 5.7% (RPI real).<sup>2478</sup>

### ***Forward-looking approaches***

- 9.362 There are two commonly used approaches to deriving the expected total market return on a forward-looking basis: 1) estimating a DDM using a range of current and forward-looking financial information, and 2) using survey

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<sup>2477</sup> KPMG's submission on behalf of Northumbrian Water set out a variety of TMR estimates using the COLI/RPI and CED/RPI data series.

<sup>2478</sup> The lower end of this range has been estimated as the 5.6% arithmetic figure derived from the DMS decompositional approach, reduced by 40 basis points for potential serial correlation, while the upper end of this approach is the 5.7% arithmetic figure derived from the Fama French approach with no adjustment made for potential serial correlation (rounded to a single decimal place).

evidence and/or practitioner forecasts which capture investors' expectations of returns over the next few years.

### *Dividend discount models*

9.363 Under the DDM approach, the expected market return is the discount rate at which the present value of future dividends is equal to the current market price.<sup>2479</sup> The key inputs to the model are the current dividend yield,<sup>2480</sup> which is known, and expectations of short-term and long-term dividend growth rates, which must be assumed.

### *Parties' views*

9.364 Ofwat considered forward-looking evidence of DDM outputs from PwC and EE, which indicated a range of 5.2% to 5.9%, RPI-real. The models used to inform these ranges variously used income yield growth (ie average yield including both dividends and buybacks) as well as (UK) GDP growth to inform estimates of TMR.<sup>2481</sup>

9.365 The water companies and Third Parties' submitted that:

- (a) Ofwat's own advisors' models supported TMR estimates up to 7.2% CPI-real (6.2% RPI-real), and that Ofwat has been selective in choosing values from the lower end of the ranges;<sup>2482</sup> and
- (b) Ofwat should have placed more weight on the Bank of England DDM, which implies a TMR estimate of 7.8% in RPI-real terms, based on a 5-year rolling average.

### *Responses to our Provisional Findings*

9.366 Oxaera (on behalf of ENA) told us that we should place more weight on the Bank of England DDM for the following reasons:

- (a) The CMA has misinterpreted the academic evidence related to the analyst forecasts and thereby incorrectly downplayed the Bank of England DDM. Rather than supporting the finding that analysts are overly optimistic, this evidence suggests that analysts overreact to recent news in both directions (optimistic and pessimistic), that analyst forecasts should be

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<sup>2479</sup> This assumes that investors value listed companies based on the present value of discounted future cashflows (in the form of dividends).

<sup>2480</sup> We note that the dividend yield is affected by share buy backs and these should be accounted for in a DDM.

<sup>2481</sup> [Ofwat's further submission on cross-cutting issues in companies' responses](#), paragraph 5.39

<sup>2482</sup> [Anglian SoC](#), pp253-260

assumed to be more accurate than those of less sophisticated investors, and that analysts tend to bias forecasts downwards in order to generate positive 'earnings surprises'; and

- (b) Data suggests that the relationship between the growth rates of dividends and GDP has changed over time, with the 0.83% figure referred to by the CMA being a long-term average for the period 1900 to 2018<sup>2483</sup> and largely driven by relatively low dividend growth in the first half of the twentieth century. Oxera highlights that, in the 2020 Yearbook, DMS stated that '[r]eal dividend growth was lower in the turbulent first half of the last century, when the real dividend growth rate on the world index was -1.63% per year', before noting that for 1950 to 2019, '[t]he real dividends on the world index grew by a far healthier 2.3% per year'. Finally, Oxera submitted that an analysis of the annual real dividend growth rate on FTSE All-Share stocks for the period 1985 to 2016 indicates a real dividend growth rate of around 5.6% (arithmetic average), which vastly exceeds annual real GDP growth of approximately 2.3%. As a result, Oxera concludes that it would be unreasonable to assume levels of real dividend growth below that of real GDP, and that the CMA is wrong to reject the Bank of England DDM on this basis.

#### *CMA assessment of DDM approach*

- 9.367 A limitation of the DDM approach is that it is wholly dependent on assumptions and produces a broad range of TMR estimates depending on the assumptions used. As the Parties' views above demonstrate, different assumptions on short and longer-term, growth rates can produce materially different TMR estimates.
- 9.368 In our Provisional Findings, we observed that historic real dividend growth (at 0.83%) has been significantly lower than historic GDP growth (at around 2% in the UK)<sup>2484</sup> over the longer term and hence it was not clear that assuming that dividends should grow in line with GDP growth forecasts was reasonable. We noted Oxera's arguments that dividend growth in the future can be expected to be higher than the long-term average. However, we are not persuaded, as a matter of principle, that choosing a subset of the available historic data is a robust approach. For example, the 1985 to 2016 figure (of 5.6%) quoted by Oxera demonstrates how a strong period of returns can produce a materially higher figure than looking at a longer time period, such as the 2.3% figure over the 1950 to 2019 period.

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<sup>2483</sup> Oxera notes that the 2020 version of the Yearbook increases this figure to 1.03%.

<sup>2484</sup> Bank of England (2017), [A millennium of macroeconomic data for the UK](#)

- 9.369 Moreover, we note that other sources make the opposite argument. For example, DMS (when considering the expected equity risk premium) suggest that the historical real growth rate of dividends on the world index may have been at least partly attributable to good fortune and they reduce their estimate of the future expected ERP as a result, ie to reflect a slower real growth rate of dividends.<sup>2485</sup> In this context, we note that dividend growth in the UK at 0.83% has significantly exceeded the growth rate on the world index of 0.46%.<sup>2486</sup>
- 9.370 On this basis, we consider that the long-term average figure of 0.83% is the best guide we have to future real dividend growth rates.
- 9.371 Next we considered Oxera's argument that we had misinterpreted the academic evidence underpinning our observation that analysts' forecasts are generally found to be overly optimistic. We disagree. De Bondt and Thaler (1990) state that: 'There are three main findings. Forecasts are too optimistic, too extreme, and even more extreme for two-year forecasts than for single-year predictions.'<sup>2487</sup> Similarly, Chan et al. (2003) explain that: 'Security analysts' earnings forecasts are... widely used as measures of the market's expectations of growth in future earnings. As a check on the quality of analysts' predictions, we evaluate how well realized growth rates align with IBES consensus forecasts. Our main findings are as follows... Security analysts' long-term growth estimates tend to be over optimistic and contribute very little to predicting realized growth over longer horizons.'<sup>2488</sup>
- 9.372 We recognise that there is some academic literature regarding (very) short-term earnings forecasts, which supports the view that analysts may wish to help managers create small positive surprises.<sup>2489</sup> However, we do not find that this literature changes our overall assessment (as set out in our Provisional Findings), which is that, taken in the round, this evidence suggests that the Bank of England's DDM, which incorporates both longer-term analysts' forecasts and a weighted international GDP growth forecast (which exceeds UK historic real growth rates in dividends), may overstate the expected TMR. Furthermore, the Bank of England highlights that:

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<sup>2485</sup> E. Dimson, P. Marsh, M. Staunton (2019), '*Credit Suisse Global Investment Returns Yearbook 2019*', 2019, p.37

<sup>2486</sup> E. Dimson, P. Marsh, M. Staunton (2019), '*Credit Suisse Global Investment Returns Yearbook 2019*', Table 10, p.34

<sup>2487</sup> For example, see De Bondt & Thaler (1990), 'Do security analysts overreact', *The American Economic Review*, Vol 80, No. 2

<sup>2488</sup> Chan et al (2003) 'The level and persistence of growth rates' *The Journal of Finance*, Vol LVIII, No 2

<sup>2489</sup> For example, see Chan, L., Karceski, J. and Lakonishok, J. (2007), 'Analysts' Conflicts of Interest and Biases in Earnings Forecast', *Journal of Financial and Quantitative Analysis*, 42, pp. 893–913, or Bissessur, S. and Veenman, D. (2016), 'Analyst information precision and small earnings surprises', *Review of Accounting Studies*, 21, pp. 1327–60.

As the ERP cannot be observed, any estimate of it is necessarily subject to uncertainty. Part of the uncertainty associated with model-based estimates of the ERP reflects uncertainty about the measurement of the model's inputs. For example, investors' true dividend expectations cannot be observed, so any proxy for these used in a DDM, whether derived from analyst surveys or GDP forecasts, is necessarily only an approximation. The inherent uncertainty about the true value of the ERP is reflected in the wide dispersion of ERP estimates in the literature. Given the uncertainty associated with measuring the ERP, the Bank's analysis tends to focus less on the precise level of the ERP and more on changes in the ERP over time or on the level of the ERP relative to historic averages.<sup>2490</sup>

9.373 On balance, therefore, we find that Ofwat's advisors' estimates of the TMR (of around 6 to 7% CPI-real) are likely to be more robust than the Bank of England model outputs.

9.374 However, due to the sensitivity of these estimates to assumptions, we place limited weight on the results derived from this approach.

#### *Survey evidence and practitioner forecasts*

9.375 Another possible source for forward-looking estimates of the ERP is surveys of investors, market participants and academics. We note the following evidence:

(a) Fernandez et al. (2019)<sup>2491</sup> results suggest a TMR for the UK of 8.3% in nominal terms, which corresponds to an RPI-deflated TMR of 5.3%).

(b) Ofwat took into account nine practitioners' forecasts in coming to a view on investors' expectations for TMR.<sup>2492</sup> These provide a range of TMR estimates of between 3.6% to 5.8% (RPI-deflated). In addition, Ofwat noted that some forecasts were substantially lower than this range.<sup>2493</sup>

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<sup>2490</sup> Bank of England (2017) *Quarterly Bulletin: An improved model for understanding equity prices*

<sup>2491</sup> Fernandez, Martinez, & Acin (2019), *Market Risk Premium and Risk-Free Rate used for 69 countries in 2019: a survey*

<sup>2492</sup> Europe Economics (2019), *The Cost of Capital for the Water Sector at PR19*, pp34-35

<sup>2493</sup> For instance, Ofwat noted that Franklin Templeton expect UK equities to achieve an annualised 5.8% nominal return over the next 7 years, and Blackrock predict an annualised nominal return of for UK equities of 5.5% over the next 15 years. Ofwat (2020), *Reference of the PR19 final-determinations: Cross-cutting issues*, paragraphs 5.44-5.45

## *Responses to our Provisional Findings*

9.376 ENA submitted<sup>2494</sup> that:

- (a) Adjusting the survey data of returns expected on a portfolio of securities to represent an arithmetic average implies a higher TMR than suggested by the CMA;
- (b) Further reading of the Fernandez et al. survey document shows that 'More than fifty respondents provided answers at the beginning of March and later, considering the coronavirus. Most of them increased MRP by 2%' meaning investor views could now be materially higher than they were at the time the survey began; and
- (c) There are multiple practitioner forecasts from post-March 2020 which give forecasts higher than those referenced by EE which were based on 2019 data. This suggests much higher expected returns than included in the CMA's TMR assumptions. Examples of this include JP Morgan at 9.06% arithmetic average and Invesco at 8.4% arithmetic return for large cap and 10.1% for small cap.

### *CMA assessment of survey evidence*

9.377 In our Provisional Findings, we observed that investor surveys and practitioner forecasts tend to produce a broad range of estimates, which as a result usually provide limited guidance on a reasonable range for the TMR. The breadth of the range will generally reflect the fact that such surveys / forecasts are subjective; the results may depend on the identity and outlook of the respondents and how they interpret the questions being asked.

9.378 We considered the new evidence and argumentation submitted by ENA. We find the presentation of this evidence to be somewhat misleading and a closer examination of it does not provide a different view from that given by the evidence set out in paragraph 9.375. In particular we note:

- (a) The practitioners' forecasts relied upon by Ofwat were drawn from analysis undertaken by Ofgem<sup>2495</sup> and, as set out in Ofgem's consultation

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<sup>2494</sup> ENA's response to the provisional findings, p13

<sup>2495</sup> Ofgem (2019), *RIO-2 Sector Specific Methodology Decision – Finance*, p39. Ofgem explains that 'We therefore agree with Oxera that geometric averages may need upward adjustment. Oxera suggested an uplift of 2% but it is much less clear to us that this quantum is appropriate. As shown at Figure 6 below, in the absence of arithmetic values from the publishers, we assume an uplift of 1%, which we believe is appropriate based on the JP Morgan publication (which implies a differential between arithmetic and geometric forecasts of 0.82%).<sup>38</sup> Note that this simplification is for demonstration purposes and may not be appropriate for all values.'



documents, already include an adjustment (of 1%) to uplift geometric means to arithmetic means;

- (b) The Fernandez et al survey ENA refers to is the 2020 version<sup>2496</sup> rather than the 2019 version (quoted in paragraph 9.375). While some respondents who replied after the start of March increased their TMR estimates as ENA states, the TMR estimate from the overall survey was 6.9% (nominal), compared with an estimate of 8.3% in the 2019 survey, ie the other respondents had a significantly *lower* TMR estimate in the 2020 survey. The 2020 survey overall, therefore, indicates an RPI-real TMR figure of just under 4%. Even if the Covid-19 pandemic had increased TMR expectations by around 2 percentage points from this estimate - and we note the very small number of respondents on which this view is based ('most of more than 50') makes such an assertion highly speculative – this would only increase the figure to 8.9% nominal, which is equivalent to 5.7% (RPI-real); and
- (c) The Invesco and JP Morgan figures<sup>2497</sup> quoted by ENA are nominal and are equivalent to RPI-real arithmetic returns of 5.4% (Invesco large cap), 6.0% (JP Morgan) and 7.0% (Invesco small cap). We consider that an appropriate benchmark for the total market return will be a weighted average of the large and small cap figures rather than either of them on their own. In combination, therefore, we consider that this evidence suggests a TMR of around 6.0% RPI-real.<sup>2498</sup>

9.379 The further evidence presented reinforces our view that survey evidence should be treated with caution. For example, we note the significant volatility from 2019 to 2020 in TMR estimates from the Fernandez et al survey.

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<sup>2496</sup> Fernandez, Martinez, & Acin (2020), Survey: Market Risk Premium and Risk-Free Rate used for 81 countries in 2020.

<sup>2497</sup> See Invesco, [2021 Long-Term Capital Market Assumptions Q1 update](#) and JP Morgan [2020 Long-Term Capital Market Assumptions](#)

<sup>2498</sup> We note that when weighting the large and small cap evidence, we would expect the large cap figures to receive a significantly greater weighting than small caps in line with their greater share of overall market capitalisation. For example, as of the end of January 2021, the FTSE 100 accounted for approximately 79% of the total UK market capitalisation, while the FTSE Small Cap accounted for approximately 13% of the total UK market capitalisation. See [Factsheets | FTSE Russell](#).



## Overall assessment of evidence on TMR

### Responses to our Provisional Findings

- 9.380 Ofgem submitted that the CMA had placed little, if any, weight on the historic ex-ante or forward-looking approaches, which suggests an unduly narrow focus.<sup>2499</sup>
- 9.381 Ofgem suggested that the CMA should consider US dollar returns as a cross-check on its estimates of TMR. If the marginal investor to the UK market is an international one, (whose currency of numeraire is the US dollar), and if the Purchasing Power Parity theory holds in the long run, then US dollar returns of the UK market should be a good measure of the actual returns investors achieved.<sup>2500</sup>
- 9.382 Further, Ofgem noted that the average of the CMA's three estimation methods, ex-post, ex-ante and forward-looking, of 5.1% to 6.1%, is out of line with the CMA's proposed range of 5.25% to 6.25%.<sup>2501</sup>
- 9.383 Anglian,<sup>2502</sup> Bristol<sup>2503</sup> and Yorkshire<sup>2504</sup> noted that adjusting the CMA's range for the various points they have made regarding deflating and averaging historic returns results in a TMR range of 5.2% to 6.8%, with a midpoint TMR of 6.0%, prior to any 'aiming up'.
- 9.384 KPMG submitted that when selecting appropriate international comparators, a key issue is the degree of investor protection offered by the legal system. La Porta et al (1998, 2000)<sup>2505</sup> note that investor protection is very different in common law countries and so KPMG submits that we should focus on countries with comparable Common Law systems to the UK. The data shows that, with the exception of Ireland, those countries with comparable legal protections for shareholders have ex-post TMR figures in line with, or above, the UK figures (see Figure 9-8).

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<sup>2499</sup> [Ofgem's response to the provisional findings](#), paragraph 32

<sup>2500</sup> [Ofgem's response to the provisional findings](#), paragraph 39

<sup>2501</sup> [Ofgem's response to the provisional findings](#), paragraph 32

<sup>2502</sup> [Anglian's response to the provisional findings](#), section 4.1

<sup>2503</sup> [Bristol's response to the provisional findings](#), section 7.2

<sup>2504</sup> [Yorkshire's response to the provisional findings](#), table 1

<sup>2505</sup> R. La Porta, F. Lopez-de-Silanes, A. Shleifer and R.W. Vishny, *Law and Finance Journal of Political Economy*, Vol. 106, No. 6 (December 1998), pp1113-1155. R. La Porta, F. Lopez-de-Silanes, A. Shleifer and R.W. Vishny, 'Investor protection and Corporate Governance', *Journal of Financial Economics* 58 (2000) 3-27

**Figure 9-8: KPMG summary of average equity market returns in common law countries**

	Australia	Canada	Ireland	NZ	South Africa	US	UK
Geometric average	6.8%	5.7%	4.4%	6.4%	7.1%	6.5%	5.5%
Arithmetic average	8.3%	7.1%	6.9%	8.1%	9.2%	8.5%	7.3%

Source: Table 1 of the 2020 DMS Publication

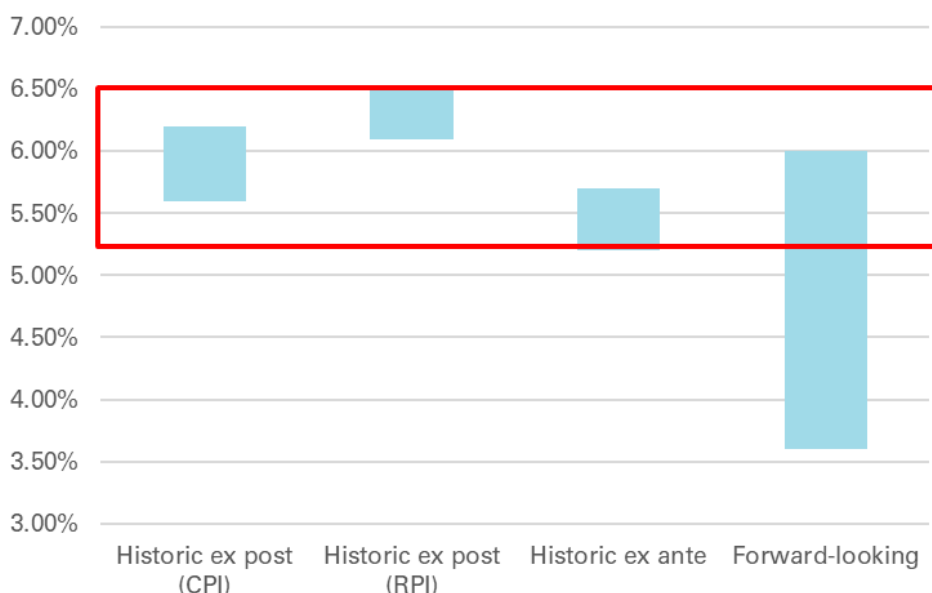
Source: KPMG

9.385 A third party told us that we should have considered the relationship between historical benchmarks and the current cost of capital more carefully, noting that in the last 12 years the risk free rate has fallen by around 400 bps making it necessary to consider the extent to which this reduction in the risk free rate feeds through into a lower total market return. This party highlighted that some practitioners believe that the TMR has fallen in tandem with the risk free rate (meaning that the ERP has been fairly stable), while others take the view that the TMR has not changed by nearly as much as gilt/AAA yields (implying that the ERP has increased). However, very few practitioners believe that the TMR is an unchanging constant or that the ERP has moved exactly one for one with changes in the risk-free rate.

#### *CMA assessment*

9.386 Figure 9-9 sets out the TMR ranges derived from the historic ex-post, historic ex-ante and forward-looking approaches.

**Figure 9-9: Total Market Return estimates, RPI-real under the historic ex-post, historic ex-ante and forward-looking approaches**



Source: CMA analysis

9.387 In previous regulatory determinations, the CMA has generally followed the approach set out in the 2018 UKRN report (and earlier reports by the same authors) of assuming that the total market return parameter is broadly stable and that the equity risk premium fluctuates with the risk free rate.<sup>2506</sup> However, as the UKRN authors explain, *‘while evidence for [a] counter-cyclical risk premia is strong..., this should not be taken as a claim that the ERP instead moves precisely one-for-one in the opposite direction to the RFR.’*<sup>2507</sup> As the third party highlights (see paragraph 9.385), the recent decline in the risk free rate, in combination with TMR estimates derived from very long-run historic data, results in an equity risk premium estimate which is significantly above the longer-term average.

9.388 It seems likely that the forward-looking evidence set out above reflects the fact that (some) investors’ current TMR expectations have declined, to a certain extent, with the risk-free rate.

9.389 In coming to a view on the appropriate range / point estimate for the total market return, we considered to what extent it was appropriate to adjust the long-run historical averages to reflect current expectations, ie how much

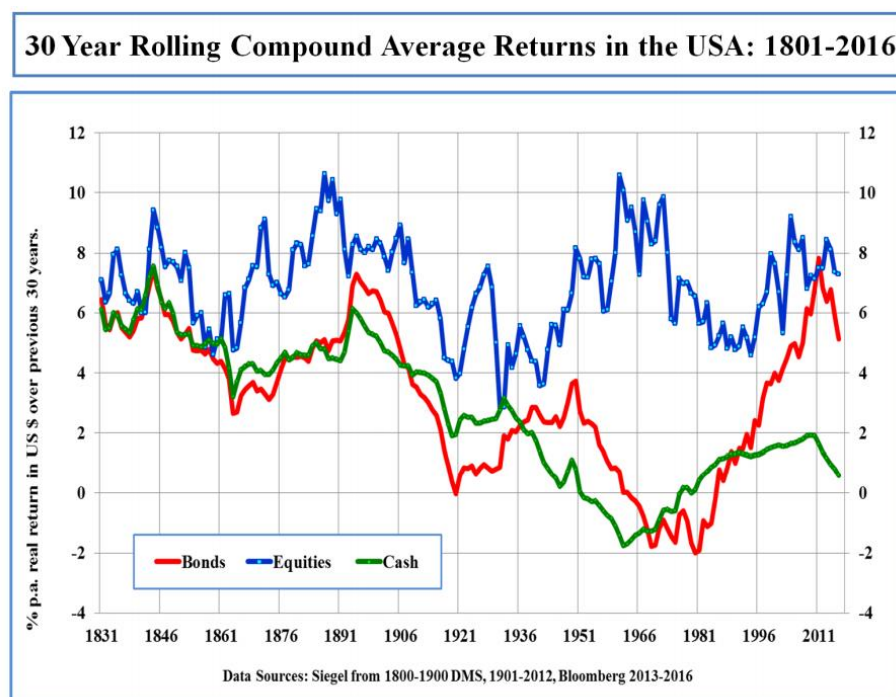
<sup>2506</sup> See CMA (2020), [NATS/CAA](#) paragraph 13.170, and CC (2014) [NIE RP5 final determination](#), paragraph 13.146

<sup>2507</sup> UKRN (2018), [Estimating the cost of capital for implementation of price controls by UK Regulators. A report by Wright, Burns, Mason and Pickford](#), 4.4.2, p39

weight to place on the historic evidence and how much on the forward-looking evidence. In this context, we observe the following:

- (a) The historic evidence, as set out in the UKRN report (see Figure 9-10), supports the view that the TMR has been significantly more stable than the ERP over time;
- (b) Equity market returns have tended to exhibit relatively long cycles (with periods of above/below average returns lasting two or more decades). However, it is unclear to what extent these cycles reflect changes in investors' expectations or return requirements and to what extent they reflect periods of good / bad luck;
- (c) The available survey evidence tends to both give a broad range of TMR estimates and can be volatile from one year to the next – for example, the Fernandez et al 2020 survey produced a TMR estimate that was 1.4 percentage points lower than the 2019 survey.

**Figure 9-10: Compound average real returns on bonds, equities and cash in the USA between 1801 and 2016.**



Source: UKRN Report, Figure 4.4.

9.390 In this context, we continue to believe that it is appropriate to place most weight on the historic TMR estimates, which should be right on average over longer time periods even if they may be too high/low at particular points in time.

9.391 Next, we considered the international evidence available to us. In particular, we noted:

- (a) The disputing companies have submitted that, to the extent that international comparisons are made, the CMA should focus on common-law countries as these offer a similar level of investor protection to the UK, and these countries, with the exception of Ireland, have enjoyed similar or higher returns than the UK;
- (b) The UKRN report focussed on comparisons with global stock market returns rather than those from specific other countries. DMS report real world equity returns of 5.0% (geometric) and 6.5% (arithmetic) mean over the 1900 to 2018 period. These figures are 0.4 and 0.7 percentage points lower than the reported UK returns (respectively); and
- (c) According to DMS, US dollar returns on the UK market have been slightly lower than sterling returns (around 5.0% compared with 5.4% on a geometric basis) due to a weakening of the pound against the dollar over the last 120 years.

9.392 We recognise the theoretical arguments for looking at international comparisons as a potential guide to expected returns in the UK, but we note that it is difficult to draw strong conclusions from this evidence. To the extent that we look at returns in other geographies, we consider that the total world return appears preferable to returns data from specific other countries, such as the USA or Australia, on the basis that the former is less likely to be biased by single-country out-performance. However, we also recognise that there is a reasonably extensive literature on the benefits of common-law systems for investors and that might suggest that returns in common-law countries, including the UK, could be expected to outperform the global average. Similarly, while US dollar returns on the UK market could be considered as a cross-check on the CPI/RPI debate, it relies on purchasing power parity holding and we consider that to be a strong assumption.

### ***TMR – CMA assessment***

9.393 In coming to a view on a reasonable range of TMR estimates, we have placed most weight on the historic ex-post and historic ex-ante approaches. The former gives a range of 5.6% to 6.5% (RPI real), while the latter gives a range of 5.2% to 5.7% (RPI real). We observed that the forward-looking approaches give a lower range of around 3.6% to 6.0%. In this context, we considered how to weigh up the available evidence.

- 9.394 First, we concluded that our reservations about the robustness of the forward-looking evidence and our preference to maintain our assumption of a constant TMR over time, meant that we should place limited weight on the forward-looking estimates. In contrast, we consider that the historic ex-ante evidence, which seeks to control for particularly good/bad luck which one may not expect to be repeated, provides a useful cross-check.
- 9.395 Second, we observed that the historic ex-ante range sits almost entirely below the historic ex-post range (overlapping only at 5.6% to 5.7%). We do not believe that narrowing the range to the area of overlap would reflect the reasonable range of TMR estimates in light of the evidence that we have collected. Rather, we have concluded that it was reasonable to include the historic ex-ante range of estimates in our overall TMR range, reducing the lower end of the range to 5.2%. On this basis, we conclude that the overall TMR range is between 5.2% and 6.5% (RPI-real).
- 9.396 This range is slightly broader than that used in our Provisional Findings (of 5.25% to 6.25%), largely reflecting our inclusion of non-overlapping averages in the range.
- 9.397 Our 5.2% to 6.5% TMR range, in RPI real terms, is equivalent to 6.15% to 7.46% CPIH real terms, as shown in Table 9-4.

**Table 9-4: TMR Estimate**

			%
<i>CPIH Real</i>	<i>Low Estimate</i>	<i>High Estimate</i>	<i>Ofwat PR19 final determination</i>
Total Market Return	6.15	7.46	6.50

Source: CMA Analysis

## Beta

### *Introduction*

- 9.398 Beta within the CAPM framework reflects an asset's (or a portfolio of assets') exposure to systematic (or common) risks relative to the broader market.
- 9.399 A commonly referenced systematic risk is the performance of the overall economy. Systematic risks are distinct from idiosyncratic risks, which may impact only a small number of assets, or may simultaneously impact different assets positively and negatively. The models we use to estimate the cost of equity assume that idiosyncratic risks are diversified away, and so we only concern ourselves with exposure to systematic risks.

9.400 We use the CAPM as the primary way to calculate the cost (or allowed return) on equity for regulated businesses. The basic formulation of this model is shown below:

$$K_E = R_{rf} + \beta(R_m - R_{rf})$$

Where  $K_E$  is the return on equity being estimated,  $R_{rf}$  is the risk-free rate,  $\beta$  (beta) is the specific company's exposure to systematic (undiversifiable) risks and  $R_m$  is the total return on the stock market.

9.401 The beta which would be faced by investors in a company's assets is often called the asset beta. However, investors normally invest in securities (which are able to call on returns earned on those assets), rather than directly investing in the assets themselves. Where this is the case, the asset beta ( $\beta_A$ ) can then be split into equity beta ( $\beta_E$ ), the exposure of shareholders to systematic risk, and debt beta ( $\beta_D$ ), the exposure of bondholders to systematic risk. In calculating the asset beta, debt and equity betas are weighted by the proportion of debt( $g$ ) and equity( $1-g$ ) within the capital structure, as shown below.

$$\beta_A = g \cdot \beta_D + (1 - g) \cdot \beta_E$$

9.402 We can see from this equation that for a given value of asset beta ( $\beta_A$ ) a positive debt beta reduces the (re-levered) equity beta, as a portion of systematic risk is assumed to be borne by debt investors, and so does not require compensation in equity returns.

9.403 The equity beta, and therefore the cost of equity, in the CAPM framework will also generally rise as gearing rises, because increasing gearing means that shareholders are exposed to increasing levels of systematic risks per share. As a result of this relationship between gearing and equity beta, an approach of calculating an asset beta is often used in regulators' WACC decisions. This approach allows firms with different capital structure to be brought onto a comparable basis. This comparator asset beta is then adjusted using the formula above to estimate the equity beta of the regulated firm.

### **Calculating equity betas**

9.404 Equity beta is typically the most straightforward to observe and calculate, and asset betas can be inferred from equity betas by adjusting for gearing. Equity beta is usually derived by regressing share price returns directly on equity market returns. When a firm's shares are not listed, and therefore the equity

beta cannot be measured directly, the betas of comparator companies with similar levels of systematic risk are used as a proxy for that firm's equity beta.

- 9.405 A share price that generally moves up and down in an exaggerated way relative to the market moving up and down will have an equity beta higher than one. A share price that generally moves in a muted way relative to the market will have an equity beta lower than one. A share price that generally moves in line with the market will have an equity beta close to one.

### **Calculating debt betas**

- 9.406 Debt beta is generally more difficult to measure than equity beta, as bonds are less well traded than equities and so the quality of bond returns data is likely to be lower than that of share price data. We received a submission from ENA which included a report from the economic consultancy firm, Oxera, that specified four ways to estimate debt beta:<sup>2508</sup>

- (a) The **Direct** approach involves regressing bond returns directly on equity market returns. This method has been used in the determination of allowed debt beta for H7 (Heathrow) and RP3 (NATS) by the CAA and for PR19 by Ofwat;
- (b) The **Indirect** approach requires a two-step methodology. The first step involves regressing a company's bond returns against returns on an index of government bonds and the returns on the shares of the same company. The second step is to multiply the coefficient on the company's equity returns (this is the elasticity of debt with respect to equity) obtained from the regression in the first step, by the company's equity beta. This is the method adopted by Oxera in its report for ENA on estimating the appropriate equity and debt betas for RIIO-2 price control;
- (c) The **Structural** approach involves viewing equity as a call option on the firm's assets, and debt a put option,<sup>2509</sup> with a strike price equal to the face value of debt. Under particular assumptions, the Black-Scholes formula<sup>2510</sup> can be used to value those options. In turn, the debt beta can be calculated from these resulting values; and
- (d) The **Decompositional** approach involves decomposing the debt spread (the spread between yields on corporate and government bonds) into three components—default premium, default risk premium and liquidity

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<sup>2508</sup> ENA third submission, Annex 05

<sup>2509</sup> A call option is a 'right to buy' at a certain price. A put option is a 'right to sell' at a certain price.

<sup>2510</sup> See Black, F and Scholes, M (1973) 'The pricing of Options and Corporate Liabilities', *The Journal of Political Economy*, pp637–654



premium. The decomposition method was the main method relied on by regulators to derive the debt beta for the recent price controls for PR19 and RP3.

9.407 We agree that this is a comprehensive summary of the potential approaches to estimating debt beta. We have considered these approaches in our assessment of debt beta below.

### ***Ofwat PR19 Decision***

9.408 This section summarises Ofwat's decisions on the choice of beta. We present more detail on Ofwat's reasoning for these decisions in the discussion of parties' arguments below.

#### ***Unlevered equity beta***

9.409 Ofwat retained its 'early view' approach of using the 'Harris Pringle'<sup>2511</sup> approach to calculate an estimate of equity beta for the notional company. This approach involved a 3-step process:<sup>2512</sup>

- (a) Taking a direct regression-based estimate of equity beta (raw equity beta) using returns data for listed water companies and the FTSE All Share Index.
- (b) Adjusting this estimate to strip out the impact of listed company gearing (unlevering).
- (c) Adding back the impact of gearing up to the notional level of 60% (re-levering).

9.410 In support of its final determination, Ofwat commissioned EE to provide analysis of equity beta using data with a cut-off date of 30 September 2019. EE focused on a weighted average composite of betas from Severn Trent Water and United Utilities and made the following estimates of unlevered beta:<sup>2513</sup>

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<sup>2511</sup> For more information on the Harris Pringle approach, please see Harris, RS and Pringle, JJ (1985), [Risk-adjusted discount rates – extensions from the average-risk case](#).

<sup>2512</sup> Ofwat (2019), [Allowed return on capital technical appendix](#), section 5.4.1

<sup>2513</sup> Ofwat (2019), [Allowed return on capital technical appendix](#), section 5.4.3 including Table 5.8

**Figure 9-11: Ofwat's estimates of unlevered beta in PR19 Final Determination, based on EE analysis**

**Table 5.8: Comparison of OLS and GARCH unlevered beta (Severn Trent – United Utilities composite, September 2019)**

	Estimator	1 year	2 year	5 year
Daily	OLS	0.20	0.25	0.32
	GARCH	0.21	0.26	0.31
Weekly	OLS	n/a	0.18	0.30
	GARCH	n/a	0.23	0.30
Monthly	OLS	n/a	n/a	0.34
	GARCH	n/a	n/a	0.31

Source: Europe Economics analysis of Refinitiv data

Source: Ofwat (2019), *Allowed return on capital technical appendix*

9.411 Based on this data, Ofwat used a point estimate of unlevered beta of 0.29 for its final determination.<sup>2514</sup> This point estimate was unchanged from its draft determination.

### Debt beta

9.412 Ofwat used two different methods to estimate debt beta (see Figure 9-12), both based on the decomposition approach. Ofwat used a debt beta point estimate close to the bottom of the range suggested by this data of 0.125, which was also consistent with debt beta from its draft determinations.<sup>2515</sup>

**Figure 9-12: Ofwat's estimates of debt beta considered within PR19 final determination**

**Table 5.9: Summary statistics for debt beta decomposition analysis, October 2018 to September 2019**

Source of equity risk premium data		Spot	2 year trailing average
PwC GDP DDM	Range	0.12 – 0.20	0.13 – 0.14
	Average	0.15	0.14
Europe Economics GDP DDM	Range	0.12 – 0.23	0.13 – 0.17
	Average	0.17	0.15

Source: Ofwat PR19 Allowed return on capital technical appendix

<sup>2514</sup> Ofwat (2019), *Allowed return on capital technical appendix*, section 5.4.3

<sup>2515</sup> Ofwat (2019), *Allowed return on capital technical appendix*, section 5.4.3 including The Brattle Group (2016), *Review of approaches to estimate reasonable rate of return for investments in telecoms networks in regulatory proceedings and options for EU harmonization* Table 5.9

## Notional equity beta

9.413 Ofwat used its unlevered asset beta estimate of 0.29 and debt beta estimate of 0.125, in conjunction with its observed gearing of 54.2% and notional gearing of 60%, to calculate a notional equity beta of 0.71. Ofwat's calculations are shown in the Figure 9-13:<sup>2516</sup>

**Figure 9-13: Ofwat's calculation of notional equity beta at draft and final determination**

**Table 5.10: Notional equity beta for final determinations, September 2019**

		Europe Economics view	Updated view for final determinations	Draft determination view
Raw equity beta	A	0.60	0.63	0.64
Observed gearing	B	56.4%	54.2%	54.7%
Unlevered beta	$C = A \times (1 - B)$	0.26	0.29	0.29
Debt beta	D	0.15	0.125	0.125
Asset beta	$E = C + D \times B$	0.34	0.36	0.36
Notional gearing	F	60%	60%	60%
Re-levered beta	$G = (E - (D \times F)) / (1 - F)$	0.64	0.71	0.71

Source: Ofwat PR19 Allowed return on capital technical appendix

## Key arguments

9.414 Parties presented arguments in two main areas relating to estimating the notional equity beta:

- (a) arguments relating to the measurement of equity betas (the source of unlevered beta estimates).
- (b) arguments relating to the measurement of debt beta.

We address each of these issues in turn.

<sup>2516</sup> Ofwat (2019), *Allowed return on capital technical appendix*, section 5.4.3 including Table 5.10

## *Submissions relating to the measurement of equity betas*

### *Ofwat*

- 9.415 Supported by the recommendation of its consultant, EE, Ofwat decided to focus on two-year daily betas, as it considered that two years amounted to a sufficient window to minimise the distorting impact of short-term volatility, but short enough to capture more recent data that was likely to be more relevant to 2020–25.<sup>2517</sup>
- 9.416 Ofwat stated that it had considered multiple sources of beta estimates in selecting its point estimate for unlevered beta, including:<sup>2518</sup>
- (a) EE’s original estimated range of 0.18 to 0.34.
  - (b) EE’s final advice estimated range of 0.25 to 0.31.
  - (c) 0.25 to 0.32, based on the implied range given by Ofwat’s raw beta plausible range of 0.58–0.66
  - (d) The CMA’s Bristol PR14 Determination unlevered beta range of 0.27 to 0.3.
  - (e) The desirable properties of 2-year daily betas (range 0.25–0.26) in terms of their predictive power and an appropriate balance between focusing on relevant data while retaining statistically robust and stable estimates.
  - (f) Ofwat’s view that it may be appropriate to assign more weight to 5-year data (range 0.30–0.34) relative to draft determinations, taking account of its approach at PR14, stakeholder representations, and other recent regulatory decisions.
  - (g) The close tracking of 0.29 by the GARCH<sup>2519</sup> estimate of 2-year daily betas over the first half of the last year.
- 9.417 Ofwat stated that having due regard to all of these considerations, it retained 0.29 as its final determination point estimate for unlevered beta. Ofwat stated that it reflected caution over placing too much weight on recent 2-year daily data (given a pronounced recent fall), and hence it placed some weight on 5-year data.<sup>2520</sup>

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<sup>2517</sup> Ofwat (2019), *PR19 final determinations: Allowed return on capital technical appendix*, section 5.4.1

<sup>2518</sup> Ofwat (2019), *PR19 final determinations: Allowed return on capital technical appendix*, section 5.4.3

<sup>2519</sup> GARCH stands for generalized autoregressive conditional heteroskedasticity. GARCH describes an approach to estimating volatility in financial markets.

<sup>2520</sup> Ofwat (2019), *PR19 final determinations: Allowed return on capital technical appendix*, section 5.4.3

- 9.418 Ofwat considered its estimate to be subject to considerable uncertainty and did not discount the possibility that 2 year daily unlevered betas could subsequently move lower given the recent 0.20–0.21 range of 1-year betas. Ofwat expected that the evolution of market data would provide confirmation on the appropriateness of 2-year betas as a guide to the unlevered beta likely to prevail over 2020–25.<sup>2521</sup>
- 9.419 In response to representations following Draft Determinations, Ofwat said that, since a forward-looking beta is required, it is relevant to consider which betas have the greatest predictive power over similar timeframes. Ofwat said that analysis carried out by EE had demonstrated that shorter beta measurement periods (of 1-year and 2-years) derived using a data cut-off close to the point at which final determinations are made had been better predictors of the average 2-year beta over the subsequent price control period than longer durations of beta measurement. Ofwat agreed with placing more weight on 5-year data in its point estimate than at draft determinations, but did not consider it appropriate to reflect 10-year betas due to the inclusion of very old data from previous price controls which it considered to be of little relevance to a forward-looking estimate for 2020-25.<sup>2522</sup>
- 9.420 In its response to the companies SoCs, Ofwat noted that the appropriate length of estimation window is uncertain, principally because there is no conclusive view on the length of estimation window which investors use to form expectations of beta. Therefore, Ofwat considered that decisions over the length of estimation window inevitably require a degree of regulatory judgment. Ofwat agreed with the CMA's approach in its Bristol PR14 Determination of placing weight on 2- and 5-year estimation windows. However, Ofwat did not favour a 'rolling average' approach to estimating betas as that approach would result in assigning weight to data as far back as 2009, which it did not consider to be especially relevant to informing investor expectations.<sup>2523</sup>
- 9.421 Ofwat did not consider that 2-year betas should be excluded from the scope of the re-determination. Its advisors, EE, firmly endorsed this length of trailing window, finding evidence that 2-year daily betas have more predictive power than other lengths of trailing window, when comparing levels at the time of a final determination and subsequent average level over the following 5 years.<sup>2524</sup>

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<sup>2521</sup> Ofwat (2019), [PR19 final determinations: Allowed return on capital technical appendix](#), section 5.4.3

<sup>2522</sup> Ofwat (2019), [PR19 final determinations: Allowed return on capital technical appendix](#), section 5.4.2

<sup>2523</sup> Ofwat's response to common issues in companies' SoCs: Risk and return, paragraphs 3.57 to 3.58

<sup>2524</sup> Ofwat's response to common issues in companies' SoCs: Risk and return, paragraph 3.59

- 9.422 Ofwat commissioned EE to investigate whether United Utilities and Severn Trent Water<sup>2525</sup> daily betas are downward biased as suggested by the water companies. EE concluded through its statistical analysis (the ‘Dimson test’)<sup>2526</sup> that there was no evidence of this type of bias at the 1% significance level, when using daily data.<sup>2527</sup>
- 9.423 Ofwat also stated that, given that United Utilities and Severn Trent Water are liquid and highly-traded FTSE 100 shares, it disagreed with KPMG’s assertion that it was plausible that delays of over one day could exist in reflecting market data in their share prices. This followed the observation of Mason et al (2003) in advice to UK economic regulators: ‘For large stocks it is very likely that any impact of general market conditions is reflected in transaction prices and quoted prices.’<sup>2528</sup>
- 9.424 EE updated its analysis of water sector betas using a data cut-off of end February 2020. It concluded that applying an approach similar to that employed by the CMA in its provisional findings for the NATS/CAA RP3 redetermination would result in an unlevered beta range of 0.21 to 0.33 or (excluding outliers) 0.26 to 0.32, giving a midpoint of 0.27 and 0.29, respectively. Ofwat therefore considered that its final determination point estimate of 0.29 for unlevered beta remains appropriate.<sup>2529</sup>
- 9.425 Ofwat disagreed with Yorkshire’s statement that share price ‘noise’ should be excluded from the CMA’s beta estimate and argued that while moving back the end of the 5 year estimation window could in principle avoid the period alleged by the company to contain PR19 ‘noise’, it would then pick up more of the ‘noise’ from the PR14 price control determinations. Ofwat therefore considered that this approach does not seem consistent with the company’s criterion.<sup>2530</sup>
- 9.426 Ofwat said that KPMG’s proposed Vasicek adjustment<sup>2531</sup> was not well-evidenced or necessary and did not provide evidence supporting KPMG’s

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<sup>2525</sup> Severn Trent and United Utilities were analysed by the Parties and the CMA as these are the two publicly listed water companies that do not have substantial non-water businesses.

<sup>2526</sup> Betas could be biased if the information-updating process that leads to movements in the stock price is materially slower than the information-updating process that leads to movements in the market index (eg it takes more than a day for new information to be fully reflected in the stock price). In order to test this hypothesis, EE used the ‘Dimson Test’. For more information please see Dimson, E (1979) ‘*Risk measurement when shares are subject to infrequent trading*’, Journal of Financial Economics, 7, pp197-226

<sup>2527</sup> [Ofwat’s response to common issues in companies’ SoCs: Risk and return](#), paragraphs 3.65 to 3.67

<sup>2528</sup> [Ofwat’s response to common issues in companies’ SoCs: Risk and return](#), paragraph 3.68, quoting Mason R, Miles D, Wright S (2003), *A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K (MMW)*.

<sup>2529</sup> [Ofwat’s response to common issues in companies’ SoCs: Risk and return](#), paragraphs 3.60 to 3.61

<sup>2530</sup> [Ofwat’s response to common issues in companies’ SoCs: Risk and return](#), paragraphs 3.62 to 3.64

<sup>2531</sup> The Vasicek/Bayesian adjustment is a statistical method that takes account of measurement uncertainty by employing a weighted average between the beta estimate for the company and a constructed average beta for

assumption that investors in water companies have the same exposure to systematic risks as investors in the overall market. Ofwat viewed this assumption as doubtful given numerous protections against systematic risk provided by the regulatory regime in water. Furthermore, Ofwat considered that KPMG's conclusion that the volatility associated with 5-year monthly beta estimates supported the need for Vasicek adjustment overlooked a much neater solution – which was to rely on daily betas.<sup>2532</sup>

- 9.427 In response to the CMA's cost of capital roundtable, Ofwat submitted updated evidence disputing the view expressed by Professor Gregory that his analysis (AGRF 2020) of structural breaks matched earlier work by Indepen (see paragraph 9.467 below). Ofwat submitted that Indepen found structural breaks for Severn Trent in 2002–03, 2004–05, 2008, 2012–13, while the Gregory papers had found breaks in 2000, 2003, 2007, 2010 and 2014. Ofwat submitted that these are clearly different years, demonstrating that different specifications of test can identify different breakpoints.
- 9.428 Ofwat stated that it was concerned that the approach to structural breaks lacks a coherent set of criteria for favouring particular formulations of test over others, raising the risk that tests may be specified in order to engineer an advantageous length of estimation window rather than on the grounds of good statistical properties.
- 9.429 Ofwat also expressed concern about the design of Gregory's test, particularly the use of 2-year daily betas to estimate statistical breaks while deriving estimate based on a different formulation of beta (roughly 5-year daily and monthly betas).
- 9.430 EE submitted updated data to the CMA which suggested an increase of weekly betas by 0.02–0.04 compared to EE's previous estimates. These new estimates suggested that Ofwat's 0.29 estimate would only be appropriate if considering 2-year daily and weekly betas. If we were to apply Ofwat's approach (placing weight on 2-year and 5-year spot daily betas) to EE's updated data, we would estimate a range between 0.28 (2-year daily) and 0.32 (5-year daily) with a mid-point of 0.30.

### *Disputing Companies*

- 9.431 Anglian, Bristol, Northumbrian, and Yorkshire all submitted that an estimation window of at least 5 years should be used. Yorkshire said that it was most

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the market as a whole that would be equal to one. The weights are based on the relative uncertainty in measurement — the higher the uncertainty in the company beta estimates relative to the variance of all betas in the market, the less weight is placed on the company beta.

<sup>2532</sup> [Ofwat's response to common issues in companies' SoCs: Risk and return](#), paragraphs 3.69 to 3.70



appropriate to place all weight on a 5-year estimation window by reference to previous CMA decisions,<sup>2533</sup> while Anglian,<sup>2534</sup> Bristol,<sup>2535</sup> and Northumbrian<sup>2536</sup> cited analysis and arguments set out by KPMG, including:

- (a) KPMG submitted, citing Indepen (2018)<sup>2537</sup> for Ofgem's RIIO-2 framework decision, that it is appropriate to use the longest run of data since the last structural break. KPMG proposed the end of the PR14 price review as the appropriate structural break in this case.
- (b) KPMG submitted that findings by Gilbert et al (2014) for the US and Gregory et al (2018) for the UK, implied that high frequency beta estimates are more likely to be biased downwards than low frequency estimates. Therefore, most weight should be placed on monthly (ie low frequency) betas.
- (c) KPMG submitted that estimates of beta are well-known to be uncertain and may suffer from a degree of statistical instability. KPMG noted that in order to address this instability, EE (on behalf of Ofwat) investigated the use of a Vasicek adjustment in its report 'PR19 – Initial Assessment of the Cost of Capital' (December 2017). This Vasicek adjustment is designed to deal with the fact that beta is estimated with error. It weights the firm beta and the market average beta by their relative variances. The idea is to place relatively more reliance on the firm beta when estimation variance is low, and less reliance when estimation variance is high.
- (d) KPMG estimated a raw equity beta range of 0.66 to 0.72, based on daily (lower end) and monthly observations over 5-year time horizons, with the 0.72 estimate being Vasicek-adjusted. KPMG said that, given that daily estimates ordinarily include a downward bias, more weight should be placed on monthly estimates, which lie at the top of this range, with the 'raw' 5-year monthly beta being 0.70.

9.432 Yorkshire requested that the CMA ensure that share price 'noise' as a result of Ofwat's draft determination, final determination, as well as the threat of renationalisation before and after the 2019 general election, did not enter and distort its beta estimates. Yorkshire's analysis of United Utilities' and Severn Trent Water's betas over a five-year window to February 2019 indicated that

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<sup>2533</sup> Yorkshire SoC, paragraphs 221 to 227

<sup>2534</sup> Anglian SoC, section 5.3

<sup>2535</sup> Bristol SoC, section 8.3

<sup>2536</sup> Northumbrian SoC, section 8.10.2

<sup>2537</sup> Indepen (2018), *Ofgem Beta Study – RIIO-2, Main Report*



the ‘unlevered beta’ of a water and sewerage company is around 0.33, which equated to an equity beta of around 0.80 at 60% gearing.<sup>2538</sup>

- 9.433 Bristol also referenced KPMG’s view that the use of time horizons of 1, 2 or 5 years is inconsistent with the recommendation of Wright et al (2018) to the UKRN to use long-run time horizons of 10 years or more.<sup>2539</sup>
- 9.434 In their replies to Ofwat, Anglian<sup>2540</sup> and Northumbrian<sup>2541</sup> argued that the beta estimate should be based on a robust approach and reliable data and cited a Gregory, Harris and Tharyan (GHT) paper which argued that for regulatory price control purposes, betas should be estimated using OLS<sup>2542</sup> over the longest time window since the last structural break. The GHT authors ran statistical tests which they claim demonstrated that structural breaks<sup>2543</sup> took place in 2014 and March 2020, hence a 63–65-month time horizon (just over 5 years) from 2014 to February 2020 should be adopted. GHT analysis of Severn Trent Water and United Utilities betas for the period to February 2020 betas across daily and monthly frequencies supported a raw equity beta of 0.72.
- 9.435 Anglian disagreed with EE’s analysis and argued that two stocks are insufficient to test the theory of whether daily estimates are biased downwards. Anglian suggested that detailed empirical evidence in Gregory (2018) and Gilbert (2014), and with the use of larger sample sizes, demonstrates that a downward bias exists. In addition, the EE analysis applied an aggressive 1% significance level and only tests the impact of a one-day lag.<sup>2544</sup>
- 9.436 Bristol and Yorkshire cited an EE report, which presents updated evidence on betas from listed comparators using the CMA methodology in the NATS/CAA provisional findings report. Bristol and Yorkshire claimed that Ofwat used a very narrow window of share price data in the final determination in order to justify an unlevered beta value that was lower than 0.30. Specifically, the companies submitted that Ofwat had focused its attention on estimates of

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<sup>2538</sup> [Yorkshire SoC](#), paragraphs 226 to 227

<sup>2539</sup> [Bristol SoC](#), paragraph 298

<sup>2540</sup> [Northumbrian’s reply to Ofwat’s response](#), Part F, p6

<sup>2541</sup> [Northumbrian’s reply to Ofwat’s response](#), paragraph 58

<sup>2542</sup> In statistics, OLS is a type of linear least squares method for estimating the unknown parameters in a linear regression model. OLS chooses the parameters of a linear function of a set of explanatory variables by the principle of least squares: minimizing the sum of the squares of the differences between the observed dependent variable (values of the variable being observed) in the given dataset and those predicted by the linear function. In lay terms, OLS is often used to provide the line of best fit in a scatter graph.

<sup>2543</sup> In econometrics and statistics, a structural break is an observable change over time in the parameters of regression models, which can lead to forecasting errors and unreliability of the model. In the case of beta measurement, the most obvious structural break would come from a distinct and meaningful change to the gearing at companies being measured.

<sup>2544</sup> [Anglian’s reply to Ofwat’s response](#), Part F, p6

betas calculated with no more than four years of data while knowing that more robust and conventional estimation approaches that used a minimum of five years of share price data gave a range for the unlevered beta of 0.30 to 0.34.<sup>2545, 2546</sup>

### ***Approach adopted in CMA Provisional Findings***

9.437 Our provisional approach to estimating the unlevered equity beta followed the broad approach used by Ofwat in PR19. For our calculations we measured the betas of UU and SVT across a range of periods, frequencies, and calculation methods including:

- (a) 2-year, 5-year and 10-year betas;
- (b) daily, weekly and monthly frequency;<sup>2547</sup>
- (c) data from i) February 2005 to end of June 2020, ii) February 2005 to end of February 2020, and iii) September 2014 to end of February 2020;
- (d) OLS calculations; and
- (e) spot betas and 1-year, 2-year, 5-year rolling averages.

9.438 We did not employ a Vasicek adjustment or use the GARCH method. Consistent with Ofwat, we applied the Harris-Pringle approach when unlevering beta.

9.439 We observed that the different frequency/sampling approaches gave a wide range of beta estimates. We considered that some of the monthly estimates were outliers and therefore should be removed.

9.440 For each period, we then calculated the minimum, average and maximum for each of the spot and rolling periods, which gave an average range of 0.27–0.32 (see Table 9-5).<sup>2548</sup> This approach placed weight on all estimation methods, although the exclusion of certain outliers gave less weight to monthly betas.

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<sup>2545</sup> [Bristol's reply to Ofwat's response](#), paragraphs 198–200 including Tables A5 and A6

<sup>2546</sup> [Yorkshire's reply to Ofwat's response](#), paragraphs 7.2–7.2.3 including Table 18

<sup>2547</sup> We average each weekday-derived estimate of weekly data in order to remove any potential measurement day impact. Wednesday data was excluded in June 2020 data due to the presence of outliers. Note, we do not use 2-year monthly estimates due to a lack of datapoints for robust analysis.

<sup>2548</sup> The minimum to maximum range for the period from February 2005 to June 2020 was 0.25 to 0.35, for February 2005 to February 2020 it was 0.25 to 0.35, and for September 2014 to February 2020, it was 0.28 to 0.33 (all figures quoted excluding outliers).

**Table 9-5: Summary of CMA analysis of Severn Trent Water and United Utilities unlevered equity betas by timeframe**

<i>Average by timeframe</i>	<i>Spot</i>	<i>1-year average</i>	<i>2-year average</i>	<i>5-year average</i>
Feb 2005 to Feb 2020	0.30	0.29	0.30	0.31
June 2005 to June 2020	0.27	0.29	0.30	0.32
September 2014 to Feb 2020	0.31			

Source: CMA analysis using Thomson Reuters data

9.441 On the basis of the data above, we provisionally used a low estimate of the unlevered beta of 0.27 and a high estimate of the unlevered beta of 0.32.

### *Parties' response to CMA Provisional Findings*

#### *Ofwat*

9.442 Ofwat told us that our approach to the exclusion of outlying data points was inconsistent and referred us to Wright and Mason's submission on betas.<sup>2549</sup>

9.443 Wright and Mason submitted that beta should be calculated using longer samples (and ideally taking GARCH estimates into account) as:

- (a) The rationale for estimating beta using short samples of daily data is inconsistent with the long horizon assumed in other calculations;
- (b) There is an inconsistency between using such short samples (implicitly assuming some form of parameter instability in beta) and using OLS estimation that is predicated on a constant value of beta; and
- (c) The apparent short-term variation in rolling estimates of beta is consistent with a multivariate GARCH process in which the conditional beta varies over time, but has a stable unconditional value.<sup>2550</sup>

9.444 In addition, Wright and Mason submitted that:

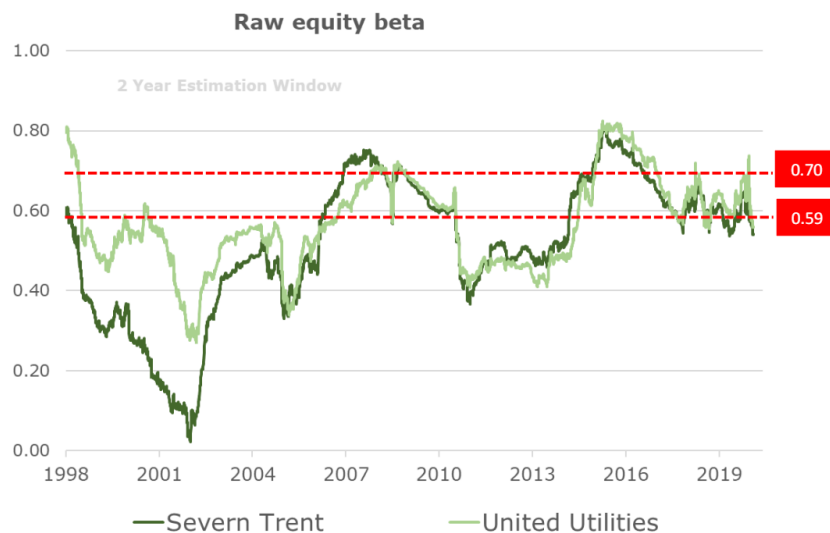
- (a) They have a strong preference for focussing on the directly estimated equity beta, rather than the constructed unlevered and asset beta series as the latter are constructed by assumptions, rather than estimation;
- (b) The evidence (see Figure 9-14) suggests:
  - (i) long-run stability for both stocks since the mid-2000s (and prior to that in the case of UU);

<sup>2549</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraphs 5.28–5.29

<sup>2550</sup> Mason, R and Wright, S (2020), [Comments prepared for Ofwat on the CMA's Provisional Findings](#), paragraphs 2.2–2.3.

- (ii) for the past 15 years the two beta estimates have been virtually identical: essentially the equity market appears to view the two companies as having identical systematic risk; and
- (iii) the CMA's chosen range of values for raw beta, of roughly 0.6 to 0.7, is very much at the upper end of the range of estimates shown in the chart. Indeed, average values of beta for the two companies over the period since end-2003, the point from which the two betas essentially moved together, are somewhat below the value CMA picks as the lower end of its range; and estimated betas have only rarely moved above the CMA's chosen range. Thus, even before the CMA applies its 'aiming up' correction, Wright and Mason argue that it has picked a range that is biased upwards;<sup>2551</sup> and
- (c) Consistent with the CMA's chosen long-term horizon and absent evidence of any long-term drift in beta, it makes sense to use as much data as possible to estimate equity beta, and hence derive estimates of asset beta. And, given the use of a longer sample of data, Wright and Mason see clear signs of an upward bias in the way the CMA (and, by implication, Ofwat) have picked their ranges for beta.<sup>2552</sup>

**Figure 9-14: Wright and Mason submission (2-year rolling equity beta estimates for UU and SVT)**



Note: The red dotted lines show the CMA's low (0.59) and high (0.70) estimates of raw equity betas, calculated from their low (0.27) and high (0.32) values of the unlevered beta and the observed gearing level of 54.2%.

Source: Wright and Mason

<sup>2551</sup> Wright and Mason explain that rolling beta estimates are a legitimate diagnostic tool for addressing the issue of whether the true (and unobservable) beta is stable over time. In contrast, if the true beta is assumed not to be stable over time, rolling betas are fraught with problems as estimators of this time-varying value at any point in time – and most notably standard errors (whether OLS or heteroscedastic-consistent) are spurious.

<sup>2552</sup> Mason, R and Wright, S (2020), [Comments prepared for Ofwat on the CMA's Provisional Findings](#), section 5

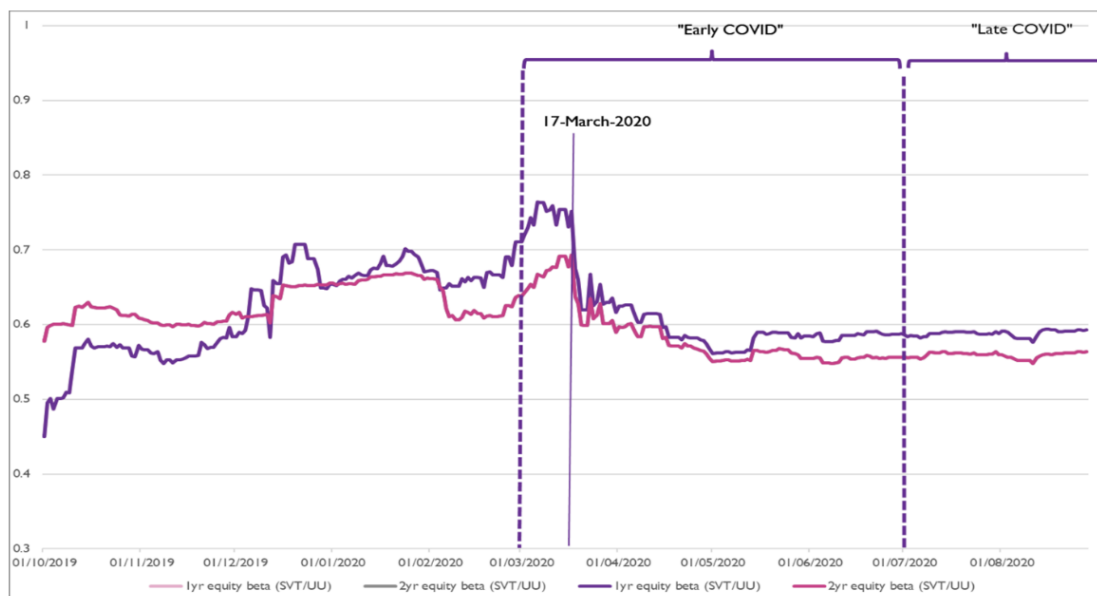
- 9.445 Ofwat submitted that increasing the span of historical data captured in beta estimation to the extent suggested by Gregory et al. includes periods when Severn Trent Water and United Utilities were not close to being ‘pure play’ water companies; thus rendering the beta estimates an unreliable guide to notional company beta. For instance, Ofwat highlighted that prior to 2006, United Utilities owned two telecoms businesses (Your Communications, and Vertex), and Severn Trent Water owned Biffa (a waste management company). Ofwat argued that Gregory et al do not attempt to control for this and so it is not clear why including this data would result in an improved estimate of the water beta.<sup>2553</sup>
- 9.446 Further, Ofwat told us that it disagrees with Gregory et al’s exclusion of the ‘early Covid’ period, noting that the rationale provided for excluding this is that this period is characterised by temporary volatility and so should not be reflected in forward-looking betas. However, much of the excluded data strongly resembles the low volatility ‘late Covid’ period which is included (see Figure 9-15). More generally Ofwat considers it problematic to exclude periods of volatility associated with a manifestly systematic risk from beta estimation. Investors’ decision making is influenced by how assets perform in periods of market turbulence. To exclude such periods of consideration from the assessment of beta is to neglect one of the key motivating factors for investors in holding these assets.<sup>2554</sup>

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<sup>2553</sup> Ofwat’s response to common issues in companies’ SoCs: Risk and return, pp11–12

<sup>2554</sup> Ofwat’s response to common issues in companies’ SoCs: Risk and return, pp11–12

**Figure 9-15: Europe Economics analysis of the recent evolution of 1-year and 2-years raw equity betas**



Source: Europe Economics

### *Disputing Companies*

9.447 Northumbrian<sup>2555</sup> and Anglian<sup>2556</sup> submitted a report prepared by Gregory et al. On the basis of this report, these firms argue for setting a point estimate that is towards or above the upper bound of the CMA's range for the notional equity beta.

9.448 In their report Gregory et al. argue that:

- (a) it is defensible to take one of two positions on the structural break issue. Either one accepts evidence that such breaks are real and important and have implications for the estimation of beta. Or one can proceed on the basis that there is some long run view of the 'true' underlying beta, such that apparent break events can be ignored. However, these two views should not be conflated;
- (b) simple (or spot) beta estimates are preferable to rolling averages. They note that the latter weight the available data differently from simple estimates, giving the example of the case of daily regressions. In simple OLS, each day's data gets an equal weighting. But in the case of rolling regressions which are averaged, the first day's data gets used once, the second twice, and so on. A similar effect takes place at the end of the

<sup>2555</sup> [Northumbrian's response to the provisional findings](#), section 7.4

<sup>2556</sup> [Anglian's response to the provisional findings](#), paragraph 392

observation period. Second, they note that if one wishes to estimate a beta for a period involving a structural break, rolling regressions typically employ data that is pre-break. This is particularly troubling with long window data, as the longer the window, the more pre-break data is included. Third, inspection of individual rolling parameter estimates reveals some wild gyrations in beta estimates, such that the individual rolling estimates are simply implausible; and

(c) the CMA should drop the beta estimates that are based on an ‘arbitrary’ 10-year basis, especially those on a rolling 10-year basis for the following reasons:

- (i) First, it does not follow that if one seeks a long-term estimate of the unconditional beta, that estimate is best derived from a 10-year analysis;
- (ii) Second, this is particularly not the case when there is strong evidence of a structural break during 2014;
- (iii) Third, because of the weighting implied, 10-year rolling estimates of beta are particularly troublesome. In particular, Gregory et al. note that it (and indeed any 20-year estimates that may be contemplated) necessarily include the financial crisis period which the Indepen Report regards as problematic.

9.449 Gregory et al identify two significant breaks in the data over the period from 1991 onwards, explaining that ‘the mean beta over the entire period is 0.565, rising by 0.129 in the post PR14 period (1/10/14 on). During the Covid period, the beta then falls back by 0.159. All of these beta changes are significant at the 1% level.’ Further, they present evidence which suggests that the COVID-19 effect is likely to be temporary rather than a permanent structural break in water company betas.<sup>2557</sup>

9.450 They then present regressions over a variety of different frequencies (daily, weekly and monthly) and time periods, including a long-term estimate (ie since 1991) which gives an asset beta of between 0.28 and 0.36 and an implied equity beta of between 0.64 and 0.83, estimates for the period from October 2014 to September 2020, estimates for the periods between October 2014 and February 2020, estimates for the period October 2014 to September

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<sup>2557</sup> They do this by splitting the post-February 2020 period into “early covid” and “late covid” periods, the former covering March to June 2020 and the latter covering July to September 2020. This regression suggests that the majority of the beta impact (-0.1496) is associated only with the early (March-June) impact of COVID-19. By contrast the late covid period impact is positive, though statistically insignificant. This suggests that the impact of COVID-19 on beta is transitory, although the authors acknowledge this could change in the presence of a second wave.

2020 (but excluding the early COVID-19 months of March 2020 to June 2020, inclusive), and estimates for the 5 years to September 2020. (The other estimates all produce figures which are within the long-term estimate ranges for both asset and equity betas).

- 9.451 On this basis, Gregory et al. conclude that the lower end of the CMA's range has no support, that the range can be tightened considerably to 0.30 to 0.35, and in general supports an asset beta right at the top of the CMA's range.
- 9.452 Yorkshire told us that our range of 0.27 to 0.32 was a skewed reading of the available data, which gives too much credence to spot estimates of beta and/or estimates taken from very short measurement periods. Yorkshire highlighted that all of the trailing average beta estimates that make use of at least five years of share price data but no more than ten years of data – the estimation window that the CMA, Ofwat, Indepen and GHT have all said in the past provides the most accurate insights into investors' perceptions of risk – sit above the CMA's preferred point estimate of beta of 0.3075. Yorkshire submitted that these trailing averages are more accurate than the spot and 10-year approaches and, accordingly, should be given more weight in the CMA's analysis.<sup>2558</sup>
- 9.453 In its final submission, Northumbrian told us that Ofwat had recognised the importance of the frequency of pandemics in consideration of the inclusion of the data for the 2020 COVID-19 period. Northumbrian argued that it would not be credible to use the 2020 data to set the beta estimates using a methodology consistent with the PFs as this would imply that between 2 and 10 years of the 20-year investment horizon are likely to be affected by lockdowns and the levels of government intervention seen in 2020. Northumbrian observed that similar levels of Government intervention (as measured by spending levels relative to GDP) have only occurred in 1 in 20 years and the last comparable pandemic occurred 102 years ago.

### *Third Parties*

- 9.454 Citizens Advice<sup>2559</sup> told us that Ofwat's proposed water company unlevered equity beta of 0.29, asset beta of 0.36, and notional equity beta of 0.71 implies that firms' risk profiles varies pro-cyclically with the wider economy to a substantial degree, for example, that a 1-percentage point change in the UK economy would imply a 0.71-percentage point change in shareholders' profit, on average. In Citizens Advice's view, this is not plausible as England and

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<sup>2558</sup> [Yorkshire's response to the provisional findings](#), pp30–31.

<sup>2559</sup> [Citizens Advice further submission](#)



Wales water companies' financial performance is not pro-cyclical to any material degree, for the following reasons:

- (a) First, water is fundamentally a non-cyclical industry, generally impervious to the wider economy and other economy-wide economic shocks, with neither revenues nor costs likely to vary materially or at all with wider economic conditions. The only likely components of pro-cyclical water company performance are bad debt risk, extreme weather risk, or political risk. However, Citizens Advice considers that the typical global investors in the UK water companies – global banks, asset management firms, private equity funds, plus major pension funds, and/or other global institutional investors and multinational corporations – are able to diversify such risk;
- (b) Second, the underlying feature of the England & Wales water regulation regime is that non-diversifiable risk is almost entirely borne by customers, rather than by investors. Furthermore, the large majority of diversifiable risk is also borne by customers rather than investors. For example, Ofwat and Ofgem have long since highlighted that: '[Water and energy] companies' exposure to unanticipated cost shocks is limited to the extent that there are regulatory mechanisms that can be used to deal with them for example in the water sector the interim determination and substantial effect mechanisms'.
- (c) Third, Citizens Advice argues that PR19 adds a series of new uncertainty mechanisms that further shift risk from investors to customers, in particular, the indexation of debt servicing costs, as well as other material and/or highly uncertain performance commitments. In addition, the CMA itself proposes a further reduction in companies' exposure to financial risk, such as the introduction of 'deadbands' that mitigate the risk to companies of factors outside their control.

9.455 As a result, Citizens Advice argues that this reduction in systematic risk at PR19 compared to PR14 must therefore mean a reduction in the equity beta. However, betas estimated using historic share price data from previous price control review periods will not reflect such lower future systematic risk.

9.456 Finally, Citizens Advice submitted that estimating regulated companies' equity betas based on short-term share price movements was likely to result in over-statement of firms' underlying non-diversifiable risk because short-term share price movements reflect the risks borne by short-term investors, not those borne by the long-term investors that characterise the large majority of investors and which the regulatory regime is intended to encourage. Citizens Advice highlighted the 2018 UKRN cost of capital report, which noted that:

‘On the basis of a priori reasoning the risk profile of cashflows for regulated businesses is almost entirely idiosyncratic [ie diversifiable]’ and argued for estimation of beta based on ‘longer-term data and at lower frequencies’, on grounds that this is ‘more relevant to the long horizons used by regulators’, and that this ‘results in distinctly lower equity beta estimates.’<sup>2560</sup>

### ***Submissions relating to the measurement of equity betas – CMA assessment***

#### ***The appropriate horizon and frequency to estimate beta***

9.457 Ofwat’s use of 2-year daily betas, with cross-checks against 1-year daily, 2-year weekly and 5-year daily, weekly and monthly estimates, is consistent with regulatory practice and has been used by the CMA in the past. 2-year daily betas were used in the recent NATS/CAA case, but this was also influenced by the short trading history available for some key comparator data.<sup>2561</sup>

9.458 However, as raised by the water companies, we acknowledge the potential presence of ‘noise’ in short term estimates, and therefore consider that this estimation method should be used along with longer periods and frequencies to provide the most robust data from which to estimate equity betas. This approach is similar to CMA’s analysis in the Bristol PR14 Determination and the NATS/CAA Provisional Findings.<sup>2562</sup>

9.459 We note this multi-period/frequency approach is one of the three approaches suggested by the Indepen report for the measurement of equity beta. This method considers ‘the distribution of results from estimates using different time windows and frequencies of returns (this can include using OLS and other estimation approaches) and applies judgements derived from the consultation process to arrive at the preferred estimate of the equity beta within the distribution’.<sup>2563</sup>

9.460 In addition, we considered the use of 10-year betas. This was suggested in the UKRN report<sup>2564</sup> and in particular by Wright, Mason and Pickford, who noted that the maturity of betas should be consistent with the maturity chosen when selecting other parameters in the price control.<sup>2565</sup> Given that the risk

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<sup>2560</sup> Citizens Advice further submission

<sup>2561</sup> NATS/CAA, paragraphs 13.56 to 13.64

<sup>2562</sup> In *Bristol Water plc. A reference under section 12(3)(a) of the Water Industry Act 1991 (Bristol PR14 Determination)* (paragraph 10.148) and *NATS/CAA* (paragraph 12.89), we used a range of horizons (2 year, 5 year) and frequencies (daily, weekly and monthly) to estimate equity beta. We then presented our estimates using spot betas and different rolling averages (1 year, 2 year and 5 year).

<sup>2563</sup> Indepen (2018), *Ofgem Beta Study – RIIO-2, Main Report*, p42

<sup>2564</sup> UKRN (2018), *Estimating the cost of capital for implementation of price controls by UK Regulators*

<sup>2565</sup> UKRN (2018), for example Recommendation 2

free rate and the total market returns are estimated over a long period, we consider it reasonable to include 10-year betas within the scope of our beta analysis. We considered Gregory et al's argument that the 10-year time period was 'arbitrary' but we were not persuaded this provided a strong reason against considering betas over this period. 2-, 5- and 10-year periods are all, in one sense, arbitrary but they provide a range of views of the beta of a stock, giving regulators a rounded picture on which to base their judgement of a reasonable beta value. In this context, we consider 10-year betas to provide useful information and to be no more 'arbitrary' than 2- or 5-year betas.<sup>2566</sup> This approach was also discussed in the NATS/CAA Provisional Findings but given that some of the comparators had only been listed for a few years, this estimation method could not be applied in that case.<sup>2567</sup>

9.461 Next, we considered whether we should consider betas over a longer time horizon: for example, using the full run of available data for the listed firms from 1991 onwards, as suggested as a reasonable approach by Gregory et al. However, we agreed with Ofwat that such an approach was likely to result in a less accurate beta estimate in the context of this redetermination as it would include data from prior to 2006 when both United Utilities and Severn Trent Water owned non-water businesses.<sup>2568</sup> While we recognise the merit of Gregory et al's argument about either taking account of structural breaks or not, we consider that not all structural breaks are 'equal'. The beta of a firm which undertakes significant non-water activities is clearly less reliable as the basis for estimating the beta of a notional water company over the PR19 period than the betas of 'pure play' water companies.<sup>2569</sup> We have not, therefore, included beta estimates drawn from time horizons of greater than 10 years, although we note that our 5-year rolling averages of 10-year beta estimates will include a small amount of data from early 2006 which will reflect these non-water business activities.

9.462 Finally, we considered the arguments submitted to us regarding the frequency of beta estimates. We found no evidence in our data to support KPMG's concern that daily beta estimates were likely to be biased downwards such that monthly betas should be used. As can be seen in Figure 9-16, for the large majority of the 2006–2020 period daily betas were actually higher than monthly betas for Severn Trent Water and United Utilities, although the 5-year

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<sup>2566</sup> We consider Gregory et al.'s argument re structural breaks separately in paragraph 9.467

<sup>2567</sup> [NATS/CAA](#), paragraph 13.89

<sup>2568</sup> We note that the non-water businesses were relatively large: Your Communications and Vertex accounted for 26% of UU turnover in 2006. Biffa accounted for 30% of SVT turnover in 2006.

<sup>2569</sup> We note that, in an earlier submission, Gregory suggested that betas should be estimated using the longest time horizon, since the last major change in the company's business structure. See Gregory (2020), [Setting the Cost of Equity in UK Price Controls](#), submitted to the CMA by Anglian, Northumbrian and Wessex Water on the NATS En-route Limited Price Determination, paragraph 9.12.

monthly beta estimates were significantly higher during the 2017 to 2019 period.<sup>2570</sup> This pattern was also noted in the CMA's Bristol PR14 Determination.<sup>2571</sup>

9.463 Next, we considered whether, as suggested by Wright and Robertson in the UKRN Report<sup>2572</sup>, we should place greater weight on lower frequency betas, ie monthly or quarterly estimates, than on the higher frequency figures. We did not find this to be a robust approach. We observe in Figure 9-16 that the 5-year monthly beta estimates are significantly more volatile than other time horizons and frequencies. We consider that this is likely to be the result of the relatively small number of data points (60 months) used in these estimates. This suggests that lower frequency estimates are likely to be 'noisier' as reflected in their higher standard errors. While we continue to believe that it is useful to consider monthly data, we are not persuaded greater weight should be placed on these estimates than on other frequencies. We have not estimated quarterly betas as these would suffer from the issue of few data points to an even greater extent. Even over a 10-year horizon, a quarterly beta estimate would only be based on 40 data points. Therefore, we have taken into account daily, weekly and monthly estimates in coming to a view on the appropriate level of beta.

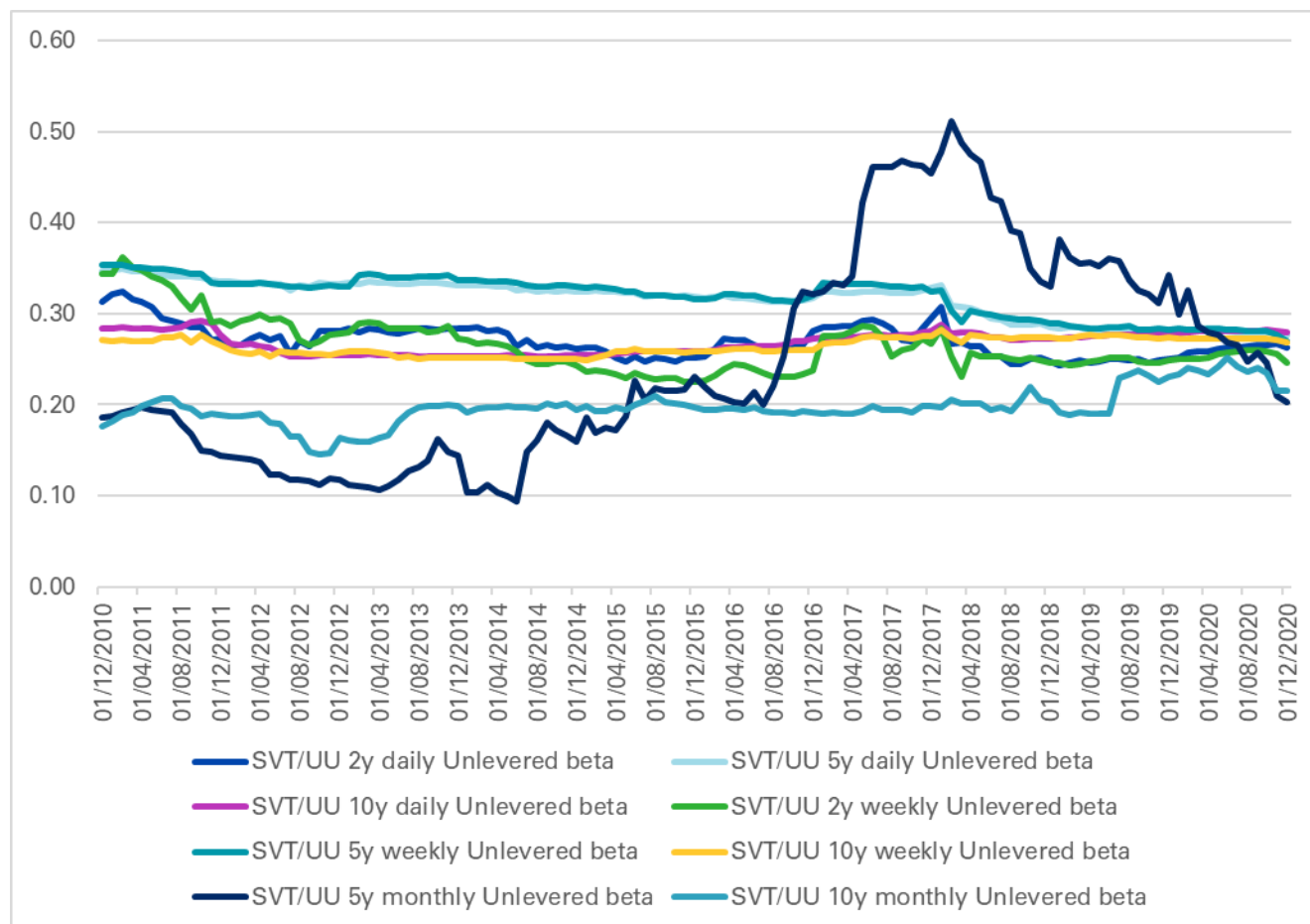
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<sup>2570</sup> CMA analysis using Thomson Reuters data.

<sup>2571</sup> [Bristol PR14 Determination](#), appendices 5.1 to 11.1, A10(1)–22, paragraph 91

<sup>2572</sup> [UKRN Report](#), Appendix G.

**Figure 9-16: unlevered beta estimates: weighted average spot figures for United Utilities and Severn Trent**



Source: CMA analysis

9.464 We note that Northumbrian cited a GHT paper which states that weekly betas should not be used because this frequency is subject to 'reference day' risk. This means that depending on the selection of the day of the week, the analysis will yield different equity beta values. However, rather than discarding the entire weekly data, we find it more appropriate to estimate weekly betas using each day of the week and calculate the average weekly beta. (See paragraph 9.474 for an explanation of how we have identified and dealt with outliers in the data).

9.465 Based on the evidence we have assessed we continue to see merit in considering as wide a range of evidence as is practical and useful when calculating beta. Therefore, a range of periods (2-year, 5-year and 10-year) and frequencies (daily, weekly and monthly) were included in our analysis.

### *The appropriate measurement period*

9.466 Ofwat/EE used end of September 2019 as cut-off date to estimate equity betas in its final decisions. EE then updated its analysis and used data up to end of February 2020.

9.467 We note that Indepen and GHT argued for the presence of structural breaks, and that betas should be measured over the longest period since the last structural break. We compared the structural break analysis carried out by Indepen and GHT, see Table 9-6. This comparison demonstrates that the results of such analysis are not consistent and we agree with Ofwat that the lack of alignment in identifying structural breaks calls into question the reliability of such analysis. As a result, while in paragraphs 9.488 to 9.490 below we do include analysis of the period between 2014 and February 2020 (the period between the ‘structural breaks’ of PR14 and the outbreak of COVID-19), we have not placed weight on beta estimates calculated from the ‘structural break’ period put forward by GHT.

**Table 9-6: Comparison of structural break analysis carried out by Indepen and GHT**

<i>Reports</i>	<i>Structural breaks in SVT data</i>								<i>Total</i>
Indepen		2002-03	2004-05		2008		2012-13		4
GHT	2000	2003		2007		2010		2014	5
<b>Common breaks</b>		<b>X</b>							

<i>Reports</i>	<i>Structural breaks in UU data</i>								<i>Total</i>
Indepen		2002	2003	2004-06	2008			2013-15	5
GHT	2000			2006		2010		2014	4
<b>Common breaks</b>				<b>X</b>				<b>X</b>	

Source: CMA analysis of Indepen report and GHT submission

9.468 In assessing the potential impact of COVID-19 on our analysis, we analysed Severn Trent Water, United Utilities and FTSE price data. We observe that events in March 2020 did lead to a sharp move in the prices of the water company shares and the overall market index level. However, as we consider the COVID-19 impact to be predominately an example of systematic risk, we do not think it is automatically appropriate to exclude data from this period. As a result, we have measured beta to both February 2020 and December 2020 before deciding on an appropriate range.

9.469 We do not accept Yorkshire’s arguments that recent share price ‘noise’ should be excluded from our analysis. As with the structural break arguments above, it would be difficult to accurately identify what factors are noise and what are legitimate examples of the impact of systematic risks on share prices. We

prefer an approach of considering long-term data over a number of periods and measurement frequencies.

#### *The use of Vasicek adjustments*

- 9.470 KPMG for Bristol, Anglian, and Northumbrian considered that Vasicek adjustments should be applied. EE investigated this further and concluded that Vasicek should not be used because the adjustment would be insignificant when using daily prices. EE stated that even if the impact had not been insignificant, this adjustment is unsound as it assumes a mean beta of 1.0 for the regulated water companies. Given our understanding of water companies exposure to systematic risks we do not consider it credible to assume that investors in water companies have the same systemic exposure to systematic risks as investors in the overall market.
- 9.471 We note that beta estimates within the GHT paper show a greater impact of Vasicek adjustments in the monthly estimates compared to the daily estimates. Rather than prove the need for a Vasicek adjustment, we consider this more likely to support our preferred approach of using 5-year monthly betas alongside a range of frequencies and horizons. Given our preferred assessment method, we do not consider that we have been presented with sufficient evidence that using Vasicek adjustments is likely to improve our estimates.
- 9.472 Similarly, we did not receive evidence that GARCH statistical calculations would materially improve our estimates versus the widely-used OLS methodology, and so we did not use this tool in our analysis.

#### *The use of rolling averages*

- 9.473 We considered Gregory et al's argument that simple spot betas should be preferred to rolling averages. We recognise that rolling averages place different weight on the various underlying data points and that this can give rise to potential distortions in the figures. However, we consider that the additional information provided by the rolling averages, in terms of highlighting trends in betas is useful in coming to an in the round assessment of the appropriate beta value, particularly in light of the material changes in the 2-year and 5-year beta estimates over the period, as shown in Figure 9-16. Therefore, we have continued to estimate rolling averages and used them in coming to a view on beta.

### *Identification of outliers*

9.474 We revised our approach to identifying outliers in response to Ofwat's submission that this was introducing bias into our analysis. Rather than excluding outliers by observation of the data, we applied a statistical rule based on the interquartile range (IQR). The IQR is the difference between the 75<sup>th</sup> percentile (or third quartile) and the 25<sup>th</sup> (or first quartile) percentile in a dataset. It measures the spread of the middle 50% of values. We have defined an observation to be an outlier where it is either 1.5 times the interquartile range (IQR) greater than the third quartile or 1.5 times the IQR less than the first quartile.

9.475 Applying this rule results in the following exclusions:

- (a) In our estimates to December 2020: 4 data points in the Wednesday dataset (weekly beta estimates)<sup>2573</sup> as well as the 10-year monthly 5-year average, and the 5-year monthly spot figures; and
- (b) In our estimates to February 2020: no exclusions.

All exclusions are highlighted in bold in Tables 9-7 and 9-8 below.

### *Other points*

9.476 We considered Citizens Advice's submission that the beta estimates generated from historic data are likely to overstate the non-diversifiable risk faced by investors in water companies over the PR19 price control for a variety of reasons.

9.477 We recognise that beta may change over time with changes in the regulatory settlement, such as the reallocation of risks between investors and customers over time. However, we do not agree that the PR19 determination represents a unilateral reduction in risk for investors and, as a result, should necessarily require a lower beta than PR14. While we acknowledge the changes that Citizens Advice highlights, we also observe that Ofwat has put in place a more demanding set of performance commitments for the water companies and has significantly reduced the cost of capital allowance. Together these two effects may be expected to increase the variability of investor returns in response to economic cycles. The overall impact of the PR19 determination on beta is unclear at the current time and we consider the most robust approach to be to use the available beta evidence that we have from historic

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<sup>2573</sup> In contrast, in our Provisional Findings, we had excluded all Wednesday beta estimates as being outliers.



movements in stock prices, rather than to make speculative adjustments to reflect how beta may change in the future.

9.478 Next, we considered Citizens Advice's view that the actual beta measured does not reflect the level of non-diversifiable risk that investors face. While not explicit, we noted that this could be interpreted as an argument for using a broader index, for example a Eurostoxx or a Global index. However, we consider that in coming to a view on the cost of equity for a water company which conducts all of its business in the UK and generates only sterling cash flows, the most relevant data is that from UK markets. This is consistent with the approach that we have taken to estimating the risk-free rate and the total market return.

#### *Equity betas – CMA analysis*

9.479 Our approach to estimating the unlevered equity beta follows the broad approach used by Ofwat in PR19. For our calculations we measure the betas of UU and SVT across a range of periods and frequencies. Our analysis is based on:

- (a) 2-year, 5-year and 10-year betas;
- (b) daily, weekly and monthly frequency;<sup>2574</sup>
- (c) data from January 2006 to end of December 2020;
- (d) OLS calculations;
- (e) spot betas and 1-year, 2-year, 5-year rolling averages; and
- (f) does not employ a Vasicek adjustment or use the GARCH method.

9.480 We first apply this approach to the entire period of data. This gives us the following measures of raw equity beta (weighted average for Severn Trent Water (SVT) and United Utilities (UU)):

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<sup>2574</sup> We average each weekday-derived estimate of weekly data in order to remove any potential measurement day impact. Wednesday data was excluded in June 2020 data due to the presence of outliers. Note, we do not use 2-year monthly estimates due to a lack of datapoints for robust analysis.

**Table 9-7: CMA analysis of Severn Trent and United Utilities raw equity betas January 2006 to December 2020**

<i>Data to December 2020</i>	<i>Spot 31/12/2020</i>	<i>1-year average</i>	<i>2-year average</i>	<i>5-year average</i>
SVT/UU 2y daily Raw beta	0.58	0.59	0.60	0.64
SVT/UU 2y weekly Raw beta	0.57	0.60	0.60	0.65
SVT/UU 5y daily Raw beta	0.58	0.62	0.65	0.65
SVT/UU 5y weekly Raw beta	0.60	0.58	0.64	0.66
SVT/UU 5y monthly Raw beta	<b>0.45*</b>	0.58	0.66	0.72
SVT/UU 10y daily Raw beta	0.59	0.59	0.57	0.59
SVT/UU 10y weekly Raw beta	0.55	0.56	0.56	0.57
SVT/UU 10y monthly Raw beta	0.47	0.52	0.49	<b>0.44*</b>

Source: CMA analysis using Thomson Reuters data

\* Footnote: Excluded, see paragraph 9.475

9.481 Consistent with Ofwat, we applied the Harris-Pringle approach and obtained the following estimates for unlevered beta:

**Table 9-8: CMA analysis of Severn Trent and United Utilities unlevered equity betas January 2006 to December 2020**

<i>Data to December 2020</i>	<i>Spot 31/12/2020</i>	<i>1-year average</i>	<i>2-year average</i>	<i>5-year average</i>
SVT/UU 2y daily Unlevered beta	0.26	0.26	0.27	0.31
SVT/UU 2y weekly Unlevered beta	0.25	0.25	0.25	0.30
SVT/UU 5y daily Unlevered beta	0.27	0.29	0.31	0.32
SVT/UU 5y weekly Unlevered beta	0.27	0.26	0.29	0.31
SVT/UU 5y monthly Unlevered beta	<b>0.20*</b>	0.26	0.31	0.34
SVT/UU 10y daily Unlevered beta	0.28	0.28	0.27	0.28
SVT/UU 10y weekly Unlevered beta	0.25	0.26	0.25	0.27
SVT/UU 10y monthly Unlevered beta	0.21	0.24	0.22	<b>0.21*</b>

Source: CMA analysis using Thomson Reuters data

\* Footnote: Excluded, see paragraph 9.475

9.482 The different frequency/sampling approaches give a wide range of beta estimates, ranging from 0.20 to 0.34. However, two of the monthly estimates are outliers and therefore have been removed based on our revised approach to identifying outliers as set out in paragraphs 9.474 and 9.475. Excluding this data gives a minimum of 0.21 and maximum of 0.34. We note that all daily and weekly estimates lie within this.

9.483 We then calculate the minimum, average and maximum for each of the spot and rolling periods. This gives an average range of 0.26–0.30. This approach places weight on all estimation methods though the exclusion of certain outliers gives less weight on 5-year and 10-year monthly betas.

**Table 9-9: Mix, Max and Average of outlier-adjusted CMA analysis of Severn Trent and United Utilities unlevered equity betas January 2006 to December 2020**

<i>Data to December 2020</i>	<i>Spot 31/12/2020</i>	<i>1-year average</i>	<i>2-year average</i>	<i>5-year average</i>
Min	0.21	0.24	0.22	0.27
Average	0.26	0.26	0.27	0.30
Max	0.28	0.29	0.31	0.34

Source: CMA analysis using Thomson Reuters data

9.484 We then considered data up to the February 2020 cut-off date suggested by the parties. This gives us the following measures of raw equity beta (weighted average for SVT and UU):

**Table 9-10: CMA analysis of Severn Trent and United Utilities raw equity betas March 2005 to February 2020**

<i>Data to February 2020</i>	<i>Spot 28/02/2020</i>	<i>1-year average</i>	<i>2-year average</i>	<i>5-year average</i>
SVT/UU 2y daily Raw beta	0.65	0.61	0.62	0.67
SVT/UU 2y weekly Raw beta	0.61	0.57	0.64	0.70
SVT/UU 5y daily Raw beta	0.69	0.67	0.68	0.64
SVT/UU 5y weekly Raw beta	0.70	0.69	0.71	0.66
SVT/UU 5y monthly Raw beta	0.71	0.73	0.79	0.70
SVT/UU 10y daily Raw beta	0.59	0.56	0.57	0.59
SVT/UU 10y weekly Raw beta	0.59	0.56	0.57	0.57
SVT/UU 10y monthly Raw beta	0.53	0.48	0.46	0.43

Source: CMA analysis using Thomson Reuters data

9.485 Consistent with Ofwat, we applied the Harris-Pringle approach and obtained the following estimates for unlevered beta:

**Table 9-11: CMA analysis of Severn Trent and United Utilities unlevered equity betas March 2005 to February 2020**

<i>Data to February 2020</i>	<i>Spot 28/02/2020</i>	<i>1-year average</i>	<i>2-year average</i>	<i>5-year average</i>
SVT/UU 2y daily Unlevered beta	0.28	0.27	0.28	0.33
SVT/UU 2y weekly Unlevered beta	0.25	0.24	0.28	0.33
SVT/UU 5y daily Unlevered beta	0.33	0.32	0.33	0.31
SVT/UU 5y weekly Unlevered beta	0.32	0.32	0.33	0.31
SVT/UU 5y monthly Unlevered beta	0.33	0.34	0.37	0.33
SVT/UU 10y daily Unlevered beta	0.28	0.26	0.27	0.29
SVT/UU 10y weekly Unlevered beta	0.27	0.26	0.26	0.27
SVT/UU 10y monthly Unlevered beta	0.24	0.22	0.21	0.20

Source: CMA analysis using Thomson Reuters data

9.486 The different frequency/sampling approaches with a February cut-off gave a wider range of unlevered beta estimates, ranging from 0.20 to 0.37. We again note that monthly estimates, which suffer from higher standard errors, provide the lowest and highest numbers. However, our revised statistical approach to identifying outliers suggests that none of these figures should be excluded.

9.487 As previously, we then calculate the minimum, average and maximum for each of the spot and rolling periods. This gives us an average range of 0.28–0.30. We note that this average range sits within the overall average range for the period to December 2020, which incorporates the pandemic period.

**Table 9-12: Mix, Max and Average of outlier-adjusted CMA analysis of Severn Trent and United Utilities unlevered equity betas March 2005 to February 2020**

<i>Data to February 2020</i>	<i>Spot 28/02/2020</i>	<i>1-year average</i>	<i>2-year average</i>	<i>5-year average</i>
Min	0.24	0.22	0.21	0.20
Average	0.29	0.28	0.29	0.30
Max	0.33	0.34	0.37	0.33

Source: CMA analysis using Thomson Reuters data

9.488 Finally, we considered ‘structural break’ data from September 2014 to February 2020. As a result of the shortened timeframe, only spot data across 2 and 5-year data was appropriate to this analysis.<sup>2575</sup>

**Table 9-13: CMA analysis of Severn Trent and United Utilities raw equity betas September 2014 to February 2020**

<i>Structural Break Data to February 2020</i>	<i>Spot 28/02/2020</i>
SVT/UU 2y daily Raw beta	0.65
SVT/UU 2y weekly Raw beta	0.61
SVT/UU 5y daily Raw beta	0.69
SVT/UU 5y weekly Raw beta	0.69
SVT/UU 5y monthly Raw beta	0.70

Source: CMA analysis using Thomson Reuters data

9.489 Consistent with Ofwat, we applied Harris-Pringle approach and obtained the following estimates for unlevered beta:

**Table 9-14: CMA analysis of Severn Trent and United Utilities unlevered equity betas September 2014 to February 2020**

<i>Structural Break Data to February 2020</i>	<i>Spot 28/02/2020</i>
SVT/UU 2y daily Unlevered beta	0.28
SVT/UU 2y weekly Unlevered beta	0.27
SVT/UU 5.5y daily Unlevered beta	0.33
SVT/UU 5.5y weekly Unlevered beta	0.32
SVT/UU 5.5y monthly Unlevered beta	0.32

Source: CMA analysis using Thomson Reuters data

9.490 The structural break range of 0.27 to 0.33 is tighter than the ‘whole period’ data, while the average spot figure of 0.30 sits at the top of the whole period average range of 0.26 to 0.30 (described in paragraph 9.483). For reference, for the same period Gregory et al suggest that a range for beta of between 0.67 and 0.69<sup>2576</sup> (based on raw beta not Vasicek-adjusted, to allow

<sup>2575</sup> We note that Indepen and GHT suggest using betas based on the longest run of data since the last structural break, but here continue with our preferred approach of considering all measurement horizons and frequencies that are applicable to a data range. Here this includes analysis of 2-year daily and weekly data.

<sup>2576</sup> Gregory et al. results adjusted from raw to unlevered beta by CMA based on observed gearing of 54.2%. Gregory references both September and October start dates. An October start date would not have a material impact on our results.

comparability with our approach). This suggests an unlevered beta range of 0.31 to 0.32.

**Table 9-15: Mix, Max and Average of outlier-adjusted CMA analysis of Severn Trent and United Utilities unlevered equity betas September 2014 to February 2020**

<i>Structural Break Data to February 2020</i>	<i>Spot 28/02/2020</i>
Min	0.27
Average	0.30
Max	0.33

Source: CMA analysis using Thomson Reuters data

### *Discussion of results*

9.491 Bringing these various estimates together gives us the following data:

**Table 9-16: Summary of CMA analysis of Severn Trent and United Utilities unlevered equity betas by timeframe**

<i>Average by timeframe</i>	<i>Spot</i>	<i>1-year average</i>	<i>2-year average</i>	<i>5-year average</i>
Feb 2005 to Feb 2020	0.29	0.28	0.29	0.30
January 2006 to December 2020	0.26	0.26	0.27	0.30
September 2014 to Feb 2020	0.30			

Source: CMA analysis using Thomson Reuters data

9.492 We considered what the appropriate range of beta values was based on this information. First, we observed that the average beta estimates set out in Table 9-16 sat within a range of 0.26 to 0.30.

9.493 The inclusion of the 10 months from March 2020 to December 2020, covering the period of the COVID-19 pandemic, reduces the spot, 1-year and 2-year rolling average beta estimates materially in comparison with the various estimates to February 2020. Similarly, we observe that, for the period to December 2020, the spot, 1- and 2-year rolling average beta estimates were materially lower than the 5-year average. While we consider that the pandemic represents a systematic event which should not be excluded from our estimates, we also recognise that this type of economic crisis is relatively rare and that it is likely to be over-weighted in our range of beta estimates, which cover the last 2-, 5- and 10-year periods. Therefore, we have placed less weight on the lower estimates from the dataset to December 2020.

9.494 On the basis of the data above, we have concluded that a low estimate of the unlevered beta of 0.28 and a high estimate of the unlevered beta of 0.30 are appropriate. This range encompasses the upper end of the data to December 2020 and the full range of that to February 2020. We note that it also encompasses the average spot estimate from the structural break analysis,

although we were not persuaded that this approach was robust and therefore did not place weight on this particular result.

**Table 9-17: Unlevered Beta Estimate**

	<i>Low Estimate</i>	<i>High Estimate</i>	<i>Ofwat PR19 final determination</i>
Unlevered Beta	0.28	0.30	0.29

Source: CMA Analysis and Ofwat PR19 final determination

### ***Submissions relating to the measurement of debt beta***

#### ***Ofwat***

- 9.495 In its draft determination, Ofwat’s point estimate for debt beta was based on analysis by EE, which used a decompositional approach to derive an estimate of debt beta from the risk premium in the iBoxx A/BBB 10yrs+ non-financials index. Ofwat picked a point estimate which was at the low end of the range of a 2-year rolling average of results from this decompositional approach. Ofwat said that this cautious approach recognised the volatility of debt beta estimates, and the uncertainty around whether current estimates of debt beta would persist into 2020–25.<sup>2577</sup>
- 9.496 Following publication of Ofwat’s Draft Determination, South East Water suggested that Ofwat’s point estimate of 0.125 should be lower or zero, citing a paper by Professor Zalewska (2019) that produced debt beta estimates which were negative or close to zero over several estimation periods. Ofwat considered the Zalewska paper’s conclusion of a zero or negative debt beta for iBoxx index was incongruous with wider evidence, as it implied that all the debt premium could be accounted for in the company-specific risk of default. Ofwat also claimed the Zalewska paper’s estimates of debt beta using the iBoxx A/BBB indices focuses entirely on estimates of debt beta using daily and weekly data, whereas using monthly data produces results which are more consistent with positive estimates produced by the decomposition approach. Ofwat was concerned that the relatively more infrequent trading of debt instruments relative to equity indices such as the FTSE could bias downwards the estimates of debt betas using daily data (Epps effect) and therefore, Ofwat justified using a monthly sampling frequency.<sup>2578</sup>
- 9.497 In its final determination, EE for Ofwat updated its decompositional approach to estimating debt beta. This approach decomposed excess returns for the

<sup>2577</sup> Ofwat (2019), [PR19 final determinations: Allowed return on capital technical appendix](#), section 5.4.1, p55

<sup>2578</sup> Ofwat (2019), [PR19 final determinations: Allowed return on capital technical appendix](#), section 5.4.2, pp60 – 61. See Zalewska, A. (2019), [Estimate of the debt beta of the bond issued by Nats \(En Route\) plc](#).

iBoxx A/BBB debt index after making a 15bps adjustment for new debt outperformance and a liquidity premium. The 5-year rolling average of the equity risk premium from EE GDP growth DDM was then used to infer a debt beta estimate. EE's analysis produced an estimate range of 0.12–0.23 on spot data and 0.13–0.17 using a 2-year trailing average.

9.498 As a sensitivity check, Ofwat also asked EE to consider how its outputs might vary if it used outputs from PwC's GDP growth DDM instead. This produced a range of 0.12–0.20 on spot data and 0.13–0.14 using a 2-year trailing average.

9.499 After considering this analysis, Ofwat retained its point estimate of 0.125 from draft determinations. While Ofwat considered that higher numbers could be supported using outputs from both the PwC and EE DDMs – and despite EE recommending a point estimate of 0.15 – it chose to adopt a figure at the bottom of the 2-year trailing average ranges over the past year.<sup>2579</sup>

9.500 In its response to the Disputing Companies statements of case, Ofwat stated that if the gearing of the listed company comparator and the notional company are similar, the addition of a debt beta has a very small effect on the final notional equity beta estimate. Ofwat said that it did not use a debt beta in PR14 because it used a net debt/RCV gearing measure to unlever and re-lever beta, which resulted in the respective gearing estimates being similar. As a result, the use of a debt beta would have made minimal difference to the allowed return on equity.<sup>2580</sup>

9.501 Ofwat said that it did not place weight on direct econometric estimates for its final determinations due to the inconclusive results returned by that approach at draft determinations (positive as well as negative estimates and wide confidence intervals). Ofwat stated that the CC, in its 2007 redetermination of Heathrow's price control, also preferred the decompositional approach, citing 'poor statistical properties of regressions' and 'thin trading' in the direct econometric approach. Ofwat observed however, that the use of monthly data (which could be justified for debt beta due to the thinner trading of debt instruments) also supported figures towards the higher end of the 0.10–0.17 range.<sup>2581</sup>

9.502 Ofwat also said that it had considered the impact of notional gearing on notional equity beta, noting that the CMA's provisional findings for the NATS/CAA PR3 determination had raised an important question around

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<sup>2579</sup> Ofwat (2019), *PR19 final determinations: Allowed return on capital technical appendix*, section 5.4.3, p68

<sup>2580</sup> Ofwat's response to common issues in companies' SoCs: Risk and return, paragraphs 3.74 to 3.75

<sup>2581</sup> Ofwat's response to common issues in companies' SoCs: Risk and return, paragraph 3.76

whether its de-gearing and re-gearing methodology was the correct approach. In its draft determination, Ofwat had noted that the definition of gearing when un-levering and re-levering beta had an impact on the level of equity beta estimated. Ofwat noted that for its chosen approach of using enterprise value gearing, it was notable that the estimate of re-levered beta was significantly higher than the raw equity beta, despite the relatively similar book value gearing between Severn Trent Water and the notional 60%. This concern had been highlighted by Wright et al (2018). Ofgem (2019) also identify that the greater the difference between notional gearing and the gearing of listed comparators, the greater the impact of changes in notional gearing on re-levered beta.

9.503 Ofwat suggested that there are several potential responses to this issue:

- (a) the 'do nothing' approach - simply retain the existing regulatory model;
- (b) the use of a positive debt beta; or
- (c) the use of a non-constant asset beta.<sup>2582</sup>

9.504 Ofwat said that it did not consider any of these options to provide a perfect solution. Using the existing regulatory model produces a WACC which strictly increases with gearing at a constant rate, contradicting a large body of financial theory which suggests otherwise. There was a risk therefore of overcompensating investors for the actual risk implied by changes in gearing. A positive debt beta would need to be improbably high to achieve a constant WACC, while an asset beta which varies with gearing may achieve a WACC which is constant but may not be a good approximation for the circumstances of the water sector, due to the presence of important features of the regulatory framework which are not captured in the Modigliani-Miller theorem.

9.505 In the context of these complex and unresolved issues, Ofwat suggested that a pragmatic solution may be to adopt the gearing of the listed water companies United Utilities and Severn Trent Water as the notional gearing for the purposes of estimating the allowed return. Ofwat stated that this approach would be consistent with arguments put forward by the four, who had all argued that the WACC is not affected by gearing changes.<sup>2583</sup>

9.506 At the cost of capital round table with the CMA, EE told us that it is important to focus on the purpose of the debt beta in our calculations. EE said that the debt beta's main use is to provide the correct equity beta after re-levering to

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<sup>2582</sup> The CMA's [NATS/CAA](#) report did suggested that an asset beta that changed with gearing could achieve a constant WACC (although the CMA did not use this approach in setting the cost of equity for the NATS case).

<sup>2583</sup> [Ofwat's response to common issues in companies' SoCs: Risk and return](#), paragraph 3.77 to 3.83



the chosen nominal level of gearing, and that failing to properly account for the debt beta is a cause of the WACC generally rising with gearing (as identified in the NATS/CAA provisional findings).

### *Disputing Companies*

- 9.507 Anglian stated that the decomposition approach is subject to considerable uncertainty, as acknowledged by the CMA in its NATS/CAA provisional findings, where the CMA used a debt beta of 0.05 – in line with econometric evidence. Anglian noted the empirical estimates relied upon by Ofwat exhibit a high degree of variability, ranging from -0.11 to 0.40 depending on the methodology and the sample size employed, suggesting underlying problems with the regressions. Anglian said that additional empirical research on debt beta suggested that a debt beta of no more than 0.05 is appropriate for the water sector.<sup>2584</sup>
- 9.508 Bristol stated that Ofwat unreasonably assumed a debt beta of 0.125, which is considerably higher than the debt beta of zero applied in PR14 and in the CMA's Bristol PR14 Determination. Bristol stated that Ofwat had assumed a high level of systematic risk of debt across the industry and the approach taken by Ofwat was entirely speculative, being without robust evidential basis. Bristol proposed an unlevered debt beta of 0.10.<sup>2585</sup>
- 9.509 In addition, Bristol stated that Ofwat should not only have relied on the decomposition method. Relying on direct methods, as well as a corrected decomposition method, would have derived a lower debt beta. Economic Insight refer specifically to the 'direct' econometric estimates of the debt beta put forward by Professor Zalewska in relation to the NATS price redetermination, which indicated that the debt beta was at, or below, 0.1.<sup>2586</sup> In addition, Economic Insight also show that Ofwat's estimate of 0.125 is the highest debt beta (excluding an indicative range given by Ofgem for RIIO-2 of 0.10 to 0.15) across a number of regulatory determinations since 2012.<sup>2587</sup>
- 9.510 Northumbrian considered that the lender protections built into the ring fence and special administration regimes would indicate a lower debt beta estimate than 0.10.<sup>2588</sup>

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<sup>2584</sup> [Anglian's reply to Ofwat's response](#), Part F, p7

<sup>2585</sup> [Bristol SoC](#), paragraph 21

<sup>2586</sup> We note that Professor Zalewska's report for NATS states that 'results strongly support the thesis that the NATS-bond's beta is statistically significantly negative for most of the investigated period, and statistically insignificantly different from zero in the last few years.' See Zalewska, A. (2019), [Estimate of the debt beta of the bond issued by Nats \(En Route\) plc](#), summary.

<sup>2587</sup> [Bristol SoC](#), paragraphs 312–314

<sup>2588</sup> [Northumbrian SoC](#), section 8.10.1

### *Third Parties*

9.511 The ENA submitted a report from Oxera, who it had commissioned to review CEPA's December 2019 report<sup>2589</sup> on estimating debt beta (produced for the UKRN). Oxera noted that as a result of its review of CEPA's work and its own analysis, it had reached four conclusions:

- (a) That methods based on regressions (the direct and indirect methods) and structural models have the advantage of measuring the systematic exposure of debt to market risk. In contrast, the spread decomposition method lacks robust theoretical support and depends on multiple uncertain parameters. The degree of uncertainty over the assumptions required by the spread decomposition approach suggest that it provides little or no incremental evidential value relative to the other approaches. Therefore, regulators should rely on regression-based and structural methods when setting debt beta for a price control.
- (b) That methods based on regressions must follow best econometric practice in terms of data inspection and cleaning, model specification, diagnostic testing, and interpretation of results. This was particularly important when working with bond return data, which presents additional challenges compared to equity return data (for example heterogenous securities and infrequent trading).
- (c) That controlling for interest rate risk was important when estimating debt beta using a regression-based method. Otherwise, the resulting debt beta estimate will capture risks over and above credit risk, resulting in a biased estimate. This was not reflected by CEPA when it compared the methodology used by Schaefer and Strebulaev (2008) ie the indirect regression-based approach to the direct regression-based methodology used by PwC and EE.
- (d) That based on the estimates from the direct and indirect regressions with the corrected version of CEPA's structural method, a debt beta assumption of 0.05 for regulated industries would be appropriate.

### ***Approach adopted in CMA Provisional Findings***

9.512 Our provisional approach to estimating the debt beta was to place weight on both Oxera's (regression) evidence, which suggested that the debt beta for some companies may be statistically insignificantly different from zero, and on

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<sup>2589</sup> CEPA (2019), [Consideration for UK regulators setting the value of debt beta – Report for the UKRN](#)

Ofwat/EE's decomposition approaches, which provided a compelling case that the regulatory model should include a positive debt beta.

- 9.513 Given the significant calculation uncertainties associated with debt beta and the relatively small consequence for the WACC in the water sector of changing the level of debt beta, we provisionally decided to set a range which reflected the different potential approaches by setting the low estimate of the debt beta at zero and the high estimate of the debt beta at 0.15.

#### *Parties' response to CMA Provisional Findings*

##### *Ofwat*

- 9.514 Ofwat told us that we had adopted an inconsistent approach to its treatment of outlying data points in its ranges for unlevered beta and debt beta. In particular, Ofwat submitted that we should not have included a zero debt beta in our range as we had recognised that there was a compelling case that the regulatory model should include a positive debt beta (thus implying that zero should be an outlier). It highlighted that if the CMA were to use a lower bound debt beta estimate of 0.05, which was consistent with the lowest value proposed by Anglian Water or Third Parties, instead of 0, the final equity beta range would become 0.65 to 0.79.<sup>2590</sup>

##### *Third Parties*

- 9.515 Oxera (on behalf of ENA), submitted that the spread decomposition method used by the CMA to identify the upper bound debt beta estimate of 0.15 lacked robust theoretical support and depended on multiple uncertain parameters. The degree of uncertainty over the assumptions required by the spread decomposition approach suggests that it provides little or no incremental evidential value relative to the other approaches. Therefore, regulators should rely on regression-based and structural methods when setting debt beta for a price control.
- 9.516 Further, Oxera argued that the decomposition approach used by EE required several assumptions in order to estimate debt beta, including assumptions regarding the ERP, expected loss and the risk-free rate. In its review of these assumptions, Oxera submitted that it had found a number of mistakes which, once corrected for, significantly reduce the debt beta obtained from the

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<sup>2590</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraphs 5.31–5.32.

decomposition approach from 0.15 to 0.05. In particular, Oxera submitted that:

- (a) EE's risk-free rate assumption is incorrect. EE used the yield on 15-year nominal gilts as the risk-free rate assumption for the decomposition approach, whereas Oxera argues that the tenor of the risk-free rate assumption should match the tenor or average maturity of the iBoxx index. In addition, EE has used government bonds as a proxy for the risk-free rate, which Oxera considers understates the RFR and therefore overstates the debt risk premium and hence also the debt beta estimate from the decomposition approach;
- (b) The expected loss assumption is an underestimate, with the academic evidence supporting an ex ante probability of default for A- and BBB-rated companies of around 0.5% rather than the 0.2% assumed by EE;
- (c) The liquidity premium of 0.3% is not in line with the CC's precedent of 0.5% and it would be prudent to consider a range in this respect; and
- (d) The formula used by EE for attributing the observed credit spreads to systematic and idiosyncratic components is not consistent with the formula used by CC when they used the same approach to set the debt beta for BAA.

### ***Arguments relating to the measurement of debt beta – CMA assessment***

9.517 The evidence above illustrates that the debt beta is difficult to measure and has a relatively small effect on the overall WACC. In our view, the choice of the debt beta should be set at a level which is consistent as far as possible with the overall framework for the WACC, without acting contrary to financial market evidence.

9.518 We agree with CEPA's conclusion to its December 2019 report for the UKRN, which argues that there is no one approach to estimating debt betas that dominates all others, as evidenced by the different methods used in studies and the different weights regulators have given to different evidence sources. This means that it is not possible to be prescriptive at a general level about what weight to attach to the different approaches – regulators have to exercise their judgement, and their decisions will depend on the details of each case.<sup>2591</sup> In this context, our approach is to reflect this uncertainty by considering the range of approaches put forward by the parties.

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<sup>2591</sup> CEPA (2019), [Consideration for UK regulators setting the value of debt beta – Report for the UKRN](#), p25

- 9.519 This approach is consistent with our findings in the recent NATS/CAA case, where we concluded that the evidence presented in that case to calculate the level of the debt beta was largely speculative. We also noted that the reasons for the current level of debt premiums, in particular why it is much higher than the premiums implied by the debt beta and risk of default, were largely unexplained.<sup>2592</sup>
- 9.520 We note Bristol's argument that Ofwat's estimate of 0.125 is the highest regulatory estimate of debt beta to data, with the modal estimate over the last 5 years being 0.10.<sup>2593</sup> We also note that the CMA used a zero figure in Bristol 2015 and a 0.05 figure in NATS/CAA, although the approach we took in NATS/CAA of using actual gearing meant that the level of the debt beta did not affect the choice of WACC.<sup>2594, 2595</sup>
- 9.521 We also note Schwert and Strebulaev's work, highlighted in CEPA's paper, that suggests that companies with an A credit rating would expect to have a debt beta of 0.05, while companies with a BBB credit rating would expect to have a debt beta of 0.10.<sup>2596</sup> While we acknowledge that there may be issues with Schwert and Strebulaev's methodology, this is a useful cross-check given our use of A and BBB benchmarks within our assessment of the cost of debt.<sup>2597</sup>
- 9.522 We have first considered the lowest potential value for debt beta, having regard to previous precedent that the debt beta could be zero, but also recognising that most regulators have now moved to a positive debt beta. We agree that Oxera's evidence suggests that the debt beta for some companies may be statistically insignificantly different from zero, and that this may be a plausible value given the significant regulatory protections the debt and bondholders in the water sector benefit from and the lack of debt default events in the water sector since privatisation.
- 9.523 In contrast, Ofwat/EE set a debt beta of 0.125 entirely based on decompositional method arguing that regression approaches have high level of volatility of results and inability to distinguish robustly from zero. Overall, we

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<sup>2592</sup> NATS/CAA, paragraph 13.121. Debt premiums reflect the cost of debt in excess of the risk free rate and should be a function of debt beta and the increased risk of default, but current 'spreads' are significantly in excess of the levels that would be expected on the basis of these metrics.

<sup>2593</sup> CEPA (2019), *Consideration for UK regulators setting the value of debt beta – Report for the UKRN*, Table 3.1

<sup>2594</sup> Bristol PR14 Determination, paragraph 10.150

<sup>2595</sup> NATS/CAA, paragraph 13.122

<sup>2596</sup> In considering Schwert and Strebulaev's findings, we consider the credit rating metrics are likely to be more applicable than the gearing metrics. Given the significant regulatory protections enjoyed by UK water companies, we would expect them to achieve strong credit ratings at higher levels of gearing than could be achieved by the average, non-regulated company in the economy.

<sup>2597</sup> CEPA (2019), section 2.2.1 including Table 2.3, referencing Schwert and Strebulaev (2014), *Capital Structure and Systematic Risk*, Table A1

agree with Oxera's analysis that a finding that the debt beta is not statistically indifferent from zero is as a result of high standard errors around what is likely to be a low debt beta, not because this form of modelling is unsuitable as a matter of principle. Rather than discarding this or any other methods, our preferred approach would be to consider all the evidence available when setting an appropriate range for the debt beta.

- 9.524 For similar reasons, we have reviewed the decomposition approaches presented by Ofwat, and conclude that while they also have a wide range of uncertainty, they provide a compelling case that the regulatory model should include a positive debt beta. Ofwat's analysis suggests that this may in practice be addressed by assuming that debt investors are taking more 'equity-like' beta risk in the context of the relatively high gearing of water companies. We recognise that this is one of a number of methodologies that can be used to estimate debt beta but we also have some concerns that it does not appear to reflect the reality of low debt premia and low observed debt betas combined with the relatively modest gearing levels of both the notional and the listed water companies.
- 9.525 Given the significant calculation uncertainties associated with debt beta, and the relatively small consequence for the WACC in the water sector of changing the level of debt beta, in our provisional findings we set a broad range which reflected these different potential approaches with a lower bound estimate of the debt beta at zero and an upper bound estimate of the debt beta at 0.15.
- 9.526 We considered the submissions that we received from both Ofwat and Oxera, challenging the credibility of the lower and upper bound figures respectively.
- 9.527 The analysis that we set out in our Provisional Findings is consistent with the view that debt beta should be positive. We agree that Oxera's analysis that a finding that the debt beta is not statistically different from zero is likely to be the result of high standard errors around a low debt beta rather than an actual zero debt beta. Therefore, we have increased our lower bound debt beta estimate to a small but positive figure of 0.05. We note that this is consistent with Oxera's estimate of debt beta.
- 9.528 Similarly, we recognise that different inputs to the decomposition approaches, particularly in terms of the risk-free rate and the probability of default, can produce widely varying figures (as highlighted by Oxera's submission), and that the current observed debt premia appear to have increased. This change produces debt beta estimates that are particularly high and raises issues regarding the credibility of the estimates. For these reasons, we concluded

that it was appropriate to lower the upper bound of our debt beta range to 0.10.<sup>2598</sup>

9.529 As a sense check to the debt beta that we have calculated using this range, we recalculate the appointee WACC using the observed 54.2% gearing used within our beta calculations as the notional level of gearing – thus removing the need to consider a debt beta.<sup>2599</sup> Using all component metrics at the midpoint of their range, we note that this produces an estimate of the appointee WACC that is only 4bps lower than the estimate using a debt beta at the middle of our range (with the middle of the range debt beta value being 0.075).

9.530 While this does suggest that WACC rises with gearing in our model, the impact is relatively small. In the absence of evidence justifying an alternative level of notional gearing, we believe that 60% notional gearing and 17% new debt match the reality of a notional company within this sector, and that these are the factors which should be considered in the WACC analysis and financeability assessment. As such, we choose to retain 60% notional gearing and the de-gearing, re-gearing method of calculating the equity beta.

**Table 9-18: Debt Beta Estimate**

	<i>Low Estimate</i>	<i>High Estimate</i>	<i>Ofwat PR19 final determination</i>
Debt Beta	0.05	0.10	0.125

Source: CMA Analysis and Ofwat PR19 final determination

### **Beta – CMA assessment**

9.531 In order to set an appropriate equity beta range, we combine our estimates of unlevered beta and debt beta with our notional gearing level of 60%.<sup>2600</sup> This process results in a provisional low notional equity beta estimate of 0.69 and a high notional beta estimate of 0.74.

9.532 We note that Ofwat's estimate of 0.71 is within our range.

<sup>2598</sup> We note that while Oxera's choice of input values to the decompositional approach produces an estimate of 0.05 for debt beta, the use of the risk-free rate set out in this Final Determination (for example), would produce a higher estimate. For this reason, we have not lowered our upper bound to 0.05 but rather kept it at 0.1.

<sup>2599</sup> As a function of this example we estimate that the proportion of new debt range falls to 8% from our current 17% estimate at 60% gearing.

<sup>2600</sup> Our estimate is converted into an asset beta by adding a figure equal to the debt beta multiplied by the observed gearing of 54.2%. Our estimate of the asset beta is converted into the notional equity beta using the following formula:  $\beta_e = (\beta_a - (\beta_d \times \text{notional gearing})) / (1 - \text{notional gearing})$

**Table 9-19: Summary of Beta range and midpoint**

	<i>Low Estimate</i>	<i>Midpoint</i>	<i>High Estimate</i>	<i>Ofwat PR19 final determination</i>
Unlevered beta	0.28	0.29	0.30	0.29
Debt Beta*	0.10	0.075	0.05	0.125
Notional Gearing	60%	60%	60%	60%
Notional Equity Beta	0.69	0.71	0.74	0.71

Source: CMA Analysis and Ofwat PR19 final determination

\* Footnote: as it is equity beta we are trying to estimate in this exercise, our high estimate of debt beta estimate is associated with our low estimate of equity beta and our low estimate of debt beta is associated with our high estimate of equity beta.

## Cost of Debt

### Introduction

9.533 The cost of debt component of the WACC estimate reflects the return required to compensate debt investors for lending to a business.

9.534 The approach taken by Ofwat in PR19 was to estimate a reasonable level of debt costs for a company with the notional financing structure, not to pass through individual company-level costs.

9.535 The cost of debt in PR19 comprises: the cost of embedded (existing) debt, which should be observable at the company, sector or benchmark level; an estimate of the cost of new debt over the price control period; an estimate of the relative weights of embedded and new debt; and an allowance for issuance and liquidity costs.

9.536 The total cost of debt is calculated using the following formula:<sup>2601</sup>

$$K_d = (w_{ED} \times K_{ED}) + (w_{ND} \times K_{ND}) + K_{IL}$$

9.537 In this section we assess each element of the cost of debt.

### Cost of Embedded Debt allowance

*Ofwat PR19*<sup>2602</sup>

9.538 Ofwat considered evidence from two approaches:

<sup>2601</sup> Where  $K_d$  is the total cost of debt,  $w_{ED}$  is the weight of embedded debt,  $w_{ND}$  is the weight of new debt,  $K_{ED}$  is the cost of embedded debt,  $K_{ND}$  is the cost of new debt and  $K_{IL}$  is issuance and liquidity costs.

<sup>2602</sup> Ofwat (2019), [Allowed return on capital technical appendix](#), section 6.3.1



- (a) The balance sheet approach – analysing the actual cost of ‘pure’ debt on company balance sheets. Ofwat considered ‘pure’ to mean fixed, floating rate or index-linked instruments, but not ‘non-standard’ instruments and swaps.
- (b) The benchmark index approach – calculating an estimate using the average of the A and BBB-rated IHS Market (iBoxx) GBP non-financials 10yrs+ indices, adjusted for market-implied interest rate rises embedded in the term structure of nominal gilts and reduced by a calculated ‘outperformance wedge’.

9.539 Ofwat focused on the benchmark index approach to calculate its estimate and used the balance sheet approach as a cross check.

9.540 For the benchmark index approach, Ofwat calculated 10- and 15-year trailing averages of the 10+ A and BBB-rated indices and increased these estimates for the 0.25% market-implied interest rate rise embedded in the term structure of nominal gilts. For the Draft Determination this process suggested figures of 4.07% and 4.75% respectively. Ofwat then applied a 25bps ‘outperformance wedge’ to reflect its assessment that water companies have shown the ability to issue debt at prices lower than suggested by Ofwat’s chosen A/BBB benchmark. Applying this outperformance wedge reduced Ofwat’s estimates to 3.82% and 4.50% respectively. Ofwat picked the latter figure as its point estimate.

9.541 Ofwat checked this 4.50% estimate against its assessment of the weighted average pure<sup>2603</sup> debt cost in the sector (4.25%), and the company-level median (4.65%). It concluded that as the benchmark approach was close to the median for WASCs and large WOCs, and lay within the overall range, it represented a sufficient allowance for an efficient company while maintaining incentives for companies to raise finance in a cost-efficient manner over the long term.

9.542 Ofwat updated this analysis for the PR19 final determination – with the 15-year average of the index minus 25bps providing a point estimate of 4.47%. It compared this to updated analysis of the WASC and large WOC median cost of debt (using its balance sheet approach)<sup>2604</sup> of 4.45% and concluded that this was an appropriate estimate.

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<sup>2603</sup> Ofwat considered ‘pure’ to mean fixed, floating rate or index-linked instruments, but not ‘non-standard’ instruments and swaps.

<sup>2604</sup> The balance sheet analysis used by Ofwat in its PR19 process uses different data to the Annual Performance Report (APR) approach subsequently proposed by Ofwat. APR data will be discussed later in this document.

## Cost of embedded debt – broader precedent

9.543 The costs of embedded debt reflect sunk costs which are largely now beyond the control of the companies today<sup>2605</sup>. The approach taken to embedded debt allowances in previous controls may have impacted the choices made by companies, and is thus worth recapping here. The following summary was provided by Ofwat:<sup>2606</sup>

**Table 9-20: Ofwat summary of historic approaches to the treatment of embedded debt costs.**

**Table 3.1: Treatment of embedded debt at historic price reviews**

Price review	Benchmarking data	Allowance for embedded debt	Length of trailing average
PR94 <sup>33</sup>	Actual costs	No	n/a
PR99 <sup>34</sup>	Actual costs	Yes	n/a
PR04 <sup>35</sup>	Actual costs	No	n/a
PR09 <sup>36</sup>	Actual costs	Yes	n/a
PR14 <sup>37</sup>	Actual costs and iBoxx A/BBB	Yes	10 years
PR19	Actual costs and iBoxx A/BBB	Yes	15 years

Source: Ofwat

9.544 As we can see from Table 9-20, prior to PR14, where embedded debt costs were considered on a standalone basis this was assessed solely on the basis of actual costs that had been incurred by the companies in the sector.

9.545 In PR14, Ofwat introduced a benchmark, the 10-year trailing average of the iBoxx A/BBB, into its calculations. In PR14, Ofwat set the upper end of the embedded debt allowance range as the 10-year average of the A/BBB index, a figure of 2.80% in real terms. It set the lower end of the embedded debt allowance range at its assessment of actual costs, a figure of 2.2% real. Ofwat then set its allowance on the basis of the benchmark estimate minus an outperformance wedge of 15bps, giving a figure of 2.65% real.<sup>2607</sup>

9.546 In PR14, Ofwat noted that it considered that water companies had historically outperformed credit benchmarks through a mixture of timing and being able to issue at a discount to the benchmark rate. Ofwat also noted that water companies bore the risk relating to the timing and cost of debt issuance, and that Ofwat did not consider it appropriate to focus solely on actual costs –

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<sup>2605</sup> Companies could choose to refinance historic debt before it matures, but it is often as or more expensive to do this than to let it mature on the original schedule. Any additional costs of refinancing may not be captured in any ongoing assessment of debt costs based on current interest and coupon payments.

<sup>2606</sup> Ofwat Risk & Return – December response, paragraph 3.4

<sup>2607</sup> Ofwat (2014), *Final price control determination notice: policy chapter A7 – risk and reward*, pp37–38

instead placing more emphasis on the part of the range informed by benchmarks.

9.547 At PR14, Ofwat did not consider it appropriate to provide any uplift to account for the cost of liquidity facilities, as these could be offset by companies through the use of low cost short-term floating debt, which it did not include in its assessment.<sup>2608</sup>

9.548 At PR19, Ofwat considered that the 15-year trailing average of the index was now a more appropriate reflection of the sector's issuance profile, with approximately 80% of outstanding listed bonds captured in the 15-year period 2005–2019, compared to 40% for the 10-year 2009–2019 period. A 10-year approach would have suggested an unadjusted allowance of 4.02%, well below all of Ofwat's assessments of actual costs.<sup>2609</sup> Ofwat noted that it might have also used a 15-year approach at PR14, but that the required benchmark average data had not been available.

9.549 We have not given particular weight to recent CMA and CC precedent, as those recent redeterminations were based on a single company, rather than broader industry-level allowances, and also the approach needs to reflect the way the cost of debt has changed in recent years. We do not consider that there is a direct read-across to the issues raised in these determinations.

#### *Cost of embedded debt – CMA approach*

9.550 The cost of embedded debt allowance has been a particularly contentious issue within the redetermination of the cost of capital. There has been significant disagreement between the Main Parties as to the correct assessment of actual costs of debt and the most appropriate application of a benchmark-based methodology.

9.551 Complexities in relation to the data used in Ofwat's 'balance sheet' approach, in particular the treatment of debt considered 'non-pure',<sup>2610</sup> meant there was significant disagreement between the parties as to the most factually correct formulation of 'actual' costs. This led the us to initially focus on a benchmark driven approach to estimating the cost of embedded debt. As can be seen from the description of Ofwat precedent above, there has been no consistent approach to the application of a benchmark in this sector. We focused our provisional estimates on a 20-year trailing average of the A/BBB 10+ index,

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<sup>2608</sup> Ofwat (2014) [Setting price controls for 2015 – 2020 – risk and reward guidance](#), fn23

<sup>2609</sup> Ofwat (2019), [PR19 final determinations: Allowed return on capital technical appendix](#), pp89–90

<sup>2610</sup> See paragraph 9.541 for Ofwat's discussion of pure debt.

reflecting the long-tenor nature of the sector's debt and the long investment horizon assumed throughout this price control.

9.552 This approach was subsequently challenged, particularly by Ofwat and consumer groups such as Citizens Advice, on the basis that it risked setting an allowance that was significantly out of line with the actual costs incurred by the companies. We undertook further analysis of actual costs, primarily based on adjustments to Ofwat's Annual Performance Report (APR) data rather than the balance sheet data that had been used in Ofwat's assessment of actual costs. This analysis included all debt costs, including those 'non-pure' costs previously disputed in Ofwat's balance sheet approach, negating much (but not all) of the disagreement on the correct measurement of actual debt costs. This analysis was published in our consultation on the cost of debt, alongside an alternative 15-year horizon of the A/BBB 10+ index,<sup>2611</sup> and further refinement of our estimates were possible due to subsequent input from the parties.

9.553 As a result of this analysis, and the subsequent submissions from the Main Parties, we are materially more confident in our assessment of actual industry costs than was the case prior to publication of our Provisional Findings. In order to ensure we correctly balance our duties to both companies and consumers, in our Final Determination we begin our assessment of the appropriate cost of embedded debt allowance with reference to actual costs, and use external benchmark data in order to cross check that such an allowance does not over-compensate companies. This is a different approach than that described by Ofwat, which set both its PR19 and PR14 allowances directly relative to an adjusted benchmark, with subsequent validation through a cross-check to their estimates of actual costs.

9.554 In the following paragraphs we will:

- (a) Examine arguments and evidence on the estimation of actual costs.
- (b) Examine arguments and evidence on the application of a benchmark-driven assessment.
- (c) Conclude on the appropriate cost of embedded debt allowance, suitably cross-checked to ensure the CMA has fairly met its various duties.

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<sup>2611</sup> [Working paper: cost of debt](#)

*Ofwat Position*

- 9.555 Prior to the CMA's Provisional Findings, Ofwat stated that its notional approach, rather than one which focused on company-by-company actual costs, represented a long-standing regulatory practice. Ofwat argued that this approach offered better incentives to issue debt cost-effectively compared to a pass-through of actual debt costs. Ofwat stated that its approach strongly incentivised companies to outperform while preventing customers from bearing all the risks associated with company financing decisions.<sup>2612</sup>
- 9.556 In response to the CMA's Provisional Findings, Ofwat stated that the allowance should be a reasonable estimate of the costs of an efficiently-run company under the notional financing structure, but that it was 'not possible to recognise this description in the CMA's point estimate of 4.81%' based on a review of the March 2020 company-reported costs of debt from annual performance reports (APR).<sup>2613</sup> Ofwat stated that it did not understand the CMA's 'blanket refusal' to consider actual company data within its sector-level allowance, and stated that placing zero weight on actual data was a 'radical departure' from the well-established approach in UK water regulation, breaks with the CMA's own approach (referencing the CMA's Bristol PR14 Determination) and was inconsistent with the cross-check used in the CMA's analysis of Bristol's CSA request.<sup>2614</sup>
- 9.557 Ofwat submitted that iBoxx indices do not capture actual water sector timing, tenor, credit ratings, floating debt proportions or access to the European Investment Bank (EIB). On this latter point, Ofwat noted that the EIB has provided around £17bn of lending to the water sector and that Moody's estimate that EIB debt carries a yield around 100bps lower than the sectors embedded debt on March 2016.<sup>2615</sup>
- 9.558 Ofwat stated that company APR reports suggested that the simple average cost of embedded debt at the companies was 4.50% in March 2020, 31bps lower than the CMA's proposed allowance. Ofwat confirmed that it considered that an instrument-level review of ex-ante efficiency would be impractical, but suggested that the data in the APRs was not in dispute between Ofwat and the Companies.<sup>2616</sup>

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<sup>2612</sup> Ofwat (2019), *PR19 final determinations: Allowed return on capital technical appendix*, Section 6.3.2

<sup>2613</sup> *Ofwat's response to the provisional findings – risk and return*, paragraph 4.6

<sup>2614</sup> *Ofwat's response to the provisional findings – risk and return*, paragraphs 4.9 & 4.12

<sup>2615</sup> *Ofwat's response to the provisional findings – risk and return*, paragraph 4.12

<sup>2616</sup> *Ofwat's response to the provisional findings – risk and return*, paragraph 4.10

- 9.559 Ofwat stated that it disagreed with Anglian's 4.95% estimate of industry actual costs. Ofwat noted that this figure is based on Ofwat's FD WASC and large WOC balance sheet cross check figure of 4.45% plus 50bps reflecting Europe Economics December 2017 view of the impact of swaps. Ofwat stated that even if swap data should be included, this 50bps figure was now out of date. Ofwat stated that rather than making such adjustments to its previous 'balance sheet' approach, that its updated approach based on the 2020 APRs should be seen as giving the definitive view of companies' cost of embedded debt as it is based on balance sheet positions as at March 2020.<sup>2617</sup>
- 9.560 As additional evidence, Ofwat stated that Severn Trent and United Utilities have gearing closer to the notional, and have credit ratings of Baa1 and A3, and embedded debt figures of 3.61% and 3.18%, respectively.<sup>2618</sup> Ofwat also stated that the CMA's provisionally-set allowance would overcompensate the embedded debt costs at all but one of the water and sewerage companies, and that those with lower costs than the CMA's allowance accounted for 89% of total sector borrowings.<sup>2619</sup>
- 9.561 Ofwat subsequently suggested that its own allowance may have been too generous, and provided additional data which focused on WASCs (which Ofwat stated represented 95% of the sectors borrowing requirements). While we note that this data was not comprehensive and may not have been presented on the same basis (for example, with the same inflation assumptions) as the APR data we use in our analysis of actual costs (see paragraph 9.604), Ofwat stated that it showed: <sup>2620</sup>
- (a) Close to 'notionally' geared companies such as Severn Trent and United Utilities have actual embedded debt costs over the price control of 3.38% (based on business plan submissions) to 3.42% (based on an assessment of listed bond data).
  - (b) Highly-geared companies such as Wessex have costs between 4.06% (listed bond data) and 4.13% (2018 business plan submissions) over the period.
  - (c) All WASCs have simple average costs of 4.04% (listed bond data) and 4.05% (2018 business plan submissions).

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<sup>2617</sup> Ofwat's reply to responses to the provisional findings – risk and return, p5

<sup>2618</sup> Ofwat's response to the provisional findings – risk and return, paragraph 4.11

<sup>2619</sup> Ofwat's response to the provisional findings – risk and return, paragraph 4.7

<sup>2620</sup> Ofwat's reply to responses to the provisional findings – risk and return, Table A1.1

*Submissions following the CMA's working paper on the cost of debt*

- 9.562 Ofwat described the CMA's updated estimates of actual embedded debt cost at 4.52%, as set out in our cost of debt working paper (based on the collapsing average of the 15-year benchmark, cross-checked against APR-sourced actual estimates of c4.45% for WASCs and c4.82% for the whole sector),<sup>2621</sup> as an undisputable movement towards a reasonable allowance. However, it still considered that the allowance was too high, and included adjustments to the APR data that were unreasonably generous in favour of the companies. Ofwat stated that the CMA's estimates were at the top end of the plausible range of 3.4% to 4.5%, and that a materially lower figure would also be supported by the available evidence. Ofwat encouraged the CMA to focus its estimates of actual cost on WASC data given the availability of company specific adjustments for small WOCs.<sup>2622</sup>
- 9.563 Ofwat noted specifically that the CMA's estimate of the cost of floating debt was based on the six-month average of the main A/BBB debt benchmark, but that this benchmark related to the price for long-term debt. A more accurate approach would be to price floating debt in terms of LIBOR plus 100bps, or use actual costs from the 'App20' data instrument-level data tables that it had submitted. In addition, adjusting APR data for yield-at-issue rather than coupon rates of debt would actually reduce the average interest cost by 8bps, rather than increase it slightly as suggested by the Disputing Companies.<sup>2623</sup>

*Disputing Companies*

- 9.564 Anglian stated that the approach to actual costs needs to be conducted on an 'all-in observed cost of debt' basis for both companies and the sector, and that without this cost of debt allowances could materially under-fund companies' for efficient financing costs based on asset-liability matching.<sup>2624</sup>
- 9.565 Anglian considered the actual debt costs calculated by Ofwat to understate the costs incurred by the average company in the sector. Anglian suggested that Ofwat's PR19 allowance had included short-term debt but excluded efficient derivative instruments. Combined with the falling average tenor of actual debt across the sector this approach was likely to provide a downward biased estimate. Anglian suggested that Ofwat's 'actual' costs should represent a floor for the cost of embedded debt allowance, and that Anglian measured the median 'all-in' cost of debt for the sector to be 4.95% (WASCs

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<sup>2621</sup> [Working paper: cost of debt](#), paragraph 192

<sup>2622</sup> [Ofwat initial response to the working papers](#), paragraphs 3.1–3.7 & 3.36–3.38

<sup>2623</sup> [Ofwat's final response to working papers](#) paragraph 3.24

<sup>2624</sup> [Anglian's response to the provisional findings](#), paragraphs 435–437



and large WOCs). Anglian compared this to its assessment of its own all-in actual costs of 4.97%, and suggest that the CMA's provisional determination of 4.81% risked underfunding efficient financing costs within the sector.<sup>2625</sup>

- 9.566 Anglian also stated that Ofwat's APR data, which was now Ofwat's preferred measure of actual costs, was also misleading and understated the actual cost of debt. Anglian stated that the APR data is prepared in accordance with Ofwat's Regulatory Accounting Guidelines and is not consistent with even Ofwat's own balance sheet checks.<sup>2626</sup> In addition to the 38bps impact from inclusion of short-term liquidity facilities, Anglian stated that APR data understated its cost of embedded debt by a further 15bps due to reasons such as measurement of coupons rather than yields at issue.
- 9.567 Bristol commissioned KPMG to undertake analysis of the CMA's Provisional Findings and Ofwat's subsequent submissions. This report stated that the cost of debt implied by the APRs includes a number of financial instruments designed to support short-term liquidity which could distort the observed cost of debt (including overdrafts, liquidity facilities and revolving credit facilities). This impact can be shown by the difference between interest costs based on gross debt (c4.5%) compared to the costs of net debt (c4.8%). These issues are considered by Ofwat in its own balance sheet approach (which is different to the APR approach), and Ofwat considers that costs associated with temporary liquidity and credit facilities are priced separately (through the allowance for issuance costs).
- 9.568 In addition, Bristol stated that the inclusion of short-term instruments distorts the allowance due to the upward sloping yield curve. Where companies have followed this path, one would expect this to introduce a wedge between the cost of debt implied by the benchmark and the reported costs. Ofwat's estimate of the outperformance wedge – which is primarily driven by shorter dated issuance – suggests that the impact of short dated debt is likely to be equivalent to at least 25bps. Ofwat recognises this by excluding instruments with a tenor of less than 10 years from its analysis of the outperformance wedge, so it is inconsistent to fail to exclude such instruments from the analysis of actual costs.
- 9.569 Bristol stated that floating rate debt is included without taking into account forward rate adjustments, which would be +10bps based on October data. Also, the inclusion of floating rate debt reduces the reported cost of debt in the APRs by c50bps, which raises the question as to whether all costs and risks associated with floating rate debt are captured. Bristol stated that floating rate

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<sup>2625</sup> [Anglian's response to the provisional findings](#), paragraphs 441–450

<sup>2626</sup> [Anglian's reply to responses to the provisional findings](#), paragraph 79



debt would need to be adjusted to capture potential volatility and risk associated with such instruments. In addition, Bristol stated that it is not appropriate for the regulator retrospectively and with the benefit of hindsight to under-fund long term debt issuance on the basis that companies which have issued floating rate or shorter dated debt have benefitted from outturn market conditions (which they could not control) and reduced the sector average cost of debt.

9.570 Bristol also stated that the costs in the APRs are based on coupons rather than yields at issues and so are not representative of actual costs faced over the entire period. In addition, they do not take account of how costs are likely to develop over the AMP period.

9.571 Bristol stated that the Ofwat balance sheet approach should suggest a figure of 4.95% (based on Ofwat's 4.45% plus Europe Economics 'early view' that there would be a 50bps increase in costs including swaps), and that as a result the CMA allowance of 4.81% may under-state the cost of debt.

9.572 Bristol stated that differences to the benchmark figure may be driven by either efficiency of issuance or companies taking different interest rate risks (eg use of variable rate debt or debt at shorter tenors). As a result, it was important to take into account an appropriate definition and specification of the history of financing for the notional company over the 20-year horizon. Bristol stated that it was reasonable to assume that the notional company would raise long-term debt in order to match its assets and that the notional company would raise debt in line with regulatory guidance. Where companies have chosen to adopt financing strategies that differ from the notional structure, it may not be appropriate to 'goal seek' the costs implied by the benchmark to an ex-post estimate of actual costs.

9.573 Northumbrian stated that Ofwat's latterly preferred APR data did not provide a good approximation of the sector average costs of embedded debt in AMP7, arguing that:<sup>2627</sup>

(a) The APR approach includes instruments that Ofwat excludes from its previous 'balance sheet' approach (on the basis that they could distort the observed cost). This includes the use of credit facilities or other temporary financing arrangements. Northumbrian noted that in the case of Anglian, drawing on a credit facility to improve liquidity during COVID-19 leads to an understatement of AMP7 debts by 38bps.

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<sup>2627</sup> [Northumbrian's reply to responses to the provisional findings](#), paragraph 142

- (b) Short term instruments reduce the observed cost of debt but increase refinancing risk. This risk is not captured in the APR data, and leads to an understatement of long-term financing costs.
- (c) The APR figure is a point estimate that does not reflect costs over the period.
- (d) Floating rate debt does not take into account forward rate adjustments (worth c10bps at October 2020), nor is it adjusted for the associated volatility risk.
- (e) The APR figure is based on coupons not yield at issue, so may misrepresent any bonds not issued at par. Northumbrian (in a later submission) estimated the cost of using coupons as opposed to yields at issue to be c5bps.

9.574 Northumbrian stated that these issues make the APR data unreliable as either a primary input or a cross check. Northumbrian also suggested that Ofwat's suggestion that it can be relied upon is 'opportunistic' given that it is constructed on the basis of its own Regulator Accounting Guidelines (RAGs) and does not match the balance sheet approach previously used by Ofwat in setting price controls. Northumbrian welcomed Ofwat's indication that a cross check should include swaps. Northumbrian's analysis of a balance sheet cross check including swaps would suggest an all-in economic cost of debt of 4.95%.<sup>2628</sup>

9.575 Yorkshire stated that its SoC had sought a cost of debt allowance that covered its efficiently incurred financing costs in full, and that the CMA would be inconsistent with the finance duty if it were to consciously underfund a company's debt costs.<sup>2629</sup>

9.576 Yorkshire stated that however the CMA ultimately calibrates its allowance the key requirement is that Yorkshire should receive sufficient revenues to cover its 4.93% embedded cost of debt.<sup>2630</sup>

9.577 In addition, Yorkshire<sup>2631</sup> stated that undertaking cross-checks on a sector-wide basis is not as simple as Ofwat seeks to portray, pointing out that the APRs are prepared in accordance with Ofwat's guidelines and should be adjusted for:

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<sup>2628</sup> [Northumbrian's reply to responses to the provisional findings](#), paragraphs 143–145

<sup>2629</sup> [Yorkshire's response to the provisional findings](#), paragraph 3.3.9

<sup>2630</sup> [Yorkshire's response to the provisional findings](#), paragraphs 3.3.10–3.3.11

<sup>2631</sup> [Yorkshire's reply to responses to the provisional findings](#), paragraphs 2.6.4–2.6.7

- (a) The difference between yields at issue and coupons (Yorkshire issued a £350m bond in April 2019 with a coupon of 2.75% but a yield at issue of 2.88%).
- (b) Different inflation assumptions, which are more complicated than portrayed by Ofwat. Ofwat states that Yorkshire's inflation-adjusted figure was 4.81%, while Yorkshire consider the correct inflation-consistent figure would be 4.84%.
- (c) Significantly higher than normal cash levels at March 2020, largely drawn as a buffer against potential COVID issues or due to company-specific issues. Calculating debt costs on the basis of net rather than gross debt would increase interest costs by c30bps, making the estimate more like 4.8% and very close to the CMA's Provisional Findings allowance.

9.578 Yorkshire stated that, appropriately adjusted for inflation, the APR cost of debt would have been c5% in 2018 and c4.9% in 2019, suggesting a figure of c4.8% as a more reasonable decline profile than the drop to 4.5% suggested by Ofwat.<sup>2632</sup> In a post-hearing submission, Yorkshire clarified that it calculated its own cost of debt to be 33bps higher than the APR data suggested (22bps from the inclusion of liquidity facilities and 9bps from other factors) while the WASC and large WOC figure was under-reported by 33bps-38bps, 28bps of which was the inclusion of liquidity facilities while 5-10bps was the estimated impact of other factors.

9.579 In addition, Yorkshire stated that if the CMA's intention is that all costs that arise from holding cash and from short-term lending facilities should be covered by the 10bps 'issuance and liquidity costs', then these items should be excluded from the calculation of embedded debt costs. This process would add 20bps to the Yorkshire cost of embedded debt.<sup>2633</sup>

#### *Submissions following the CMA's working paper on the cost of debt*

9.580 The Disputing Companies made several additional points in response to the CMA's working paper on the cost of debt, with the majority of submissions focused on the principles relating to setting an allowance and the correct use of benchmarks.

9.581 Anglian argued that an allowance that approximated actual company financing was fundamentally inconsistent with Ofwat's policy on the allocation of risk across companies and customers, and risked transferring risks to

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<sup>2632</sup> [Yorkshire's reply to responses to the provisional findings](#), paragraph 2.6.8

<sup>2633</sup> [Yorkshire's reply to responses to the provisional findings](#), paragraph 2.6.5

customers. Underlying this concern was a view that future interest rates could push an allowance based on actual costs (or a benchmark with matching adjustments) above the prevailing benchmark rates, transferring risks away from companies and on to customers.<sup>2634</sup>

9.582 In addition, Anglian stated the CMA had not taken into account actual financing decisions which it considers could increase the cost of debt (for example, through gearing or index linked debt), but selectively matched features of actual company financing which reduce observed costs (short term, floating debt). The CMA had also failed to undertake the required detailed analysis of cost of carry for water companies. Anglian stated that analysis of cash on company balance sheets indicates cost of carry of 9-18 bps in addition to the 4bps provided by Ofwat, which only covers costs associated with liquidity facilities.<sup>2635</sup>

9.583 Bristol primarily commented on the applicable cost for a small company, which we cover in paragraphs 9.955 to 9.1006.

9.584 Northumbrian noted the need to update assumptions of actual (or matching adjustments) that include the use of floating rate debt, arguing that measures that deviate from the notional structure (which does not include floating rate debt) should also include allowances such as a cost of carry adjustment.<sup>2636</sup> Northumbrian estimated the cost of carry at WASCs and large WOCs to be 12bps.<sup>2637</sup>

9.585 Northumbrian also stated that it would be inappropriate to set an allowance for the notional company on the basis of actual company costs, as such an approach could penalise companies that have or plan to issue debt in line with the selected benchmark, and that the implied risk exposure undermines companies' financeability.<sup>2638</sup> Northumbrian stated that such a 'non-notional' approach also exposed customers to interest rate risks and was an example of asymmetric regulatory policy if costs were passed to customers when rates fall but not if rates rise.

9.586 Northumbrian argued that APR data remained an inappropriate source of actual costs, and that Ofwat's balance sheet check was more appropriate (although with its own issues). If using APR data, this should be adjusted for net versus gross debt and median figures should be used to adjust for outliers or the undue impact of very large companies. Taking such an approach would

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<sup>2634</sup> [Anglian Full response to the CMA's working papers on Cost of Capital](#), paragraphs 38–47

<sup>2635</sup> [Anglian Full response to the CMA's working papers on Cost of Capital](#), p15

<sup>2636</sup> [Northumbrian Final submission](#), section 3.3.2.5.4

<sup>2637</sup> [Northumbrian Final submission](#), paragraph 84

<sup>2638</sup> [Northumbrian Initial response to working paper on cost of capital](#), paragraph 76

provide estimates of 4.52% - 4.82%, with a WASC and Large WOC median of 4.63%, which was not inconsistent with the CMA's original Provisional Findings estimate of 4.81%. Northumbrian cautioned that the lower end of the range was likely to understate efficient costs where WASCs had exhibited material exposure to short-term or floating debt.

- 9.587 Anglian<sup>2639</sup> and Northumbrian<sup>2640</sup> stated that floating rate debt should be assessed by directly removing credit facilities rather than using 2018/19 weights of fixed, index-linked and floating debt – the approach used by the CMA in its cost of debt consultation. In addition, while it was appropriate to price this debt from the main iBoxx index, as floating debt could be seen as new debt issued by the notional company, it should be over a longer trailing average to reflect floating debt raised across the last 20 years.
- 9.588 Yorkshire stated that actual data should serve solely as a cross-check for the benchmark approach, otherwise the approach essentially becomes an 'actual' one. Yorkshire stated that if the chosen benchmark was within the actual data cross check range, then there should be no need for further adjustments.
- 9.589 In addition, Yorkshire believed that the CMA's working paper estimates of actual costs continued to underestimate the true actual costs. Yorkshire suggested more fundamental adjustments for the presence of liquidity facilities and an approach which focused on median estimates of WASC and large WOC companies. Such adjustments would lead to a revised range for the actual costs of 4.61% to 4.72%.<sup>2641</sup>
- 9.590 Yorkshire also stated that the total adjustment to account for net vs gross debt and other data issues inherent in APR data would be 20bps, not the 5-10bps suggested by the CMA's analysis.<sup>2642</sup>

### *Third Parties*

- 9.591 The UKRN stated that in explicitly choosing not to look at the balance sheet cost of debt in its Provisional Findings, the CMA may have allowed a debt cost allowance that cross-subsidised equity returns.<sup>2643</sup>

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<sup>2639</sup> [Anglian Initial response to the CMA's working papers on cost of capital](#), paragraphs 61–32

<sup>2640</sup> [Northumbrian initial response to working paper on cost of capital](#), section A1.2.2

<sup>2641</sup> [Yorkshire Initial response to CMA WACC consultations](#), section 3.2

<sup>2642</sup> [Yorkshire Final response to CMA WACC consultations – Paper 2\(A\): The Cost of Embedded Debt](#), section 4

<sup>2643</sup> [UKRN's response to the provisional findings](#)

- 9.592 Ofgem explained that it explicitly attempts to match its chosen benchmark (and any adjustments) so that aggregate industry debt costs are neither over nor under-compensated.
- 9.593 Ofgem had sympathy with the CMA's time and resource constraints when analysing actual costs, but suggested that the CMA should take more account of Ofwat's balance sheet approach to actual costs as a cross check to ensure that the embedded debt cost allowance was not materially above a fair and reasonable estimate of the costs likely to be incurred by a notional efficient operator in the sector.<sup>2644</sup>
- 9.594 Ofgem stated that if customers were to pay more than average actual debt costs, this implied a subsidy to equity returns which means they will exceed the estimated cost of equity (and vice versa). Ofgem considered it important that actual data is considered as getting this measure wrong could be extremely costly to either water consumers or to regulated companies.<sup>2645</sup>
- 9.595 Ofgem supported the use of average sector debt costs rather than allowing the 'cost-pass-through' of individual company debt cost on the basis of ensuring companies were incentivised to keep costs as low as possible.<sup>2646</sup>
- 9.596 CCWater stated that the bottom of the CMA's Provisional Findings range was higher than 13 companies reported their interest costs to be in their 2019-2020 annual performance reports, and that of the Disputing Companies only Yorkshire had higher reported costs. CCWater stated that this approach would go beyond cost-pass through, with consumers in effect paying a premium above incurred costs – effectively building in financial outperformance from the outset. This approach would most likely benefit investors and was manifestly not in the customer interest.<sup>2647</sup>
- 9.597 Energy North West Limited (ENWL) suggested that while it agreed that starting with the notional company is practical and efficient, the financing duty will not be properly discharged if actual company positions are not considered. In conjunction, the assessment of debts should take into account all types of debt instruments and debt costs. ENWL stated that derivatives are an important part of the actual debt costs and should therefore be taken into account by regulators.<sup>2648</sup>

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<sup>2644</sup> [Ofgem's response to the provisional findings](#), paragraph 15

<sup>2645</sup> [Ofgem's response to the provisional findings](#), paragraphs 12–14

<sup>2646</sup> [Ofgem's response to the cost of capital working papers](#), paragraph 6

<sup>2647</sup> [The Consumer Council for Water's response to the provisional findings](#), paragraph 5.12

<sup>2648</sup> [Electricity North West Ltd's response to the provisional findings](#), paragraphs 13–17

9.598 ENWL suggested that a number of companies had already commissioned external reviews of the reasonableness of their debt portfolios, and that this evidence could be relied upon by the CMA.<sup>2649</sup> ENWL stated that companies on the ‘wrong side’ of the average cannot rectify their position by refinancing at lower costs in the future, as the ability to match or beat the index will be a function of luck or timing, rather than anything to do with efficiency. With investment needs or maturing debt the primary driver of issuance, the regulatory regime will benefit the lucky or the large (and thus flexible) at the expense of those otherwise efficient companies who need to access the market at inopportune moments.<sup>2650</sup>

#### *Cost of Embedded Debt– CMA assessment of Actual Costs*

9.599 The redetermination process has seen significant debate between the Parties as to the correct methodology for calculating bottom-up estimates of actual company and sector costs of embedded debt. Figures provided by the Parties have varied so extensively as to challenge the conventional understanding of the word ‘actual’.

9.600 For example, Ofwat has provided estimates of:

- (a) 4.25% as the weighted average pure debt cost in the sector at draft determination (PR19 FD)<sup>2651</sup>
- (b) 4.65% as the company-level median pure debt cost in the sector at draft determination (PR19 FD)<sup>2652</sup>
- (c) 4.45% as the WASC and large WOC median cost of debt at final determination (PR19 FD)<sup>2653</sup>
- (d) 4.50% as the March 2020 APR-derived figure (response to Provisional Findings)<sup>2654</sup>
- (e) 3.61% and 3.18% as the actual costs at Severn Trent and United Utilities respectively (response to Provisional Findings)<sup>2655</sup>

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<sup>2649</sup> [Electricity North West Ltd's response to the provisional findings](#), paragraphs 18–19

<sup>2650</sup> [Electricity North West Ltd's response to the provisional findings](#), paragraphs 25–29

<sup>2651</sup> Ofwat (2019), [PR19 final determinations: Allowed return on capital technical appendix](#), Section 6.3.1

<sup>2652</sup> Ofwat (2019), [PR19 final determinations: Allowed return on capital technical appendix](#), Section 6.3.1

<sup>2653</sup> Ofwat (2019), [PR19 final determinations: Allowed return on capital technical appendix](#), Section 6.3.3

<sup>2654</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 4.7

<sup>2655</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 4.11



(f) 4.04%-4.05% as the all-WASC average actual costs (reply to responses to Provisional Findings).<sup>2656</sup>

9.601 By contrast, during the redetermination process the Disputing Companies have variously estimated actual 'all-in' industry costs to range from 4.47%<sup>2657</sup> to 5.15%.<sup>2658</sup> We present these ranges from the Disputing Parties as indicative of the many issues that impact any measure of 'actual' costs. Differences in the instruments measured, the companies measured, the inflation assumption used, and the single date 'snapshot' nature of balance sheet checks, amongst other things, makes it easy for different parties to provide differing measures of 'actual' costs.

#### *CMA analysis of actual debt costs*

9.602 Despite the difficulties described in the preceding paragraphs, we consider that the various submissions and evidence supplied by the parties, in addition to our own analysis, have allowed a sufficiently accurate estimate of the actual costs of embedded debt across the water industry.

9.603 In the cost of debt working paper we based our actual cost estimates on Ofwat's March 2020 APR data, with a 30bps upward adjustment to index-linked debt costs to account for the higher inflation assumption used by the CMA throughout this determination.<sup>2659</sup>

9.604 We addressed the companies concerns about inappropriate levels of RCFs within the March 2020 APR data by using 2018/19 weights for fixed, indexed and floating debt. We also addressed any associated pricing issues by pricing all floating rate debt at the price implied by the previous 6-month average of the iBoxx A/BBB 10+ indices. We also added 5-10bps to our estimates to account for issues such as the difference between yield-at-issuance and coupon rates of debt. On this basis, we estimated approximate actual costs of:<sup>2660</sup>

(a) WASCs: 4.45%

(b) Whole Sector: 4.82%

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<sup>2656</sup> [Ofwat's response to the provisional findings – risk and return](#), Table A1.1

<sup>2657</sup> 4.47% is based on [Bristol's SoC](#) assessment of costs excluding a company specific adjustment, Table B1. As Bristol focuses on a suitable allowance after the company specific adjustment, a more appropriate low estimate may be 4.87% - based on Yorkshire's assessment that Ofwat's 4.47% allowance included errors worth 40-50bps, [Yorkshire's reply to responses to the provisional findings](#), paragraph 7.5.12

<sup>2658</sup> [Anglian SoC](#), paragraph 1183

<sup>2659</sup> [Working paper: cost of debt](#), paragraphs 163–164

<sup>2660</sup> [Working paper: cost of debt](#), paragraphs 166–169



9.605 We also measured ‘actual-notional’ cost of debt. This was actual company costs of fixed and indexed-linked debt, applied in the 2/3 fixed and 1/3 index-linked ratio that both Ofwat and the CMA use for the notional company structure when assessing financeability. On this basis, we estimated median costs of:<sup>2661</sup>

(a) WASCs: 4.54%

(b) Whole Sector: 4.54%

9.606 Following submissions from all the Main Parties, we have further refined these estimates. In particular, we have:

(a) Updated our approach to using floating rate debt within any calculation.

(i) Rather than using 2018/19 weights, which parties suggested could also include RCFs, we use 2020 weights, minus cash (with a downward limit of zero);

(ii) Included a 10bps additional cost of carry allowance when measuring debt under approaches that include floating rate debt.

(iii) Updated our pricing assumption to be the 6-month average of the iBoxx A/BBB 1-3 indices.

(b) Generally based our assessment on net debt positions;

(c) Focused on metrics that cover WASCs and large WOCs;

(d) Focused on median metrics within the data.

(e) Removed any further adjustments.

9.607 We agreed with the Disputing Companies that it would be better to make more direct adjustments to 2019/20 rather than use 2018/19 weights that may also have some distortions. We approached this slightly differently to the Disputing Companies (which more directly stripped-out identified RCFs) but achieved broadly the same results. We agreed with the Disputing Companies’ assessment that Ofwat had previously been explicit that it did not allow a cost of carry allowance as this cost could be offset by lower cost short-term or floating debt (see paragraph 9.547). We note that Northumbrian’s estimate of this costs is 12bps while Anglian suggest 9-18bps. As we have assumed a conservative (in favour of the companies) price for the cost of floating debt

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<sup>2661</sup> Working paper: cost of debt, paragraphs 194–195

based on the iBoxx A/BBB 1-3 rather than a SONIA-based benchmark, it would seem prudent to use a cost of carry estimate towards the low end of the companies' estimates. For the purposes of this exercise, we consider 10bps to be an appropriate estimate of the cost of carry.

- 9.608 We also agreed with the Disputing Companies that the adjustments made to floating debt would imply that we should generally consider debt costs on a net basis. Failure to adjust for cash levels may give a distorted impression of the debt used to invest in the long-term assets of the business.
- 9.609 Conversely, we agreed with Ofwat that our previous pricing of floating rate debt (2.53%) was potentially too generous as it was focused on long-term issuance. We considered two potential pricing options, the 10-year average of the SONIA<sup>2662</sup> rate plus 100bps, which gave an estimate of 1.47%,<sup>2663</sup> and the 10-year average of the iBoxx A/BBB 1-3 index, which gave an estimate of 1.85%. As we were applying a single rate across all companies, we chose to take the higher of these two figures. An alternative approach would have been to apply the SONIA-based rate to the WASCs and large WOCs and the iBoxx-based rate to the WOCs, but as both are inaccurate approximations and floating rate debt is a relatively small component of sector-wide funding, we chose the conservative option.<sup>2664</sup>
- 9.610 We agreed with all parties that focusing on WASCs and large WOCs as a group was more appropriate than measuring costs at WASCs and at the whole sector. Large WOCs are likely to have comparable costs to many of the WASCs, while whole sector data may be skewed by the small WOCs which have the ability to apply for a company specific adjustment (CSA). For more details on Bristol's application for a CSA, see paragraph 9.905.
- 9.611 We also agreed that a focus on median measures would help to avoid undue influence of any outlier figures, an impact that could be particularly important if a company's outlying cost of debt reflected an approach to risk that was a material departure from what could be considered as within the normal range for the notional company.
- 9.612 We considered evidence from both Ofwat and the Disputing Companies on potential further adjustments to actual costs measured through the APR data. We concluded that the competing evidence of small upward and downward

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<sup>2662</sup> SONIA is the Sterling Overnight Index Average, and is the Bank of England Working Group on Sterling Risk Free Reference Rates' preferred benchmark as financial institutions transition away from the LIBOR (London Inter-Bank Offered Rate) rate suggested by Ofwat in paragraph 9.563

<sup>2663</sup> Bank of England data

<sup>2664</sup> For note, the net impact of using the lower SONIA-based estimate would have been only 1bps at the level of median WASC and large WOC.

adjustments on issues such as yield at issue versus coupon rates were likely to broadly net out across the sector and over time, and so decided to make no further manual adjustments to this data (above the cost of carry adjustment discussed in paragraph 9.606). As a result, we do not apply the 5-10bps adjustment used in our consultation on the cost of debt.

9.613 Acknowledging the significant disagreement between the parties in relation to floating costs, we first consider the costs of fixed and index-linked debt suggested by our adjusted APR data. These instruments are the two considered as applicable to financing the RCV when assessing financeability, and account for the vast bulk of debt held by companies in the sector.

9.614 Table 9-21 shows that when measuring only fixed and indexed linked debt, the median WASC and large WOC median cost of debt is 4.54%.

**Table 9-21: CMA analysis of adjusted APR data – Fixed and Indexed-Linked debt only**

<i>Company</i>	<i>Fixed Debt £000</i>	<i>Indexed Debt £000</i>	<i>Fixed and Indexed Debt £000</i>	<i>Fixed Debt Interest Rate</i>	<i>Indexed-Debt Interest Rate (CMA-basis)</i>	<i>Total Fixed and Indexed Costs as % of Total Fixed and Indexed Debt</i>
Anglian Water	2585	3910	6496	4.42%	5.35%	4.98%
Dŵr Cymru	818	3081	3899	5.17%	4.37%	4.54%
Hafren Dyfrdwy	0	33	33	3.49%	6.63%	6.62%
Northumbrian Water	1791	1136	2928	4.44%	4.14%	4.32%
Severn Trent Water	3771	1426	5197	3.85%	4.48%	4.02%
South West Water	1214	576	1791	1.94%	4.81%	2.86%
Southern Water	677	2672	3349	5.70%	5.51%	5.55%
Thames Water	4113	7545	11658	5.32%	4.14%	4.56%
United Utilities	3568	4060	7628	2.97%	4.04%	3.54%
Wessex Water	1145	802	1946	4.17%	4.52%	4.31%
Yorkshire Water	2493	1796	4288	2.87%	10.04%	5.87%
<b>WASC Average</b>				<b>4.03%</b>	<b>5.28%</b>	<b>4.65%</b>
<b>WASC Median</b>				<b>4.17%</b>	<b>4.52%</b>	<b>4.54%</b>
Affinity Water	503	576	1078	4.37%	4.68%	4.53%
South East Water	346	570	917	4.29%	6.04%	5.38%
<b>WASC and Large WOC Average</b>				<b>4.08%</b>	<b>5.29%</b>	<b>4.70%</b>
<b>WASC and Large WOC Median</b>				<b>4.29%</b>	<b>4.68%</b>	<b>4.54%</b>

Source: CMA analysis of Ofwat data

9.615 Secondly, we consider what these costs would be if applied in the notional structure of 2/3 fixed and 1/3 indexed debt. There are two ways we could do this. We could take a 2/3 weight of the median WASC and large WOC fixed cost of 4.29% and then a 1/3 weight of the median WASC and large WOC indexed cost of 4.68%, which would give an estimate of 4.42%. We could also calculate the implied interest cost at each company using this structure, and

then take the median of these estimates. This approach yields a result of 4.54%,<sup>2665</sup> which is shown in Table 9-22.

**Table 9-22: CMA analysis of adjusted APR data – Weighted at notional structure**

				%
<i>Company</i>	<i>Fixed Debt Interest Rate</i>	<i>Indexed-Debt Interest Rate (CMA Inflation)</i>	<i>Weight by notional structure (individually)</i>	<i>Weight by notional structure (total)</i>
Anglian Water	4.42	5.35	4.73	
Dŵr Cymru	5.17	4.37	4.90	
Hafren Dyfrdwy	3.49	6.63	4.54	
Northumbrian Water	4.44	4.14	4.34	
Severn Trent Water	3.85	4.48	4.06	
South West Water	1.94	4.81	2.90	
Southern Water	5.70	5.51	5.64	
Thames Water	5.32	4.14	4.93	
United Utilities	2.97	4.04	3.33	
Wessex Water	4.17	4.52	4.29	
Yorkshire Water	2.87	10.04	5.26	
<b>WASC Average</b>	<b>4.03</b>	<b>5.28</b>	<b>4.45</b>	<b>4.45</b>
<b>WASC Median</b>	<b>4.17</b>	<b>4.52</b>	<b>4.54</b>	<b>4.29</b>
Affinity Water	4.37	4.68	4.47	
South East Water	4.29	6.04	4.87	
<b>WASC and Large WOC Average</b>	<b>4.08</b>	<b>5.29</b>	<b>4.48</b>	<b>4.48</b>
<b>WASC and Large WOC Median</b>	<b>4.29</b>	<b>4.68</b>	<b>4.54</b>	<b>4.42</b>

Source: CMA analysis of Ofwat data

9.616 The companies have questioned whether this approach is fair, as no allowance is made for the timing of the ‘notionalisation’ process, and so the rates implied for each instrument may not be the same as the rates available at the time of issue if the companies had chosen to borrow in line with the notional structure. However, we consider this to be a relatively minor risk as:

- (a) There should be no structural bias in this process, so any timing or other factors that impact the accuracy of the company level analysis should be mitigated once aggregated across the sector; and
- (b) This is only one element of our analysis, so it should be obvious if this approach gave a materially misleading view of actual costs.

9.617 We note that the ‘fixed and indexed only approach’ and the ‘notional-actual’ approach (using the more generous measure) both give a median WASC and large WOC estimate of 4.54% in this case.

<sup>2665</sup> The two approaches give different median results as there are companies who have below average fixed debt costs but above average indexed costs, or vice versa. This impact is smoothed in the approach that measures the notional cost at each company rather than just at aggregate levels. The average figure is unaffected by the choice of methodology, and would give an estimate of 4.48%.

9.618 Next in our assessment, we bring in analysis including floating rate debt to form an ‘all-in’ assessment of actual costs. In this way we can cross check against the fixed and indexed and ‘notional-actual’ approaches described above. As discussed in paragraph 9.607, we first adjust March 2020 data for excess levels of cash on company balance sheets. This can be seen in Table 9-23.

**Table 9-23: CMA analysis of adjusted APR data – Floating rate debt adjusted for cash balances**

<i>Company</i>	<i>Floating Debt in APR</i>	<i>Cash</i>	<i>Floating not used to fund cash</i>	<i>Floating assumed as company choice</i>	<i>Net Debt</i>	<i>Floating as % of net debt</i>
Anglian Water	1042	1048	-6	0	6490	0%
Dŵr Cymru	225	613	-388	0	3511	0%
Hafren Dyfrdwy	28	0	28	28	60	46%
Northumbrian Water	30	59	-29	0	2898	0%
Severn Trent Water	1002	15	988	988	6185	16%
South West Water	801	282	518	518	2309	22%
Southern Water	330	129	201	201	3550	6%
Thames Water	1483	1053	430	430	12088	4%
United Utilities	674	542	132	132	7760	2%
Wessex Water	316	42	273	273	2219	12%
Yorkshire Water	1303	59	1245	1245	5533	22%
<b>WASC Average</b>						<b>12%</b>
<b>WASC Median</b>						<b>6%</b>
Affinity Water	0	102	-102	0	976	0%
South East Water	150	13	137	137	1054	13%
<b>WASC and Large WOC Average</b>						<b>11%</b>
<b>WASC and Large WOC Median</b>						<b>6%</b>

Source: CMA analysis of Ofwat data

9.619 As can be seen from Table 9-23, the use of floating rate debt, even after accounting for funding cash balances, varies significant across the industry. Of the Disputing Companies Anglian and Northumbrian have little to no floating debt after accounting for cash, while Yorkshire has a more substantial exposure. The median exposure to floating debt (after funding cash) is 6%.

9.620 With the establishment of a ‘cash-adjusted’ floating figure, we can bring together our assessment ‘all-in’ actual costs at the WASCs and large WOC. The result is shown in Table 9-24.

**Table 9-24: CMA analysis of adjusted APR data – ‘All-in’ actual cost of debt**

<i>Company</i>	<i>Adjusted Floating Amount £000</i>	<i>Assumed Floating Interest Rate</i>	<i>Floating Cost £000</i>	<i>Fixed Cost £000</i>	<i>Indexed Cost £000</i>	<i>Total Interest Costs £000</i>	<i>Net Debt £000</i>	<i>Interest on Net Debt £100</i>
Anglian Water	0	1.85%	0	114	209	323	6490	4.98%
Dŵr Cymru	0	1.85%	0	42	135	177	3511	5.04%
Hafren Dyfrdwy	28	1.85%	1	0	2	3	60	4.44%
Northumbrian Water	0	1.85%	0	80	47	127	2898	4.37%
Severn Trent Water	988	1.85%	18	145	64	227	6185	3.68%
South West Water	518	1.85%	10	24	28	61	2309	2.64%
Southern Water	201	1.85%	4	39	147	190	3550	5.34%
Thames Water	430	1.85%	8	219	312	539	12088	4.46%
United Utilities	132	1.85%	2	106	164	272	7760	3.51%
Wessex Water	273	1.85%	5	48	36	89	2219	4.01%
Yorkshire Water	1245	1.85%	23	72	180	275	5533	4.97%
<b>WASC Average</b>								<b>4.31%</b>
<b>WASC Median</b>								<b>4.44%</b>
Affinity Water	0	1.85%	0	22	27	49	976	5.01%
South East Water	137	1.85%	3	15	34	52	1054	4.92%
<b>WASC and Large WOC Average</b>								<b>4.41%</b>
<b>WASC and Large WOC Median</b>								<b>4.46%</b>
<b>Actual cost using adjusted floating rate calculation</b>								<b>4.46%</b>
<b>Cost of carry uplift for using floating</b>								<b>0.10%</b>
<b>CMA estimate of 'all in' actual costs</b>								<b>4.56%</b>

Source: CMA analysis of Ofwat data

9.621 As we can see from this table, our median cash-adjusted ‘all-in’ cost of debt for the WASCs and large WOCs is 4.46%. As discussed in paragraph 9.607, we add a 10bps cost of carry allowance to this assessment, giving a final figure of 4.56%. As a result, we can see that an assessment based on only fixed and indexed debt, and an assessment that includes floating debt with adjustments for excess cash and offsetting costs of carry, provide very similar results in our analysis.

9.622 Adding this cost of carry allowance may be seen as generous. We note that the (pre-carry) company level costs in this analysis appear close to or higher than those used by the Disputing Companies. For example, Anglian claims a cost of 4.97% versus our ‘all-in’ estimate of 4.98%, while Yorkshire claims a cost of 4.93%, meaningfully below our estimate of 5.08%. The latter deviation is likely a function of Yorkshire’s larger than average exposure to floating debt and our choice of a ‘conservative’ pricing option for this type of debt. Using SONIA-based pricing would suggest a cost of 5.0%, reasonably close to Yorkshire’s estimate.

9.623 We consider our assessment of actual costs to benefit from some degree of agreement between the parties. Northumbrian provided its own calculations in

relation to adjusting APR data, building on the CMA's working paper calculations. Northumbrian calculated an identical estimate of fixed and indexed cost at a WASC and large WOC median of 4.54%. It also identified a cost of 4.54% when adjusting debt balanced for drawn RCF balanced as identified by Capital IQ data, an approach similar to our 'floating-ex-cash' analysis'. Finally, it identified a cost of 4.76% on a fully net debt basis. However, we note that this is on the basis of our previous 2.53% cost of floating debt. At what we now consider to be a more reasonable cost of 1.85%, this assessment would fall to below our estimates, coming in at 4.46%. This corroboration helps to increase confidence in our assessment of actual costs.

- 9.624 As a result, while there are a number of possible methodological variations on the assessment of actual costs, and accepting that the Main Parties may continue to disagree on the absolute figure, we are confident that our updated assessment provides a reasonable assessment of actual industry embedded debt costs.
- 9.625 The Disputing Companies have asserted that basing our allowance on actual cost (either directly or through adjustments to a benchmark) leads to a risk of inappropriate incentives, increases risks to customers or encourages a 'race to the bottom' on debt costs<sup>2666</sup>. We do not believe such risks are material for the following reasons.
- 9.626 Firstly, such risks should be adequately mitigated by averaging actual costs over a sufficient number of water companies as well as by considering actual costs on the basis of the notional structure.
- 9.627 Secondly, as discussed at paragraph 9.544, actual costs have always formed part of any assessment of embedded debt costs. Despite this, annual average tenor at issue over the last 20 years has varied from 8.5 years to 42.5 years (see paragraph 9.659 below). We expect water company management and owners to continue to behave in a responsible and economically-rational manner. As such, we expect companies to react appropriately to the options available to them in the debt market at whatever time they need to raise debt, and to do so in compliance with the requirement to ensure suitable levels of business risk and financial resilience. As with all inappropriate conduct by management and owners, we would also expect Ofwat to intervene directly if it is apparent that individual companies are taking on excessive risks. In addition, we conducted cross-checks against a number of benchmark-based

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<sup>2666</sup> Where companies increase interest rate risk by taking on increasingly short-term debt by trying to outperform the allowance.

approaches to ensure that there is no evidence of excess risk or inappropriately high costs being passed to customers.

9.628 Concluding our assessment of actual costs, we note that our estimates to this point are a representation of embedded debt costs at the end of AMP6, not on average over AMP7. Given that interest rates have generally fallen since the global financial crisis in the mid-late 2000s, we might expect average historical interest costs to decrease over AMP7 as older, more-expensive debt matures. However, Ofwat provided evidence that suggested that the impact would be relatively muted in this price control, with the average cost of listed bonds at the WASCs falling by only 3bps over the price control.<sup>2667</sup>

9.629 While Ofwat's evidence a) only covers WASCs and b) is prepared on a different basis to our actual debt analysis, it does suggest that average costs are likely to fall by single digit bps over the length of the control. On this basis, it appears reasonable to assume that average borrowing costs are likely to fall by only c3bps over the course of the price control.

9.630 On this basis, we can summarise our assessment of WASC and large WOC actual costs as:

**Table 9-25: CMA actual cost of embedded debt estimates**

<i>Measure</i>	<i>Figure</i>	<i>%</i>	
		<i>Mid-period adjustment</i>	<i>Final Figure</i>
Fixed and Indexed Costs only	4.54	-0.03	4.51
CMA Actual-Notional Structure	4.54	-0.03	4.51
CMA All-In Actual Costs inc Carry	4.56	-0.03	4.53

Source: CMA analysis

9.631 As shown in Table 9-25, our estimate is not dependent on the use of floating rate debt within the calculation, since we reach very similar estimates using only fixed and index-linked debt cost in either the actual or the notional structures. In our judgement, a reasonable estimate of the actual cost of embedded debt for the notional company is 4.52%. By our assessment, Anglian and Yorkshire have costs that are higher than this figure while Northumbrian has costs that are lower.

9.632 Unlike forward-looking equity costs, the cost of embedded debt is backward looking. As such, we consider that we do not need a range of estimates for the calculation of the overall WACC.

<sup>2667</sup> [Ofwat's reply to responses to the provisional findings – risk and return](#), Table A1.1 3bps represents the average fall to the middle of the price control period.



- 9.633 We continue to disagree with Yorkshire's view that embedded debt costs at each company should be separately reimbursed, absent evidence of inefficiency. The water sector is broad enough to ensure that aggregate industry debt costs provide a good indication of the efficient costs associated with securing that water companies can finance the proper carrying out of their statutory functions. An individual allowance based on the costs incurred by each company would likely require the regulator to conduct forensic assessment of the efficiency of each debt instrument used, which would not be a suitable use of the regulator's time or resources. More importantly, such an approach would reduce incentives to ensure that companies drive best practice, ensure efficiency and do not take inappropriate risks in their treasury management practices.
- 9.634 As discussed above in paragraph 9.624, the CMA's consultation processes and the incremental evidence provided by the Main Parties has allowed us to build confidence in the accuracy of our actual costs estimates and, as a result, the appropriateness of actual costs as the underlying basis of our cost of embedded debt allowance. This was not possible in advance of our Provisional Findings.
- 9.635 We consider that starting with an actual cost approach has a number of key advantages over the benchmark-led approach discussed in our Provisional Findings, including:
- (a) It ensures that customers do not pay any more than is reasonably required to allow the regulator to secure that water companies can finance the proper carrying out of their statutory functions;
  - (b) In using median values across a broad range of companies, it ensures that our allowance is not skewed by the performance or risk approach of outlier companies while maintaining incentives for efficiencies;
  - (c) It mitigates the Disputing Companies' concerns that some benchmark approaches arbitrarily disallow some historic debt costs – an actual approach explicitly includes historic debt, regardless of tenor (with the caveat in b) above that particularly low or high historic costs are largely excluded through the use of a median value).
- 9.636 The Disputing Companies have suggested that a major downside of an allowance set on the basis of actual costs (or a benchmark approach, effectively adjusted to replicate actual costs) is that companies may take a higher-risk approach as a result. We note that actual costs have always played a role in the setting of a cost of embedded debt allowance in this sector and we consider this risk is not material (as discussed above at

paragraphs 9.625– 9.627). However, we agree that it is useful to assess and potentially address this risk by cross-checking our estimate against a series of benchmark approaches. This process, which we conduct next, should demonstrate whether actual costs of debt are reasonable and efficient.

- 9.637 If our estimates of actual costs are at or below relevant benchmark cross-checks, we can be suitably confident that our actual cost allowance is appropriate and does not expose customers to higher-than-necessary costs. If actual costs prove to be higher than a relevant benchmark, we may consider that further analysis is required to ascertain whether actual costs are inappropriately high and should not form the basis of our allowance.

#### *Cost of Embedded Debt – Benchmarks*

- 9.638 There was significant disagreement between the parties in regard to the correct application of a benchmark-based measurement of the appropriate cost of embedded debt allowance. As noted in paragraph 9.542, Ofwat's PR19 approach utilised a 15-year average of the iBoxx A/BBB benchmark, lowered by a 25bps 'outperformance wedge' to reflect water companies' ability to outperform this benchmark. The CMA's Provisional Findings focused on a 20-year average of the iBoxx A/BBB benchmark without further adjustment. After considering additional submissions, the CMA consulted on the use of a 15-year collapsing average of the iBoxx A/BBB benchmark.<sup>2668</sup>

- 9.639 In the following paragraphs, we will consider arguments and evidence relating to:

- (a) Choosing an appropriate benchmark;
- (b) The measurement of the benchmark; and
- (c) Appropriate adjustments to the benchmark estimate.

We will conclude each sub-segment with our assessment of the evidence. We will then conclude with the CMA's overall analysis of appropriate benchmarks and suitable adjustments, and compare these to our estimate of actual costs in order to test whether we can consider median actual costs to represent efficiently incurred costs for the purposes of setting the cost of embedded debt allowance for the price control.

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<sup>2668</sup> A collapsing average is a measurement methodology that 'drops' one year of the trailing average every year. For example, a 15-year collapsing average over the 5-year price control period would be an average of the 15-year, 14-year, 13-year, 12-year and 11-year averages. This methodology attempts to mimic the impact of moving through the price control period, so that (in this example), if we start with a 15 year trailing average of embedded debt, by the end of the first year we will have 14 years of embedded debt and one year of new debt, and so on.

## Choosing an appropriate benchmark

### Main Parties Views

- 9.640 There was agreement from Anglian<sup>2669</sup>, Bristol<sup>2670</sup>, and Northumbrian<sup>2671</sup> that Ofwat's use of the iBoxx £ A and BBB 10+ indices was an appropriate benchmark for the measurement of the cost of debt. Yorkshire was concerned that this would suggest a credit rating that was not achievable for the notionally-structured company, and suggested that that cost of debt would be more appropriately set with reference to the BBB index alone.<sup>2672</sup> In addition, Yorkshire placed much greater emphasis on actual costs being the basis for the allowance.<sup>2673</sup>
- 9.641 Anglian stated that it agreed with the benchmark chosen (iBoxx non-financial 10+ A/BBB) as it reflected the target credit rating and the asset lives of the notional company, the average tenor at issue across the sector, had been proven to offer comparable yields at issue (versus water bonds) and was previously agreed in consultation between Ofwat and the sector to be the most suitable benchmark overall.<sup>2674</sup>
- 9.642 However, the Main Parties generally disagreed with the CMA's provisional approach of setting the allowance 'aimed' at the A-rated index as a proxy for falling rates, with the companies suggesting that this method was inconsistent with the notional credit rating underpinning the remainder of the price control determination, including the financeability assessment.<sup>2675</sup>
- 9.643 Ofwat suggested that its own use of the A/BBB 10+ benchmarks may not have been appropriate for the whole of either a 15 or 20 year look back period, and that the notional company was previously funded to have credit metrics consistent with a higher rating than the CMA's assumed Baa1/BBB+ rating. Ofwat noted that on the basis of Moody's guidance, the notional company in PR99, PR04 and PR09 controls would have been more consistent with an A3 rating.<sup>2676</sup> Ofwat also submitted evidence that at PR09 it had stated that 'We have targeted financial ratios that are consistent with an A-/A3 credit rating'.<sup>2677</sup> As a result, the 'past' notional company should have

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<sup>2669</sup> [Anglian SoC](#), paragraph 1208

<sup>2670</sup> [Bristol SoC](#), paragraph 320

<sup>2671</sup> [Northumbrian SoC](#), paragraph 873

<sup>2672</sup> [Yorkshire SoC](#), paragraph 238

<sup>2673</sup> [Yorkshire SoC](#), paragraph 232

<sup>2674</sup> [Anglian's response to the provisional findings](#), paragraphs 411–413

<sup>2675</sup> For example, [Northumbrian response to the provisional findings](#), paragraph 307 and [Ofwat's response to the provisional findings – risk and return](#), paragraph 4.37. We discuss the suggested alternative 'collapsing average' approach in paragraph 9.638

<sup>2676</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 4.33 including Table 4.5

<sup>2677</sup> [Ofwat's initial response to the cost of capital working papers](#), paragraph 3.10

been able to issue at the level of just the A-rated index (rather than the average of the A/BBB) and this index should be used to measure costs in these time periods (or a suitable adjustment made to the A/BBB index over this time period).<sup>2678</sup>

**Figure 9-17: Ofwat data on past price control financial metrics**

**Table 4.5: Notional company (water and sewerage companies) credit metrics and Moodys (pre-2018)<sup>115</sup> guidance for an A3 rating**

	<b>PR99 (2000-05)</b>	<b>PR04 (2005-10)</b>	<b>PR09 (2010-15)</b>	<b>Moody's guidance</b>
Interest Cover Ratio	>3x	Around 3x	Around 3x	n/a
Adjusted Interest Cover Ratio	n/a	Around 1.6x	Around 1.6x	≥1.6x
Gearing	Min 40%	Below 65%	Below 65%	<65%

Source: Ofwat analysis of Moodys guidance and previous final determinations

Source: Ofwat Response to Provisional Findings

9.644 Ofwat stated that this view was further corroborated by the fact that 57 of the 86 bonds (84%) used in analysis that led to the outperformance wedge were rated A3 or higher. In addition, this percentage increased when analysing KPMG's wider 'outperformance wedge' dataset. Ofwat stated that this demonstrated that customers had paid for higher credit quality through their bills in previous reviews and that it was right to reflect this assumption for the notional company.<sup>2679</sup>

### *Third Parties*

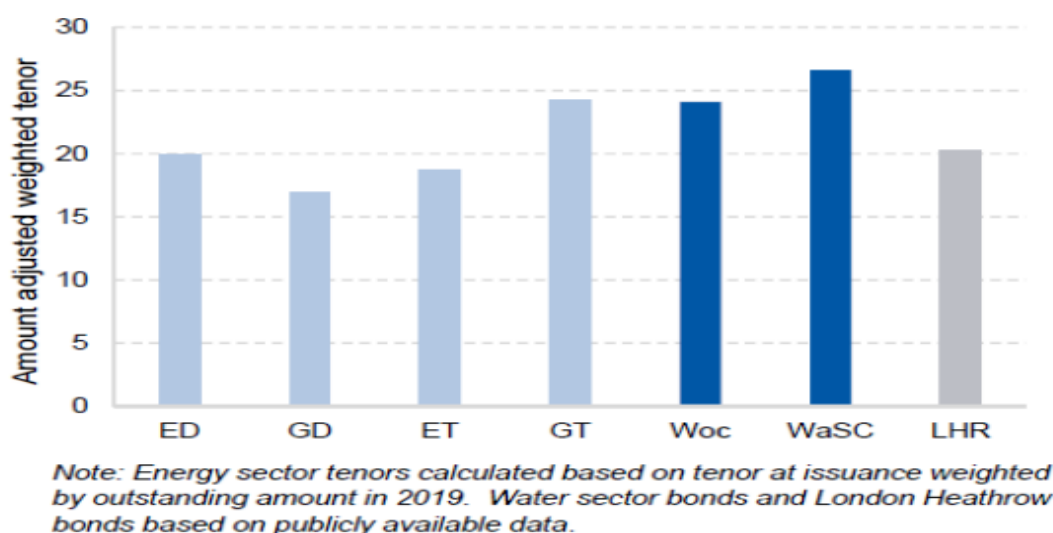
9.645 ENA submitted that it was important to consider the average tenor at issue when considering measures of embedded debt. ENA provided analysis by NERA (for ENA as part of the RIIO-2 process) that showed the average tenor at issuance for the outstanding debt of WOCs and WASCs to be over 20 years.

<sup>2678</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 4.33 including Table 4.5

<sup>2679</sup> [Ofwat Initial response to the working papers](#), paragraph 3.11

Figure 9-18: NERA data on tenor at issue in regulated sectors

UK energy and other regulated sectors tenors range from 17 (GDNs) to around 24 years (GT)



Source: NERA analysis

Source: ENA [Response to provisional findings](#)

#### *Choosing an appropriate benchmark - CMA assessment*

- 9.646 The use of an equal weight of the iBoxx Non-Financial A and BBB 10+ indices was generally agreed upon during the PR19 process, and has been comparatively uncontroversial in this redetermination.
- 9.647 In relation to Ofwat's suggestion of using a varying credit-rating benchmark, we note evidence from Ofwat that PR09 included a statement that it was targeting financial ratios that were consistent with an A-/A3 credit rating (see paragraph 9.643).<sup>2680</sup> Ofwat also submitted evidence that the ratios associated with PR99 and PR04 were at least as strong as those targeted at PR09. However, Ofwat did accept that it had not provided published evidence that it had explicitly targeted an A3 rating at PR99 or PR04.
- 9.648 On balance, we consider Ofwat's arguments on past credit ratings have merit, but that they should be considered when assessing whether an allowance should sit at or below a benchmark measure. As one of the key benefits of a benchmark approach is simplicity, we consider it more appropriate to maintain a consistent average of the A and BBB indices, in line with the current notional credit rating.

<sup>2680</sup> [Ofwat's Initial response to the cost of capital working papers](#), paragraph 3.10

9.649 We have decided to retain the iBoxx A/BBB index as our benchmark for estimating the costs of embedded debt. The characteristics of the 10+ benchmark appear to be a suitable match for our notional target credit rating, our investment horizon and it has an average remaining maturity of 19.4 years, roughly matching the longer-term average tenor at issue in the water sector (see discussion at paragraphs 9.659). We also note that the iBoxx A/BBB 10+ indices benefit from previous consultation and general acceptance by the Parties.

#### *The measurement of the benchmark*

9.650 As noted above, the vast majority of submissions on the appropriate measurement of the benchmark focused on the length of the trailing average, and whether 15 year (as used by Ofwat in PR19 and the CMA's post-Provisional Findings consultation) or 20 years (as used by the CMA in its Provisional Findings) was the most appropriate methodology.

9.651 In the following paragraphs we focus on arguments relating to the trailing average of the benchmark indices. In the subsequent section, we consider arguments relating to any adjustments or outperformance wedges that could be applied to the benchmark.

#### *Ofwat*

9.652 Ofwat stated that a 20-year trailing average assigns too much weight to earlier years and is calculated in a way that includes 22.5 years of total (embedded and new) data.

9.653 Ofwat stated that evidence showing that 20% of outstanding sector debt was issued prior to 2005 (and so outside of a 15-year average) over-estimated actual debt costs. Ofwat noted that:

- (a) the 20% of debt figure counts only bond data, not bank debt (which tends to offer loans over a shorter period). Ofwat estimates that bank lending accounts for approximately 18% of total borrowing; and
- (b) using a benchmark covering 2000–2005 gives weight to a period characterised by material long-tenor issuance for non-operational reasons (returns of capital through special dividends or intercompany loans). Ofwat suggested that 61% of the outstanding bonds issued between 2000-2005 are attributable to intercompany lending. Ofwat suggested that excluding non-operational borrowing would assign only 7.4% of total debt

weighting to this period, in contrast to the 25% in the CMA's provisional approach.<sup>2681</sup>

- 9.654 Ofwat stated that a move from a 10-year trailing horizon (used in PR14) to a 20-year trailing horizon may increase expectations that 20 years will be adopted in PR24. Ofwat stated that such an approach may disadvantage companies with shorter refinancing cycles (average maturities) if interest rates rise quickly. Ofwat stated that the CMA should adopt a more 'evolutionary' change from PR14's 10-year approach to balance the interests of companies with longer and shorter refinancing cycles.<sup>2682</sup>
- 9.655 Ofwat noted that its decision to move from a 10-year trailing average to a 15-year trailing average was in line with a long-standing policy to give some weight to the cost of embedded debt on companies' balance sheets. Ofwat noted that at PR19 there was improved availability of long-term rolling averages (and that in prior controls longer averages were unavailable). Ofwat noted the outstanding average tenor of companies' debt at 13–17 years and considered it prudent and conservative to move to a 15-year trailing average (after cross checking against what companies were actually paying) to reach a view about the appropriate allowance.
- 9.656 Ofwat stated that the fall in tenor used by water companies is a symptom of the shape of the yield curve and not as a result of its policies. It also questioned the assumption that it is in the customer interest for companies to asset-liability match, given the implication that there would be a slower pass through of the benefit of falling interest rates to customers. Ofwat stated that moving to 20 years does not remove the incentive to issue in a way that beats the index, and that the regulator's choice of trailing average is not the key determinant of treasury policy.
- 9.657 Ofwat expressed serious concerns about attempting to match the notional debt tenor and the trailing average of the benchmark measurement. Ofwat stated that such an approach would 'smuggle in' a constraint on the notional structure which had not hitherto existed as an assumption for the notional company. In addition, tenor at issue analysis tends to focus only on listed bond issuance, which accounts for only (roughly) two thirds of total sector borrowings. As non-bond issuance is likely to be on shorter terms, any point estimates based on only bond issuance should be treated with caution.

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<sup>2681</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraphs 4.16–4.20, including Figure 4.3

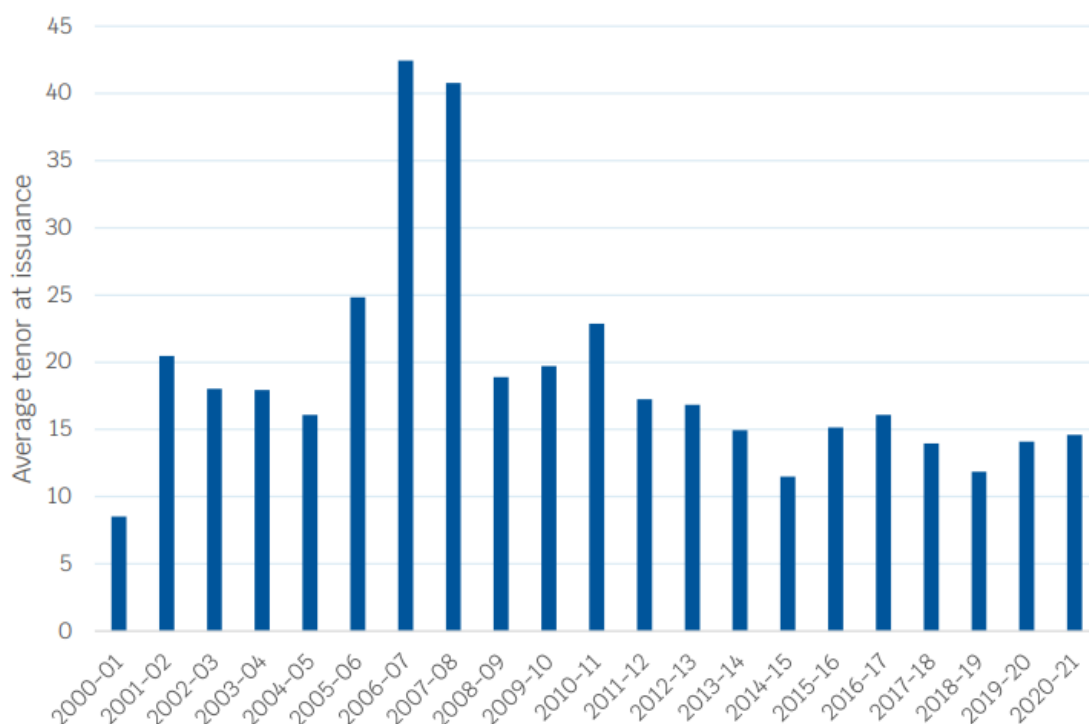
<sup>2682</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraphs 4.21–4.23

9.658 In addition, Ofwat stated that iBoxx years to maturity and sector tenor at issuance are liable to be distorted by the issuance of ultra-long tenor bonds.<sup>2683</sup>

9.659 Ofwat stated that even if the CMA were to calibrate its trailing average on the basis of average tenor at issue, there was sufficient evidence to justify the use of 15 years. Ofwat stated that the average tenor at issue over the last two price controls has been 15.4 years, and that the median over 2000–2020 was 16.8 years. Ofwat encouraged the CMA to focus on the median rather than the average over the period, as the average was distorted by the ultra-high tenor issuance in 2005–2008, which was likely due to a period of historically atypical yield curve inversion. Ofwat provided the following graph to demonstrate the pattern of average tenor at issuance by year:<sup>2684</sup>

**Figure 9-19: Ofwat data on annual average tenor at issuance since 2000**

**Figure 3.1: Tenor-at-issuance for water companies, 2000-2021**



Source: Ofwat analysis of Refinitiv, Bloomberg, and Capital IQ data

Source: Ofwat

9.660 Ofwat stated that arguments that a 15-year approach was ‘retrospective’ by disallowing debt issued prior to 2005 were, at best, misleading. Ofwat stated

<sup>2683</sup> Ofwat Cost of capital – final response to working papers, paragraph 3.15

<sup>2684</sup> Ofwat Cost of capital – final response to working papers, paragraph 3.16



that it had never provided assurances that all debt would be funded at future controls. In addition, the debt not covered by a 15-year approach was also largely not covered by the 10-year horizon used in PR14. Ofwat stated that the impact of debt from 2000–2005 or before was not the primary issue at stake – as companies with larger proportions of pre-2005 debt had lower costs than companies such as Yorkshire and Anglian. Ofwat stated that as a result, disagreements over the length of the trailing average may be a distraction from more important issues which are causing individual company underperformance against the updated 4.52% allowance proposed in the CMA’s consultation on the cost of debt,<sup>2685</sup> such as high gearing and the use of expensive swaps.<sup>2686</sup>

9.661 Ofwat also suggested that a collapsing trailing approach would give a more accurate view of benchmark costs over a control (rather than the CMA’s provisional approach of aiming down in order to capture this effect). Ofwat noted that this is different to the approach it applied in PR19, but should be logically applied to the CMA’s approach. Ofwat provided a ‘stylised’ example of this approach, suggesting a collapsing 20-year trailing average of 4.95% rather than the CMA’s provisionally determined 4.81%.<sup>2687</sup>

9.662 Ofwat (and the Disputing Companies) noted that the CMA had used ‘up-to-date’ market data with a cut-off of July 2020. While this approach may be applicable in other calculations, Ofwat (and others) noted that in the calculation of debt allowances this approach risks double counting the costs and weights used to calculate the cost of new debt (which is subject to a true-up mechanism) and total debt allowances. Ofwat (and the Disputing Companies) suggested that the correct end data for the calculation of embedded debt should be 31/03/2020, with new debt counted from 01/04/2020.<sup>2688</sup> For brevity we will not repeat the same advice from the companies in our summaries below.<sup>2689</sup>

### *Wright and Mason*

9.663 Wright and Mason, in a report commissioned by Ofwat, stated that regulators should start from a position of being sceptical about allowing for the costs of embedded debt, as unregulated companies do not receive this kind of insurance from their customers. This issue is compounded by a historic

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<sup>2685</sup> [Working paper: cost of debt](#)

<sup>2686</sup> [Ofwat Cost of capital – final response to working papers](#), paragraphs 3.16–3.21

<sup>2687</sup> [Ofwat’s response to the provisional findings – risk and return](#), paragraph 4.37 including Table 4.6

<sup>2688</sup> [Ofwat’s response to the provisional findings – risk and return](#), paragraph 4.35

<sup>2689</sup> See [Anglian’s response to the provisional findings](#), paragraph 428, [Northumbrian’s response to the provisional findings](#), Section 7.5.3 and [Yorkshire’s response to the provisional findings](#), p31

pattern of overestimating the cost of embedded debt due to using a trailing average in a period of falling interest rates.

9.664 The trailing average anchors embedded debt costs in previous periods where the cost of debt was much higher. In contrast, Wright and Mason suggest anchoring the cost of embedded debt to the cost of new debt (which is much lower).

9.665 On this basis, Wright and Mason stated that rather than 15 years (Ofwat) or 20 years (CMA), the trailing window should be zero. However, if one must be used, a shorter or weighted window should be used.

### *The Disputing Companies*

- *The choice of a trailing average*

9.666 Anglian stated that rather than being an ex-post assessment of costs, that the cost of embedded debt had to be set based on ex-ante principles.<sup>2690</sup> Anglian agreed with the CMA's provisional decision to use a 20-year trailing average, as this recognised the importance of timing of issuance on cost, was consistent with the tenor at issue of water company bonds, encouraged and incentivised long-term financing in line with the long-term nature of assets and allowed regulatory consistency as market levels change. The approach also avoids extracting realised benefits 'ex post' reflecting how markets moved, leaving companies exposed to losses due to falling rates.<sup>2691</sup>

9.667 Anglian disagreed with the CMA's consultation on the use of a 15-year trailing average, stating that such an approach meant that any company which has 'legitimately and efficiently' issued long term debt is now exposed to penalties due only to the fact that rates have fallen since that debt was originally incurred. Anglian claimed that in its case, this would leave c£100m of efficiently incurred debt unfunded.<sup>2692</sup>

9.668 Anglian stated that in moving to a 15-year approach, the CMA had confused tenor at issue with years to maturity, and that years to maturity reflected the weighted average time outstanding. Tenor at issue would, assuming consistent debt issuance, be roughly twice the year to maturity. On the basis of 13 – 14 years average maturity across the industry, this would impact a 26-year tenor at issue and trailing average. Anglian stated that whilst this was an

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<sup>2690</sup> [Anglian Full response to the CMA's working papers on Cost of Capital](#), paragraph 31

<sup>2691</sup> [Anglian's response to the provisional findings](#), paragraphs 421–425

<sup>2692</sup> [Anglian Full response to the CMA's working papers on Cost of Capital](#), paragraphs 8–9

imperfect measure for calibrating the trailing average, it was clear that the CMA's approach would understate the appropriate trailing average.

- 9.669 Anglian stated that its analysis of fixed rate bonds indicated that the average tenor at issue across the sector was 20 years, and so was consistent with the tenor implied by the iBoxx benchmark.<sup>2693</sup>
- 9.670 Anglian noted Ofwat's statements that debt raised by Anglian between 2000–2005 had been used to 'pay money back to shareholders', but suggested that this debt was raised efficiently (it was cheaper than suggested by the benchmark price at the time) and Ofwat had raised no concerns about the debt issue at the time. Anglian stated it was contrary to best practice for regulators to now be concerned about this debt only as a result of interest rates subsequently falling.<sup>2694</sup>
- 9.671 Anglian suggested that if the CMA chose to maintain the approach set out in its cost of debt consultation (the use of a 15-year collapsing average), the CMA should recognise the scale of proposed change and take steps to limit the impact. Anglian stated that such an approach would give time for companies to gradually and efficiently adjust to a new regulatory expectation that companies should in future take on more short-tenor financing and deal with the issues that have emerged due to large market movements, Anglian stated that this could be done by creating a glidepath by using a non-collapsing average when estimating the cost of embedded debt.<sup>2695</sup>
- 9.672 Bristol commissioned KPMG to consider these issues on its behalf. Through the KPMG report, Bristol stated that Ofwat's approach created incentives for companies to issue shorter term variable interest rate cost of debt, which is inconsistent with typical infrastructure financing, and is wrong as it creates re-financing and interest rate risk. Bristol noted that Ofwat highlights that it is concerned that a 20-year trailing average could crystallise refinancing risk for companies which issued shorter dated debt if interest rates increase. Bristol agreed that this was a valid concern as where rates increase, for companies which need to refinance, a long-term trailing average may not compensate all costs. However, Bristol stated that it is appropriate that this refinancing risk – driven by short-dated issuance – is allocated to companies which have departed from the iBoxx benchmark, and not translated into the specification of the notional company and its history of financing.

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<sup>2693</sup> [Anglian Full response to the CMA's working papers on Cost of Capital](#), paragraphs 33–34

<sup>2694</sup> [Anglian Full response to the CMA's working papers on Cost of Capital](#), paragraphs 10–17

<sup>2695</sup> [Anglian Full response to the CMA's working papers on Cost of Capital](#), paragraphs 18–25

- 9.673 Bristol disagreed with the CMA's consultation on the use of a 15-year trailing average, arguing that it was not reasonable to use a shorter trailing average for historical debt data than 20 years for a small WOC. Bristol stated that small companies have higher transaction costs and cost of carry, which are minimised by not going to market to issue debt frequently in shorter tenors. Bristol also stated that adopting a shorter-term financing approach would reduce the incentives for long-term financing in the industry.<sup>2696</sup>
- 9.674 Northumbrian stated that 20 years is consistent with the investment horizon adopted through the CMA's analysis and is an effective proxy for ensuring the cost of efficiently incurred debt is properly recovered whilst reducing, but not fully eliminating, the downside risk of any shortfall arising. Northumbrian stated that this approach also provides a stable, transparent benchmark for companies and is consistent with a profile of debt issuance that minimises asset-liability mismatch and hence refinancing risk. In addition, longer averages are more stable and thus should protect customers if interest rates were to rise in the future.<sup>2697</sup>
- 9.675 Northumbrian disagreed with the CMA's consultation on the use of a 15-year trailing average, arguing that this approach was not supported by empirical evidence, was inconsistent with the benchmark selected and relied on wrong and misleading evidence.<sup>2698</sup> Northumbrian agreed that the CMA had misinterpreted average maturity figures of 13 years being supportive of a 15-year trailing average – with the CMA's approach actually suggesting a 7.5 average years to maturity. Northumbrian stated that yield to maturity was highly misleading and cannot be used to calibrate the trailing average, and that tenor at issue should be used.<sup>2699</sup>
- 9.676 Northumbrian stated that the trailing average period should conceptually be matched to the tenor at issuance implied by the benchmark, which in this case is around 20 years. This would ensure that a company issuing 20-year debt on a continuous basis could expect to recover costs equal to the yield at issuance across the maturity period. A shorter period, when accompanied by a collapsing approach, would expose companies with long-term debt to losses, attached weight to the particular financing solutions adopted by some companies, transferred risk to customers over time and increased both risk and volatility.<sup>2700</sup>

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<sup>2696</sup> Bristol Further response to the CMA cost of capital working papers, paragraphs 17–18

<sup>2697</sup> Northumbrian's response to the provisional findings, paragraphs 300–303

<sup>2698</sup> Northumbrian Initial response to working paper on cost of capital, paragraph 12

<sup>2699</sup> Northumbrian Initial response to working paper on cost of capital, paragraphs 52–59

<sup>2700</sup> Northumbrian Initial response to working paper on cost of capital, paragraphs 47–51

9.677 Northumbrian disputed Ofwat's evidence on average tenor at issue over the last 20 years (see Figure 9-19). Northumbrian stated that this graph was misleading as a result of:

- (a) Including debt issued after the start of this price control and matured debt;
- (b) Excluding debt issued prior to 2000; and
- (c) Presenting a median of simple annual averages rather than a purely median observation.

Northumbrian stated that correcting for these errors, the median tenor at issue was 20 years on the basis of all debt or 26.7 years on the basis of only outstanding debt.<sup>2701</sup>

9.678 Northumbrian stated the regulatory policy should provide for recovery of efficient costs on a consistent basis over time to support the stability and predictability of the framework for cost recovery. Northumbrian stated that Ofwat had supported long term financing in the past, in line with asset lives, and had not stated that long-dated debt would not be remunerated. Northumbrian argued that infrastructure investors were generally unwilling and unable to accept material risk of deviations between revenues and costs of financing over time, and as a result would generally seek to finance assets based on their useful economic lives.<sup>2702</sup>

9.679 Yorkshire stated that it was imperative that the CMA retains its 20-year averaging period. Yorkshire argue that £9.8bn of current water company bonds were issued prior to 2005, representing 13% of industry RCV or more than 20% of the notionally geared industry balance sheet.<sup>2703</sup> Yorkshire agreed with the other Disputing Companies that the CMA had misinterpreted average maturity figures of 13 years being supportive of a 15-year trailing average, and that this was a mistake that must be rectified.

9.680 Anglian, Bristol and Northumbrian<sup>2704</sup> (and their advisers) specifically disputed the findings of Wright and Mason, highlighting the need for long-term financing of infrastructure assets, and suggest that Wright and Mason themselves identify the constraints of disallowing embedded debt costs in the form of financeability issues, increased beta and higher WACCs.

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<sup>2701</sup> Northumbrian Final submission, p24

<sup>2702</sup> Northumbrian Initial response to working paper on cost of capital, paragraphs 47–51

<sup>2703</sup> Yorkshire's response to the provisional findings, paragraphs 3.3.12–3.3.13

<sup>2704</sup> Northumbrian's reply to responses to the provisional findings, section 3.2

### *Third Parties*

- 9.681 CCWater noted the CMA's argument that the use of shorter lookbacks could provide an inappropriate signal to companies that the regulator is encouraging them to shorten the tenor of their debt in order to reduce costs, potentially trading lower short-term costs for increased financing risk. However, CCWater noted that there is a risk that locking in a longer tenor of debt, coupled with an expectation of a premium over actual costs, that this approach would significantly lessen the incentive for prudent financial management. Again, this would not be in consumers' interests at subsequent price reviews.<sup>2705</sup> CCWater welcomed the CMA's consultation on the move to a 15-year collapsing average and the use of actual costs as a cross check.<sup>2706</sup>
- 9.682 South East Water welcomed the CMA's recognition of the importance of long-term financing and shared its concerns that Ofwat's approach could encourage the use of shorter tenor debt and increase refinancing risk. South East Water also agreed with the use of a 20-year trailing average.<sup>2707</sup> South East Water stated that the CMA's own cross-checks demonstrated that the 15-year collapsing average of 4.52% was inadequate in funding industry embedded debt costs.<sup>2708</sup>
- 9.683 Portsmouth Water stated that in a long-term industry with asset lives significantly greater than 20 years, a longer time period should be used to assess the cost of embedded debt. This is particularly relevant for the small companies, which tend to need to access debt markets much less frequently and therefore cannot efficiently carry a portfolio of debt with a mixture of tenors.<sup>2709</sup>
- 9.684 ENA suggested that NERA evidence shows average tenors at issue for the Water companies are 24–26 years, and so supported the CMA's provisional conclusion that allowances based on 10 or 15 year averages would be inappropriate and could provide perverse incentives on companies to shorten tenor of debt in a way that would not be in customers' interests.<sup>2710</sup>
- 9.685 National Grid stated that the use of shorter lookbacks could provide an inappropriate signal to companies that the regulator is encouraging them to shorten the tenor of their debt, potentially increasing financial risk.<sup>2711</sup>

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<sup>2705</sup> [CCWater's response to the provisional findings](#), paragraph 5.13

<sup>2706</sup> [CCWater's response to the cost of capital working papers](#), paragraph 2.2.2

<sup>2707</sup> [South East Water's response to the provisional findings](#)

<sup>2708</sup> [South East Water's response to the cost of capital working papers](#)

<sup>2709</sup> [Portsmouth Water's response to the cost of capital working papers](#)

<sup>2710</sup> [Energy Network Association's response to the provisional findings](#), paragraphs 8.1 to 8.6, including Figure 2

<sup>2711</sup> [National Grid's response to the provisional findings](#), paragraphs 3.6–3.8

- 9.686 Western Power Distribution stated that a 20-year, unadjusted trailing average recognised the importance of long-term financing of long term regulated infrastructure in line with asset lives, and that it was critical to capital market conditions when debt was raised across the sector.<sup>2712</sup>
- 9.687 Following the publication of our consultation on the cost of debt, we received several submissions from current and former investors in the sector, including current investors in the Disputing companies. Corsair Capital,<sup>2713</sup> iCon Infrastructure,<sup>2714</sup> CPP Investments,<sup>2715</sup> Dalmore Capital,<sup>2716</sup> First Sentier Investors,<sup>2717</sup> GLIL Infrastructure<sup>2718</sup> and IFM Investors,<sup>2719</sup> as well as the submission from the Global Infrastructure Investor Association (GIIA) all argued against approaches that excluded historic debt issuances or provided inappropriate incentives to increase risk.

*The measurement of the benchmark – CMA assessment*

- 9.688 Our Provisional Findings expressed a preference for a benchmark-driven cost of debt estimate.<sup>2720</sup> This view was based on both the positive attributes of a benchmark approach, such as being broad and unbiased, objective, and avoiding company-specific cost pass-through. As discussed above, at that point in the determination we also had significant concern about the disputed nature of estimates of actual costs.
- 9.689 As our estimates of actual costs have improved, there is less need to rely on a benchmark as the primary source of the cost of embedded debt allowance. Instead, benchmarks can provide a cross-check that the actual debt costs at water companies are, on average and at the notional structure, fair representations of the efficiently incurred costs required to fund the debt portion of the RCV. Debt costs that are around or lower than reasonably measured benchmark averages suggest that company costs are reasonable, while debt costs that are higher than benchmarks may suggest that companies have been inefficient or ineffective when raising debt – and that we should investigate carefully to ensure that customers are not charged a premium for risks or outcomes that should be borne by shareholders.

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<sup>2712</sup> [Western Power Distribution's response to the provisional findings](#)

<sup>2713</sup> [Corsair Capital's response to the cost of capital working papers](#)

<sup>2714</sup> [iCON Infrastructure's response to the cost of capital working papers](#)

<sup>2715</sup> [CPP Investments' response to the cost of capital working papers](#)

<sup>2716</sup> [Dalmore Capital's response to the cost of capital working papers](#)

<sup>2717</sup> [First Sentier Investors response to the cost of capital working papers](#)

<sup>2718</sup> [GLIL Infrastructure's response to the cost of capital working papers](#)

<sup>2719</sup> [IFM Investors' response to the cost of capital working papers](#)

<sup>2720</sup> [Provisional findings report](#), paragraph 9.359



9.690 As set out in our consultation on the cost of debt, the 20-year trailing average benchmark approach used in the Provisional Findings provided an estimate that was well in excess of the current measure of actual industry costs. As a result, such an approach risked over-compensating companies - leading customers to pay more than efficiently incurred debt costs due to regulatory design. We also noted that strict adherence to a benchmark approach may also lead to an asymmetric balance of risks, where companies receive a benefit when actual costs are below benchmark costs but attempt to avoid the associated risks if actual costs rise above benchmark costs on the basis of financeability concerns.<sup>2721</sup>

9.691 As a result, we further assessed potential benchmark approaches, concluding that:

- (a) We agreed with the parties that a collapsing average was likely to give a more accurate picture of the change in embedded debt costs as they develop over the price control;<sup>2722</sup> and
- (b) At this point in time a 15-year average appeared to be a better proxy for the range of instruments used by water companies (for example, long vs short tenors, differing weights of fixed and floating debt) and thus would provide an estimate of notional costs more representative of actually-incurred costs.<sup>2723</sup>

And as a result, we based our updated assessment on the 15-year collapsing average of the A/BBB 10+ indices, a figure of 4.52%.<sup>2724</sup>

9.692 While Ofwat was broadly supportive of this updated conclusion, the Disputing Companies were strongly against the change. The companies have made a range of arguments, including:

- (a) That a 15-year approach is logically inconsistent with a benchmark that has a 20-year average maturity and evidence on the actual tenor at issue used by water companies;
- (b) That a 15-year approach inappropriately fails to take c£10bn of debt issued pre-2005 into account and does not allow companies to match debt costs and asset lives;

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<sup>2721</sup> Working paper: cost of debt, paragraph 177

<sup>2722</sup> Working paper: cost of debt, paragraph 63

<sup>2723</sup> Working paper: cost of debt, paragraph 78

<sup>2724</sup> Working paper: cost of debt, paragraph 81. We note that index data supplied by the Parties would suggest a slightly higher figure of 4.54% for the 15-year collapsing average. In subsequent analysis we will use 4.54% for consistency.



- (c) That the CMA has confused average maturity of 13-14 years with the need to price debt in relation to average tenor at issue, and that the latter is 20 years or more.
- (d) That the move to a 15-year approach was a change in regulatory approach to long-term financing and recovery of costs, and that such an approach could incentivise companies to issues at shorter-terms, increasing risks that would ultimately be passed to customers.

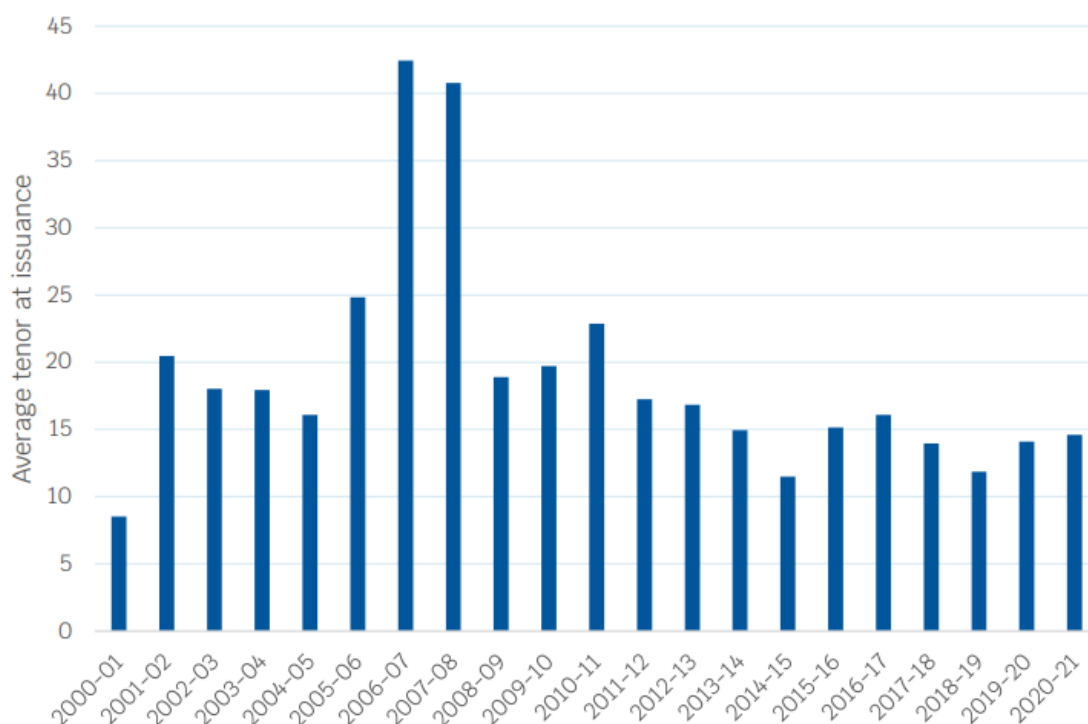
We address each of these issues in turn.

- *Consistency with the average maturity of the benchmark and actual tenor at issue*

9.693 We agree with the Disputing Companies that it is conceptually more intuitive to match the trailing average with the average maturity of the debt in the benchmark, in our case roughly 20 years. However, this is an area where the long-term trailing averages and year-by-year practice are not well aligned. Returning to Ofwat's data on average annual tenor at issue in Figure 9-20 below, we can see that neither a 15-year or 20-year trailing average would be a good representation of company behaviour in every year. Even before we factor in non-bond debt, which is likely to be shorter term, companies have issued debt at an average tenor of 20 years or more in only 5 of the last 20 years.

Figure 9-20: Ofwat data on annual average tenor at issuance since 2000

Figure 3.1: Tenor-at-issuance for water companies, 2000-2021



Source: Ofwat analysis of Refinitiv, Bloomberg, and Capital IQ data

Source: Ofwat

9.694 We note Northumbrian’s objections that a median of 16.8 may be misleading, as it is based on a median of annual averages rather than all data. However, this issue does not seem to prevent interpretation of this graph. Similarly, while excluding pre-2000 debt and including now matured debt may be inappropriate when calculating the actual allowance, such a calibration of data should not impede our ability to assess company behaviour and the tenor of debt issued over time.

9.695 We also note that any averaging of this data will be impacted by the very long-tenor issuance in the 2006–2008 period. Here we agree with Ofwat that such an atypical approach was likely driven by the inversion of the yield curve at that time.<sup>2725</sup> Analysis of the price of government debt and RPI inflation in

<sup>2725</sup> The yield curve, the cost of debt at various maturities, tends to be upward sloping – the longer the term of debt the higher the cost. This is intuitive – the longer a lender has to wait to receive its money back, the higher price it charges. Occasionally, this relationship breaks down and the yield curve ‘inverts’, meaning that longer-term debt can be priced at or below shorter-term debt. This unusual dynamic tends to occur in the years before an economic slowdown. The yield curve may invert in this way as a result of investors perceiving shorter-term bonds to have increased levels of risk if they require repayment in a period of economic stress. Alternatively, concerns about the economy may lead investors to increase their preference for relatively low-risk long term bonds at the

those years suggests that this long-term debt was likely to be priced around or below 20-year debt – hence the significant take-up by the water companies. We note that this broad take-up likely indicates that issuing at very long tenors in this way was considered to be efficient at the time.

9.696 While the notional company is not necessarily represented by the behaviour of the companies on average, what is clear is that a conceptual approach of companies consistently raising 1/20<sup>th</sup> of their debt needs via 20-year bonds each year is not a good representation of actual behaviour. There is no perfect ex-ante or even ex-post benchmark that will accurately reflect the average borrowing patterns at water companies. If we accept this, but still want to identify the best fit possible, there are a range of potential interpretations of this data:

- (a) The median annual average of 16.8 years could be argued to support either a 15-year approach or a 20-year collapsing average approach.
- (b) An all-data median of 20 years would clearly support a 20-year approach.
- (c) An approach focused on the average of 15.4 years over the last 2 controls as representative of current water company policy would support a 15-year approach.

9.697 We consider that, in the round, a 20-year trailing average is likely to be preferable when considering the costs of bond debt that water companies should reasonably be expected to incur. While higher than the average tenor deployed by companies over the last decade, this approach is better matched to the financing of long-term infrastructure assets than shorter trailing averages. However, this view relates specifically to pricing bond debt. In order to effectively set a cost of embedded debt allowance, we also have to consider the reasons why water companies might reasonably be expected to have total debt costs lower or higher than suggested by just a bond index – a topic we discuss in paragraphs 9.753– 9.790.

- *The exclusion of historical (pre-2005) debt*

9.698 A benchmark approach clearly excludes any debt issued beyond the trailing average used in the calculation. We agree with the companies that a 20-year approach covers the vast bulk of the sector's debt, while a 15-year approach would fail to count a significant proportion of current debt (whether preferring

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expense of higher risk assets. For more information of inverted yield curves, see this [blog](#) from the Government Actuary's Department.

the companies' interpretation of this as 20% or Ofwat's interpretation of 7.4% including short-term debt facilities).

9.699 We also acknowledge Ofwat's arguments that a significant proportion of debt issued in the 2000–2005 period was used for capital restructuring purposes and ultimately returned to shareholders. As with the Disputing Companies' concerns with regards to time rather than cost, we consider this argument to be largely irrelevant to our assessment of embedded debt costs. We consider that a regulator is reasonably entitled to review whether past company practices have been appropriate. A key benefit of privatisation is encouraging innovation, and it is unlikely that such innovation will always be preceded with appropriate regulatory knowledge or assessment capability. However, in this case we are considering costs appropriate for a company at the notional structure. As a result, while the timing of the debt in question by Ofwat may have a small impact on our assessment of actual costs, a focus on the notional mix and levels of debt, as well as significant cross checks against benchmarks, should appropriately mitigate Ofwat's concerns.

9.700 In our view, the Disputing Companies' concerns about the 'stranding' of historical debt costs are now mitigated by basing our assessment of the embedded debt allowance primarily on median actual and 'notional-actual' costs at the WASCs and large WOCs. In doing so, all debt currently on relevant water companies' books is counted, regardless of when it was issued. Of course, by definition, individual companies will have costs that are higher or lower than the median value, but this would also be the case with any sensibly calibrated benchmark approach. As stated previously, we do not agree with the pass-through of individual company costs.

- *The CMA has confused average maturity with tenor at issue*

9.701 The Disputing Companies have expressed concern that our consultation on the use of a 15-year average of the benchmark is based on a misinterpretation of c13 years average maturity of debt across the industry (which in a stylised example with equal annual issuance would suggest a tenor of c26 years). As discussed in paragraph 9.710, if it were correct to match the trailing average to the tenor at issue, 15-years would appear to be too short.

9.702 We consider this concern is due to a misinterpretation of the CMA's view. In the consultation paper we noted in paragraph 78 that:

[However], a 15-year average appears to be a better proxy for the range of instruments used by water companies (for example, long vs short tenors, differing weights of fixed and floating debt) and

thus would provide a more accurate assessment of efficiently incurred costs than an unadjusted 20-year average. The current measure of average maturity using APR data is approximately 13 years, while Ofwat estimated the range of current maturities to be 13–17 years (see paragraph 33). This suggests that a 15-year average adequately meets the CMA’s objectives for a benchmark approach without the need for judgement or manipulation of data that would be inevitable with either an RCV-weighted approach or the application of an outperformance wedge.<sup>2726</sup>

9.703 The range of issues in this paragraph appears to have been misunderstood as suggesting that the ‘13 years’ or ‘13–17 years’ of this quote drive the decision to use a 15-year trailing average. The key message we intended to communicate was that ‘a 15-year average appears to be a better proxy for the range of instruments used by water companies (for example, long vs short tenors, differing weights of fixed and floating debt) and thus would provide a more accurate assessment of efficiently incurred costs than an unadjusted 20-year average.’

9.704 For clarity, our analysis of the appropriate trailing averages for benchmarks takes average tenor at issue, not average maturity, into account. However, as discussed above in paragraph 9.697, our final allowance and the interpretation of any benchmark cross-check must consider the reasons why water companies might reasonably be expected to have total debt costs lower or higher than suggested by just a bond index. Failure to do so could potentially leave companies under-compensated or customers paying higher bills than was required.

- *A 15-year approach is a change in regulatory approach to long-term financing and recovery of costs – increasing risk to customers.*

9.705 The Disputing Companies have suggested that a 15-year trailing average rather than a 20-year trailing average approach would represent a departure from regulatory norms and a change that the companies will have to adapt to. We do not agree with this assessment

9.706 As discussed above, our use of actual costs ensures that long-term financing is taken into account. This alone would seem to mitigate such concerns.

9.707 More broadly, we note that actual costs have always played a role in setting an embedded debt allowance. A trailing average of a benchmark was only

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<sup>2726</sup> Working paper: cost of debt, paragraph 78

introduced in PR14, and at this point the trailing average was set at 10-years. At PR19, Ofwat increased the trailing average to 15-years. Ofwat has never used a 20-year trailing average. Whether the CMA now chooses to focus on a 15-year average or a 20-year average, neither appears to be more or less in line with the regulatory approach prior to PR19. As a result, we consider the Disputing Companies arguments that the CMA's use of a 15-year trailing average rather than a 20-year trailing would present retrospective regulatory change or an increase in implied risk tolerance to be inconsistent with previous regulatory practice.

9.708 As discussed in our assessment of actual costs, we do not consider there to be a material risk of a 'race to the bottom' or interest rates being passed to customers. Average tenor at issue has been c14 years since the introduction of the 10-year trailing average. If the benchmark approach really does drive company behaviour ex-ante, it would seem logical that both a 15-year and a 20-year approach would lead to an upward trend in the average tenor at issue – lessening any potential interest rate risk exposure for customers. In practice, we expect company management and owners to react to market conditions without exposing their companies or customers to inappropriate risks.

- *Trailing average – CMA conclusion*

9.709 We consider that evidence of past trends in tenor at issue suggest that there is no perfect benchmark on an ex-ante basis. Neither 15-year nor 20-year is strictly 'right' or 'wrong', and both could be justified as sensible checks on the efficiency and appropriateness of the actual costs incurred by companies acting without incurring undue levels of interest rate risk.

9.710 20 years is the long-term average of tenor at issue, and so may capture behaviour over long cycles. 20 years matches the average maturity of the benchmark and seems to be the better fit with the concept of funding long-life assets. If regulators wished to signal likely reasonable behaviour via the choice of a trailing average, this would also seem to be the most appropriate benchmark to use.

9.711 We also agree that the collapsing average approach would seem to be appropriate for a price control that assumes an increasing weight of new debt as each year passes.

9.712 The 20-year average of the iBoxx Non-Financials A/BBB 10+ index is 5.12%, while the collapsing average is 4.95%.<sup>2727</sup> As such, such an approach

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<sup>2727</sup> We quote iBoxx benchmark data supplied by both Ofwat and the companies.

suggests that the median 4.52% incurred by the companies has significantly outperformed this particular bond-only benchmark. As a result, these figures suggest that any allowance based on this bond-debt benchmark alone would risk significantly overcompensating the actual costs incurred by the industry, which would mean customers paying more than was strictly necessary. We have shown that companies appear to have reacted more to market conditions than to the embedded debt allowance approach of the regulator. We do not think it would be appropriate for a regulator to allow a 43bps – 58bps premium over actual costs in the hope of encouraging lower-risk behaviour at otherwise profit-maximising companies.

- 9.713 We also consider company issuance data to mean that a 15-year trailing average would be informative. The average annual tenor at issue over the last decade has been 15.4 years, suggesting that 15-years would be a good approximation for what is currently considered best practice. In addition, while this approach may under-represent the debt issued prior to 2005, the data may conversely suggest that a benchmark priced on debt with c20 years to maturity would over-estimate the actual costs of the c15-year tenor debt incurred over the last decade. Given that interest rates in the last decade were lower than those in the 2000-2005 period, the issues may offset to some extent.
- 9.714 The 15-year average of the iBoxx Non-Financials A/BBB 10+ index is 4.72%, while the collapsing average is 4.54%.<sup>2728</sup> While closer to our actual cost estimate, both 15-year average approaches appear to demonstrate that the median actual cost of 4.52% incurred by the companies has been achieved in a way that does not expose customers to a higher cost than was necessary. As noted in our working paper, this may support the view that a 15-year measurement approach effectively proxies the various influences on debt costs that mean the actual costs incurred by companies will be below a 20-year measure of listed bond-data in isolation. We discuss this further in the next section.
- 9.715 It is important to ensure that our preferred actual cost allowance does not allow companies to pass interest rate risks (and so higher costs) on to customers as the result of management choices. As a key cross-check, we consider both the 20-year and the 15-year averages of the A/BBB benchmark, as well as the collapsing averages of the two approaches, to support the view that our actual-driven estimate of 4.52% has been efficiently incurred. As a

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<sup>2728</sup> We quote iBoxx benchmark data supplied by both Ofwat and the companies for consistency. This data varies from our own by c2bps over long-term averages, likely as a result of the collation methodology (for example, daily, monthly or annual data and averaging data quotes to differing levels of decimal places). We do not consider that these very small differences have any material impact on the conclusions of our analysis.

result, this confirms that our 4.52% allowance is an appropriate basis for our costs of embedded debt allowance, balancing our duties to the companies and consumers.

#### *Potential adjustments to the benchmark*

9.716 As an alternative to the actual cost approach used as the basis of our cost of embedded debt allowance in this determination, we considered applying a benchmark approach with an associated cross-check against evidence of actual costs. However, as discussed, in order to balance our duties, we would have to carefully consider if there were legitimate reasons why any allowance would reasonably be expected to deviate from that suggested by a bond-benchmark. Failure to consider such an approach would risk over or undercompensating companies or over or under-charging consumers.

9.717 We received a number of submissions on this topic both before and after our provisional findings and before and after the publication of our consultation on the cost of debt. Evidence was presented in relation to:

- (a) The use of an RCV-weighted benchmark;
- (b) Ofwat's use of an outperformance wedge; and
- (c) Matching adjustments to account for the use of higher-rated, shorter-tenor, subsidised or floating rate debt.

We will address each topic in turn.

#### *The use of an RCV-weighted benchmark;*

- *Ofwat*

9.718 Ofwat stated that if the CMA wanted to use a 20-year average, then the CMA should revisit the weights used in its calculation. Ofwat stated that rather than equally weighting each year of the average, that calculation can be 'corrected' by weighting each year by the RCV growth within the water sector. Ofwat suggested that this approach ensures that customers are insulated from paying for non-operational financing decisions. Ofwat provided a data table suggesting that the 20-year RCV-weighted average cost of debt using the equally weighted iBoxx A/BBB index would be 4.60%.<sup>2729</sup> In response to the CMA's cost of debt working paper, Ofwat agreed with the CMA's calculation of the adjusted collapsing average of the RCV weighted benchmark at 4.55%,

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<sup>2729</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraphs 4.24–4.26, including Table 4.2



and that the companies approach to this calculation (suggesting a figure of 4.84%) was erroneous.<sup>2730</sup>

- *Disputing Companies*

9.719 Anglian<sup>2731</sup>, Bristol and Northumbrian<sup>2732</sup> disagreed with Ofwat's suggestion of weighting the index by RCV growth. Using analysis by KPMG, Anglian, Bristol and Northumbrian argued that Ofwat's approach suffered from significant design flaws. Specifically, Ofwat's calculation failed to capture early debt refinancing and licence changes, failed to incorporate the use of index-linked debt and used lumpy changes to notional gearing assumptions that were lagging and inappropriate indicators of the effective levels of operational debt used within the sector. They also stated that the sector average was unlikely to match the needs of individual companies and will create artificial winners and losers.

9.720 Anglian<sup>2733</sup>, Bristol and Northumbrian<sup>2734</sup> suggested that linking sector-wide RCV growth to remuneration of embedded debt exposed companies to significant mismatches between their (efficient) costs and future regulatory allowances. Northumbrian stated that it is not clear why this approach would be appropriate, and suggested that it may be 'an ex post attempt by Ofwat to derive a cost of debt that is consistent with its pre-conceived view', as opposed to a robust and principles-based methodology for estimating the cost of debt.<sup>2735</sup>

9.721 Yorkshire submitted that Ofwat had failed to account for refinancing of maturing debt between 2000 and 2010, and that this was unrealistic. Yorkshire stated that a straight weighting of the trailing average may not give an exact match to the profile of debt issuance in the sector, but it was unlikely to result in a significant costing error. As such, Ofwat's proposal should be rejected.<sup>2736</sup>

9.722 Anglian,<sup>2737</sup> Bristol and Northumbrian<sup>2738</sup> submitted their own calculated adjustments to the Ofwat RCV-weighted approach, stating that these adjust for a failure to include continuous refinancing of the RCV (worth 14bps), the use of exclusively fixed rate debt despite the last two controls assuming

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<sup>2730</sup> Ofwat Final written submission, p71

<sup>2731</sup> Anglian's reply to responses to the provisional findings, paragraph 81

<sup>2732</sup> Northumbrian's reply to responses to the provisional findings, section 3.1.4

<sup>2733</sup> Anglian's reply to responses to the provisional findings, paragraph 81

<sup>2734</sup> Northumbrian's reply to responses to the provisional findings, section 3.1.4

<sup>2735</sup> Northumbrian's reply to responses to the provisional findings, paragraph 163

<sup>2736</sup> Yorkshire's reply to responses to the provisional findings, p61

<sup>2737</sup> Anglian's reply to responses to the provisional findings, paragraph 100

<sup>2738</sup> Northumbrian's reply to responses to the provisional findings, section 3.1.4

index-linked debt (worth 5bps) and a failure to model gradual changes to gearing (worth 14bps). The companies suggested that these adjustments supported an RCV-weighted estimate of 4.95%, which on different scenarios could be as high as 5.04%.

9.723 Anglian stated that the CMA's calculation of a 20-year collapsing average of the RCV-weighted benchmark as 4.55% was incorrect, and that the correct calculation by KPMG suggested a higher figure of 4.84%.<sup>2739</sup>

9.724 Anglian,<sup>2740</sup> Bristol, Northumbrian<sup>2741</sup> and Yorkshire<sup>2742</sup> also questioned Ofwat's analysis of non-operational financing issued pre-2006, stating that capital structures are complicated but that swapping debt for equity does not impact the capital committed to the sector. The companies stated that Ofwat's analysis is flawed in failing to consider counter-factual scenarios that suggest similar proportions of debt would have been issued in AMP3 and AMP4 by the notional company, and that there are companies which exhibit gearing similar to the current notional level which still have a significant proportion of pre-2006 public debt outstanding.

- *RCV Weighting – CMA Assessment*

9.725 An RCV-weighted approach would appear to have some advantages not present in either actual costs or a simple, unadjusted benchmark approach. In retaining a 20-year average, it focuses on a notional company with a long-horizon approach. In addition, by weighting the index by RCV growth, it ensures that the customer is less exposed to the timing of costs associated with the capital structure decisions taken by shareholders.

9.726 These benefits are, however, mitigated by the significant disagreement about what figure is suggested by this calculation. Ofwat suggest an RCV-weighted 20-year average of 4.62%, but also agreed with the CMA's assessment that an adjusted 20-year collapsing average would suggest a figure of 4.55%. The companies, using KPMG analysis suggest a figure of 4.95%, with the difference coming from a continuous refinancing of the RCV (worth 14bps), the inclusion of index-linked debt (worth 5bps) and gradual changes to gearing (worth 14bps). The companies disagreed with the CMA's methodology for a collapsing average, and instead suggest such an approach provides an estimate of 4.84%.

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<sup>2739</sup> [Anglian Full response to the CMA's working papers on Cost of Capital](#), p16

<sup>2740</sup> [Anglian's reply to responses to the provisional findings](#), paragraph 101

<sup>2741</sup> [Northumbrian's reply to responses to the provisional findings](#), section 3.1.6

<sup>2742</sup> [Yorkshire's reply to responses to the provisional findings](#), p61

9.727 We note that, regardless of the formulation of the calculation chosen, none of the supplied estimates suggest that the actual costs of the companies are inefficient. Thus, for our purposes, this benchmark approach is a useful cross-check that brings confidence in our estimate. In particular, the 20-year collapsing average approach (at least as agreed by Ofwat and the CMA), suggests an estimate of 4.55%, very close to our 4.52% actual cost assessment.

#### *Ofwat's Outperformance Wedge*

- *Ofwat*

9.728 Ofwat's analysis of nominal debt of at least 10 years to maturity at issuance indicated material and sustained outperformance relative to its benchmark iBoxx A/BBB over the period 2000–2018. As a result of this analysis, Ofwat applied a downward 'outperformance wedge' of 25bps to its cost of embedded debt allowance. Ofwat stated that this approach matched the CMA's approach in the 2015 British Gas Trading appeal and the Bristol PR14 Determination.<sup>2743</sup>

9.729 Ofwat went on to state that, while in principle controlling for tenor and credit rating would be appropriate if the aim were to isolate the debt pricing benefit of being a regulated water utility (the halo effect), this is not what it was trying to do. Rather, Ofwat's approach was to set an allowance for the cost of debt which was reflective of efficient borrowing costs and which did not materially overcompensate companies for these costs. Ofwat submitted that United Utilities, with gearing of 64.8% (close to the notional 60%), had stated that it typically outperformed Ofwat's FD on cost of new debt by 50-100bps.<sup>2744</sup>

9.730 Ofwat argued that its historic approach had succeeded in combining strong incentives to issue debt efficiently while allowing customers to benefit from these efficiency gains at 5-year regulatory resets. Ofwat stated that the notional benchmark gives companies a target to outperform while allowances that reflect this outperformance offer more stretching targets over time. Ofwat stated that the CMA proposes a system whereby companies capture all of the gains from outperforming the index without benefit to customers.<sup>2745</sup>

9.731 Ofwat stated that, based on the view that there is no evidence of outperformance of water bonds once tenor and credit rating are controlled for, and the fact the CMA has matched its notional tenor and credit rating to the

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<sup>2743</sup> [Ofwat's response to common issues in companies' SoCs: Risk and return](#), paragraph 3.112

<sup>2744</sup> [Ofwat's response to common issues in companies' SoCs: Risk and return](#), paragraph 3.111

<sup>2745</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraphs 4.13–4.14

historical average tenor and credit rating of the benchmark iBoxx A/BBB, there would be little prospect of notional company outperformance and Ofwat would ‘understand the logic’ of the CMA’s position. However, Ofwat continued to believe there is evidence that water bonds can outperform a broad benchmark, even controlling for credit rating and tenor.<sup>2746</sup>

9.732 Ofwat cited the view of its consultants, Europe Economics, which suggested that ‘there is nothing controversial about the idea that bond yields for a specific sector might be different even controlling for these two factors’. Ofwat suggested that this is because the yield includes both credit risk and debt beta (correlation of credit risk with the wider asset return cycle). Ofwat provided evidence that BBB yields in different sectors are not identical, with Financials and Industrials appearing to yield a consistent premium versus other sectors.<sup>2747</sup>

9.733 Ofwat also disputed the KPMG finding of no water outperformance once tenor and credit rating is controlled for. Using a filtered sample of 68 water bonds (with a weighted average tenor at issuance of 21.9 years versus the benchmark average of 19.4 years), Ofwat found a weighted average of 39bps difference to the benchmark and a negative relationship in all ‘tenor buckets’. Ofwat concluded that there is no consistent relationship between longer tenor and level of discount to the benchmark and that outperformance is on average present even where tenor exceeds the benchmark tenor.<sup>2748</sup>

9.734 However, when measuring similarly rated bonds issued at 5 years either side of the benchmark, Ofwat found a weighted average spread of only 6bps – an almost identical result to the ‘no material outperformance’ result found in the KPMG analysis referenced by the CMA. It also suggests a weighted average spread of 22bps, rather than the 39bps referenced in the report and that the bulk of this difference comes from comparing bonds issued at 5 to 15 years shorter duration than the benchmark average.<sup>2749</sup>

9.735 Ofwat acknowledged that the distribution of ratings in its sample was likely to drive ‘some of the discount’ to the iBoxx average, and noted that two thirds of its sample are bonds rated at A3, while the iBoxx average credit rating (and the target rating for the notional company) is Baa1 (BBB+). As shown in Table 4.4 [of its submission], only 8.8% of the bonds in Ofwat’s sample have a Baa1

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<sup>2746</sup> Ofwat’s response to the provisional findings – risk and return, paragraph 4.28–4.29

<sup>2747</sup> Ofwat’s response to the provisional findings – risk and return, paragraph 4.30 including Figure 4.4

<sup>2748</sup> Ofwat’s response to the provisional findings – risk and return, paragraphs 4.31–4.32

<sup>2749</sup> Ofwat’s response to the provisional findings – risk and return, paragraph 4.32 including Table 4.3

rating, while 83.7% have a higher A-based rating and only 7.4% have a lower rating.<sup>2750</sup>

- 9.736 Ofwat commissioned a report by Wright and Mason, who stated that Ofwat's outperformance wedge is an adjustment to reflect the historic gap between actual costs of debt and the index, but noted that this may be unclear due to naming it an 'outperformance wedge'. The use of 'outperformance' had led to analysis of whether water companies outperformed other companies with similar characteristics, rather than whether the benchmark reflects the key features of the water companies. The 'wedge' would be better called a 'matching adjustment' that factors in differences in tenor and credit rating.
- 9.737 Wright and Mason stated that using the A/BBB without adjustment required water customers to reward shareholders because the regulators cannot agree a way to ensure historic debt is costed correctly. Alternatively, there could be a view that it will all 'come out in the wash', with periods where firms' embedded debt is cheaper than the index balanced by periods when it is more expensive. Wright and Mason had concerns about this approach, as they 'suspect' that in periods of higher 'actual' costs, financeability pressures will require the higher figures to be used – causing asymmetry.

- *Disputing Companies*

- 9.738 Anglian, Bristol and Northumbrian commissioned KPMG to assess Ofwat's analysis of the 'halo effect' in water bonds at issuance. KPMG suggested that under both the Ofwat and KPMG approaches there was no evidence of a material 'halo effect' because the simple average spread to the iBoxx for bonds in the -5 to +5 buckets is close to zero and significantly smaller than the 25bps wedge applied to embedded debt by Ofwat. KPMG suggested that this meant that Europe Economics' position (that claimed credit and tenor are not the key drivers of yields) was inconsistent with the Ofwat and KPMG findings.
- 9.739 Addressing the counter-intuitive result of a yield discount to the index at longer maturities, KPMG stated that the sample size for the +15 to +50-year bucket was small, with less than a quarter of the bonds represented in the -5 to +5 or -5 to -15 buckets. Therefore, the statistical accuracy in the very long-term tenor range is likely to be relatively diminished when compared to the other results. Moreover, when reviewing the characteristics of the two additional bonds in Ofwat's sample, KPMG found that the yield curve was inverted at the time of the bond issuance. This yield inversion contributed significantly to the divergence between the yields on the two additional bonds

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<sup>2750</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 4.33 including Table 4.4

and the relevant iBoxx, and should not be interpreted as water-specific outperformance.

- 9.740 Anglian agreed with the removal of an outperformance wedge on the basis of no statistical evidence to suggest outperformance after accounting for tenor and credit-related factors. Anglian noted that KPMG had updated its analysis to September 2020 and found consistent results. Anglian argue that alternative findings would suggest that credit ratings agencies do not accurately capture the industry-wide risks to an investor of holding debt in a water company.<sup>2751</sup> Anglian stated that the Ofwat data on bond issuance is predicated on only two bonds, and that in total matches the KPMG-based evidence suggesting no outperformance.<sup>2752</sup>
- 9.741 Anglian stated that Ofwat's 'wedge' implies an unjustified value transfer to consumers in the short term while making it 'ultimately impossible for companies to finance themselves'. Anglian also stated that the wedge has a detrimental impact on consumers due to the abandonment of asset-liability matching, a lack of support for long-term investments as well as refinancing risk which will have to be passed on. Anglian stated that an Ofwat style wedge would create 'wrong incentives' for companies to issue short-dated debt and take on more interest rate risk than assumed for the notional company, and argued that this risk exposure to rising rates would ultimately be passed on to customers in the form of higher bills 'where short-tenor strategies are reflected in regulatory policy risk'.<sup>2753</sup>
- 9.742 Bristol raised several issues with the Ofwat outperformance wedge data (in comparison to the KPMG data) but found that under both the Ofwat and KPMG approaches there is no evidence of a material 'halo effect'. In addition, in areas where Ofwat claim there to be an irrational relationship (such as the outperformance of the +15 to +50 years bucket), this is based on a small sample size of data. In addition, KPMG found that the yield curve was inverted at the time these bonds were issued, helping to explain the divergence between the yields on those bonds and the iBoxx index.
- 9.743 Bristol stated that differences to the benchmark figure may be driven by either efficiency of issuance or companies taking different interest rate risks (eg use of variable rate debt or debt at shorter tenors). As a result, it was important to take into account an appropriate definition and specification of the history of financing for the notional company over the 20-year horizon. Bristol stated that it was reasonable to assume that the notional company would raise long-

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<sup>2751</sup> [Anglian's response to the provisional findings](#), paragraphs 414–418

<sup>2752</sup> [Anglian's reply to responses to the provisional findings](#), paragraph 97

<sup>2753</sup> [Anglian's response to the provisional findings](#), paragraphs 419–420



term debt in order to match its assets and that the notional company would raise debt in line with regulatory guidance. Where companies have chosen to adopt financing strategies that differ from the notional structure, it may not be appropriate to 'goal seek' the costs implied by the benchmark to an ex-post estimate of actual costs.

9.744 Northumbrian agreed with the removal of the outperformance wedge, citing the KPMG evidence. As with Anglian, Northumbrian note that KPMG has updated its analysis and its conclusions remain 'approximately unchanged'.<sup>2754</sup> Northumbrian also noted KPMG-based evidence suggesting no outperformance once tenor and credit rating are matched.<sup>2755</sup>

9.745 Yorkshire stated that Ofwat has provided the CMA with no new information to suggest evidence for an outperformance wedge once tenor and credit rating are counted for.<sup>2756</sup>

- *Third Parties*

9.746 Ofgem,<sup>2757</sup> and Citizens Advice<sup>2758</sup> submitted that, rather than being too harsh, recent debt issuance might suggest that the 25bps performance wedge was too lenient. Citizens Advice stated that in adjusting the index to calculate the efficient cost of existing debt, Ofwat applies an adjustment of 25bps, compared to historical average outperformance levels of 31bps (2000-2018) and 44bps (2015-2018). Citizens Advice stated that Ofwat appears to have incorrectly assumed that it is necessary to adjust historical levels of outperformance downwards to reflect future uncertainty (which can only apply to future debt). Citizens Advice recommend that the CMA use of an adjustment of 31bps is reasonable given the evidence.

9.747 ENA agreed with the CMA's conclusion that there was no evidence to support the application of an outperformance wedge.<sup>2759</sup>

9.748 SP Energy Networks stated that the CMA recognised that the use of a performance wedge within the cost of debt risked encouraging companies to shorten the tenor of their debt, which may not be in the best interests of customers.<sup>2760</sup>

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<sup>2754</sup> [Northumbrian's response to the provisional findings](#), paragraphs 296–299

<sup>2755</sup> [Northumbrian's reply to responses to the provisional findings](#), paragraph 159

<sup>2756</sup> [Yorkshire's reply to responses to the provisional findings](#), paragraph 2.6.11

<sup>2757</sup> [Ofgem submission](#)

<sup>2758</sup> [Citizens Advice further submission](#)

<sup>2759</sup> [ENA's response to the provisional findings](#), paragraphs 8.1–8.6, including Figure 2

<sup>2760</sup> [SP Energy Networks' response to the provisional findings](#)

- *Outperformance wedge – CMA assessment*

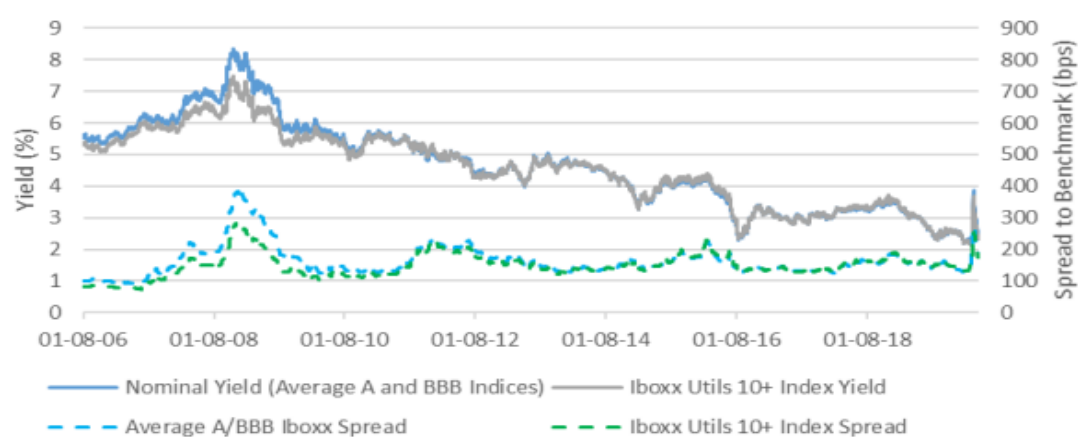
9.749 Much time and effort has gone in to assessing the existence of water bond outperformance that would justify the use of Ofwat's outperformance wedge. Most of this effort has focused on assessing whether water bonds can, on an 'apples-to-apples' comparison, outperform a broader index – a 'halo effect'. While Ofwat continues to believe that such a 'halo effect' is present in the data, much of the subsequent debate involved other structural reasons why debt, at issue, may be priced differently to the benchmark.

9.750 Our assessment of the evidence is that the scope for material and/or sustained discounts to broader market rates is negligible. Given the difficulty of measuring an exact comparison of bonds, tenor and credit rating between a relatively small sample of company bonds and a broad index, differences of 6bps as measured by Ofwat (with an acknowledged sample skew above the notional credit rating) and 1bps as measured by KPMG (both in terms of bonds -5 to +5 years relative to the benchmark average) are not in our view strong evidence of a 'halo effect'.

9.751 We note Ofgem's analysis of the Utilities index versus the broad index as part of its RIIO-2 determination process. From Ofgem's chart of spreads shown below, we can see that there may be evidence of higher debt betas in non-utility bonds at times of significant stress such as the global financial crisis. This was a period of significant reassessment of risk in multiple sectors of the economy, but largely not the regulated utilities sector. Outside of such a period, there is little evidence of material or sustained like-for-like outperformance of utility companies in comparison to the broader market.

**Figure 9-21: Ofgem chart comparing the iBoxx A/BBB 10+ and the iBoxx Utilities 10+ index**

**Figure 2: iBoxx Index Yield and benchmark spread history**



Source: Ofgem



9.752 On balance, the evidence is not sufficient for any outperformance wedge based on like-for-like pricing of water bonds relative to bonds in the broader market. However, as argued by Wright and Mason in their report for Ofwat, some versions of Ofwat's description of the outperformance wedge may have distracted all parties from a more relevant discussion of whether water companies use debt instruments that can reasonably be expected to be either structurally or currently materially cheaper than standard bond financing. We consider these issues to be more important in understanding whether a bond-index would provide a reasonable estimate of an appropriate allowance for the water sector. We will consider these issues in the section below.

### *Matching Adjustments*

- 9.753 Matching adjustments involve measuring the impact of the various financing options available to companies, and adjusting the estimate provided by the bond-only benchmark accordingly. The phrase 'matching adjustment' was coined by Wright and Mason, writing on behalf of Ofwat and in response to our Provisional Findings. We further explored this issue in our cost of debt consultation, where we found that a matching adjustment of up to 40bps could be justified.<sup>2761</sup>
- 9.754 In adjusting a bond-only estimate as provided by the iBoxx benchmark, we are effectively undertaking an exercise in estimating a reasonable level of actual costs. As a result, this approach (or the equivalent approach of using a 15-year collapsing average to proxy all of the underlying 'matching' impacts) was not supported by the Disputing Companies, which preferred a benchmark-only approach or individual company cost passthrough.
- 9.755 It could be argued that applying matching adjustments to our chosen benchmark is simply a less accurate assessment of actual costs. However, as with our use of unadjusted benchmarks, we believe there is some value in exploring whether sensible assumptions about the type of debt actually used by water companies can explain why actual costs are below the level implied by a benchmark measured over the issuance profile of the sector's debt. As such, matching adjustments may provide another useful cross check on whether our 4.52% estimate balances our duties to both customers and the companies.

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<sup>2761</sup> [Working paper: cost of debt](#), paragraph 121

- Ofwat

9.756 Prior to the publication of our consultation on the cost of debt, Ofwat noted that there were several reasons why an unadjusted benchmark could provide a poor proxy for actual costs incurred by the sectors. These were:<sup>2762</sup>

- (a) Timing – the flexibility to avoid high-cost periods;
- (b) Tenor – Ofwat stated that the weighted average years-to-maturity of the iBoxx A/BBB 10+ of 19.4 years was too long in comparison to the 13.2 years for the sector.<sup>2763</sup> In addition, company balance sheets include short-term bank debt that is not reflected in the iBoxx benchmarks;
- (c) Credit rating – companies were previously funded to (and achieved) higher credit ratings than implied by the A/BBB benchmark;
- (d) Floating rate debt – companies have on average 13% exposure to floating rate debt, which will reflect current lower prices and is not counted in the benchmark;
- (e) European Investment Bank (EIB) debt – companies have been able to access EIB debt, which was not counted in the benchmark. Ofwat stated that Moody's had noted EIB debt carried yields of around 100bps lower than the sector's embedded debt on March 2016.

9.757 Following publication of the CMA's consultation on the cost of debt, Ofwat endorsed the principle of a 'matching factor' and welcomed the CMA's recognition of the fact that different types of debt issuance (eg floating rate and EIB debt), which are not captured within the iBoxx A/BBB index, have led to sector debt costs which are lower than an unadjusted 20 year trailing average of that index.

9.758 Ofwat stated that the evidence submitted by disputing companies on 'positive' matching adjustments did not convincingly support these issues being the type of persistent, sector-wide and structural factors which would warrant making an explicit adjustment to benchmarks drawn from actual data.<sup>2764</sup>

9.759 Ofwat also stated that, more generally, if all 'actual benchmarks' are lower than the 20-year collapsing trailing average, this either pointed to miscalibration of the index or structural outperformance. Both factors constituted justification for making an adjustment, the size of which does not

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<sup>2762</sup> Ofwat's reply to responses to the provisional findings – risk and return, paragraph 4.13

<sup>2763</sup> This appears to be an error, comparing the pricing of debt with 19.4 years to maturity on average with the years to maturing remaining on company balance sheets, but priced relative to the original tenor of issue.

<sup>2764</sup> Ofwat Initial response to the working papers, paragraphs 3.34–3.35

need to be based on a bottom-up calculation of the impact of each contributory factor. Further, Ofwat noted that the CMA's notional-actual calculations helped to avoid any controversy over the use of EIB or floating rate debt by using the notional split of index-linked and fixed-rate debt in the calculation.<sup>2765</sup>

9.760 As in the case of shorter trailing averages or the use of actual costs, Ofwat disagreed with the Disputing Companies that the adoption of 'matching principles' created incentives to issue short-term debt in a 'race to the bottom' on costs. Ofwat stated that regulatory policy is just one of multiple factors determining debt issuance policy. Ofwat stated that they had clearly set out, over successive determinations, that an efficient company is one that has a balanced portfolio of debt, that diversifies its risk and retains the flexibility to respond to changing market conditions. Ofwat stated that an important restraint on individual company risk-taking is a benchmark-based approach that prevents cost passthrough. It is important therefore that the regulator applies a balanced reading in setting the allowed return on debt and ensures its determination is not unduly influenced by the arguments put forward by a subset of companies.<sup>2766</sup>

9.761 Wright and Mason, writing on behalf of Ofwat, suggested that there is sufficient evidence for a 'matching adjustment' of around 25bps and that the value of the adjustment should be assessed periodically.

- *Disputing Companies*

9.762 Anglian disagreed with the application of a matching adjustment when considering a benchmark-led estimate, stating that it was, by definition, retrospective regulation that seeks to approximate features of actual company financing that have come to pass after the point in time when the historical debt was incurred. Anglian also considered the matching principle to be inconsistent with both the CMA's past approach to water sector costs of debt and Ofwat policy.<sup>2767</sup> Anglian suggested that in adopting such an approach here, the CMA was proposing to disallow £100m of Anglian's debt costs which would need to be funded by equity returns<sup>2768</sup>

9.763 Anglian also considered that the matching principle was fundamentally inconsistent with CMA's view that 'risks should sit with companies' as it implies that if rates increase in the future, allowances would increase by more

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<sup>2765</sup> [Ofwat Final response to working papers](#), paragraphs 3.29–3.30

<sup>2766</sup> [Ofwat Final written submission](#), paragraph 5.34

<sup>2767</sup> [Anglian Full response to the CMA's working papers on Cost of Capital](#), paragraphs 32–40

<sup>2768</sup> [Anglian Full response to the CMA's working papers on Cost of Capital](#), paragraphs 55–60

than the benchmark to match actuals (which would be funded by customers). If a matching policy is applied, it is effectively sharing actual company risk with customers and cannot be seen as a one-way bet. At the moment it would capture the fact that the market is falling. But in future it would mean customers would be exposed to increases in interest rates.<sup>2769</sup>

9.764 Anglian stated that future allowances based on the matching principle cannot be predicted ex ante (as this would require forecasting the debt strategy of each firm in the 'pool' and then matching the weighted average strategy), so it is not possible for a prudent firm to hedge the regime on an ex ante basis. This would imply that water companies should try to 'beat the market' on an ex ante basis, creating material financing risk that water companies are not well suited to bear.<sup>2770</sup>

9.765 Anglian also disputed the CMA's 40bps estimate of the matching adjustment, noting that:

- (a) There was only £5.3bn of EIB debt on company balance sheets at the beginning of AMP7, rather than the £7bn that the CMA had assumed;
- (b) The cost of EIB debt was higher than assumed by the CMA, and was more likely to be at a 60-70bps discount than the 100bps assumed by the CMA;
- (c) The CMA should not have relied on a simple average of floating debt, as this attaches weight to outlier companies. It should focus on the median, which was 6%.
- (d) Ofwat had disallowed both floating costs and costs of carry in the past, and that if floating were to be counted, so should the higher costs of carry (which were likely to be 9 – 18bps).

9.766 Bristol stated that the consideration of matching-adjustments was not appropriate for small companies, as small companies could not achieve the financing assumptions used. Specifically, smaller companies could not typically issue at shorter frequencies and they do not have access to cheaper EIB debt. In addition, the inclusion of floating rate debt would actually increase the gap between WASC and WOC costs, suggesting that any inclusion of floating debt would lead to a positive matching adjustment to the benchmark of 10bps.<sup>2771</sup>

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<sup>2769</sup> [Anglian Full response to the CMA's working papers on Cost of Capital](#), paragraphs 40–43

<sup>2770</sup> [Anglian Full response to the CMA's working papers on Cost of Capital](#), pp12–13

<sup>2771</sup> [Bristol Further response to the CMA cost of capital working papers](#), paragraphs 17–22

9.767 Northumbrian stated that the use of matching adjustments was based on an ex-post concept of actual financing policies, not ex-ante principles. Northumbrian argued that the CMA should assume a notional capital structure consistent with that set on an ex-ante basis in past regulatory determinations. Such an approach would ensure that companies could finance themselves if they adopted the notional financial structure, but would bear the risks associated with their choice if adopting a different structure.<sup>2772</sup>

9.768 Northumbrian argued that the ex-post application of a matching principle would provide the wrong incentives, as it:<sup>2773</sup>

- (a) increased exposure for prudent companies that had issued long-term fixed rate debt (or equivalent) in line with the notional company and a prudent treasury policy for a regulated network;
- (b) assumed reductions in the cost of debt which have been achieved by taking on more risk, which:
  - (i) encouraged risk taking and a possible 'race to the bottom' rather than incentivising genuine efficiency;
  - (ii) transferred risk to customers, assuming consistent regulatory policy when rates increase; and
  - (iii) blurred the distinction between assumptions of the notional company and the cost of debt allowance.
- (c) Increased regulatory risk for water companies as:
  - (i) future allowances could not be predicted ex-ante, so it was not possible for a prudent firm to 'hedge the regime'; and
  - (ii) it was unclear whether Ofwat would follow a sector-wide pass-through policy if interest rates rise.

9.769 Northumbrian argued that making adjustments to the allowance based on shorter-dated issuances was inconsistent with the long-term 20-year investor horizon reflected in the benchmarks selected for the notional company. Northumbrian argued that while the issuance of shorter-maturity debt may appear less costly on an ex-post basis, it also increased a firm's ex-ante

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<sup>2772</sup> [Northumbrian Initial response to working paper on cost of capital](#), paragraphs 67–70

<sup>2773</sup> [Northumbrian Initial response to working paper on cost of capital](#), paragraph 71

exposure to refinancing risk. As such, there was no ‘risk-adjusted’ increase in efficiency on an ex-ante basis.<sup>2774</sup>

- 9.770 On the inclusion of floating debt, Northumbrian stated that a number of companies had raised such debt and taken on the associated additional risks and volatility of financing in a way that is not reflected in the notional company structure. However, including this debt in the allowance on an ex-post basis would punish those companies, such as Northumbrian, that have already issued fixed debt in line with the ‘benchmark/allowances/risks’ implied by the regime.<sup>2775</sup>
- 9.771 Yorkshire acknowledged the CMA’s concern that a purely iBoxx-based approach may not properly capture the full range of instruments that companies use to finance their function, and that a different methodology to that used in the Provisional Findings may therefore be merited in order to generate a credible benchmark for the cost of debt. However, Yorkshire disagreed that a ‘matching adjustment’ was an appropriate solution.<sup>2776</sup>
- 9.772 Yorkshire argued that a matching adjustment approach amounted to an ‘actualisation adjustment’, and that such a ‘back-fitting’ to an actual target would be a mistake for reasons already identified by the CMA. Namely, that it has been impossible for the CMA to work through and understand all of the industry’s actual cost of debt data in the timescales for this redetermination. As a result, if the CMA could not be confident in the actual cost of debt, it could not reasonably know what a matching adjustment should be.<sup>2777</sup>
- 9.773 Instead, Yorkshire proposed a composite benchmark approach which included explicit weighting to fixed (61%), floating (3%), EIB-floating (3%), index-linked (29%) and EIB index-linked (4%) debt. Yorkshire calculations on this basis, and using a combination of CMA and Yorkshire pricing assumptions, was a weighted rate of 4.82%. On this basis, any matching adjustment to the 4.95% 20-year collapsing average of the iBoxx A/BBB index would be 13bps (4.95% minus 4.82%), smaller than the 40bps figure suggested by the CMA.<sup>2778</sup>

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<sup>2774</sup> Northumbrian Initial response to working paper on cost of capital, paragraphs 80–84

<sup>2775</sup> Northumbrian Initial response to working paper on cost of capital, paragraphs 85–87

<sup>2776</sup> Yorkshire Final response to the CMA WACC consultations, paragraphs 3.1.1–3.1.3

<sup>2777</sup> Yorkshire Final response to the CMA WACC consultations, paragraph 3.1.3

<sup>2778</sup> Yorkshire Final response to the CMA WACC consultations, paragraphs 3.2.1–3.2.5

9.774 Anglian,<sup>2779</sup> Northumbrian<sup>2780</sup> and Yorkshire<sup>2781</sup> also disagreed with the CMA's calculation of a matching adjustment up to 40bps, suggesting that:

- (a) the calculation on the adjustment for floating rate debt was wrong, as it was based on an average that included outlier data from companies that had assumed very different risk positions to that assumed for the notional company. The median weight to floating for the sector, excluding RCFs, was c5.5%.
- (b) EIB debt accounted for only £5.3bn, or 9%, of water company debt – falling to c£2bn by the end of the period. In addition, Northumbrian noted Lords Select Committee evidence that pricing was 50-100bps lower than benchmark, while water company debt was 60-70bps lower than benchmark, suggesting that the CMA's 100bps estimate likely overstated the required discount.
- (c) as a result of a) and b), any matching adjustment would be closer to 20bps than 40bps

- *Third parties*

9.775 Ofgem suggest that the CMA calibrate its estimate for RCV growth, access to EIB funding (which is subsidised by UK taxpayers) and the use of floating rate debt (which benefits from current low rates) and more explicitly compare this to reported average water sector debt costs.<sup>2782</sup>

#### *Matching Adjustments – CMA assessment*

9.776 We received a range of evidence relating to both the principle and the calculation of any matching adjustment to a long-term bond benchmark. We will first address issues of principle, and then will update the calculations first offered in our cost of debt consultation.

9.777 Many of the in-principle arguments against the use of a matching adjustment are similar or identical to those against the use of actual costs or a shorter-term average of the benchmark. As such, our response to these arguments are in line with those discussed at paragraphs 9.626 to 9.627

9.778 In summary, we agree that in an ideal world it could be advantageous to ex-ante set a benchmark that would perfectly represent the likely behaviour of

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<sup>2779</sup> [Anglian Full response to the CMA's working papers on Cost of Capital](#), pp13–16

<sup>2780</sup> [Northumbrian Initial response to working paper on cost of capital](#), paragraphs 88–95

<sup>2781</sup> [Yorkshire Final response to the CMA WACC consultations](#), paragraphs 3.3.1–3.3.3

<sup>2782</sup> [Ofgem's response to the provisional findings](#), paragraphs 17–18



the notional water company. However, while the historic behaviour of the average (or median) company may not be the perfect representation of such a notional company, it gives some insight into how we should be calibrating our expectations of 'efficient' behaviour. As such, the evidence appears to demonstrate that no possible benchmark would have either ex-ante predicted, or can now ex-post explain, the actual behaviour of water companies.

- 9.779 In practice, water companies have adapted their approach to market conditions, within their risk tolerances, a practice we fully expect to continue. The application of a long-term benchmark that explicitly does not reflect the pattern of issuance would seem to allow water companies excess returns with no associated benefits for customers. As a result, we think it is reasonable and appropriate to consider whether there are justifiable reasons why an efficient water company may have incurred costs lower than those suggested by a bond-only benchmark.
- 9.780 As also discussed above, we acknowledge the potential role of incentives in this area. However, we do not envision a material risk of a 'race to the bottom' effect given the significant economic and regulatory forces that ensure suitable practices are followed across the industry. Neither do we consider that such an approach risks punishing a 'prudent' company due to the behaviour of 'risky' companies, as has been suggested by Northumbrian.
- 9.781 Taking Northumbrian as an example, it has described its approach as having issued debt 'in line with the regime'<sup>2783</sup> and that it has gearing close to the notional structure.<sup>2784</sup> Despite these 'notionally-compliant' approaches, Ofwat's APR data measures Northumbrian's cost of debt at 4.18% while the CMA's estimate (on a slightly different inflation basis) is 4.37%. As Northumbrian rightly points out, it does not employ any material amount of floating debt, so we can be even more confident that our estimate is a close match for reality. Even if there were remaining and company-specific inaccuracies (such as in relation to difference between coupon debt and yields at issue) we consider it to be extremely unlikely that making allowance for any such adjustments would lead to an actual cost of debt materially higher than our 4.52% industry figure.
- 9.782 While debt management luck and/or skill may have played a hard to identify role in Northumbrian's currently relatively low cost of debt, it appears clear that it has been neither constrained nor punished by a regulatory process that has always considered industry actual costs within the calculation of the cost of embedded debt allowance. Such a regulatory approach has also, by its

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<sup>2783</sup> [Northumbrian Initial response to working paper on cost of capital](#), paragraphs 87

<sup>2784</sup> [Northumbrian's reply to responses to the provisional findings](#), paragraph 173



own admission, not yet forced Northumbrian to take on excessive risks in order to outperform the allowance. We do not see any reason why these theoretical inappropriate incentives would start to have an impact only now.

- 9.783 Turning now to the issue of calculating appropriate matching adjustments. In the cost of capital working paper, we noted that consideration of floating and EIB debt could warrant up to 40bps of matching adjustments versus an unadjusted benchmark.<sup>2785</sup> We note that all such calculations are likely to be approximate and broadly applicable at best, not verifiably accurate adjustments appropriate for every company. As we are attempting a cross-check of our allowance, we consider that this exercise can still provide some insight into the appropriateness of our allowance.
- 9.784 In the following paragraphs we update our assumptions on the impact of including floating rate debt and EIB debt into a benchmark approach before returning to Ofwat's arguments on average historical credit rating and the outperformance wedge.
- 9.785 In terms of floating debt, we previously assumed a weight of 6-12% at a cost of 2.53% - suggesting a matching adjustment of 15 – 31bps against a 20-year average of the benchmark.<sup>2786</sup> We can now update this assumption for our expanded and improved analysis of actual costs. If we use our current assumption on the cost of floating debt as discussed at paragraph 9.609, this updates to a median amount of 6% at a cost of 1.85%. Versus a 20-year collapsing average of 4.95%, this would represent a floating debt matching adjustment of 19bps.<sup>2787</sup>
- 9.786 In terms of EIB debt, we previously assumed a weight of 12.5% and a discount to the benchmark of 100bps, suggesting a matching adjustment of 12.5bps.<sup>2788</sup> Based on evidence provided by the Disputing Companies we now update this assumption to 9% at a 50bps to 100bps discount. This suggests an EIB 'matching adjustment' of 4bps to 9bps.
- 9.787 Combined these two factors alone would suggest a matching adjustment of 23bps to 28bps, which would take our 20-year average of the iBoxx A/BBB 10+ benchmark figure from 4.95% to approximately 4.7%.
- 9.788 In addition, we re-examine Ofwat's evidence in support of its outperformance wedge. While in paragraph 9.752 we conclude that an approach that does not account for tenor or credit rating cannot be used to describe a halo effect

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<sup>2785</sup> Working paper: cost of debt, paragraph 121

<sup>2786</sup> Working paper: cost of debt, paragraph 113

<sup>2787</sup> Based on  $(6\% \times 1.85\%) + (94\% \times 4.95\%) = 4.76\%$

<sup>2788</sup> Working paper: cost of debt, paragraph 121

(like-for-like outperformance), it can by definition be used to describe the difference between the benchmark implied costs and the actual costs achieved by water companies. Despite applying an outperformance wedge of 25bps, Ofwat found that bonds issued between 2000 and 2019 had achieved a weighted outperformance of 49bps relative to an iBoxx A/BBB 10+ benchmark.<sup>2789</sup> If we ignored floating debt completely and just looked at what companies had achieved through a combination of tenor selection and the benefits of higher (historic) credit ratings, we could assume a matching adjustment of c50bps against the benchmark implied 4.95%, or an allowance of c4.45%.

9.789 By its nature, an approach of using a benchmark plus one or more matching adjustments is likely to give approximate results. However, our analysis shows that there are a number of plausible reasons why actual costs would be lower than suggested by either a 15- or 20-year average of a bond benchmark (at a specified credit rating) alone.

9.790 As with the cross-checks using unadjusted benchmarks discussed in paragraph 9.715, we consider the analysis of benchmark approaches plus matching adjustments as further corroboration that our actual-based embedded debt allowance is both a fair representation of:

- (a) the actual costs that water companies have to cover within this price control; and
- (b) that these costs do not include significant inefficiencies that consumers should not be required to pay for.

#### *The Cost of Embedded Debt – Summary and allowance*

9.791 In the proceeding paragraphs we discussed our consultation on the cost of debt, the evidence provided by the parties and our updated assessment of actual costs incurred by the industry. We have concluded that median actual costs as measured both in fixed and index-linked only, notional structure and actual structure terms suggest similar results. As a result, we are confident in our assessment of actual costs at 4.52%, and that 4.52% would be an appropriate allowance for the WASC and large WOCs at the notional level of gearing.

9.792 We have then cross-checked this approach against 15-year and 20-year averages of agreed-upon iBoxx A/BBB benchmark, and have concluded that

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<sup>2789</sup> [Ofwat's response to common issues in companies' SoCs: Risk and return](#), paragraph 3.109

neither trailing average suggests that a 4.52% allowance risks over-charging customers, building further confidence in our actual cost estimate.

- 9.793 Finally, we have cross-checked our allowance against benchmarks adjusted for typical debt management policies in the sector, and have concluded that there are a number of reasonable approaches to adjusting a bond-only benchmark that would corroborate an allowance of 4.52% as appropriate for both companies and consumers.
- 9.794 As a result of this extensive analysis and cross-checking process, we consider our actual and notional-actual based assessment of embedded debt costs to be an appropriate allowance in this case. Our decision in this case reflects that we have both been able to measure with confidence the cost of debt attributable to the financing of the companies. We have also been able to compare this calculation against appropriate benchmarks which indicate that allowing the recovery of actual costs would be consistent with customers funding efficiently incurred costs.
- 9.795 We set our cost of embedded debt allowance at 4.52% in nominal terms. Deflating for 2% CPIH gives a real cost of embedded debt allowance of 2.47%.

### ***Cost of New Debt allowance***

- 9.796 The cost of new debt allowance was comparatively less disputed than the cost of embedded debt allowance. The main points of disagreement were the averaging period for measuring the baseline cost of new debt (which would then be subject to a true-up mechanism) and whether an outperformance wedge was suitable.
- 9.797 In the following paragraphs we will briefly review Ofwat's PR19 approach and the approach taken by both Ofwat and the CMA at PR14. We will then examine the evidence provided by the parties and conclude on our assessment of the appropriate cost of new debt allowance.

### ***PR19 and PR14 precedent***

#### ***PR19 Decision***<sup>2790</sup>

- 9.798 Ofwat based its allowance for the cost of new debt on recent evidence of the yield of its benchmark index, adjusted to account for the market implied

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<sup>2790</sup> Ofwat (2019), [Allowed return on capital technical appendix](#), section 6.2.3

increase in the 15-year nominal risk-free rate over 2020–25 embedded in the term structure of nominal gilts.

- 9.799 Ofwat lowered its view of the ‘outperformance wedge’ applicable to this data from its draft determination estimate of 25 basis points to 15 basis points in its final determination. This reduction reflected its view that the lower overall allowed return on capital in PR19 could potentially reduce outperformance against the iBoxx A/BBB over 2020–25.
- 9.800 Ofwat used a forward rate adjustment of 25bps to reflect market-implied rate rises.<sup>2791</sup>
- 9.801 In its PR19 methodology document for PR19<sup>2792</sup> Ofwat stated that it had decided to have separate approaches to embedded debt and new debt, with a fixed approach to embedded debt and an indexation mechanism for new debt. It stated that at the end of the period it would compare the revenue allowance (based on the PR19 spot rate chosen), against a trailing average of the iBoxx A/BBB index over the same period; any difference in revenues would be reflected in future revenues or RCV. Ofwat stated that its policy on how the true-up would be reflected in company revenues would be decided as part of the next price review, PR24.

*Ofwat’s PR14*<sup>2793</sup>

- 9.802 Ofwat noted that, because of estimation uncertainties, it assessed equity returns, betas and inflation over a long-term period. However, debt capital markets data provided a more direct evidence of the new debt financing costs companies were likely to face in AMP6 – and so its methodology closely tracked movements in debt capital markets.
- 9.803 Ofwat noted that its January 2014 risk and reward guidance had included a 50bps forward looking uplift to market rates, and that while rate expectations had fallen in the intervening (January 2014 to December 2014) period, it did not consider that there was sufficient evidence to change the uplift assumption.
- 9.804 Applying a 60bps uplift to current iBoxx A and BBB yields suggested a range of 1.95% to 2.15%. Ofwat then deducted 15bps from the upper end of the

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<sup>2791</sup> Ofwat (2019), [Allowed return on capital technical appendix](#), Table 6.1

<sup>2792</sup> Ofwat (2017), [Delivering Water 2020: Our methodology for the 2019 price review. Appendix 12: Aligning Risk and Return](#), section 6.3

<sup>2793</sup> Ofwat (2014), [Final price control determination notice: policy chapter A7 – risk and reward](#), pp38–39

range in order to reflect a degree of outperformance – giving a point estimate of 2%.

*CMA's Bristol PR14 Determination*<sup>2794</sup>

9.805 Following Bristol's request for a redetermination of its price control, the CMA based its estimate of the cost of debt on two methodologies:

- (a) An iBoxx based approach (in line with Ofwat) that suggested an estimate of 1.6% to 1.8%;
- (b) A Gilt-rates plus WOC spread estimate that suggested an estimate of 1.15% to 1.6%.

9.806 The CMA noted that the differences between these estimates was partially due to the level of risk associated with issuing different types of long-term debt and that it would be difficult to forecast the exact mix of fixed and indexed linked debt that a company was likely to achieve.

9.807 The CMA concluded that 1.6% represented an appropriate new debt cost for Bristol, 40bps lower than the allowance awarded by Ofwat.

*Evidence from the Parties*

*Ofwat*

9.808 Ofwat disagreed with arguments from Anglian and Yorkshire (see paragraph 9.814) suggesting that its final determination implied a notional company credit rating below BBB+/Baa1. Ofwat stated that this assessment was based on a simplistic assessment of a single metric (AICR (Adjusted Interest Cover Ratio)), and that companies close to its notional gearing as at March 2020 were rated at least Baa1. For instance, Dŵr Cymru (60.0% gearing) is rated A3, Severn Trent (64.9% gearing) is rated Baa1, United Utilities (67.7% gearing) is rated A3.

9.809 Ofwat disagreed that evidence used to dispute the outperformance wedge in the assessment of embedded debt had also been used to dismiss an applicable adjustment to new debt. Ofwat provided evidence on the pricing of greater than 10-year tenor bonds issued at one notch of the notional credit rating since its final determination. Ofwat stated that even after adjustment for

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<sup>2794</sup> [Bristol PR14 Determination](#), paragraphs 10.116–10.124

tenor and credit rating, this data suggested outperformance by water sector bonds of 25bps.<sup>2795</sup>

9.810 Ofwat stated that, even if the CMA were not persuaded to apply an outperformance adjustment, it should consider that an outperformance adjustment remains relevant for the cost of new debt for two key reasons:<sup>2796</sup>

- (a) The A/BBB 10+ index did not capture currently lower-cost types of financial instruments in use in the water sector; and
- (b) There was sufficient and sustained evidence that companies can issue at a discount of around 25bps to the A/BBB 10+ index after controlling for tenor and credit rating.

9.811 Ofwat stated that were the CMA to decide against making any adjustment to the new debt allowance, the material and persistent outperformance should at least be considered as part of the CMA's 'in-the-round' assessment of asymmetry of expected returns and the evidence base for its 'aiming-up' of the cost of equity.<sup>2797</sup>

9.812 In its methodology document for PR19<sup>2798</sup> Ofwat stated that it had decided to have separate approaches to embedded debt and new debt, with a fixed approach to embedded debt and an indexation mechanism for new debt. It stated that at the end of the period it would compare the revenue allowance (based on the PR19 spot rate chosen), against a trailing average of the iBoxx A/BBB index over the same period; any difference in revenues would be reflected in future revenues or RCV. Ofwat stated that its policy on how the true-up would be reflected in company revenues would be decided as part of the next price review, PR24. The indexing/true-up of new debt was not raised as an issue by the Disputing Companies.

### *Disputing Companies*

9.813 As with the issues highlighted in relation to the outperformance wedge applied to the cost of embedded debt, Anglian<sup>2799</sup> and Northumbrian<sup>2800</sup> submitted that there was no evidence of an outperformance wedge once tenor and credit rating were taken into account.

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<sup>2795</sup> Ofwat Initial response to the working papers, paragraph 3.25

<sup>2796</sup> Ofwat Initial response to the working papers, paragraph 3.26

<sup>2797</sup> Ofwat Final response to the working papers, paragraph 3.33

<sup>2798</sup> Ofwat (2017), *Delivering Water 2020: Our methodology for the 2019 price review. Appendix 12: Aligning Risk and Return*, section 6.3

<sup>2799</sup> Anglian SoC, chapter I, section 7.2

<sup>2800</sup> Northumbrian SoC, section 8.11

- 9.814 Anglian<sup>2801</sup> and Yorkshire<sup>2802</sup> submitted that Ofwat's approach assumed that companies would be able to issue at yields lower than those that would be paid on Baa1 bonds, and that this was inconsistent with the credit rating that efficient companies were likely to be able to achieve as a result of the PR19 price control. Yorkshire referenced Economic Insight's analysis that suggested a low probability of an efficient firm being able to secure a Baa rating based on Ofwat's FD and submitted that the cost of new debt should be based on the iBoxx BBB with no performance wedge deduction.
- 9.815 Anglian disagreed with the CMA's provisional approach, which excluded the use of a forward uplift. Anglian stated that applying the forward uplift simply sets the cost of new debt at a level which the market considers will prevail during the charge control, rather than at the start of the charge control.<sup>2803</sup>
- 9.816 Bristol stated<sup>2804</sup> that the cost of new debt was based on the risk-free rate, plus an adjustment for credit risk, and that Ofwat's 0.58% nominal risk-free rate was too low (with 1.00% being a more thorough but conservative estimate). Bristol stated that, as Ofwat had determined that the cost of new debt was 2.54%, this should now be uplifted by 42bps (1.00%-0.58%), suggesting a revised industry cost of new debt of 3%.
- 9.817 Bristol stated that a forward uplift should be applied to the cost of new debt estimate in recognition that the allowance will apply for the duration of the price control period. Consistent with the rationale for applying the forward rate to the RFR, the forward uplift simply takes the market view of rates over the price control period, rather than at the start of the price control period, in recognition of the fact that new debt will be raised across the 2020–2025 period.<sup>2805</sup>
- 9.818 Northumbrian stated that the CMA should apply a forward rate adjustment to the cost of new debt. It acknowledged that the forward rate adjustment based on Bank of England data points to a lower 'pickup' (10 basis points) than assumed in Ofwat's FD19 (25 basis points) and proposed that this figure should be applied to the cost of new debt. This suggests a range of 0.31%-0.62%. Northumbrian also noted that, in practice, the forward rate adjustment would not have a material impact on the outturn allowance, given the proposal to apply a true-up mechanism in AMP 7.<sup>2806</sup>

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<sup>2801</sup> Anglian SoC, chapter I, section 7.2

<sup>2802</sup> Yorkshire SoC, paragraphs 233–240

<sup>2803</sup> Anglian Response to Provisional Findings, paragraph 451

<sup>2804</sup> Bristol SoC, paragraphs 322–324

<sup>2805</sup> Bristol's response to the provisional findings, paragraph 69. Bristol's other responses on this topic were in relation to its application for a company specific adjustment, and will be dealt with separately.

<sup>2806</sup> Northumbrian's response to the provisional findings, paragraphs 311–312



- 9.819 Yorkshire stated that Ofwat appeared to have selected two bonds rated Baa1/BBB+ (one of which was issued back in 2012) to support its initial view on an outperformance wedge for new debt, without any consideration of other factors that would influence market views on pricing. Yorkshire believed this analysis to be extremely limited and should include a 20 year £350m bond issued by Thames Water in April 2020, rated Baa1/BBB+, at a yield similar to the prevailing A/BBB iBoxx indices at the time of issuance.<sup>2807</sup>
- 9.820 In addition, Yorkshire disputed Ofwat's later evidence on new debt pricing since the start of AMP7, stating that it was selective in only focusing on Moody's ratings. In addition, it conflated one agency's (S&P) view of the estimated cost of a notch with another agency's (Moody's) actual rating. Dŵr Cymru, for example has a higher 'A' rating with Fitch (the third major ratings agency). Applying Ofwat's adjustment here would suggest underperformance rather than outperformance.<sup>2808</sup>
- 9.821 Anglian<sup>2809</sup> and Northumbrian<sup>2810</sup> and Ofwat<sup>2811</sup> noted that the CMA's Provisional Findings included an 'up-to-date' assessment of benchmark embedded debt costs that inappropriately ran past the end of AMP6 (March 2020). The Disputing Companies noted that embedded debt should be measured to March 2020, with new debt measured from April 2020.<sup>2812</sup>

#### *Cost of New Debt allowance – CMA assessment*

- 9.822 The bulk of submissions on this topic refer to two issues:

- (a) The application of an outperformance wedge; and
- (b) The application of a forward rate adjustment.

- 9.823 As discussed above in relation to embedded debt, we have concluded that there is insufficient evidence of like-for-like outperformance of water company debt versus the broader market. We note Ofwat's updated evidence of issuance since its PR19 final determination, and also Yorkshire's evidence on the potential inaccuracies in Ofwat's adjustments to account for differences in tenor and credit rating. In the round, we consider this sample size in Ofwat's later submission to be too small to draw statistically significant conclusions. If we instead focus on Ofwat and KPMG's larger studies of water debt issuance

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<sup>2807</sup> Yorkshire's reply to responses to the provisional findings, p62

<sup>2808</sup> Yorkshire Final submission, p25

<sup>2809</sup> Anglian's response to the provisional findings, paragraph 428.

<sup>2810</sup> Northumbrian's response to the provisional findings, paragraphs 304–305

<sup>2811</sup> Ofwat's response to the provisional findings – risk and return, paragraph 4.3

<sup>2812</sup> This correction was made in our Cost of Debt consultation paper, and is also applied in these Final Determinations.



(see paragraph 9.750) we retain the conclusion that there is insufficient evidence of a material or sustained 'halo effect'.

9.824 By contrast, our assessment of embedded debt outperformance noted that superior credit ratings, lower tenor at issue and the inclusion of EIB and floating rate debt could all explain why realised costs could be lower than those suggested by an unadjusted bond-only benchmark. However, we do not think that it would be appropriate to apply Ofwat's 15bps outperformance wedge (or any other adjustment) to the cost of new debt for the following reason:

- (a) Ofwat's evidence on superior credit ratings is predominately focused on issuance in previous price controls. When focusing on new debt, most companies in the sector are now at or below the notional Baa1/BBB+ target, with only Dŵr Cymru having a rating superior to this.<sup>2813</sup> As such, we consider it significantly less likely that future issuance will have the same credit rating benefit as past issuance;
- (b) With the completion of Brexit, it is unclear whether water companies will retain access to EIB-style debt on the same advantageous terms. At this stage, we would consider it more prudent not to assume that such debt is available until we see tangible evidence.
- (c) While the inclusion of floating debt could have justified a material matching adjustment to the embedded debt allowance, this impact is largely negated by Ofwat's new debt 'true-up' mechanism. Companies' outturn allowance will reflect subsequent movements in the benchmark, and so will already incorporate prevailing market rates.

9.825 As a result, only the potential to issue at lower tenors than suggested by the benchmark would seem to justify any adjustment to the new debt allowance. We have not received evidence that this issue alone is material enough to justify any adjustment. As a result, and as per the approach at Provisional Findings and described in our consultation on the cost of debt, we do not adjust the benchmark estimate for anticipated outperformance.

9.826 Our view on forward rate adjustments is covered extensively in relation to the risk-free rate, as described in paragraphs 9.228 to 9.234. To summarise, we do not consider forward rates to provide a superior estimate of future spot rates. Again, this issue is significantly negated in relation to new debt costs, as Ofwat's true up will ensure that companies are compensated on the basis

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<sup>2813</sup> Ofwat (2020), [Monitoring financial resilience report](#), p4

of actual future market rates. This makes forward rate adjustments largely redundant.

9.827 In relation to Bristol's arguments linking the risk-free rate to the cost of new debt allowance, and in line with our assessment in the Provisional Findings, we consider there is insufficient evidence to justify an uplift to a broad range of market prices on the basis that one metric (the risk-free rate in this case) was considered to be 'too low' by a party.<sup>2814</sup>

9.828 As with the updated approach to embedded debt, we focus our attention on one specific estimate of new debt costs. We measure the six-month average of the iBoxx A/BBB indices to be 2.19%. Deflating this figure by 2% CPIH gives a real cost of new debt allowance of 0.19%.

### ***Proportion of Embedded and New Debt***

9.829 As both Ofwat and we set separate allowances for the costs of embedded and new debt, we also need to consider the applicable weight of embedded and new debt over the period of the price control.

9.830 There is no perfect calibration of the ratio of embedded and new debt, with differing results depending on whether we focus on actual data on maturing debt or the ratio suggested by the trailing average of a benchmark approach. If focusing on notional data, the assumed horizon/issue tenor will be the main influence on the ratio. If focusing on actual data, debt rolling off during the price control will be the main influence on the ratio. Both approaches will also be impacted by the amount of debt assumed to fund new investment during the period.

9.831 In the cost of debt consultation, the CMA used differing approaches to estimate a range of 18–22% new, debt, with a point estimate at 20%. While Ofwat broadly agreed with this approach, the Disputing Companies pointed out logical inconsistencies with the one of the notional approaches used by both Ofwat and the CMA.

9.832 In the following paragraphs we first summarise the approach taken by Ofwat at PR19 and Ofwat and the CMA at PR14. We then review the evidence submitted by the Parties, before conducting our own assessment of the appropriate ratio of embedded and new debt.

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<sup>2814</sup> [Provisional findings](#), paragraph 9.369

*Ofwat's PR19 FD*<sup>2815</sup>

9.833 Ofwat conducted its analysis using notional, company-led and notional-actual hybrid approaches to estimating the required proportion of embedded and new debt. Ofwat noted that the company-led approach gives an estimate of around 15% new debt as a percentage of total debt, while the more notional approaches give estimates between 17-21%. Ofwat stated that, as revised business plans' debt issuance forecasts did not reflect higher final totex allowances, it was not convinced that the average share of new debt should be as low as 15%. Noting that the other two methods give a range that is very similar to the draft determination range of 17-22%, Ofwat decided that there were insufficient grounds to move its point estimate and retained 20% for its final determination.

9.834 Ofwat conducted detailed analysis to inform its estimate, considering three approaches:

- (a) notional;
- (b) company-led; and
- (c) notional-actual hybrid.

- *Notional*

9.835 The notional approach assumed that a new debt issuance profile can be inferred from data on the years to maturity of companies' existing embedded debt. Here the proportion of new debt at the end of the control period should be the number of years in the control period divided by the weighted average years to maturity of debt.

$$N = T/M$$

Where:

N = Proportion of new debt at the end of the control period  
M = The weighted average years to maturity of debt  
T = The number of years in the control period

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<sup>2815</sup> Ofwat (2019), [Allowed return on capital technical appendix](#), section 6.1.3

9.836 Under this approach, Ofwat calculated the sector average years to maturity to be 14.2 years, and the weighted average to be 13.9 years, which suggested an end-of-period range of new debt share of 36-37%.

9.837 Ofwat noted that this range underestimated end-of-period share as it did not account for new RCV formation financed by debt. Assuming that real RCV growth is financed 60% by new debt (to maintain 60% notional gearing), this suggests a higher end-of-period new debt share range of 40-42%. Dividing these figures by 2 gives an average for the period of 20-21%.

9.838 Ofwat noted that while this approach has the benefit of simplicity, it does not capture company proposals around the paydown of embedded debt or the profiling of new debt.

- *Company-led*

9.839 Ofwat stated that the company-led approach helped to deal with these issues, calculating the rolling mid-year balances of new debt and embedded debt over 2020–25 by assuming that new debt balances evolved according to company forecast debt issuance and that embedded debt balances evolved according to company forecast inflation-linked indexation and paydown of debt.

9.840 Ofwat noted that applying this approach resulted in an average share of new debt of 14-17% (weighted average), a range that was similar to that proposed by companies in pre-final determination representations to Ofwat.

- *Notional-actual hybrid*

9.841 Ofwat stated that the notional-actual hybrid approach built on revised business plan data, while including the latest evidence on totex allowances and its assessment of equity's contribution to new RCV. This approach assumed embedded debt balances evolved according to company forecast inflation-linked indexation and planned paydown of debt (as in the company-led approach), but for new debt used a bottom-up profile of issuance generated for each company. This assumed that 'pure' debt falling due over 2020–25 was refinanced as new debt and that growth in RCV was financed by new debt minus the contribution of equity. This resulted in an average share of new debt in the range of 17-18%.

- 9.842 In its Risk and reward guidance document, Ofwat noted that the companies had proposed a ratio of 72% embedded debt and 28% new debt. Ofwat concluded that a ratio of 75% embedded debt and 25% new debt would be appropriate.

*CMA's Bristol PR14 Determination*<sup>2817</sup>

- 9.843 In the PR14 Determination, the CMA noted that it was difficult to accurately estimate the amount of new debt a specific company would raise during a future period. The CMA considered that the amount of new debt taken in any particular period remained a decision for management, and was not for the regulator to second guess.
- 9.844 The CMA saw insufficient merit in Bristol company/WOC-specific arguments to justify a departure from regulatory precedent in using a constant assumption for the cost of capital through the period based on a notional weighting of the evidence for the cost of debt, including both forward-looking and embedded debt costs. The CMA noted that Ofwat's ratio of 25%:75% (for new and embedded debt respectively) was based on the average of the industry, so the CMA considered that this represented an appropriate basis on which to calculate an allowed cost of debt.

*Evidence from the Parties*

*Ofwat*

- 9.845 Ofwat stated that the water sector's issuance-weighted years to maturity was 13.9 years on March 2019. Assuming this debt falls due at a constant rate, this suggested that at the end of 2020-25, the share of new debt due to refinancing will be around 36%. Including real RCV growth financed 60% by debt increases this figure to around 40% by the end of the period, or 20% on average. Ofwat therefore considered that its assumption of 20% from final determinations was appropriate.
- 9.846 Ofwat stated that companies' actual share of new debt would tend to fluctuate based on historic and current investment patterns, and would, at times, out- and under-perform its notional assumption. However, Ofwat submitted that

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<sup>2816</sup> Ofwat (2014), [Setting price controls for 2015 – 2020 – risk and reward guidance](#), p20

<sup>2817</sup> [Bristol PR14 Determination](#), paragraphs 10.130–10.135

these deviations should broadly balance out over time, and that this did not necessitate a bespoke approach of setting an allowance for each company.

- 9.847 Ofwat stated that setting an allowance for each company could drive inefficient behaviour, such as incentivising companies to issue most of their debt towards the end of a price control (to ensure that it is remunerated as embedded), outweighing considerations of whether the price achieved for such issuance was efficient.<sup>2818</sup>
- 9.848 Following the CMA's use of a 20% new debt ratio in the consultation papers, and in response to criticism of this choice by the disputing companies, Ofwat stated that the decision was 'not an error but a matter of judgement. Ofwat stated that the companies' claim was based on the false premise that the trailing average must be 20 years.<sup>2819</sup> Using the 15-year collapsing average would have suggested a notional share of new debt should be 19% – 24% depending on the extent to which nominal rather than real RCV growth is used to estimate the new debt issued for RCV formation.
- 9.849 Ofwat also noted that company-level forecasts of debt issuance suggested a 15% weight at PR19, but that this had not been adjusted for a £900m increase in totex in the Ofwat FD. As a result, the 15% estimate may understate companies' plans to issue new debt in AMP7.<sup>2820</sup>

### *Disputing Companies*

- 9.850 Anglian did not raise concerns about Ofwat's 20% ratio of embedded and new debt in its SoC. In response to the CMA's Provisional Findings, Anglian stated that the CMA should base the estimate on the fully notional approach using the average maturity of the benchmark.<sup>2821</sup>
- 9.851 Subsequent to the CMA's consultation on the cost of debt, Anglian stated that the CMA's consultation assumed an adjustment in its calibration of the trailing average period for floating rate debt of 15-31 bps in its derivation of a 15-year trailing average. However, the CMA also assumed that 20% of new debt (5% higher than the new debt implied by a 20Y trailing average) and that this is raised at 2019/20 iBoxx. This effectively double counts the impact of adjusting for floating debt on the overall cost of debt.
- 9.852 Anglian also stated that the CMA consultation misapplied years to maturity in its analysis of the new to embedded debt ratio (as it assumes all sector debt

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<sup>2818</sup> [Ofwat's response to common issues in companies' SoCs: Risk and return](#), paragraphs 3.103–3.108

<sup>2819</sup> [Ofwat Final written submission](#), p75

<sup>2820</sup> [Ofwat's final response to the cost of capital working papers](#), paragraphs 3.34–3.39

<sup>2821</sup> [Anglian's response to the provisional findings](#), paragraph 452

will mature in 13.8 years ie 2034 when in practice only 50% of debt will have matured by this date). Correcting this gives new debt % of 11%. Notional company analysis (consistent with the 20-year investment horizon and collapsing average methodology) implies 1/20th debt refinanced in each year of AMP7 ie 25% by 2025 equivalent to 12.5% across AMP7. After including the impacts of RCV growth and the assumed reduction in notional gearing from 62.5% in AMP6 to 60% in AMP7, the notional new debt ratio becomes 11.95%.<sup>2822</sup>

9.853 Bristol's arguments were predominately in relation to the ratio of embedded and new debt applicable to smaller companies, and will be covered in more detail in paragraphs 9.1036 to 9.1051.

9.854 Northumbrian did not raise concerns about Ofwat's 20% ratio of embedded and new debt in its SoC or response to the CMA's Provisional Findings.

9.855 Subsequent to the CMA's consultation on the cost of debt, Northumbrian stated that the CMA had misapplied industry average years to maturity in its analysis of the new to embedded debt ratio as it assumed all sector debt will mature in 13.8 years, when in practice only 50% of debt will have matured by this date. Correcting for this error gave a new debt ratio of 11% based on actual company data.

9.856 Northumbrian stated that notional company analysis implied 12.5% - 16.5% new debt across AMP7. Including RCV growth would increase this by 2%, while adjusting for the assumed reduction in notional gearing from 62.5% in AMP6 to 60% in AMP7 would reduce this by 2.5%.<sup>2823</sup>

9.857 Anglian<sup>2824</sup> and Northumbrian<sup>2825</sup> stated that Ofwat's updated analysis in relation to new debt requirements was flawed as it implied that the sole driver of the new debt requirement is RCV growth. Anglian and Northumbrian stated that in practice water companies were continuously cashflow negative as a result of capital-intensive investments and the real-nominal mismatch. In addition, Anglian and Northumbrian disagreed with Ofwat's treatment of inflation, index-linked debt and the assumed reduction in notional gearing.

9.858 In its SoC, Yorkshire asked the CMA to factor in its actual embedded debt percentage (88%) into the cost of debt calculation to ensure consistency with Yorkshire's arguments on actual embedded debt costs (discussed in paragraphs 9.575) Yorkshire submitted that Ofwat's 'one size' approach

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<sup>2822</sup> [Anglian Full response to the CMA's working papers on Cost of Capital](#), p15

<sup>2823</sup> [Northumbrian Final response to working paper on WACC](#), p7

<sup>2824</sup> [Anglian Annex2: Finance](#), p15

<sup>2825</sup> [Northumbrian Final submission](#), p25

suggested that there was one optimum approach to debt issuance, that this was irrational and that it resulted in Ofwat failing to give regard to relevant considerations.<sup>2826</sup>

9.859 Yorkshire stated that the CMA's consultation on the cost of debt had proposed that the mix of embedded and new debt can be computed on a notional basis using the formula  $N = T/M$ , where N is the proportion of new debt in year T, T is the number of years in a price control period, and M is the weighted average number of years to maturity. The formula implies that when  $T=M$ , all of a company's embedded debt will have matured and the weight for new debt ought to be 100%. However, M is the average number of years to maturity across a company's debt portfolio. When  $T=M$ , it is more logical to assume that approximately half of the embedded debt will have matured and half will still be in place. The correct formula for the proportion of new debt in year T, is therefore:  $N = 0.5 \times T / M$ .<sup>2827</sup>

9.860 Yorkshire stated that an appropriate cross-check to available actual industry data would have identified the errors set out above. The App20 data submitted by each of the companies during PR19, and provided by Ofwat to the CMA, details existing instruments and the maturity dates of those instruments. The App20 data does not show anything like the 35–40% of debt maturing before the end of AMP7 that the CMA would have needed to observe in order to justify a 20% average weight for new debt.<sup>2828</sup>

9.861 Yorkshire stated that a notional approach would suggest a range of 11% - 14.5% of new debt, an App20 data approach would suggest 12.2% and Ofwat's 'company data-led' approach would suggest 12% –15%.<sup>2829</sup>

9.862 In addition, we note that Ofwat received more representations on this issue as part of the PR19 process than were submitted to the CMA prior to the publication of the consultation on the cost of debt. with eight stakeholder representations suggesting that 20% was too high an estimate to use, with the following specific arguments:<sup>2830</sup>

(a) Northumbrian stated that Ofwat's 20% estimate implied a 40% end-of-period share and average tenor of 12.5 years, which was at odds with the Annual Performance Report data. Northumbrian also argued that Ofwat's

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<sup>2826</sup> [Yorkshire SoC](#), paragraph 232 and [Yorkshire's Reply to Ofwat's Response](#), section 7.5

<sup>2827</sup> [Yorkshire's final response to the cost of capital working papers: Proportions of embedded debt and new debt](#), paragraphs 2.3.1–2.3.3

<sup>2828</sup> [Yorkshire's final response to the cost of capital working papers: Proportions of embedded debt and new debt](#), paragraphs 2.4.1–2.4.3

<sup>2829</sup> [Yorkshire's final response to the cost of capital working papers: Proportions of embedded debt and new debt](#), paragraphs 3.1.1–3.4.3

<sup>2830</sup> Ofwat (2019), [Allowed return on capital technical appendix](#), section 6.1.2



figure did not reflect an 11% cost assessment challenge at draft determinations which could be expected to reduce new debt issuance further by reducing allowed totex.

- (b) Various stakeholder responses used updated business plan data to calculate a new estimate, with some adapting Ofwat's approach. Frontier Economics (in a report for three companies) calculated a range of 14% to 18.3%, with a midpoint of 16.3%, which was similar to estimates from Anglian (15%) and United Utilities (17%).

### *CMA assessment*

- 9.863 There was comparatively little evidence submitted on the element of the cost of debt prior to the publication of the CMA's Provisional Findings and subsequent consultation on the cost of debt, with only Yorkshire raising the issue prior to these publications.
- 9.864 Subsequent arguments have largely focused on the correct notional approach to the cost of embedded debt, specifically the trailing average of the benchmark used, and how this impacts on the associated weights of embedded and new debt.
- 9.865 In theory, a trailing average set at 15 or 20 years suggests a specific proportion (either  $1/15^{\text{th}}$  or  $1/20^{\text{th}}$ ) of historic debt being retired each year and replaced by new debt. With an assumption for new debt needed to fund incremental investment (rather than just replace old debt) it should be relatively simply to decide what the appropriate proportion of embedded and new debt should be.
- 9.866 However, as we saw in our examination of the cost of embedded debt, this is unlikely to be the case in practice. As we noted, the date at which debt was issued is less important than the resulting cost to companies and consumers. Hence, we have used benchmarks to cross check our actual costs – rather than using them as an unquestionable notional approach to financing water companies. We noted in paragraph 9.709 that there is no perfect trailing average benchmark and that neither a 15-year or a 20-year approach is verifiably 'right' or 'wrong'.
- 9.867 The Disputing Companies' criticised the ' $N = T/M$ ' formula used by both the CMA and Ofwat in the notional calculation of the required proportion of new debt. We agree that in setting M as the average weighted maturity (rather than the average tenor at issue), this formula will over-estimate the quantum of new debt required in a period. This error is corrected to set M as the implied tenor at issue in the calculations below.

9.868 In assessing an appropriate proportion of embedded and new debt, we adapt our approach to match our approach to assessing the cost of embedded debt – we start with ‘actual’ data. Ofwat’s data 2019/20 data, and its updated assumption on new debt required for RCV growth,<sup>2831</sup> we can assess the WASC and large WOC debt due to mature in AMP7. In the table below, we can see that, including a 5.6% impact of RCV growth, the average new debt required in the period is 17%.

**Table 9-26: Ofwat data on debt maturity over AMP7 (including impact of RCV growth)**

	%				
<i>Company</i>	<i>Proportion of debt due within 1 year</i>	<i>Proportion of debt due in 1 - 2 years</i>	<i>Proportion of debt due in 2 - 5 years</i>	<i>Proportion of debt due in 5 - 20 years</i>	<i>Total up to 5 Years</i>
Anglian	5	6	25	48	36
Dŵr Cymru	10	2	10	74	21
Northumbrian	1	1	15	57	17
Severn Trent	8	7	20	4	34
South West	2	4	8	48	15
Southern	0	20	8	54	28
Thames	13	5	16	38	34
United Utilities	18	1	12	50	31
Wessex	0	4	25	39	29
Yorkshire	1	4	18	56	22
Hafren	46	0	0	54	46
Affinity	0	0	2	63	2
South East	3	0	0	71	3
<b>WASC and Large WOC Average</b>					<b>24</b>
<b>WASC and Large WOC Median</b>					<b>28</b>
<b>Total new debt for RCV Growth</b>					<b>6</b>
<b>New debt for AMP7<sup>2832</sup></b>					<b>17</b>

Source: CMA analysis of Ofwat data

9.869 As with our assessment of costs, we can cross-check this figure against notional approaches using 15- and 20-year collapsing averages.

9.870 A 15-year collapsing average would suggest an ending weight of new debt of 33% (5/15 years). In combination with the new debt needed to fund RCV growth, this would suggest a notional new debt weight of 19%.

<sup>2831</sup> 5.6%, calculated based on Ofwat’s data on Real RCV growth of £4.331bn, financed 60% with debt of £2.599bn, as a proportion of end 2024/25 notional debt of £46.253bn. See [Ofwat Final response to working papers](#), Table 3.2

<sup>2832</sup> Represents 28% matured debt plus 5.9% new debt to finance RCV growth, divided by two to give the average weight of new debt required by the AMP.

**Table 9-27: CMA example of new debt needed in a 15-year collapsing average approach**

<i>Year of AMP</i>	<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>Average</i>
Embedded Debt							
years	15	14	13	12	11	10	12.5
%	100%	93%	87%	80%	73%	67%	83%
New Debt							
years	0	1	2	3	4	5	2.5
%	0%	7%	13%	20%	27%	33%	17%
<b>Ofwat updated RCV Growth</b>							<b>6%</b>
<b>Ofwat updated RCV Growth average for period</b>							<b>3%</b>
<b>New Debt Weight</b>							<b>19%</b>

Source: CMA analysis

9.871 A 20-year collapsing average would suggest an ending weight of new debt of 25% (5/20 years). In combination with the new debt needed to fund RCV growth, this would suggest a notional new debt weight of 15%.

**Table 9-28: CMA example of new debt needed in a 20-year collapsing average approach**

<i>Year</i>	<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>Average</i>
Embedded Debt							
years	20	19	18	17	16	15	17.5
%	100%	95%	90%	85%	80%	75%	88%
New Debt							
years	0	1	2	3	4	5	2.5
%	0%	5%	10%	15%	20%	25%	13%
<b>Ofwat updated RCV Growth</b>							<b>6%</b>
<b>Ofwat updated RCV Growth average for period</b>							<b>3%</b>
<b>New Debt Weight</b>							<b>15%</b>

Source: CMA analysis

9.872 As a result, actual data appears to approximate the average of taking a 15-year or 20-year benchmark approach to embedded debt (assuming a collapsing average).

9.873 Ofwat provided<sup>2833</sup> a worked example of a 15-year trailing approach to embedded debt for the whole sector, which we replicate below – along with the same analysis applied to a 20-year trailing average (not provided by Ofwat). This approach gives almost identical results.

<sup>2833</sup> [Ofwat Final response to working papers](#), Table 3.2

**Table 9-29: Analysis of new debt requirement using 15-year and 20-year trailing average – Ofwat data**

	<i>Real RCV 15- year trailing average</i>	<i>Real RCV - 20- year trailing average</i>
Starting 2020/21 RCV	72,757	72,757
Ending 2024/25 ending RCV	77,088	89,071
Notional gearing	60%	60%
2024/25 ending notional debt	46,253	53,443
End of period share of new debt	33%	25%
End of period refinancing new debt	15,418	13,361
RCV growth	4,331	16,314
Notional RCV new debt	2,599	9,788
Total end of period new debt	39%	43%
Average new debt over 2020-25	19%	22%

Source: Ofwat and CMA analysis

9.874 Returning now to Ofwat’s ‘notional’ approach using the  $N=T/M$  formula, we can observe the results in Table 9-30. As noted by the companies, if we assume that the c13 year average maturity of debt at companies corresponds to equal annual issuance of similar debt, we can assume that  $M = 26$ . This would correspond to a new debt requirement of only c12%, rather than the 20% suggested in paragraph 257 of the cost of debt consultation paper. However, we note that if we use either the 15- or 20-year tenor at issue assumptions (as discussed in the cost of embedded debt analysis), this approach to the assessment would suggest 15-19% new debt.

**Table 9-30: CMA analysis of the notional weight to new debt at various assumptions for average tenor at issue**

	<i>Assumed tenor from average maturity of c13 years</i>	<i>15-year average tenor at issue</i>	<i>20-year average tenor at issue</i>
T	5	5	5
M	26	15	20
N (no growth)	19%	33%	25%
End period new debt assumption	5.6%	5.6%	5.6%
N (with growth)	25%	39%	31%
<b>Average for AMP</b>	<b>12%</b>	<b>19%</b>	<b>15%</b>

Source: CMA analysis

9.875 We have noted that there is no perfect measure of the required weight of new debt for the notional company in a single AMP. If we start our assessment of actual debt maturing and required for RCV growth over the price control, we estimate a figure of 17%. We note that this figure is in line with Ofwat’s Notional-actual hybrid approach and our assessment in the Provisional Findings. We also consider that this approach is more likely to be accurate than an assumed tenor profile from an average maturity figure, as this does not actually tell us what mix of shorter- and longer-tenor debt makes up that average maturity.

- 9.876 If we now cross check that against the notional assessment using either a 15-year or 20-year horizon, we get a range of 15% to 19%. On this basis, our 17% 'actual' figure appears broadly appropriate for this price control.
- 9.877 We note Anglian and Northumbrian's disagreement with Ofwat's updated estimates of new debt required for new growth that contributes to our overall estimate of a 17% new debt ratio, as well as Ofwat's evidence that previous estimates were based on totex figures lower than now expected over the AMP. We also note that neither company raised the weight of new debt as an issue in their statements of case, despite Ofwat's use of a higher 20% figure in its PR19 determination. We acknowledge that any RCV growth figure for the whole industry will be approximate and influenced by a range of factors. On balance, we consider Ofwat's estimate to be sufficient for our estimation purposes.
- 9.878 As with issues relating to the cost of debt, we continue to disagree with Yorkshire's assessment that allowances should be based on individual company requirements for new debt within the period. Such an approach would encourage companies to appeal to the CMA for a redetermination only if their new debt needs in a particular control were below average (assuming new debt remains cheaper than historic debt), but incentivise companies not to appeal and keep the benefits if their new debt needs were above average. Such a 'one-way bet' would inappropriately disadvantage customers. We also consider that for the WASCs and large WOCs, deviations from the average should smooth out over time. Bristol's request for a separate ratio of new debt for small WOCs will be considered in paragraphs 9.1036 – 9.1051.
- 9.879 As a result, when setting the cost of debt allowance we assume an 83% weight to embedded debt and 17% weight to new debt.

### ***Issuance and liquidity costs***

- 9.880 Companies incur costs in order to issue debt in addition to interest costs. Debt issuance fees to financial intermediaries (for example, banks syndicating a debt issue) represent one significant source of such costs. In addition, the terms of some loans may also oblige firms to maintain liquidity, which can be achieved through holding cash or maintaining short-term lending facilities, which is a cost to companies.
- 9.881 Issuance and liquidity costs were not a significant area of contention in Disputing Company statements of case or in submissions following the publication of our Provisional Findings. We received additional submissions following the publication of our consultation on the cost of debt, primarily in

relation to the need to include an addition cost of carry allowance if basing cost of embedded debt estimates on data including floating rate debt.

9.882 In the following paragraphs we will review Ofwat's PR19 approach and Ofwat and the CMA's PR14 approach, before considering evidence from the Parties.

### *PR19 and PR14*

#### *Ofwat PR19 Decision:*<sup>2834</sup>

9.883 Ofwat allowed 10bps for issuance and liquidity costs in its PR19 final determination, in line with its draft determination. Ofwat based this assessment on Europe Economics analysis of:

- (a) Issuance fees covering 72 issuances over the period 1993 – 2017, with an assessed range of 3-6bps; and
- (b) Liquidity facilities, based on a cost of 35-45bps point fee and assumed to be required for 10% of total outstanding debt, suggesting liquidity fees of 3.5-4.5bps.

9.884 Ofwat noted that it did not receive representations on issuance and liquidity fees in response to its draft determinations.

#### *Ofwat's PR14*<sup>2835</sup>

9.885 Ofwat added an uplift of 10bps for amortised issuance costs.

#### *CMA's PR14 Determination*<sup>2836</sup>

9.886 The CMA assumed 10bps issuance costs and 10-20bps of cash holding costs.

### *Evidence from the parties*

9.887 Ofwat stated that its use of 10bps for issuance and liquidity costs was not contentious at PR19, and that it had received no submissions challenging its use of this assumption at draft determinations.

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<sup>2834</sup> Ofwat (2019), [Allowed return on capital technical appendix](#), section 6.4.3

<sup>2835</sup> Ofwat (2014), [Setting price controls for 2015-20 – risk and reward guidance](#), p22

<sup>2836</sup> [Bristol PR14 Determination](#), paragraphs 10.1 and 10.117 – 10.118. Note the CMA included both issuance and liquidity costs in its assessment of Bristol's actual embedded debt, which along with notional costs influenced the embedded debt allowance. Only issuance costs were included in its assessment of new debt costs.

- 9.888 Ofwat also noted it was included in Bristol Water's CSA-adjusted proposal from its SoC. The CMA's Bristol decision in 2015 placed weight on Bristol's company-specific and notional costs. The notional perspective allowed for an uplift of 0.1% for issuance costs and no liquidity costs. The 0.2-0.3% relate to Bristol Water's former actual structure, with limited read-across to the CMA's current exercise.
- 9.889 In response to the Disputing Companies noting that Ofgem had included a higher allowance, Ofwat stated that Ofgem had calibrated the length of its RIIO-2 iBoxx extending trailing average based on a detailed projection of the sector's balance sheet interest costs over the RIIO-2 control period, resulting in a 10-14 year averaging period. Ofwat suggested that if yield costs were overcompensated by adopting a longer averaging period, it does not follow that the issuance and liquidity cost allowance would remain the same. Ofwat stated that there would be a strong 'in-the-round' case for arguing the basic index-led allowance was sufficient because of the greater amount of headroom. Ofwat stated that in RIIO-ED1, Ofgem decided to not make an allowance for issuance and liquidity costs, as it considered that the 'halo effect' from its unadjusted iBoxx-led allowance provided headroom to encompass such costs.
- 9.890 In response to Disputing Companies arguing for an additional cost of carry allowance, Ofwat stated that basing a cost of carry on balance sheet cash wrongly ignores interactions with the 4-5bps allowance for liquidity costs in the 10bps issuance and liquidity costs allowance. This is based on companies holding 10% of borrowings as liquidity. Ofwat stated that as this percentage is already larger than the 4.44% median ratio of cash to gross debt, and is already covered in the issuance and liquidity costs allowance, a further allowance for cash holding would be a double count.<sup>2837</sup>
- 9.891 Anglian did not raise concerns about Ofwat's 10bps issuance and liquidity allowance in its SoC or response to our Provisional Findings.
- 9.892 Subsequent to the CMA's consultation on the cost of debt, Anglian stated if the CMA decided to adopt at 15-year trailing average when measuring the cost of embedded debt (based on the matching principle), then it should further analyse the cost of carry and costs associated with management of the transition to CPIH. Anglian stated that Ofwat's 10bps allowance was materially lower than the costs implied by companies' actual positions, and

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<sup>2837</sup> [Ofwat's final submission](#), pp74–75

that benchmarking by Ofwat estimated issuance and liquidity costs at 25bps.<sup>2838</sup>

- 9.893 Anglian stated that in addition to the 4bps of liquidity costs provided by Ofwat's allowance, the CMA needed to consider that analysis of the cash on company balance sheets indicates a cost of carry of 9 -18bps.<sup>2839</sup>
- 9.894 Bristol's arguments were predominately in relation to the issuance and liquidity costs applicable to smaller companies, and will be covered in more detail in paragraphs 9.1022to 9.1024.
- 9.895 Northumbrian did not raise concerns about Ofwat's 10bps issuance and liquidity allowance in its SoC or response to our Provisional Findings.
- 9.896 Subsequent to the CMA's consultation on the cost of debt, Northumbrian stated that it had consistently been assumed that for the notional company the impact of the cost of carry and floating rate debt offset one another, which allows analysis of notional company costs to focus on long-term RCV financing. Northumbrian quote Ofwat's statement from the Bristol 2014 Redetermination that:<sup>2840</sup>

We do not include these holding costs in our notional cost of debt as they are offset by the lower cost of short-term floating debt, which is not factored into our notional cost of debt.<sup>2841</sup>

- 9.897 Northumbrian stated that including floating rate debt would necessitate the inclusion of a cost of carry allowance. Northumbrian estimates the cost of carry for WASCs and large WOCs at 12bps, a figure that was 'in line with Ofgem's point estimate (10bps) for RIIO-2'.<sup>2842</sup>
- 9.898 Yorkshire<sup>2843</sup> stated that, whilst Ofwat's proposed allowance of 10bps for issuance and liquidity costs was consistent with its prior determinations, a closer examination of regulatory precedent indicated that, typically, this was insufficient to recover the combined (efficient) costs of issuance and liquidity. Yorkshire referenced an Economic Insight paper,<sup>2844</sup> which was prepared for NATS as part of the RP3 process, as support for its argument.

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<sup>2838</sup> [Anglian's initial response to the cost of capital working papers](#), paragraph 68

<sup>2839</sup> [Anglian's final response to the cost of capital working papers](#), p15

<sup>2840</sup> [Northumbrian Final submission](#), paragraph 82

<sup>2841</sup> Ofwat (2015) [Response to Bristol Water's Price Determination Statement of Case dated 11 March 2015](#), paragraph 310

<sup>2842</sup> [Northumbrian Final submission](#), paragraph 84

<sup>2843</sup> [Yorkshire SoC](#), paragraph 241

<sup>2844</sup> Economic Insight (2019), [Assurance review and assessment of the evidence on the WACC at RP3, a report for NATS](#), pp116–119.



### *CMA assessment*

- 9.899 We note that issuance and liquidity costs were not a matter of contention in either the PR19 process or prior to the publication of our consultation on the cost of debt.
- 9.900 We acknowledge that Yorkshire has questioned Ofwat's 10bps allowance as being insufficient but note that it has not explicitly suggested an alternative estimate.
- 9.901 Submissions following our consultation on the cost of debt have focused on Ofwat's previous statement that it did not include a specific cost of carry allowance as this cost was offset by cheaper floating rate debt, which was not factored into its notional cost of debt.<sup>2845</sup>
- 9.902 The Disputing Companies are right in principle to point out that it would be reasonable when counting the cost of floating rate debt that associated costs should be included in any assessment. However, as can be seen in our cost of embedded debt analysis, our assessment of actual embedded costs is almost identical regardless of whether we focus on only fixed and index-linked debt (at either actual or notional weights) or whether we include floating rate debt with an associated 10bps allowance for the cost of carry.
- 9.903 As a result, we consider the cost of debt allowance is not reliant on inclusion of floating debt absent a cost of carry allowance, and so no additional allowance is merited here. In the absence of material improvement to the Europe Economics' estimates of 10bps of issuance and liquidity costs used by Ofwat, we continue to set our issuance and liquidity allowance at 10bps.

### ***Total Cost of Debt – CMA assessment***

- 9.904 In summary, our total cost of debt allowance is presented in Table 9-31 in both nominal and CPIH-real terms:

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<sup>2845</sup> Ofwat (2015) [Response to Bristol Water's Price Determination Statement of Case dated 11 March 2015](#), paragraph 310

**Table 9-31: Summary of our Cost of Debt allowances**

			%
<i>Metric</i>	<i>CMA - Nominal</i>	<i>CMA - CPIH-Real</i>	<i>Ofwat PR19 final determination CPIH-real</i>
Cost of Embedded Debt	4.52	2.47	2.42
Cost of New Debt	2.19	0.19	0.53
Weight of New Debt	17	17	20
Blended Cost of Debt	4.12	2.08	2.04
Issuance and Liquidity Costs	0.10	0.10	0.10
Cost of Debt Allowance	4.22	2.18	2.14

Source: CMA Analysis and Ofwat PR19 final determination

## Bristol – Company Specific Adjustment

### **Background**

9.905 In this report references to a Company Specific Adjustment (CSA) are to an adjustment to one or more metrics within a water-only company's cost of capital to reflect structurally higher costs faced by smaller water-only companies within the industry.

9.906 Bristol's claim for a CSA uplift to its cost of debt was rejected by Ofwat in Ofwat's FD.

9.907 Bristol is claiming a CSA as part of the CMA's redetermination of the price control. In its SoC, Bristol requested that the CMA apply a CSA in the form of a 37.35bps uplift to the cost of debt allowance and a 13% uplift to the asset beta used in Bristol's cost of equity allowance.<sup>2846</sup>

### **Ofwat's PR19 decision and other precedent**

#### **Ofwat - PR19** <sup>2847</sup>

9.908 Ofwat used a three-stage approach to assessing requests for a company-specific adjustment to the cost of capital, asking:

- (a) **Levels assessment:** Is there compelling evidence that the level of the requested adjustment is appropriate;

<sup>2846</sup> Bristol SoC, paragraph 207 & 255

<sup>2847</sup> Ofwat (2019), *Allowed return on capital technical appendix*, annex 1.1

(b) **Benefits assessment:** Is there compelling evidence that there are benefits that adequately compensate customers for the increased cost; and

(c) **Customer support assessment:** Is there compelling evidence of customer support for the proposed adjustment?

9.909 Three companies (Bristol, Portsmouth Water, and SES) originally applied for a company-specific adjustment to their cost of capital in their initial business plans. In January 2019, Ofwat decided that Portsmouth Water had passed all three assessments, with sufficient evidence in support of its proposed uplift to its allowed cost of capital. Ofwat decided that Bristol and SES had not passed all three assessments, there being insufficient evidence supporting their applications.

9.910 In July 2019, as part of draft determinations, Ofwat considered new evidence provided by Bristol and SES in support of their applications. It again decided that these companies did not pass all three assessments.

9.911 In their responses to Ofwat's draft determination, both Bristol and SES notified Ofwat that they wished it to reconsider their case for a company-specific adjustment at final determination. They were joined by South Staffs Water, which indicated in its representation that it was now seeking a company-specific adjustment.

9.912 In the final determination process, Portsmouth Water and South Staffs Water passed all three assessments that Ofwat required to be allowed a CSA. Bristol failed the customer benefits assessment and so was not allowed a CSA. SES failed the customer benefits and customer support assessments and so was not allowed a CSA.

9.913 Ofwat's analysis of small company borrowing costs indicated that the appropriate uplift for a notional small company relative to its industry-level allowance was 35bps on embedded debt and 25bps on new debt, or 33bps on the overall cost of debt, at its notional 20% share of new debt. This CSA was applied to Portsmouth Water and South Staffs Water.

## Ofwat PR14/CMA's Bristol PR14 Determination

9.914 At PR14, Ofwat concluded<sup>2848</sup> that the six smaller WOCs (including Bristol) did not face higher equity costs, but did face higher debt costs equivalent to 15bps on the WACC.

9.915 Ofwat applied an 'offsetting customer benefits' test to the six small WOCs, and found that only Portsmouth Water and Sembcorp Bournemouth Water provided customer benefits that exceeded the incremental financing cost of a small WOC. As a result, only these two companies were allowed an uplift on their financing costs.

9.916 As a result, Bristol sought a redetermination from the CMA – requesting an uplift to both the cost of debt and cost of equity allowances. Bristol requested a 0.55% uplift to its cost of debt allowance and a 0.75% uplift to its cost of equity allowance.<sup>2849</sup> Bristol also argued that a customer benefits assessment was not required and was contrary to Ofwat's duties.<sup>2850</sup>

9.917 In its determination, the CMA:

- (a) did not consider that there was a clear link between the relative position of small companies within the benchmarking and the efficient level of the cost of capital. As a result, we did not apply a customer benefits assessment;<sup>2851</sup>
- (b) awarded a cost of debt of 2.61%, a 0.02% uplift to Ofwat's PR14 determination (consisting of a 20bps increase in the cost of embedded debt, but a 40bps lower cost of new debt);<sup>2852</sup>
- (c) used Ofwat's industry-level split of embedded and new debt;<sup>2853</sup>
- (d) awarded a cost of equity of 5.73%, 0.12% uplift to Ofwat's PR14 determination; and
- (e) awarded an overall WACC of 3.78%, 0.04% uplift to Ofwat's PR14 determination.<sup>2854</sup>

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<sup>2848</sup> Ofwat (2014), *Final price control determination notice: policy charter A7 – risk and reward*, section A7.4.2

<sup>2849</sup> Bristol Water (2015), *Statement of Case*, Table 108.

<sup>2850</sup> Bristol Water (2015), *Statement of Case*, paragraph 1574

<sup>2851</sup> CMA (2015), *Bristol Water plc. A reference under section 12(3)(a) of the Water Industry Act 1991 (Bristol PR14 Determination)*, paragraph 10.79

<sup>2852</sup> *Bristol PR14 Determination*, Table 10.4

<sup>2853</sup> *Bristol PR14 Determination*, paragraph 10.135

<sup>2854</sup> *Bristol PR14 Determination*, Table 10.4

## *Ofwat PR09/CC's Bristol 2010 Determination*

- 9.918 Ofwat awarded a 40bps uplift to the cost of debt at the small water-only companies. Ofwat also lowered the gearing of water only companies from 55% to 52.5% (without any offsetting reduction in the equity beta), effectively giving them an uplift on the WACC.<sup>2855</sup>
- 9.919 Bristol appealed to the CC, requesting a cost of debt of 4.3% (a 0.3% uplift to Ofwat's PR09 allowance), a cost of equity of 10.4% (a 2.5% uplift to a re-gear version of Ofwat's PR09 allowance) and an overall WACC of 6.7% (a 1.2% uplift to Ofwat's PR09 allowance).
- 9.920 In its determination, the CC:
- (a) awarded cost of debt of 3.9%, 0.1% lower than Ofwat's PR09 water only company allowance but 0.3% higher than the industry allowance
  - (b) Awarded a cost of equity of 6.6%, 0.5% lower than Ofwat's PR09 industry and small company allowance (primarily as a result of lower beta and market return estimates).
  - (c) Awarded an overall WACC of 5.0% (4.9% at 52.5% gearing), 0.6% lower than Ofwat's PR09 allowance.<sup>2856</sup>

### **Key arguments**

- 9.921 In considering Bristol's application for a CSA as part of our redetermination we consider arguments presented by the Parties in the following areas:
- (a) Whether it is appropriate to apply a customer benefit assessment to an application for a CSA.
  - (b) Whether, and to what extent, a CSA uplift is warranted to Bristol's cost of debt (including the appropriate proportion of new debt).
  - (c) Whether, and to what extent, a CSA uplift is warranted to Bristol's cost of equity.

We will conclude on each of these issues in the relevant section before briefly summarising our decision.

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<sup>2855</sup> Ofwat (2009), *Future water and sewerage charges 2010 – 15: final determinations*, section 5.5

<sup>2856</sup> CMA (2010), *Bristol Water plc. Notice of Reference: Determination of Adjustment Factor for the period 2010 – 2015*, Appendix N, Table 12

## ***Customer benefits assessment***

9.922 The customer benefits assessment made by Ofwat was a financial assessment of net benefits to customers and the sector, after the application of a CSA, of a company remaining independent. Ofwat did not believe that a CSA should be awarded to any company that failed to pass its customer benefits assessment. CCWater agreed with Ofwat's approach.

9.923 Bristol believe that it had proved both the need and customer support for an uplift, and thus a customer benefits assessment was not needed. The CMA's provisional decision was not to apply such an assessment, a decision that was in line with previous CC/CMA decisions such as the CMA's Bristol PR14 Determination.<sup>2857</sup>

## ***Ofwat position***

9.924 Ofwat stated that customers are not able to choose their service provider, but investors are able to seek financing efficiencies, including as a result of mergers, and by pooling financing arrangements. As customers cannot choose their supplier (nor the corporate or ownership structure of the company that supplies them), it applied a high bar to accepting CSAs to the allowed return on capital. Ofwat argued that where it accepted an adjustment, it must be satisfied that the allowances made were reasonable and served the interests of customers.<sup>2858</sup>

9.925 Ofwat suggested that it may be possible to maintain some of the perceived customer benefits of a small, local company following a takeover, and cited the example of Dee Valley Water which is run as a separate company Hafren Dyfrdwy, under the ownership of Severn Trent Water.

9.926 Ofwat was concerned that the CMA's approach privileged the interests of investors over customers and did not give appropriate weight to its duties. Ofwat also thought that it provided artificial incentives to embed inefficient ownership structures in place for customers who cannot choose their water company.<sup>2859</sup>

9.927 In making its assessment, Ofwat assessed benefits in three areas:<sup>2860</sup>

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<sup>2857</sup> [Bristol PR14 Determination](#), paragraph 10.72

<sup>2858</sup> Ofwat (2019), [Allowed return on capital technical appendix](#), annex 1.1

<sup>2859</sup> Ofwat, [Risk and Return – response to CMA provisional findings](#), paragraphs 6.3–6.10

<sup>2860</sup> Ofwat (2019), [Allowed return on capital technical appendix](#), annex 1.3

- (a) Impact on Ofwat's cost benchmarks – where Ofwat calculated the upper-quartile challenge in the absence of the small company concerned and compared the new totex allowance with the baseline allowance.
- (b) Impact on Ofwat's service benchmarks – where Ofwat re-calculated the upper quartile/median challenge without the small company concerned and compared 'stretch' in resulting service levels with the baseline.
- (c) Benefits in other areas – where Ofwat reviewed company submissions on benefits.

9.928 Ofwat stated that its customer benefits assessment indicated negative net benefits in the case of Bristol.<sup>2861</sup> Ofwat stated that it placed most weight on a forward-looking approach, as it considered that any decisions on CSAs would only have a causal effect on their benchmarks in future price controls and to reflect that the benchmarking benefit of a company may change over time. On this basis, Bristol was the only company applying for a CSA that was estimated to have a negative forward-looking benefit of providing an uplift.<sup>2862</sup>

9.929 Ofwat also included sensitivity analysis on its results which assessed the impact of varying the forecast horizon used in its estimations. It provided an estimate of NPV including all benchmarking benefits as the number of price controls included increased. Again, Bristol was the only company where results suggested a negative NPV over a horizon of five price controls.<sup>2863</sup>

9.930 Ofwat noted Bristol's objections to its approach and the claim that Ofwat's analysis had failed to capture harder to quantify benefits provided by Bristol such as: loss of precision in totex modelling; water refill stations; customer stated preference of remaining independent; and dissemination of best practice. However, Ofwat stated that, assessed in the round, it did not consider that the collective value to customers of these benefits could be expected (with a high degree of confidence) to exceed the negative £14 million of NPV that their benefit assessment analysis had suggested.<sup>2864</sup>

9.931 Ofwat submitted that on three separate occasions during the PR19 process it had reviewed evidence provided by Bristol to assess whether the company provides benefits which adequately compensate for the additional cost of providing its requested uplift, and that in all three instances it did not find evidence of sufficient benefits. Ofwat claimed that in reviewing the company's

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<sup>2861</sup> Ofwat (2019), [Allowed return on capital technical appendix](#), annex 1.3 including Table A1.6 Of the other companies applying for a CSA, the test for Portsmouth Water and South Staffs Water suggested strongly positive net benchmarking impacts, while SES's test suggested negative benefits.

<sup>2862</sup> Ofwat (2019), [Allowed return on capital technical appendix](#), annex 1.3 including Table A1.7

<sup>2863</sup> Ofwat (2019), [Allowed return on capital technical appendix](#), annex 1.3 including Figure A1.1

<sup>2864</sup> Ofwat (2019), [Allowed return on capital technical appendix](#), annex 1.3

SoC and the significantly increased costs of its requested uplift, its confidence in its final determination conclusion was strengthened.<sup>2865</sup>

- 9.932 Ofwat noted that Bristol had claimed various alleged errors and omissions in Ofwat's approach to modelling the benefits that would be provided if the company received a 33bps uplift to the allowed cost of debt. Ofwat submitted that any revised benefits assessment would have to feature the cost impact of its updated small company premiums on the cost of debt and equity, which would jointly add 73bps to the sector return on capital rather than the 20bps assumed by Ofwat or the 22bps proposed by Bristol (at the WACC level) during the PR19 process. As Ofwat calculated a negative NPV of benefits based on a 20bps additional costs, it was 'especially doubtful' that a near quadrupling of the uplift would result in a different outcome.<sup>2866</sup>
- 9.933 Ofwat acknowledged that the CMA did not apply a benefits assessment in the CMA's Bristol PR14 Determination. However, Ofwat stated it had responded to the issues raised by the CMA in this previous determination within its initial assessment of CSA requests during the PR19 process. Ofwat stated that it had set out its rationale explaining the link between awarding the cost of debt uplift to decreasing merger probability. Ofwat stated that mergers would tend to affect future customer benefits through their impact on the strength of its benchmarks used to challenge the sector to improve efficiency and service levels.<sup>2867</sup>
- 9.934 CCWater also disagreed with the CMA's provisional decision to not apply a customer benefits assessment. CCWater stated its disappointment that consideration not been given to the additional benefits customers should receive in return for this uplift, following the CMA's rejection of Ofwat's 'evidential' test.<sup>2868</sup>

### *Bristol position*

- 9.935 Bristol stated that there is no clear link between the relative position of small companies within industry cost benchmarking and the efficient level of the cost of capital, and that a customer benefits assessment should not apply.<sup>2869</sup>
- 9.936 Bristol noted that Ofwat recognised that Bristol had provided compelling evidence supporting its request for a CSA by way of an adjustment to the cost of debt, but that Ofwat had declined to apply the CSA on the basis that Bristol

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<sup>2865</sup> [Ofwat's Response to Bristol's SoC](#), paragraph 1.24

<sup>2866</sup> [Ofwat's Response to Bristol's SoC](#), paragraphs 6.45–6.46

<sup>2867</sup> [Ofwat's Response to Bristol's SoC](#), paragraph 6.44 including Table 6.2.

<sup>2868</sup> [CCWater's response to the provisional findings](#), paragraph 2.12

<sup>2869</sup> [Bristol's response to the provisional findings](#), paragraph 12



did not meet its 'customer benefits' assessment. Bristol believed that in taking this approach, Ofwat has acted contrary to its Financing Duty, in particular its duty to ensure that water companies are able to secure reasonable returns on their capital to finance the carrying out of their functions. Bristol stated that Ofwat's decision was also contrary to clear CMA precedent concerning Bristol.<sup>2870</sup>

9.937 Bristol noted that it had received an uplift on the industry-allowed cost of capital since 1995, reflecting its higher cost of raising capital as a result of company-specific circumstances which have applied historically and continue to apply. Bristol suggested that Ofwat and the CMA have previously recognised that these higher costs resulted from Bristol's scale and have nonetheless been efficiently incurred, and that this was the case at PR94, PR99, PR04, PR09 and PR14 (following the CMA's Bristol PR14 Determination).<sup>2871</sup>

9.938 Bristol stated that the relevance of a benefits assessment has already been rejected by the CMA in the Bristol PR14 Determination, where the CMA had found that:

- (a) There was no causal link between the cost of debt required by small WOCs and the customer benefits assessed by Ofwat.
- (b) Ofwat's benefits assessment was not necessary to meeting the CMA's duty to protect the interest of customers, and that there are many reasons why customers of small companies may have different bills.
- (c) Given the long-term nature of financing, departing from regulatory precedent without evidence of changing market conditions raised the risk of stranded costs.

9.939 Bristol pointed out that Ofwat acknowledged these concerns in its PR19 Final Methodology, but that it did not agree with the CMA's Bristol PR14 Determination conclusions.<sup>2872</sup>

9.940 Bristol claimed that in PR19 Ofwat has departed from the CMA's precedent despite being subject to unchanged statutory duties and having accepted that Bristol has a higher cost of capital than larger companies.<sup>2873</sup>

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<sup>2870</sup> Bristol SoC, paragraphs 158–159

<sup>2871</sup> Bristol SoC, paragraph 154

<sup>2872</sup> Bristol SoC, paragraph 166, referencing [Bristol PR14 Determination](#), paragraph 10.72

<sup>2873</sup> Bristol SoC, paragraph 157

- 9.941 Bristol noted that it had passed Ofwat's levels and customer support assessments but did not pass the benefits assessment. Bristol characterised this as having provided compelling evidence that the level of CSA sought was appropriate and that customers were content to 'unconditionally' fund the cost of the CSA, but that Ofwat had decided not to provide a CSA on the basis of its view that the benefits of providing a CSA did not adequately compensate customers for the increased costs (despite their willingness to fund it).<sup>2874</sup>
- 9.942 Bristol said that the application of the customer benefit assessment is flawed for at least two reasons. First, that the assessment is irrelevant to determining whether a CSA should be applied, that it is inconsistent with Ofwat's statutory duties and that it departs from CMA precedent without justification. Second, that even if the CMA were to decide that Ofwat's benefits assessment is appropriate, Bristol would have passed the assessment if it were correctly applied.<sup>2875</sup>
- 9.943 Bristol suggested that Ofwat's view is that if an efficient small WOC cannot finance its functions as a result of not being provided with a CSA, it can reduce its cost of capital by pooling financing arrangements (similar to the Artesian<sup>2876</sup> arrangements which led to the higher cost of embedded debt) or by merging. Bristol pointed out that while merging is an option for smaller companies, they are not required to do this.
- 9.944 Bristol also submitted that the PR19 Final Methodology states that 'failure to meet our test does not imply mergers must happen, but that the return investors receive should be commensurate with the efficient cost and quality of service customer receive'.<sup>2877</sup> Bristol submitted that in this statement, Ofwat clearly acknowledged that it was not setting the cost of capital based on the level of a notional company comparable to Bristol, rather it is setting the industry cost of capital at a level that is below that of a notional company

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<sup>2874</sup> Bristol SoC, paragraph 158

<sup>2875</sup> Bristol SoC, paragraph 159

<sup>2876</sup> As described in [Bristol's Reply to Ofwat's Response](#), annex 5, Bristol gave the following description of their Artesian financing: Artesian Finance plc was conceived by Royal Bank of Scotland (RBS) in November 2001, ostensibly in anticipation of demand for more flexible and index-linked funding from water companies, and in particular from smaller water companies that might otherwise find it more difficult to access debt capital markets on favourable terms. Artesian Finance II plc was subsequently established in May 2003, followed by Artesian Finance III plc in 2005. The latter is not relevant to Bristol. RBS created these special purpose vehicles (SPVs) to issue bonds or notes, guaranteed by monoline insurers, on behalf of WOCs and/or WASCs that wished to access the capital markets at a more competitive and efficient cost than they could have accessed if they were to issue directly. The monies raised were then issued to WOCs and/or WASCs via RBS through fixed rate or index-linked loans. Bristol issued five tranches of Artesian debt between 2003 and 2005, with the tenors ranging from 27.4 years to 30.4 years. The 2003 issuances extend to 2032, and the 2004 and 2005 issuances extend to 2033

<sup>2877</sup> Ofwat (2017), [Delivering Water 2020: Our methodology for the 2019 price Review – Appendix 12: Aligning risk and return](#), p91

relevant to Bristol's circumstances. As a result, Ofwat had recognised that Bristol would not be able to raise capital at the level set by Ofwat.<sup>2878</sup>

9.945 Bristol stated that Ofwat's approach had left it with a stark choice – either seek to reduce its cost of capital through a merger or find other means to finance its functions notwithstanding a cost of capital allowance that does not reflect – and is acknowledged to be below – Bristol's actual, efficiently-incurred costs. Bristol stated that this is a clear breach of Ofwat's Financing Duty.<sup>2879</sup>

9.946 Bristol stated that Ofwat's benefit assessment result showing a negative NPV of £14 million was erroneous due to six material errors:<sup>2880</sup>

- (a) Ofwat omitted relevant customer benefits from its benefit assessment;
- (b) Ofwat did not consider the effect a merger would have on model precision;
- (c) Ofwat's approach did not align with its final determination benchmarking methodology;
- (d) Ofwat understated the benefits of service comparisons due to an unbalanced use of incentive rates;
- (e) Ofwat's estimates of future comparative non-totex benefits were arbitrary and understated the benefit; and
- (f) Ofwat had wrongly assessed Bristol's efficiency.

9.947 Bristol stated that if these errors had been corrected, Bristol would have satisfied Ofwat's assessment – showing that Ofwat did not have a cogent reason for deciding not to provide a CSA, even on its own (inappropriate) test.<sup>2881</sup>

9.948 Bristol stated that Ofwat was wrong to apply a benefit assessment and wrongly assessed that Bristol had not passed such an assessment. Bristol requested that the CMA should either not apply the customer benefit assessment, or alternatively should correct the errors in Ofwat's approach. It was Bristol's view that the CMA was not required to consider the evidence on the assessment itself as previous precedent on this still applied.<sup>2882</sup>

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<sup>2878</sup> Bristol SoC, paragraphs 163–164

<sup>2879</sup> Bristol SoC, paragraph 165

<sup>2880</sup> Bristol SoC, paragraph 173

<sup>2881</sup> Bristol SoC, paragraph 174

<sup>2882</sup> Bristol SoC, paragraph 205

*Whether* it is appropriate to apply a customer benefit assessment to an application for a CSA – CMA assessment

- 9.949 The issues around the need for a CSA and the relevance of a customer benefits assessment appear to be similar to those in previous determinations. We acknowledge that as regards this aspect of the determination, there may be a benefit from regulatory consistency if there is no evidence of a changing situation. We note that investors in smaller companies might expect that Ofwat would consider applying a CSA for as long as historic higher costs of financing remain on balance sheets.
- 9.950 Ofwat has assessed that the smaller WOCs, including Bristol, will continue to have higher financing costs during AMP7. Our assessment in the upcoming sections suggests that there can be a higher cost of financing smaller WOCs.
- 9.951 We note that Ofwat's rationale for the customer benefits assessment is consistent with the general competitive market benchmark approach applied at times in other areas of economic regulation. However, Ofwat's approach appears to be inconsistent with the approach applied elsewhere in the price control. There are many areas of operational expenditure where the efficiently incurred costs for one group of customers are higher than industry average due to a company's specific circumstances. These are typically recovered without the need for a customer benefits assessment.
- 9.952 Ofwat highlighted in its submissions that in the case of small companies, it is for management to decide whether or not to make a change to the ownership of the company. In our view, whilst there might be an argument that smaller companies could choose to sell out the ownership of the company, if that would address the risk of incurring higher cost of debt in the future, it seems to be disproportionate to require management to do so as a condition for the company to be allowed to cover its costs. Bristol provided a number of reasons why its customers might prefer a local business, and in our own assessment we found that Bristol brought benefits to our comparative assessment – for example as a frontier performer on leakage, where we used Bristol's high performance and low costs as part of our evidence of the efficient costs for the other firms. We do not therefore agree that Ofwat's assessment fully reflects all the benefits and costs to customers and to Ofwat's ability to make comparisons. Given that the costs are below a 1% increase on bills for a small number of water customers, we do not agree that the benefits are likely to be lower than these costs.
- 9.953 The CMA clearly addressed the appropriateness of a customer benefits assessment in its Bristol PR14 Determination, where it chose not to apply such a test. In that determination the CMA stated that it did not consider that

there was a clear link between the relative position of small companies within benchmarking and the efficient level of the cost of capital.<sup>2883</sup> The level of the cost of capital should be set at a level which allows a notional company to finance its activities. If it is identified that the notional small water company will incur higher costs to finance its activities, we would expect that this should be reflected in the notional cost of capital for such a small company. As a result, we do not apply a customer benefits assessment within our assessment of Bristol's request for a CSA.

***Whether, and to what extent, Bristol requires a CSA uplift to their cost of debt allowance***

9.954 In the following paragraphs we will consider whether Bristol requires a CSA to its allowances for:

- (a) the cost of embedded debt;
- (b) the cost of new debt and issuance and liquidity costs; and
- (c) the weight of new debt.

For each metric we will also assess an appropriate adjustment.

***Cost of embedded debt***

***Ofwat position***

9.955 Ofwat's final determination noted that of the four companies<sup>2884</sup> seeking an uplift to their cost of capital, only Bristol provided detailed analysis in support of their requested figure. Bristol based its submission on estimates by KPMG of the spread-to-iBoxx for bonds with comparable credit rating, from which Bristol identified the following plausible ranges for the small company premium:

- (a) Embedded debt: 41-45bps
- (b) New debt: 33-34bps

9.956 Ofwat found a historical yield-at-issuance spread to the iBoxx A/BBB of 10bps on average for small WOCs, which was very close to the premium of 11bps identified by the CMA's Bristol PR14 Determination. As Ofwat's cost of embedded debt allowance was set as the iBoxx A/BBB minus 25bps for

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<sup>2883</sup> [Bristol PR14 Determination](#), paragraph 10.72

<sup>2884</sup> Bristol, Portsmouth Water, SES Water and South Staffs Water.

embedded debt and 15bps for new debt, this analysis would imply a small company cost of debt premium of 35bps and 25bps on embedded and new debt respectively. At Ofwat's notional share of 20% new debt, this would imply an uplift of 33bps to the overall cost of debt.

- 9.957 Ofwat flagged that this 33bps figure was consistent with analysis by PwC in 2014 and the CMA's Bristol PR14 Determination, which had informed the 25-40bps range used in previous iterations of Ofwat's 'levels' assessment. Ofwat suggested that the fact that these exercises estimated a different small company cost of debt premium to their 33bps did not undermine its approach but was rather a function of PwC and the CMA picking a different 'outperformance wedge' assumption.
- 9.958 Ofwat noted that its notional uplift of 33bps was close to the 38bps uplift proposed by Bristol so decided that Bristol's request was appropriate. Ofwat stated that the companies would not have been able to anticipate Ofwat's decision to reduce the outperformance wedge on new debt to 0.15% in its final determination. Consequently, Bristol passed Ofwat's levels assessment, but would receive Ofwat's 33bps uplift (rather than their own estimate) if it passed the remaining assessments.<sup>2885</sup>
- 9.959 In its response to Bristol's SoC, Ofwat changed this assessment and questioned Bristol's requirement for a cost of debt adjustment. Ofwat stated that Bristol's higher cost of debt was a function of its financing choices, not its size.
- 9.960 Ofwat noted that as a WOC, Bristol is smaller than the other Disputing Companies, but that with an RCV of £530 million it is not a small company in absolute terms, that it was the largest of the companies requesting a CSA in PR19 and that, unlike some other small companies, Bristol had been able independently to access finance from listed bond markets – most recently in 2011.
- 9.961 Ofwat noted that Bristol's cost of embedded debt is lower than three (larger) WASCs (Southern Water, Dŵr Cymru and Yorkshire). Ofwat noted that in its Bristol PR14 Determination the CMA recognised that improved access to financing over time could imply that any change in the CSA would likely be downwards rather than upwards.<sup>2886</sup>
- 9.962 Ofwat also suggested that Bristol's position related to its decision to issue significant quantities of long-dated debt in the early 2000s (through the

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<sup>2885</sup> Ofwat (2019) *Allowed return on capital technical appendix*, Annex 1.2, including Tables A1.2, A1.3 and A1.4

<sup>2886</sup> Ofwat's Response to Bristol's SoC, paragraphs 1.29, 6.35–6.36

Artesian programme), that for several years the cost of this debt was 'significantly below' the regulatory allowance and that it was only subsequent falls in market interest rates that meant that this was no longer the case. Ofwat submitted that, given that the cost of the Artesian debt was previously lower than the price control allowance, it was not clear that the company was set to under-recover debt interest costs on average over the debt's 30-year term.<sup>2887</sup>

- 9.963 Ofwat suggested that if the term on Bristol's Artesian bonds had been around 15 years instead of 30, and the borrowing had been refinanced at the average iBoxx rate of 3.05% over 2017 to 2019 (plus a 10bps small company premium), the company's resultant nominal cost of embedded debt would have been 3.16% versus the PR19 final determination of 4.47%. Ofwat further submitted that this example illustrated that its embedded cost allowance is achievable in principle for a small company and that choices over tenor of issuance rather than size disadvantages are the relevant issue.<sup>2888</sup>
- 9.964 Ofwat submitted that, regardless of the arguments above, Bristol's proposed 38bps uplift was overstated, unconvincing and poorly evidenced.<sup>2889</sup> Ofwat also believed that its own 33bps uplift to the cost of debt may be an overestimate. Ofwat submitted that any uplift should be based on the additional costs incurred due to the company's small size, and that tenor of issue is not a function of company size. As a result, the uplift should control for the impact of tenor on yield. Evidence from subsequent work by EE suggests that once this is factored in, the small size premium on the cost of debt could be as low as 5bps.<sup>2890</sup>
- 9.965 Ofwat also stated that PwC's 2014 report suggesting a 30bps premium was based on just 3 small WOC bonds, and did not include Artesian borrowing, which dominates small WOC balance sheets. Ofwat also stated that Bristol had presented conflicting evidence on Artesian pricing, with a 12<sup>th</sup> June presentation to the CMA suggesting a 70-80bps spread over gilts while PwC's work suggested a small WOC spread of 210bps.
- 9.966 Ofwat also noted that PwC's findings relating to premiums on bank debt were unlikely to be applicable to an approach driven by a fixed-debt benchmark.<sup>2891</sup>

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<sup>2887</sup> [Ofwat's Response to Bristol's SoC](#), paragraphs 6.37–6.40

<sup>2888</sup> [Ofwat's Response to Bristol's SoC](#), paragraphs 6.41–6.42

<sup>2889</sup> [Ofwat's Response to Bristol's SoC](#), paragraph 1.31

<sup>2890</sup> [Ofwat's Response to Bristol's SoC](#), paragraph 6.50

<sup>2891</sup> [Ofwat's reply to responses to the provisional findings – risk and return](#), pp25–26



## *Bristol position*

- 9.967 Bristol suggested that its weighted average cost of embedded debt across fixed, floating and index-linked debt in nominal terms is 5.09%, and that this is significantly higher than the allowed cost of debt in the final determination of 4.47%.
- 9.968 Bristol disputed Ofwat's claim that its costs were broadly similar to large WASCs and Ofwat's noting that Bristol's cost of debt in 2018/19 was 4.73%. Bristol suggested that whilst this was the case in 2018/19, it did not take into account that the average RPI inflation indexation on Bristol's index linked debt was 2.4%. Bristol claimed that it is an error for Ofwat not to adjust the long-term inflation rate in line with the final determination, which used a long-term RPI rate of 3%. Correcting for this increased Bristol's nominal interest costs from 4.73% to 5.09%.<sup>2892</sup>
- 9.969 Bristol submitted that there were 'good grounds' to apply a CSA for debt of 62bps based on a nominal cost of debt of 5.09%. However, it had taken a 'conservative approach' of applying a lower CSA of 37bps on the basis that a nominal cost of debt of 4.85% for a relevant notional company like Bristol is supported by the evidence.<sup>2893</sup> In submissions following the CMA's working paper on the industry level of the cost of debt, Bristol updated its estimate slightly, stating that an appropriate cross check range for the small WOC cost of debt would be 4.75% to 5.01%, with a midpoint of 4.88%. Bristol stated that this suggested that c4.9% would be the correct allowance.<sup>2894</sup>
- 9.970 Bristol stated that any 'matching adjustment' to a benchmark estimate applied by the CMA would likely include access to EIB debt, which in practical terms has not been available to water only companies, while the inclusion of any floating rate debt would acknowledge the higher costs of shorter-term financing faced by WOCs.<sup>2895</sup> Bristol also stated that if the CMA decided to make matching adjustments based on instruments that do not feature in the iBoxx benchmarks, it should also consider Bristol's irredeemable preference shares and debentures. These are included in Ofwat's definition of regulatory gearing and have a cost of c.7.7%.<sup>2896</sup>
- 9.971 Bristol stated that the updated arguments suggested in Ofwat's response to its SoC were inconsistent with Ofwat's historic approach of accepting the presence of higher debt costs for smaller companies (acknowledged in price

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<sup>2892</sup> Bristol SoC, paragraph 221

<sup>2893</sup> Bristol SoC, paragraph 227

<sup>2894</sup> Bristol Further response to the CMA cost of capital working papers, paragraphs 13–16

<sup>2895</sup> Bristol Further response to the CMA cost of capital working papers, paragraphs 17–20.

<sup>2896</sup> Bristol Further response to the CMA cost of capital working papers, paragraphs 21–22



controls from PR04 to PR14).<sup>2897</sup> Bristol stated that Ofwat excluded both Bristol's Artesian debt and its publicly listed debt (from the CSA calculation) 'precisely for the reason that small companies face higher financing costs', while all of Ofwat's consultants calculate the applicable CSA by including Bristol's Artesian debt in the 'small WOC samples'.<sup>2898</sup>

9.972 Bristol submitted that Ofwat's change in view on Bristol's required uplift was particularly surprising given that its portfolio of debt was largely unchanged since the last price review, and specifically that the higher cost Artesian debt had been in place since the early 2000s. In addition, Ofwat's updated view contrasted with the views expressed by the CC and CMA in Bristol's last two redeterminations that provided a 40bps small company premium (equivalent to a CSA) having considered the additional costs of debt financing, including the Artesian debt.<sup>2899</sup>

9.973 Bristol submitted that Ofwat's response suggested that the tenor and timing of issuance are management choices and that as a result companies should bear the risk of these choices. Bristol submitted that water companies regularly issue long-term debt to part finance their assets, which have very long economic lives (and longer than most of the corporate sector). Water companies have some choices in issuing debt (typically the tenor and the balance of fixed vs floating), but unlike other sectors have limited choice as to when to issue debt and in what quantum. Bristol submitted that as a small company it would be inefficient to tap financial markets on a regular basis as this would incur significant transaction costs which would not be economically efficient. Bristol stated that Artesian issuance was raised to enable Bristol to finance substantial forward capex requirements as part of the PR99 review.<sup>2900</sup> This need for less frequent, longer-tenor issuance also suggested that shorter trailing averages when measuring the benchmark cost of debt would not be appropriate for small WOCs, as smaller companies attempt to minimise their costs by less frequent and longer-tenor issuance.<sup>2901</sup>

9.974 Bristol also stated that Ofwat's claim that it may recover (or over-recover) the cost of the Artesian debt over the debt's 30-year term was misleading and based on flawed analysis. Bristol suggested that the evidence presented by Ofwat included additional non-cash indirect costs in the allowance but not in the 'effective yield' on Artesian debt. Bristol stated that such all-in costs present in the allowance but not in the Artesian yield included:

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<sup>2897</sup> [Bristol's Reply to Ofwat's Response](#), paragraphs 56–58

<sup>2898</sup> [Bristol's Reply to Ofwat's Response](#), paragraph 59

<sup>2899</sup> [Bristol's Reply to Ofwat's Response](#), paragraphs 61–65

<sup>2900</sup> [Bristol's Reply to Ofwat's Response](#), paragraphs 82–84

<sup>2901</sup> [Bristol Further response to the CMA cost of capital working papers](#), paragraphs 17–20

- (a) Transactions cost allowance of 10bps.
- (b) Liquidity cost allowances – in the past the CMA has made explicit provisions for covenants that require Bristol to hold minimum cash balances. The CMA has in the past allowed 20bps for such costs (on both existing and new debt).
- (c) Non-cash costs included in the CSA.

9.975 Bristol stated that the cost of financing for small companies was not reflected in full in Ofwat's analysis and that Ofwat presented the overall cost of debt allowance with particular Artesian yields in a way that is not comparable. By comparison, in 2009 the CC stated that Bristol's actual, weighted average real cost of debt was 3.53%, which was higher than the effective yields presented by Ofwat. The CC's best estimate of the all-in cost of debt at that point was 3.9% real.<sup>2902</sup>

9.976 Bristol rejected Ofwat's claim that its traded debt issued in 2011 was cheap relative to the iBoxx index, stating that the bond was issued at a significant premium to the iBoxx A/BBB index at the time of issuance. This bond was also known to Ofwat in the final determination and was considered by the CC in its PR09 Determination and the CMA in its PR14 Determination. In these instances, the instrument did not prevent the CC or the CMA from allowing a CSA. Bristol believed that it was incumbent on Ofwat to prove why this approach should now be reversed.<sup>2903</sup>

9.977 Bristol also rejected Ofwat's view that Bristol was not small in absolute terms, arguing that this is not a relevant issue and cannot be used as a reason not to allow a CSA. In Bristol's view the relevant question was whether it faced a higher cost of debt than the industry allowance as the result of its size.<sup>2904</sup>

9.978 Bristol stated that in its final determination, the CMA should further consider the new evidence from Bristol which suggested that the premium is likely to be higher than the 10bps premium to iBoxx for a notional small company like Bristol Water found in the CMA Provisional Findings.<sup>2905</sup>

9.979 Bristol stated<sup>2906</sup> that in 2015, to determine the level of the uplift needed for a small company, the CMA considered the following:

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<sup>2902</sup> [Bristol's Reply to Ofwat's Response](#), paragraphs 97–102

<sup>2903</sup> [Bristol's Reply to Ofwat's Response](#), paragraphs 116–118

<sup>2904</sup> [Bristol's Reply to Ofwat's Response](#), paragraphs 119–125

<sup>2905</sup> [Bristol's response to the provisional findings](#), paragraphs 81–82

<sup>2906</sup> [Bristol's response to the provisional findings](#), paragraphs 83–84

- (a) it carried out its own analysis on differences between the iBoxx index and large water and sewerage companies' (WASCs) issues, which it found to average at 26bps; and
- (b) it adopted PwC's assessment of the premium at issue between the average yield on Artesian debt to iBoxx at 11bps.

9.980 Bristol stated that the Bristol PR14 Determination therefore was not based on an assessment of the premium to iBoxx required for all small WOCs, nor did it consider all the evidence available at the time. For instance, the debt service cost of the monoline insurance wrapper that allowed it to be issued at a AAA rating, and other costs of accessing the programme have not been considered. In addition, the same paper by PwC cited by the CMA, which found 11bps of premium for Artesian debt against the iBoxx (26bps against the allowance which then included 15bps outperformance wedge for WASCs), also presented a wider set of evidence on small company issuance, which showed the premium could be higher – specifically:

- (a) based on the relevant evidence of bond issuance by WOCs, PwC found the premium above WASCs to sit at 30bps, ie higher than that based on Artesian debt; and
- (b) separately, PwC also cited evidence from existing bank debt and from interviews with commercial banks which found that the premium for small WOCs could be between 20- 40bps above WASCs' bank costs.

9.981 Bristol presented evidence<sup>2907</sup> on yields at issuance for debt issued by small WOCs since 2010, suggesting that the majority of the long-dated debt issued by small WOCs since 2010 was issued at a significant premium to the iBoxx index.<sup>2908</sup>

9.982 Bristol stated that KPMG found that on average, when calculated against the relevant iBoxx, WOCs issued at 23-26 bps above the relevant iBoxx index given their credit rating at issuance, or 22bps against the iBoxx A/BBB allowance.

9.983 Bristol also argued that Ofwat had dismissed its own evidence of a 10bps premium to iBoxx for small WOCs as not being relevant for the CMA process, and instead proposed an alternative approach for calculating the CSA which found a smaller premium of 5bps. Notwithstanding Bristol's significant

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<sup>2907</sup> [Bristol's response to the provisional findings](#), paragraphs 85–88

<sup>2908</sup> We note that the text of Bristol's submission suggests that its 2011 debt was issued at a 77bps premium to the average A/BBB iBoxx index and at 85bps to the 'relevant' iBoxx index, but the table appears to show the inverse.

concerns for the alternative approach proposed by Ofwat for calculating the CSA, Ofwat's basis for dismissing the original Europe Economics analysis which found a 10bps premium to iBoxx for small WOCs (or a 35bps total premium including outperformance wedge), as used for the FD, was that it was not controlling for tenor. Bristol noted that in its response Ofwat specifically stated: 'The majority of the 35 basis point uplift we allowed for two small water companies at final determinations is due to the longer average tenor of debt issued by small companies compared to the iBoxx. Once tenor is controlled for, the residual higher yield at issuance attributable to small size and other factors is approximately 5 basis points.'

9.984 Bristol stated that as both the CMA and Ofwat consider that controlling for tenor is appropriate when assessing pricing of company debt against benchmarks, the CMA should dismiss the Europe Economics analysis which incorrectly suggests 10bps is an appropriate estimate of the premium to index for small WOCs, as this is not based on analysis that controls for tenor. Bristol did not agree with Ofwat's alternative evidence, also based on analysis by Europe Economics, which whilst controlling for tenor, fails to control for credit rating. Bristol stated that the analysis of a CSA should be based on a robust assessment that controls for both tenor and credit rating (as well as for timing of issuance, through the use of spreads analysis). Bristol viewed the premium to iBoxx for a small WOC should be at least as high as 20bps.<sup>2909</sup>

9.985 Bristol countered Ofwat's assertion that small companies could retain their identity as part of larger groups. Bristol stated that the factual evidence supports the opposite conclusion to the point raised by Ofwat. Bristol argued that whilst a local identity may have been maintained, this was not evidence as to whether customers had lost the benefits of the kind received by the customers served by Bristol. Bristol stated that the [Dee Valley and Severn Trent] merger was extremely controversial at the time<sup>2910</sup> and also resulted in a high number of customer complaints. Bristol stated that Ofwat's recent service delivery report placed Hafren Dyfrdwy as 'Poorer performing',<sup>2911</sup> as had CCWater's complaint handling report.<sup>2912</sup> Bristol noted that Ofwat had previously categorised it as a poorer performer, but that changes possible as the result of the agility of a smaller local water company had allowed significant improvements for Bristol customers.<sup>2913</sup>

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<sup>2909</sup> Bristol's response to the provisional findings, paragraphs 89–95

<sup>2910</sup> Bristol reference the following news story: <https://www.bbc.co.uk/news/uk-wales-north-east-wales-38906186>

<sup>2911</sup> Ofwat Service delivery report 2019-20

<sup>2912</sup> <https://www.ccwater.org.uk/wp-content/uploads/2020/09/Review-of-water-companies-complaint-handling-2019-20.pdf>

<sup>2913</sup> Post Provisional Hearings: Bristol Water comments and input on new issues raised, pp3–4

## *Embedded debt CSA – CMA analysis and determination*

- 9.986 In our Provisional Findings we proposed to award Bristol a 10bps increase in cost of embedded debt allowance over and above the industry (CPIH-real) allowance of 2.76%, giving a total CPIH real allowance of 2.86%. This compared to Bristol's 'request' of Ofwat of 2.80%<sup>2914</sup>, Bristol's estimate of its actual costs of 3.03%<sup>2915</sup> and the 2.77% allowance it would have received from Ofwat if it had passed the customer benefits assessment.
- 9.987 On the basis of our subsequent consultation, the CMA's' final determination of the industry cost of embedded debt is 4.52% nominal and 2.47% (CPIH real). This is the level to which any updated CSA to the costs of embedded debt allowance must be applied.
- 9.988 In making our final determination on the cost of embedded debt CSA, we consider two key questions:
- (a) Do we continue to class Bristol as a 'small' company?
  - (b) If yes, what is the appropriate CSA to award?

### *Is Bristol a small company?*

- 9.989 On the first question of Bristol's size and suitability for an adjustment, we note that Bristol originally passed Ofwat's assessments of both level of request and customer support (failing only the customer benefit assessment, which we have decided not to apply – see paragraph 9.953).
- 9.990 We also note that Ofwat changed its view following Bristol's request for a redetermination, and now states that it no longer considers Bristol to be a small company. As described in paragraph 9.960, Ofwat highlighted that with an RCV of £530 million, Bristol is not small in absolute terms and it was the largest of the companies requesting a CSA in PR19. Ofwat also highlighted that, unlike some other small companies, Bristol had been able independently to access finance from listed bond markets and that (Ofwat's calculation) of Bristol's cost of embedded debt is lower than that of three (larger) WASCs (Southern, Dŵr Cymru and Yorkshire). Ofwat noted that in its Bristol PR14 Determination the CMA recognised that improved access to financing over time could imply that any change in the company specific adjustment would likely be downwards rather than upwards.<sup>2916</sup>

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<sup>2914</sup> Based on a requested uplift of 38bps over the industry figure.

<sup>2915</sup> 5.09% deflated by 2%

<sup>2916</sup> [Ofwat's Response to Bristol's SoC](#), paragraphs 1.29, 6.35–6.36

- 9.991 The CMA has previously recognised that Bristol faced higher costs as a result of its size and awarded Bristol a cost of debt uplift in previous determinations, most recently in PR14. In that determination, the CMA awarded Bristol an embedded debt uplift of 20bps, but did note that it expected the required uplift may fall over time as access to debt markets improved.<sup>2917</sup>
- 9.992 We also note that, in relation to embedded debt costs, the impact of Bristol's size at the time of issue is of more importance than Bristol's current size. As the CMA has previously accepted that size played at least some role in the characteristics of Bristol's long-term 'Artesian' debt, and that this debt will almost certainly be in place throughout this price control, it appears appropriate that Bristol's size at the time of that issuance (mid-2000s) is the key determinant of whether size should play a factor in cost of embedded debt allowance.
- 9.993 After careful consideration, for the calculation of a CSA on the embedded debt allowance, we think that Bristol should be considered as a small WOC. Even using contemporary data, Bristol's RCV is 4<sup>th</sup> smallest out of 17 companies in the sector, while the 5<sup>th</sup> smallest is more than double the size (despite also being a WOC).

*What is the appropriate CSA on embedded debt?*

- 9.994 The uplift awarded in our Provisional Findings was 10bps above the industry allowance of 4.81% (nominal), which was based on a 20-year straight average of the iBoxx A/BBB 10+ index (although the bottom end of the range – corresponding to the A index – was used to set the industry allowance).
- 9.995 After consultation, the CMA has updated its industry-level cost of embedded debt methodology. This change in the industry-level methodology has led to a reduction in the industry-level allowance from 4.81% to 4.52%. This change also requires an associated update to the assessment of the appropriate CSA uplift to represent a reasonable cost of embedded debt allowance for a small company.
- 9.996 In deciding on an appropriate level of uplift, in the following paragraphs we consider:
- (a) Ofwat's assessment of a 35bps uplift;
  - (b) Recent CMA precedent;

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<sup>2917</sup> [Bristol Water 2014 Determination](#), paragraphs 10.71 and 10.108



(c) analysis of the required uplift suggested by the PwC and KPMG analysis; and

(d) Bristol, Ofwat and the CMA's assessment of Bristol actual costs and notional WOC actual costs.

9.997 As noted above in paragraph 9.540, Ofwat applied a -25bps outperformance wedge to a straight 15-year average of the iBoxx A/BBB 10+ index to reach an industry-level allowance of 4.47%. Its CSA allowance, if awarded, would have been 35bps – composed of adding back the 25bps of outperformance wedge and combining this with a further 10bps premium. In deciding this level of adjustment, Ofwat noted PwC's 2014 analysis and the CMA's Bristol PR14 redetermination which (in conjunction with its new debt uplift of 25bps) informed its 25-40bps adjustment range.<sup>2918</sup>

9.998 In its Bristol's 2014 Determination, the CMA estimated an appropriate overall total small company premium (SCP) of 40bps. The CMA noted that this figure was consistent with the CC's PR09 Final Determination, and saw no reason why the size of the SCP would have increased. In fact, the CMA noted that with greater access to the bond markets the justifiable SCP would more likely fall than rise.<sup>2919</sup> The cost of embedded debt awarded to Bristol was 2.95%, a 20bps uplift compared to Ofwat's PR14 industry-level allowance of 2.75%.<sup>2920</sup>

9.999 PwC's 2014 analysis and more contemporary analysis by KPMG suggests that a premium of 20-40bps over the industry allowance could be justified for WOCs. Bristol also flagged that it estimates that its 2011 30-year bond was issued at a 77bps to the A/BBB iBoxx index, and has argued that the evidence suggests a premium of at least 20bps would be warranted for the notional small company.

9.1000 Our updated analysis of actual costs suggests that Bristol has an actual cost of 4.89% (or, 4.99% with the assumption of a 10bps cost of carry benefit if using floating debt within the analysis – for further discussion of this, see paragraph 9.602). However, this is based on a single cost of floating debt assumption for the whole sector, which may be lower than is practical for the WOCs. This is particularly important for Bristol, which has one of the highest weights of floating debt within the overall mix. This estimate compares to Ofwat's APR estimate of 4.75%<sup>2921</sup> and Bristol's own assessment of 5.09%.

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<sup>2918</sup> Ofwat (2019), *PR19 final determinations: Allowed return on capital technical appendix*, p101

<sup>2919</sup> *Bristol PR14 Determination*, paragraph 10.71

<sup>2920</sup> *Bristol PR14 Determination*, table 10.4

<sup>2921</sup> Using CMA levels of inflation, with no cost of carry assumption.

9.1001 We have also considered the actual costs of Bristol and WOCs taken in line with the notional capital structure (debt costs assuming 2/3 of debt is fixed and 1/3 of debt is index-linked).<sup>2922</sup> We estimate that Bristol's costs on this basis would be 5.41%, while the median WOC cost on this basis is 4.78%, 24bps higher than the WASC and large WOC median of 4.54% on the same basis.

9.1002 We note that WOC actual costs (by any measure) are higher than suggested by this 2/3, 1/3 notional analysis. This appears to be due to the higher weight of the (currently higher cost) indexed-linked debt deployed by WOCs (75% average) compared to WASCs (44% average) and the notional 1/3 allocation. We note that this higher exposure may be an active decision by the WOCs to trade off increased costs with improved cashflow matching.

9.1003 Picking a point estimate of an appropriate uplift for the notional small company requires judgement in considering the data discussed above. We give particular consideration to the following data:

- (a) Our assessment of industry-level embedded debt costs of 4.52% (nominal).
- (b) The 20bps embedded debt premium awarded in the CMA's Bristol 2014 Determination.
- (c) The 35bps CSA uplift to industry-level allowance deemed reasonable by Ofwat at PR19.
- (d) Notionally structured (2/3 fixed, 1/3 index-linked) WOC average estimates 24bps higher than industry average estimates.
- (e) Bristol's supplied analysis suggesting a potential 20-40bps uplift and estimate of actual costs of 5.09%.

9.1004 In coming to an in the round assessment we give primary regard to WOC costs at the notional structure, but also consider Bristol-specific costs. Our estimate of actual WOC embedded debt costs at the notional structure suggest an uplift of 24bps, while the analysis by PwC and KPMG suggests a notional uplift of 20-40bps. Bristol specific costs would suggest an uplift of 47-57bps.

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<sup>2922</sup> An approach that corresponds to the notional structure used when assessing financeability.



9.1005 We do not take account of average or median actual WOC costs at the actual structure (estimated at 5.92% and 6.07% respectively). We take this decision as a result of:

- (a) These costs being the result of significant deviation from the notional structure.
- (b) The small sample size of four companies.
- (c) Bristol having by far the lowest costs of the group, with approximately a 1% gap to the next lowest cost WOC.

9.1006 We make an in the round assessment that 30bps would be an appropriate uplift for the notionally-structured WOC. In nominal-terms, this would equate to a cost of embedded debt allowance for Bristol of 4.82% and a CPIH-real allowance of 2.76%. This allowance is slightly lower than the allowance implied by our Provisional Findings and Bristol's request of 4.88%. It is exactly in line with the cost of embedded debt allowance that would have been awarded by Ofwat if Bristol had passed its customer benefits assessment. The uplift is slightly larger than was awarded in the CMA's Bristol PR14 Determination, primarily as Bristol's higher costs are associated with historic debt issued in the 2000s, while the industry debt allowance has been more broadly influenced by the subsequent falls in average debt costs.

### ***Cost of new debt and issuance and liquidity costs***

#### ***Ofwat position***

9.1007 At PR19, Ofwat's analysis of small company borrowing costs indicated that the appropriate uplift for a notional small company relative to its industry-level allowance was 25 basis points on new debt.<sup>2923</sup>

9.1008 As noted in paragraph 9.960, during the redetermination process, Ofwat argued that it no longer considered Bristol to be a small company and highlighted that Bristol had been able independently to access finance from listed bond markets – most recently in 2011.

9.1009 Ofwat also noted that Bristol's £40 million listed bond that is due in 2041 yielded 25bps lower than the average value of the iBoxx A/BBB over the last year. The yield of 2.37% was below the Ofwat final determination allowance for new debt, suggesting it would be possible for the company to issue new debt with a coupon that implies outperformance against Ofwat's

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<sup>2923</sup> Ofwat (2019), [Allowed return on capital technical appendix](#), annex 1.1

sector wide allowance. Ofwat stated that Bristol claims that it cannot outperform the iBoxx A/BBB due to being unable to issue debt with short-duration tenor, which Ofwat claimed was ‘puzzling’ given that Bristol took out a 10-year term loan in May 2018 and that its listed bonds have traded at yields below the iBoxx despite similar average years to maturity.<sup>2924</sup>

9.1010 In response to Bristol’s submissions relating to its Sun Life and ING loans, Ofwat stated that it was inappropriate to state that Bristol’s Baa1 credit rating was misaligned with the A/BBB 10+ non financials benchmark, and pointed out that in other areas the Disputing Companies had argued that the 50/50 average of the A and B was appropriate for the notional credit rating targeted in this price control.

9.1011 Ofwat considered that using Anglian’s KPMG work on yield curves was another way to test the pricing of these shorter-term loans, and noted that such an exercise suggested that the pricing on these loans was below that suggested by the benchmark – demonstrating that Bristol Water would not require a premium for new debt issuance if it were to receive an allowance based on the iBoxx A/BBB.<sup>2925</sup>

9.1012 Ofwat also considered issuance and liquidity costs to be uncontentious through the PR19 process, and questioned why it was now being raised as an issue. Regardless, Ofwat stated that the fees on Bristol’s loans would be below the 10bps allowance if amortised over 20 years.<sup>2926</sup>

### *Bristol position*

9.1013 Bristol disagreed with the CMA’s Provisional Finding decision not to award it an uplift to new debt costs. Bristol stated that it cannot achieve the same rates as those achievable by larger companies, regardless of what debt financing strategy it chooses (or is able) to pursue.<sup>2927</sup>

9.1014 Bristol stated that the need to issue in smaller tranches meant that it often needed to rely on bank loans, which can be more expensive and restrictive than public debt issued at scale. This meant that the debt pricing it could achieve was less competitive than the rates suggested by the iBoxx after controlling for tenor and rating.<sup>2928</sup>

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<sup>2924</sup> Ofwat’s response to Bristol’s SoC, paragraph 6.52

<sup>2925</sup> Ofwat’s reply to responses to the provisional findings – risk and return, p26

<sup>2926</sup> Ofwat’s reply to responses to the provisional findings – risk and return, p27

<sup>2927</sup> Bristol’s response to the provisional findings, paragraph 97

<sup>2928</sup> Bristol’s initial response to the CMA cost of capital working papers, paragraph 8

- 9.1015 Bristol submitted a range of evidence in relation to its 2018 refinancing exercise. The vast bulk of this evidence is commercially sensitive and will not be presented in this analysis.
- 9.1016 Bristol stated that its 2018 refinancing exercise comprised loans of shorter duration than the CMA's chosen iBoxx A/BBB 10+ fixed bond benchmark, and that as a result the costs of these loans were not comparable to the CMA's main benchmark. Bristol stated that to conclude whether the loan was competitively priced, one would need to consider relevant reference benchmarks with tenor of close to 10 years and credit rating of Baa1. In addition, Bristol argued for using a blend on the 7–10 year and 10–15 year indices in order to match the loan tenor of 10 years.<sup>2929</sup>
- 9.1017 In matching the rating of the index, Bristol argued that it is generally well understood in corporate finance that risk and pricing is not linear, such that the difference in pricing for high quality bonds (eg the difference in yields of say an A1 and A2 rated bond) is not the same as the difference in pricing at lower credit rating (eg between Baa2 and Baa3). In fact, premia increase as the credit rating deteriorates, such that the yield premia at Baa2, Baa3 and Ba1 ratings (relative to the central tendency) are greater than the discounts at A2 and A1 credit rating. This alone means that the average yield across the A and BBB indices will not accurately reflect the average credit rating, even if the distribution were perfectly symmetric (which it is not). This further exacerbates the impact from the unbalanced distribution of bonds within these indices.<sup>2930</sup>
- 9.1018 Bristol stated that due to the issues above, the appropriate benchmark for the analysis would be one that assigns 2/3rds weight on the A index family and 1/3rd weight on the BBB index family (henceforth the 'blended iBoxx A /BBB 66/33 index'). This combination offsets the impact from greater premia and greater weight at the lower notches within the BBB rating. This combination also results in a tenor of close to 10 years which closely matches the term of its loans.<sup>2931</sup>
- 9.1019 On this basis, Bristol stated that the margin (over the chosen 10-year gilt instrument) on its chosen index was [X]bps lower than the pricing on its Sunlife Loan, and that this demonstrates that the SunLife loan pricing was [X]bps more expensive relative to the best available benchmark at the time of

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<sup>2929</sup> [Bristol's response to the provisional findings](#), paragraph 100

<sup>2930</sup> [Bristol's response to the provisional findings](#), paragraph 111–112

<sup>2931</sup> [Bristol's response to the provisional findings](#), paragraph 113

issuance (and by implication the price at which a large company could borrow).<sup>2932</sup>

9.1020 Bristol also highlighted its June 2018 £[REDACTED] over 10 years ING loan, which had a variable rate comprised of a time-varying margin and underlying reference benchmark, the expected payment over the life of the loan varies, and the loan coupon is therefore not directly comparable to fixed rate debt instruments. Bristol calculated the implied annualised fixed rate represented a discount to its preferred iBoxx A/BBB 66:33 benchmark of [REDACTED]bps.<sup>2933</sup>

9.1021 Bristol provided further evidence that the spreads over 10-year government bond on the SunLife and ING loans [REDACTED], were higher than a broad sample of bonds issued by large water companies in the sector around the time when its SunLife and ING loans were issued, with an average margin close to [REDACTED]bps lower than the margin on its loans. Bristol acknowledged that these bonds reflect broader set of characteristics, which could lead to both under- and over- statement of the true difference in pricing between its loans and those of large companies on a comparable bases (ie for the same timing, tenor and credit rating), but that this is nevertheless a useful cross-check that strongly supports the conclusions from the benchmarking relative to the iBoxx index shown above, that Bristol does face a premium on its loans issued in 2018.<sup>2934</sup>

9.1022 Bristol also stated that in addition to paying higher coupon rates for the bank loans than those available to large companies through public debt capital markets, it also had to pay significant transaction costs on these loans. Bristol stated that these fees were unavoidable, but that due to the small scale of the loans they constituted a larger cost relative to the size of the issuance. In the case of the ING loan, if amortized over the 10-year life of the loan, fees would be equivalent to [REDACTED]bps, excluding commitment fees. These fees are higher than the 10bps assumed by the CMA and Ofwat as standard transaction fees for the cost of debt allowance.

9.1023 [REDACTED].

9.1024 [REDACTED].

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<sup>2932</sup> [Bristol's response to the provisional findings](#), paragraph 114–116

<sup>2933</sup> [Bristol's response to the provisional findings](#), paragraph 117–122

<sup>2934</sup> [Bristol's response to the provisional findings](#), paragraph 123–129

## *Cost of new debt and issuance and liquidity costs – CMA assessment*

### *Cost of new debt*

- 9.1025 Bristol has attempted to show that its costs are c10bps higher than an equivalent benchmark would suggest was reasonable. However, this analysis is based on bespoke benchmarks and credit ratings rather than our industry allowance and notional structure (as used to assess WOCs as well as WASCs). While we understand the desire to measure costs on a like-for-like basis, that is not the methodology we adopt elsewhere. For example, we do not consider historic long-tenor debt against a higher tenor benchmark when considering the uplift to embedded debt costs. We also do not agree with an analytical approach that uses a benchmark skewed to a higher rating than either the notional company or of Bristol itself.
- 9.1026 Looking instead at our chosen industry benchmark (A/BBB 10+), the implied index costs for the Feb to May 2018 period highlighted by Bristol would suggest benchmark costs of 3.21%, significantly higher than the SunLife bank loan. In addition, the cost of the ING loan in June 2018 was materially lower than the 3.32% benchmark yield for that month.
- 9.1027 Even if we were to adopt Bristol's broad methodology and use the 10-15-year A/BBB index, both loans would appear to be competitively priced versus our chosen debt benchmark. An even more accommodating approach would be to accept Bristol's mix of the 7-10 and the 10-15 index, but weighted 50/50 A and BBB. Even adopting this approach Bristol's loans would be at or below the benchmark levels for the same month(s).
- 9.1028 In our view, Bristol's evidence of higher new debt costs is not compelling, and is based on bespoke benchmarks and credit ratings that are inconsistent with our notional allowances. We do not consider this evidence to suggest that Bristol was either forced to borrow over a 10-year period (rather than over a longer timeframe), that its costs were materially different to a benchmark 10-year rate, or that this evidence is sufficient to prove that Bristol would have faced higher than benchmark costs if it had instead issued at tenors of 15 or 20 years.
- 9.1029 We also disagree with Bristol's statement that it is forced to take on shorter-term loans as a result of its size. Such a view would seem to clash with the rationale for the uplift on embedded debt – that smaller scale meant that WOCs were pushed to issue public debt infrequently and at long tenors. We consider that Bristol's access to shorter-term loans highlights that it has increased financing flexibility and is not constrained to the use of infrequent

and long-tenor financing approaches. It appears clear to us that Bristol can now access debt markets in different ways and at competitive rates.

9.1030 We also note that the decision to refinance one third of the debt book suggests that the exercise was economically advantageous to Bristol and would not have been conducted if this were not the case.

9.1031 We do not consider that the decision to award Bristol a CSA in relation to its embedded debt allowance automatically justifies a similar adjustment to the cost of new debt allowance. Our decision on embedded debt relates in large part to the impact of long-term historic debt issued nearly two decades ago. The analysis of more recently issued debt above suggests that Bristol has demonstrated that it can now issue debt more flexibly and more competitively than was historically the case.

9.1032 In our judgement, the evidence supplied by Bristol is insufficient to justify a premium to our industry-level new debt allowance. As a result, we award Bristol the industry-level allowance for the cost of new debt, and do not apply a cost of new debt CSA. For further information on the 0.19% industry level allowance for new debt, see paragraph 9.822

#### *Issuance and liquidity costs*

9.1033 While we consider the evidence to show that Bristol's new debt borrowing costs are dominated by credit rating and management choices of tenor and time of issuance (rather than size), it appears more reasonable that issuance and liquidity costs vary less with scale (proportional costs are higher at lower scale).

9.1034 The evidence provided by Bristol for the 10-year loan suggests recent issuance costs of [X]bps versus our industry level assumption of 10 bps. The CMA awarded a 15bps issuance and liquidity allowance in the NATS/CAA Final Report to reflect the costs faced by a smaller company with fewer market interactions. We note, however, that the NATS/CAA Final Report was essentially a provisional decision and that the CAA's original RP3 award was only 10bps.<sup>2935</sup>

9.1035 We have concluded that as a small company Bristol may face higher average issuance and liquidity costs. Considering both Bristol's evidence relating to its 2018 refinancing exercise and the approach adopted in the CMA

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<sup>2935</sup> [NATS/CAA](#), paragraphs 13.156–13.157. See footnote 2252 at paragraph 9.30 for more details of the provisional nature of the NATS/CAA report.

NATS/CAA Final Report, we propose to award an issuance and liquidity CSA of 5 bps in addition to the industry-level allowance of 10bps.

### ***The appropriate weight of new debt***

#### *Ofwat position*

- 9.1036 Ofwat dismissed Bristol's claim for only 5% of new debt. Ofwat recognised that lumpy investment/debt issuance may cause a company's share of new debt to deviate from the sector-wide assumption and that this may lead to under or outperformance in any period. However, Ofwat expected that these deviations would balance out, with underperforming positions becoming outperforming positions and vice versa.
- 9.1037 Ofwat submitted that a redetermination based on actual company circumstances would distort incentives as financing decisions would have a material impact on the allowed return. It would also encourage companies to refer their determinations to the CMA only when their actual ratio disadvantages them relative to the notional, which would clearly not benefit customers in the long-term.<sup>2936</sup>
- 9.1038 Ofwat stated that lumpy investment profiles did not necessarily imply lumpy debt issuance profiles, and that companies were capable of financing using a range of maturities in order to achieve a smoother profile of new debt share over time.
- 9.1039 Ofwat did not agree with Bristol's assessment that WASCs currently have higher RCV growth than small WOCs or that historically higher growth justifies a bespoke assumption for small companies. Comparing these two groupings based on PR19 final determinations, nominal WASC RCV was scheduled to increase by 16.8% over 2020-25, while the equivalent figure for small WOCs was 36.6%. Ofwat expected strong RCV growth for WOCs would continue due to planned measures to improve drought resilience and reduce abstraction for environmental reasons, and that these measures would grow the wholesale water RCV.<sup>2937</sup>
- 9.1040 Ofwat stated that the share of new debt is not structurally lower for small companies. To prove the company's claim to the contrary Ofwat would expect evidence that small companies have permanently lower refinancing needs and/or lower investment requirements. Ofwat did not consider that

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<sup>2936</sup> [Ofwat's Response to Bristol's SoC](#), paragraph 6.51

<sup>2937</sup> [Ofwat's reply to responses to the provisional findings – risk and return](#), pp27–28

Bristol had evidenced this in its submissions, and viewed the company's substantial issuance of new debt in 2015-20 as not helpful to its case.<sup>2938</sup>

### *Bristol Position*

9.1041 Bristol had two concerns with Ofwat's industry level of 20% new debt. First, this level was itself higher than the 17% shown by industry-wide data. Second, it did not take account of smaller companies requiring far lower proportions of new debt. Bristol's anticipated percentage of new debt during AMP7 was 5%. In setting a cost of capital that fails to reflect the financing structure of a relevant notional company, Ofwat has set a cost of capital which is not achievable by an efficiently run small WOC.

9.1042 Bristol noted that in the CMA's Bristol PR14 Determination the CMA applied Ofwat's notional new debt ratio in its calculation but argued that circumstances had significantly changed since then, and that the lower returns afforded under PR19 and bigger differences between embedded and new debt allowances undermined Bristol's ability to finance its operations.<sup>2939</sup>

9.1043 Bristol stated that the approach adopted by Ofwat and provisionally followed by the CMA in the Provisional Findings is wrong. As a small company, Bristol's issuance is lumpy and as such, in different regulatory periods we may have considerably higher or lower weights on new (vs embedded) debt, relative to the industry average.<sup>2940</sup>

9.1044 Bristol stated that the CMA should reconsider the 'weights average over time' argument presented by Ofwat, because even if this is true over subsequent price controls, whether it ends up out- or under-performing the cost of debt allowance is not just a function of the weights, but also of the prevailing interest rates (on new and embedded debt) prevalent at the time. For example:<sup>2941</sup>

- (a) Bristol (like other WOCs) is significantly under-performing on the cost of debt, because it has much higher embedded debt weight than the allowance, and embedded debt is more expensive than new debt under the current market conditions;
- (b) however, in subsequent periods, Bristol Water (like other WOCs) may have a higher weight on new debt when new debt rates might turn out to be higher (eg this could plausibly happen in AMP7 as monetary policy QE

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<sup>2938</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 6.8

<sup>2939</sup> [Bristol SoC](#), paragraphs 228–236

<sup>2940</sup> [Bristol's response to the provisional findings](#), paragraph 149

<sup>2941</sup> [Bristol's response to the provisional findings](#), paragraph 150



unwinds). So, in the future, Bristol may have a higher new debt weight when new debt is expensive (relative to the embedded debt) again ending up on the 'wrong end of the allowance', even if the weights balance; and

- (c) small companies in general have lumpy debt profiles driven by their investment and refinancing needs, which means that management has limited control over the amount that a small company like Bristol can issue and limited ability to control its capex requirements or time debt so that it falls due for refinancing at a point in time when market rates might be favourable.

9.1045 Bristol stated that the refinancing of existing debt is not the only material factor that affects the lower proportion of new debt. The WOCs, and in particular the smaller and geographically connected companies, generally have better resilience in water supplies and better drinking water quality (CRI). It stated that the CMA will be aware of the larger water resilience schemes, and the challenges to wastewater of sewer flooding and increasing expectations of river quality. Bristol had by far the lowest enhancement share of totex at PR19, as an illustration of this point.

9.1046 Bristol stated that while it is possible that this could change with future Government policy towards the industry, this would appear to be unlikely enough that it is reasonable to assume that the water service, and particularly small connected area companies, will have lower future enhancement expenditure than WASCs. Accordingly, the evidence indicates that this should be reflected in the new embedded debt ratio that applies to Bristol Water. With a common new to embedded debt weight this provides an advantage to the WASCs generally over the WOCs because of the WASCs higher RCV growth. Those companies with higher refinancing requirements because of RCV growth, in the lower interest rate environment than has prevailed, get an effective benefit to their cost of capital.<sup>2942</sup>

#### *The appropriate weight of new debt – CMA assessment*

9.1047 We note Bristol's lower RCV growth in AMP7, but also Ofwat's assessment of high and continuing growth across WOCs and Bristol's decision to refinance one third of its debt book (significantly more than the 25% new debt assumption used in PR14) in the last AMP. These issues appear to undermine any argument that smaller companies require a structurally lower proportion of new debt.

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<sup>2942</sup> [Bristol's response to the provisional findings](#), paragraphs 151–153

9.1048 As with our industry assessment of the weight of new debt, we start with data on actual debt maturing during the AMP. For WOCs, we estimate c10% average new debt will be required over the price control. We also acknowledge that AMP7 refinancing needs are likely to be lower at small WOCs than at WASCs and large WOCs. However, we also note that average maturities between these two groups are almost identical,<sup>2943</sup> suggesting that this is a timing rather than a structural issue. We are aware that we cannot guarantee that losers today (those who need less new debt than the average) will definitely be winners tomorrow. However, we share Ofwat's concern that this is a distinctly 'one-way bet', where customers face higher costs if smaller companies are incentivised to appeal in periods of low refinancing needs but not when refinancing levels are high. We also note that interest rates would have to rise significantly for new debt costs to outweigh historical costs, further skewing incentives to appeal.

9.1049 Bristol also requested a lower weight of new debt in the CMA's Bristol PR14 Determination.<sup>2944</sup> The CMA rejected this request, noting that the decision of the amount of new debt taken in any particular period remained a decision for management, and that this supported a notional level of new vs embedded debt. As Ofwat's 25% ratio was based on the industry average, the CMA considered this to be appropriate for Bristol.<sup>2945</sup>

9.1050 Finally, we note that Bristol has one of the highest allocations to floating rate debt (even adjusting for cash levels) at 25%, materially higher than the 6% WASC and large WOC median and exposure at small WOC peers,<sup>2946</sup> giving it significantly more exposure to newer interest rates than is implied by the average amount of debt that is rolling off over the price control.

9.1051 As a result of these considerations, we consider it appropriate to take the same approach as followed by the CMA in its PR14 determinations and award Bristol the same 17% weight of new debt as our industry-level allowance.

### ***Whether, and to what extent, Bristol requires a CSA uplift to its cost of equity***

#### ***Ofwat position***

9.1052 Ofwat stated that Bristol did not apply for a CSA to the cost of equity at any point during the PR19, that Bristol conducted no customer engagement in

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<sup>2943</sup> 13.3 years for the small WOCs and 13.1 years for the WASCs and large WOCs.

<sup>2944</sup> Bristol requested 15% versus the PR14 decision of 25%. [Bristol PR14 Determination](#), paragraph 10.129

<sup>2945</sup> [Bristol PR14 Determination](#), paragraph 10.135

<sup>2946</sup> Portsmouth and South Staffs have no floating debt on this basis, while SES Water have 5%.

relation to any cost of equity proposal and that no other water company, including those smaller than Bristol, requested a CSA to the cost of equity at PR19.<sup>2947</sup>

9.1053 In its response to Bristol's SoC, Ofwat highlighted that, in its April 2019 revised business plan, Bristol had stated that 'in the context of a relatively small and potentially declining value, and the overall weak evidence and difficulties in calculating it, we conclude that as a part of a package of assumptions in our business plan that it is not required for 2020-2025'.<sup>2948</sup> However, it should be noted that in its final determination, Ofwat had noted that Bristol had argued that evidence supported an uplift to the cost of equity, and had signalled that it could in the future seek such an uplift, dependent on the outcome of Ofwat's final determination.<sup>2949</sup>

9.1054 Ofwat disputed the need for any cost of equity uplift and claimed that Bristol's arguments could also be used to suggest that the company had relatively low risk exposure. Ofwat suggested that with substantially fixed revenues, it is not clear why having a higher share of fixed costs should increase rather than decrease the volatility of profits.<sup>2950</sup>

9.1055 Ofwat also disputed Bristol's claim that a relatively low RCV results in lower profit margins. While it admitted that the size of RCV informed the size of RCV run-off and allowed return, Ofwat stated that these revenue streams correspond to costs (depreciation and finance costs) that are also linked to the size of the RCV. It would then be incorrect to treat them as pure profit margins. In addition, Bristol's relatively low RCV resulted in a higher return on regulatory equity than water and sewerage companies because its retail margin was higher as a proportion of notional equity.<sup>2951</sup>

9.1056 Ofwat also expressed concerns with evidence from Economic Insight's operational gearing analysis (used by Bristol) on the basis that:<sup>2952</sup>

(a) Economic Insight had not adequately measured operational gearing. Ofwat assumed that the CMA would seek to apply its definition of operational gearing from the NATS/CAA <sup>2953</sup> price control: 'relative exposure of profits to changes in cost', whereas Economic Insight's

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<sup>2947</sup> Ofwat's Response to Bristol's SoC, paragraph 6.10

<sup>2948</sup> Ofwat's Response to Bristol's SoC, paragraph 6.13

<sup>2949</sup> Ofwat (2019), *Allowed return on capital technical appendix*, annex 1.2

<sup>2950</sup> Ofwat (2019), *Allowed return on capital technical appendix*, annex 1.2

<sup>2951</sup> Ofwat's Response to Bristol's SoC, paragraph 6.27

<sup>2952</sup> Ofwat's Response to Bristol's SoC, paragraph 6.28

<sup>2953</sup> See NATS/CAA, paragraph 13.58 for discussion of operational leverage

measures focused only on revenue mix and does not adequately consider costs.

- (b) Economic Insight provided revenue ratios that could equally support the conclusion that Bristol has lower operational gearing, and that Bristol may in fact have lower rather than higher exposure to systematic risk.
- (c) Economic Insight's analysis ignored the fact that there are also systematic risks associated with financing costs, and that EE noted that a relatively high RCV carries its own risk (such as changes in the market cost of equity and cost of debt driven by macroeconomic events). As a result, companies with higher operating costs and lower financing costs (as a result of a lower RCV) do not necessarily have higher risk exposure overall.
- (d) The Bristol 2010 Determination view that an uplift applied to the entire asset beta overstated the exposure to systematic risk and risked ignoring non-cyclical sources of systemic risk such as political risk.

9.1057 Ofwat stated that evidence that small water only companies are more exposed to risks is weak, and that it did not observe systematically lower market-to-asset ratios (MARs)<sup>2954</sup> in equity transactions. Ofwat highlighted recent transactions and MARs as demonstrating a lack of evidence of a required uplift.<sup>2955</sup>

- (a) Affinity Water being purchased for a 53% premium to RCV in 2017.
- (b) Dee Valley Water being purchased for a 50% premium to RCV in 2016.
- (c) The average premium over RCV between 2016 and 2017 for the two daily traded water companies, Severn Trent Water and Untied Utilities, was 22%.

9.1058 Ofwat also disputed Bristol's claim that it is more exposed to cost shocks, suggesting that the volatility of Bristol's totex RoRE was not markedly different to the two listed comparators over the past four years, and submitted that uncertainties associated with Canal & River Trust costs are already covered by uncertainty mechanisms elsewhere in the determination.<sup>2956</sup> Ofwat stated that outturn performance did not in itself provide a guide to the inherent skewness or downside bias of risk distributions. In addition, RoRE

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<sup>2954</sup> The Market to Asset Ratio (MAR) is the ratio between the market value of a regulated business and its RCV.

<sup>2955</sup> Ofwat (2019), *Allowed return on capital technical appendix*, annex 1.2, footnote 126

<sup>2956</sup> *Ofwat's Response to Bristol's SoC*, paragraphs 6.29–6.31

performance reflected company-specifics as well as systematic factors, making it difficult to assess whether a significantly different exposure to systematic risks exists between small WOCs and WASCs.<sup>2957</sup>

9.1059 Ofwat stated that if it were true that the company's higher operational gearing implies a higher asset beta, then the appropriate response would be to lower the notional gearing level on which the determination is based, not adjust the cost of equity. This approach would increase the notional company's resilience to systematic shocks and reduce the volatility of returns on regulatory equity, and would be consistent with the approach at PR09, where Ofwat applied different gearing assumptions for water only companies to take account of the fact that WOCs tended to exhibit lower gearing at the time.<sup>2958</sup>

9.1060 Ofwat stated that it had not seen evidence of WOCs having difficulty raising finance in the absence of an uplift to the allowed cost of equity in previous price reviews. Ofwat submitted that Bristol referenced the depth of investor appetite in the market for financing utilities within its SoC, stating that 'there has been no evidence of restricted investor appetite for UK water corporate debt and companies have continued to have unrestricted access to both debt and equity capital, as evidenced by continuous corporate debt issuance and equity transactions'.<sup>2959</sup>

### *Bristol's position*

9.1061 Bristol stated that Ofwat did not recognise any cost of equity CSA in its final determination, and that this approach was flawed as it failed to recognise that small WOCs such as Bristol had higher operational gearing and were subject to higher asset beta risk, and therefore required an uplift in its equity beta.

9.1062 Bristol acknowledged that at the time it submitted its revised business plan, it did not seek a CSA for the cost of equity. While its advisers' analysis had demonstrated that there should be such a CSA, Bristol considered that due to difficulties in calculating the value of the CSA for the cost of equity and the relatively low impact of this element of the CSA, it would not request it for AMP7. However, this position changed following Ofwat's draft determination. Bristol considered that the balance of risk in its plan had changed as a result

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<sup>2957</sup> Ofwat Final written submission, p78

<sup>2958</sup> Ofwat's Response to Bristol's SoC, paragraph 6.32

<sup>2959</sup> Ofwat's Response to Bristol's SoC, paragraph 6.33, referencing Bristol SoC paragraph 685

of Ofwat's position on cost of capital and the cost and incentive challenges arising from Ofwat's WASC-weighted analysis.<sup>2960</sup>

- 9.1063 Bristol submitted that operational gearing was a measure of the balance between fixed and variable costs within a company's cost structure. Higher operational gearing (higher fixed costs) increased systematic risk (which is reflected in asset beta) as companies with higher fixed costs had greater profit volatility in response to demand shocks (since most of their costs are unavoidable). Bristol believed that this principle is well established and, as a general principle, is recognised by Ofwat.<sup>2961</sup>
- 9.1064 Bristol noted that in PR19 Ofwat had rejected the link between operational leverage and increased systemic risk due to regulated utilities not being exposed to demand risk. Bristol countered this view by suggesting that operational gearing resulted in higher profit volatility due to cost and outcome incentives having a disproportionately higher impact on profit margins for small companies. Therefore, any cost or ODI shock represented a greater proportion of profits for small WOCs compared to WASCs.<sup>2962</sup>
- 9.1065 Bristol stated that the principle of adjusting beta for operational gearing was well recognised in economic regulation, including in the CC's Bristol 2010 Determination and the CMA's Bristol PR14 Determination, where an uplift to beta was allowed in both cases, due to higher operational gearing relative to WASCs, which resulted in higher profit volatility and beta risk.<sup>2963</sup>
- 9.1066 Bristol suggested that Ofwat's position in PR19 is materially the same as it was in PR14, and that this was not accepted by the CMA in its Bristol PR14 Determination which had stated that the CMA recognised that not all of the operational gearing would necessarily reflect systematic risk, and not all beta risk will result from operational factors. Bristol noted the CMA's view then was that it was not persuaded that zero was a suitable point estimate for the uplift, and that the CMA had chosen to apply a beta uplift of 13%.<sup>2964</sup>
- 9.1067 Bristol based its cost of equity uplift level request on analysis by Economic Insight which compared Bristol's operational gearing to WASCs, particularly those that are publicly listed (as Ofwat uses these to set the industry asset beta). Economic Insight's analysis focused on the following ratios:

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<sup>2960</sup> Bristol SoC, paragraph 247

<sup>2961</sup> Bristol SoC, paragraph 239–240

<sup>2962</sup> Bristol SoC, paragraph 243–244

<sup>2963</sup> Bristol SoC, paragraph 242

<sup>2964</sup> Bristol SoC, paragraphs 245–246

- (a) Totex to RCV;
- (b) Operating Cash Flows to Revenue; and
- (c) RCV run-off and return on capital to final allowed revenues.

9.1068 Bristol noted that despite Ofwat's claim that Economic Insight had not used an appropriate set of metrics when assessing operational leverage, the metrics used were consistent with the approach taken by the CMA in its PR14 and PR09 Determinations.<sup>2965</sup>

9.1069 Economic Insight's analysis concluded that Bristol's totex/RCV is more than twice that of the listed WASCs, that operating cashflows/revenue was 5% higher than the listed WASCs (noting that a lower ratio indicated higher leverage) and that RCV run-off and return on capital/final allowed revenues was 26% higher than the listed WASCs. Economic Insight generally favoured the latter two measures, which supported an uplift to beta of 5 to 26% compared to the CMA's previous finding that a 13% uplift was appropriate.<sup>2966</sup>

9.1070 Bristol also conducted its own analysis using measures of operational gearing that had been considered by the CMA in the past. Bristol stated that this evidence suggested a higher figure for operational gearing, but this was in part driven by the disallowance of the CSA on debt and other parts of the SoC, which had reduced operational cash flows compared to other companies. Bristol stated this analysis demonstrated that the impact from operational leverage was exacerbated under the PR19 framework due to notable downside risk on ODIs and totex in the framework, which Bristol bears as a small company. Specifically, Bristol highlighted the skew between the upside and downside RoRE analysis in the final determination, which for each of costs, ODIs and financing, provided a larger downside skew for Bristol than for listed companies.<sup>2967</sup>

9.1071 In relation to Ofwat's argument that thinner margins at smaller WOCs reduce systematic risks, Bristol suggested that this implied that the revenue allowances for small WOCs are more stable across regulatory resets and therefore they face lower systematic risk. Bristol stated that this view of operating leverage was inconsistent with the definition endorsed by Ofwat which related to the 'relative exposure of profits to changes in cost'.<sup>2968</sup>

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<sup>2965</sup> [Bristol's Reply to Ofwat's Response](#), paragraph 163

<sup>2966</sup> [Bristol SoC](#), paragraphs 248–250

<sup>2967</sup> [Bristol SoC](#), paragraphs 251–255

<sup>2968</sup> [Bristol's Reply to Ofwat's Response](#), paragraphs 169–170



9.1072 Bristol noted that Ofwat and EE argue against the theoretical underpinnings of the cost of equity adjustment, focusing on the view that the risks that operational leverage exacerbates are either:

- (a) Not systematic or are within management control; or
- (b) Are counter-cyclical, to the extent that they arise due to costs being cyclical.

9.1073 Bristol stated that these points were considered by the CMA in its Bristol PR14 Determination. The CMA nevertheless allowed an uplift on the cost of equity for Bristol, explicitly stating that operational gearing adjustment is needed where the risks that generate this excess volatility in cashflows are not fully systemic.<sup>2969</sup>

9.1074 Bristol also disputed Ofwat's argument that if operational gearing were an issue, the data should show small companies having lower leverage and lower MARs. Bristol believed that the data on MARs provided by Ofwat is misleading as the MAR for any given company can be driven by a number of factors other than operating leverage, including potential for outperformance on totex, financing and ODI, non-regulated activities and assumptions on the overall market WACC relative to allowance in current and subsequent periods. It was therefore impossible to tell whether a particular MAR in a small sample was influenced by operating leverage.<sup>2970</sup> Bristol suggested that other transaction examples, such as Bournemouth-South West, occurred with a much lower premium.

9.1075 Bristol stated that in its PR14 Determination, the CMA clearly recognized that 'in practice, there are a number of reasons why investors may value assets at a figure greater than that implied by the RCV'. According to Bristol, this statement clearly accepts that market / investor valuations are affected by a myriad of factors which need to be understood before anything conclusive can be said about the appropriateness of the allowed cost of equity.<sup>2971</sup>

9.1076 On gearing, Bristol noted that gearing is again affected by a number of factors. In both samples of WOCs vs WASCs there is significant variation in gearing across the companies, making any observed differences in the

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<sup>2969</sup> [Bristol's Reply to Ofwat's Response](#), paragraphs 165–167

<sup>2970</sup> [Bristol's Reply to Ofwat's Response](#), paragraphs 174–175

<sup>2971</sup> [Bristol's response to the provisional findings](#), paragraphs 165–169



average gearing of the two samples susceptible to a significant margin of error.<sup>2972</sup>

9.1077 Bristol noted Ofwat's argument that totex RoRE at Bristol was not markedly different from that of other listed companies over the last four years. Bristol stated that, on a forward-looking basis (and because of its small RCV), the impact from financing and downside risk was greater for Bristol by comparison to the listed comparators.<sup>2973</sup>

9.1078 Bristol stated that the evidence supported its requested operational gearing adjustment of 13% on asset beta, which was below the 16% midpoint suggested by Economic Insight, was the minimum suggested by Bristol's analysis of Ofwat's FD data and is the amount the CMA applied in the Bristol PR14 Determination.<sup>2974</sup>

9.1079 Bristol noted that while the CMA's Bristol PR14 Determination recognised that operational leverage metrics are volatile, and it is difficult to come to a single appropriate methodology for adjustment, this nevertheless did not prevent the CMA applying an uplift based on a set of measures that it considered were appropriate. Bristol suggested that the CMA should use the same measures of operational leverage as those considered in its Bristol PR14 Determination.

9.1080 Bristol stated that the fact that operational leverage (and an appropriate adjustment for the additional risk it creates) is difficult to measure, does not deny the principle, grounded in standard finance theory, that higher operational leverage implies greater systematic (exacerbated beta) risk. Bristol stated that the CMA had not set out why the principle should not apply at present, or what has changed in terms of risk or underlying principles, which would therefore imply that departure from established CMA precedent is warranted.<sup>2975</sup>

9.1081 Bristol stated that it's SOC set out an alternative approach to purely relying on operational gearing in support of its small company notional cost of equity evidence based on RoRE ODI, cost and financing skew. This has a link to the operational gearing evidence it presented for the CSA cost of equity uplift, and demonstrates that cost shocks and ODI penalties both have greater

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<sup>2972</sup> [Bristol's Reply to Ofwat's Response](#), paragraph 176

<sup>2973</sup> [Bristol's Reply to Ofwat's Response](#), paragraphs 179–182

<sup>2974</sup> [Bristol SoC](#), paragraph 256

<sup>2975</sup> [Bristol's response to the provisional findings](#), paragraphs 156–160

impact on Bristol than on other larger companies (the analysis refers to the listed companies).<sup>2976</sup>

9.1082 Bristol also stated that ODI and cost risk skew remains an issue for small companies in the regulatory framework, and that further support for the principle of a relatively small RCV resulting in higher cost of capital was recognised in a recent cost of capital assessment as part of the water draft determination by the Utility Regulator Northern Ireland.<sup>2977</sup>

9.1083 Bristol also noted that the CMA had ‘aimed up’ on the CoE, to reflect uncertainty in the underlying parameters and the existence of asymmetric risk, which the CMA claimed made additional adjustments for operational gearing redundant. Bristol stated that the reasons for its request for an operational gearing adjustment are that as a small company, it requires an additional equity buffer to withstand downside risk than what would be considered appropriate for a large company whose profits are higher in absolute terms. It considered appropriate the CMA findings that the CoE should reflect ‘aiming up’ to accommodate uncertainty and asymmetry in the price settlement. However, all of those issues are common for all companies, and should be considered outside and separate from its need for operational gearing adjustment.

9.1084 Bristol noted that the CMA’s financeability analysis makes no mention of equity financeability, and instead focuses on whether Bristol can achieve ratios consistent with comfortable investment grade rating, as well as the impact on those ratings under downside scenarios. Bristol stated that both of these are debt financeability concepts.<sup>2978</sup>

#### *Response to Ofwat’s view on customer support*

9.1085 Bristol disputed Ofwat’s assertion that it did not consult customers on their willingness to fund a CSA, claiming that three pieces of customer research were undertaken in support of the inclusion of a company specific adjustment in its original plan. Bristol stated that its research found that most customers would prefer Bristol to remain their supplier as long as the additional cost is kept below £3, and for this to be reflected in visible service benefits. Customers would prefer to pay a little more to be served by a smaller company due to the better customer service and a preference to be supplied

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<sup>2976</sup> [Bristol’s response to the provisional findings](#), paragraphs 161

<sup>2977</sup> [Bristol’s response to the provisional findings](#), paragraphs 162–163

<sup>2978</sup> [Bristol’s response to the provisional findings](#), paragraphs 170 –173

by a local company. Customers did not see a potential £3 reduction in their bill as enough of an incentive to be served by a larger company.<sup>2979</sup>

9.1086 Bristol also stated that quantitative research carried out by ICS Consulting found overwhelming support for the small company cost of financing for Bristol, particularly if there were offsetting benefits and a reinvestment mechanism should borrowing costs be lower than expected or fundamental service delivery in support of the benefits did not transpire. 78% of customers were supportive of paying higher costs of finance, with 38% supporting paying £3 even if there were no offsetting benefits. Only 12% of customers were opposed to paying the additional cost of finance.<sup>2980</sup>

9.1087 Bristol noted that it undertook further customer research for its revised April 2019 business plan following Ofwat's criticism of its previous research. Ofwat suggested specific wording for this additional research, in line with research undertaken by Portsmouth. This research found 88% support for the CSA equivalent to £1.73 (based on a cost of debt CSA). Bristol stated that based on this research, it concluded that customers would be happy to support a CSA of up to £3 with no direct or specific offsetting benefits, and that the total value of its proposed uplift to the WACC (including the cost of equity uplift) equated to £2.91 per customer. From this Bristol concluded that customers supported the combined value of the cost of debt and cost of equity adjustments proposed in its SoC.<sup>2981</sup>

9.1088 Bristol highlighted that its original business plan also presented evidence of the 'loss aversion' value of how much bill reduction customers would need to receive to be supplied by an alternative supplier to Bristol. Excluding those who would not be happy with the change and valuing all other observations at the minimum of the range (eg, less than £5 was counted as zero), Bristol calculated a value to customers of c.£20, driven by service contentment as well as local service. Only 12% of customers were price sensitive in terms of the cost of finance.<sup>2982</sup>

*Whether, and to what extent, Bristol requires a CSA uplift to its cost of equity – CMA assessment*

9.1089 In our consideration of a CSA uplift to Bristol's cost of equity allowance, we consider three main issues:

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<sup>2979</sup> [Bristol's Reply to Ofwat's Response](#), paragraphs 141–144

<sup>2980</sup> [Bristol's Reply to Ofwat's Response](#), paragraphs 145–147

<sup>2981</sup> [Bristol's Reply to Ofwat's Response](#), paragraphs 148–155

<sup>2982</sup> [Bristol's Reply to Ofwat's Response](#), paragraphs 156

- (a) Whether Bristol's evidence on operational gearing is sufficient evidence of theoretical and/or actual need for an uplift;
- (b) Whether new evidence on market premiums and debt market access requires the CMA to reconsider the approach taken in the CMA's PR14 Determination; and
- (c) Bristol's financeability position and whether there is evidence of additional ODI skew.

### *Operational gearing*

9.1090 As a starting point, we found that the wide range of analysis highlighted that there is no single approach to determining the level of an uplift to the cost of equity for smaller companies, or even an established approach which would demonstrate whether a higher cost of equity is warranted at all. We agree with Bristol's *Financeability risk and return and affordability* report which states that the evidence relating to assessing the requirement for a cost of equity uplift is relatively weak and difficult to calculate with accuracy.<sup>2983</sup>

9.1091 The CMA has previously (at PR14) awarded Bristol a 13% uplift to asset beta as part of a CSA process, although the CMA acknowledged at the time both that making such an adjustment required judgement, and that there was no single way to measure the effect on the asset beta.<sup>2984</sup> The CMA has also considered further the case for an equity adjustment in other reviews, including firmus energy, SONI and NATS/CAA.<sup>2985</sup> All these reviews illustrate that the link between the cost of capital and operational gearing is case-specific, and depends on both the risk associated with the assets in question and the overall determination in the round.

9.1092 In the case of the adjustment made by the CMA in the Bristol PR14 Determination, the use of 13% would not have worked well for the other WOCs, but was an adjustment which in that review appeared to the CMA to result in a cost of equity which reflected the risks faced by Bristol. In other words, while in the Bristol PR14 Determination the CMA considered that the adjustment resulted in the right level of beta for Bristol in AMP6, the kind of calculations proposed by Economic Insight for Bristol would have resulted in a

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<sup>2983</sup> Bristol, *Financeability, Risk & Return and Affordability*, p75

<sup>2984</sup> *Bristol PR14 Determination*, paragraph 10.155

<sup>2985</sup> See CMA (2017), *Energy licence modification appeal: Firmus Energy*, Section 7, *CMA – SONI Limited v Northern Ireland Authority for Utility Regulation*, paragraph 7.6 - 7.246, *NATS/CAA* 2019 paragraph 12.123–12.125

wide range of adjustments if applied across the small companies, some of which would have been implausibly high or had a different effect.<sup>2986</sup>

### *New evidence*

9.1093        Against the backdrop of these challenges to correct measurement of any uplift to the cost of equity we consider it important to keep under review any evidence as to whether a cost of equity uplift remains appropriate.

9.1094        We note that our conclusions on new debt costs suggest that there is no additional risk premium charged by lenders when providing funds to Bristol (as measured against our debt benchmark and most calibrations of Bristol's adjusted benchmarks). This suggests that Bristol is seen as having risks in line with its credit rating (Baa1 at the time – in line with the notional sector target), without additional risks as a function of its size. This appears to be an example of highly-informed market participants considering there to be no material uncompensated systematic risk present in the price control for WOCs.

9.1095        In addition, we note Ofwat's evidence that since the CMA's Bristol PR14 Determination, small companies have been purchased at a significant premium (see paragraph 9.1057). We also note that even in the 'low premium' example of Bournemouth-South West suggested by Bristol (see paragraph 9.1074), the assets were purchased for well above RCV value.

9.1096        On the basis that none of the companies acquired at a significant premium benefitted from a cost of equity uplift through a CSA, the transactions may suggest that highly informed purchasers do not consider there to be a material uncompensated systematic risk present in price controls for smaller water companies. However, we treat MAR evidence with caution as there are a range of factors that can go into an investor's decision to purchase assets at a particular price premium. What is more reasonable to infer from this data is that there is no evidence that independent and rational investors demand a discount as a result of the industry cost of equity allowance providing insufficient equity returns for the WOCs.

9.1097        Taken together, we find the inputs from both debt and equity markets to be sufficient new evidence against the need for an uplift to the cost of equity allowance. While we acknowledge the potential benefit of regulatory consistency, we do not consider it outweighs the need to critically reassess approaches and consider new data. To fail to do so would jeopardise our duty

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<sup>2986</sup> [Bristol Redetermination Appendices](#), A10(1)-33

to customers, even if Bristol's evidence suggests that they would be willing to pay more if required.

#### *Financeability and ODI skew*

9.1098 In addition to the assessment of any theoretical higher risk, actual need must be considered when balancing our duties. We note that Bristol is the only company to have requested any type of cost of equity uplift through the PR19 process. While the allowed cost of equity may not have been the only element of Ofwat's final determination that encouraged Bristol to update its CSA request to include a cost of equity uplift, it is likely to have been an important factor (see paragraph 9.1062. As our industry-level cost of equity allowance of 4.73% is materially higher than the Ofwat's draft determination of 4.47%,<sup>2987</sup> we consider this to significantly reduce the strength of Bristol's case for an equity uplift.

9.1099 Our financeability assessment is a cross-check that companies (at the notional structure) can sufficiently finance their activities. As such, if small companies pass with no required adjustment then we would be failing the duty to customers if we were to provide additional returns over what was deemed necessary to meet our financing duty. We note Bristol's evidence that customers would be willing to pay for an equity uplift, but do not consider this to be sufficient justification if our analysis shows that such an uplift is not required.

9.1100 As we consider that Bristol is financeable as measured by our assessments in section X, this does not suggest a pressing need for an increased equity allowance.

9.1101 In respect of asymmetry, we estimated the asymmetry for Bristol on a like-for-like basis to the other Disputing Companies, ie. as a proportion of RCV. We found that Bristol's exposure was comparable in scale. We therefore did not accept that Bristol's size meant that it needed an additional equity return to address the risk of asymmetry. We consider Bristol's arguments on the scale of asymmetry which are not related to size of company in paragraph 9.1327.

#### *Cost of equity summary*

9.1102 In the round, we consider that new market data evidence and our financeability tests support an assessment that Bristol does not require an

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<sup>2987</sup> Ofwat (2019), [PR19 final determinations: Allowed return on capital technical appendix](#), Table 5.1

uplift to its cost of equity allowance. As no other small companies requested a cost of equity uplift, and it has been acknowledged previous theoretical evidence on operational gearing could not be applied to other small WOCs, we also see no evidence supporting an uplift to a purely notional small company. In combination, we see no theoretical or practical need at Bristol, and do not award a cost of equity CSA.

### ***Bristol CSA - CMA assessment***

9.1103 We have awarded Bristol an uplift to its cost of embedded debt allowance and to its issuance and liquidity cost allowance. We have not adjusted Bristol's cost of new debt allowance, its proportion of new debt or its cost of equity allowance. Bristol's overall Cost of Capital for this price control is shown in Table 9-32.

**Table 9-32: Summary of Bristol cost of capital allowance including CSA**

<i>CPIH-real</i>	<i>CMA – Industry</i>	<i>CMA – Bristol CSA</i>	<i>Ofwat PR19 final determination</i>	<i>%</i>
Cost of embedded debt	2.47	2.76	2.42	
Cost of new debt	0.19	0.19	0.53	
Proportion of new debt	17	17	20	
Issuance and liquidity costs	0.10	0.15	0.10	
<b>Total Cost of Debt</b>	<b>2.18</b>	<b>2.47</b>	<b>2.04</b>	
<b>Cost of Equity</b>	<b>4.73</b>	<b>4.73</b>	<b>2.14</b>	
Gearing	60	60	60	
<b>Appointee Return on Capital (vanilla)</b>	<b>3.20</b>	<b>3.37</b>	<b>2.96</b>	

Source: CMA Analysis and Ofwat PR19 final determination

## **Retail Margin Adjustment**

### ***Background***

9.1104 Prior to PR14, the water companies earned an allowed cost of capital on the total assets of the integrated water business. At PR14, Ofwat adopted a new approach when it decided to set separate price controls for wholesale and retail businesses for AMP6.

9.1105 One of the challenges of separating the two price controls was the allocation of the RCV from the start of PR14. Ofwat decided that existing fixed assets used to provide retail activities would remain in the wholesale RCV. The effect of this was that return on retail investments made by the companies prior to the start of PR14 were paid for through PR14 wholesale revenues.



- 9.1106 Ofwat said that, over time, the retail business would build up its own assets, and the legacy retail assets in wholesale would depreciate away.<sup>2988</sup> The period of this depreciation would be shorter for retail assets as unlike a wholesale business which had significant long-lived tangible assets, a retail business was more asset light.
- 9.1107 Ofwat calculated its PR14 retail controls by adding operating costs and a net margin. The allowed margin was calculated by benchmarking against other retailers and was determined to be 1.0% for household.<sup>2989</sup>
- 9.1108 Ofwat explained that, since the retail business generated positive margins, this represented a return on the RCV which should be netted off the WACC to give a wholesale water WACC. Ofwat said this would ensure that returns on notional retail assets were not included twice (in both the margins, and the WACC).<sup>2990 2991</sup>

### **PR19 Decision**

- 9.1109 Ofwat stated that the allowed return for the retail control was set by reference to a retail net margin of 1.0% (the same as PR14). Ofwat explained that in order to determine the allowed return for wholesale controls an adjustment must be made to the appointee allowed return to remove the impact of the allowed retail margin. This is called the retail margin adjustment.
- 9.1110 Ofwat said that the retail margin could be conceived of as covering three financing cost items:<sup>2992</sup>
- (a) required return on fixed assets;
  - (b) required return on working capital; and
  - (c) required return to compensate for additional systematic risk.
- 9.1111 Ofwat explained that it considered (a) and (b) were not double counted in the appointee-level allowed return on capital and that the wholesale RCV could now be thought of as essentially free of retail fixed assets.<sup>2993,2994</sup>

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<sup>2988</sup> Ofwat (2014), [Setting price controls for 2015-20 – risk and reward guidance](#), p34

<sup>2989</sup> Ofwat (2014), [Setting price controls for 2015-20 – risk and reward guidance](#), Table 2

<sup>2990</sup> Ofwat (2014), [Setting price controls for 2015-20 – risk and reward guidance](#), p34

<sup>2991</sup> In its PR14 final determination, Ofwat made a 14bps deduction from the allowed return on the wholesale RCV to avoid double counting.

<sup>2992</sup> Ofwat (2019), [PR19 final determinations: Allowed return on capital technical appendix](#), p14

<sup>2993</sup> Ofwat said that as part of PR14, retail fixed assets were transferred to the wholesale RCV, but that the short asset lives of these investments (~ 9 years) and age on date of transfer meant that, at PR14, Ofwat assumed the assets transferred would be fully depreciated by 2020.

<sup>2994</sup> Ofwat said that all retail assets and retail working capital are now contained within the retail business.



9.1112 Ofwat stated that in relation to point (c), the appointee allowed return on capital would reflect a blended average of systematic risks borne by the wholesale and retail business. Ofwat stated that, as the retail margin was intended to cover these costs to the extent that they related to retail activities, the higher systematic risks were compensated within the retail margin. Ofwat explained that higher retail systematic risks meant that the wholesale systematic risks were lower.

9.1113 Ofwat explained that as a result, cost item (c) would be double counted as there would be an appointee return on capital on both the wholesale RCV and the residential retail margin. Ofwat said that it therefore reduced the appointee allowed return on capital by 4bps to achieve a wholesale allowed return on capital that reflected the lower level of systematic risk in the wholesale business.<sup>2995</sup>

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<sup>2995</sup> To avoid the double count, Ofwat stated that it calculates cost item (c) using business plan data and draft determinations models. See Figure 9-22 for Ofwat's calculation methodology.

Figure 9-22: Ofwat's calculation of a 4bps retail margin adjustment

Component	Calculation	Point estimate (nominal)	Notes
Fixed asset balance for retail controls (2020-25 average)	A	£386m	From draft determination financial models
Cost of financing fixed assets	B	5.02%	Appointee allowed return on capital
<b>1) Required revenue for return on retail fixed assets</b>	<b>C = (A x B)</b>	<b>£19m</b>	
Average annual debtor days	D	40	From April revised business plans.
Average annual turnover	E	£11,989m	From draft determination financial models
Days in a year	F	365	
Average annual working capital requirement	G = (D / F) x E	£1,309m	
Working capital financing rate	H	3.06%	From April revised business plans. <sup>18</sup>

Component	Calculation	Point estimate (nominal)	Notes
<b>2) Required revenue for return on working capital</b>	<b>I = G x H</b>	<b>£40m</b>	
Total retail-specific capital costs	J = C + I	£59m	
Retail margin allowed revenue apportioned to households	K	£93m	From draft determination financial models
<b>3) Required return for additional systematic risk</b>	<b>L = K – J</b>	<b>£34m</b>	
Average RCV	M	£84,125m	From draft determination financial models
<b>Retail margin adjustment</b>	<b>N = L / M</b>	<b>0.04%</b>	

Source: Ofwat PR19 FD

## Submissions on the Retail Margin Adjustment

### Disputing Companies

#### Northumbrian

9.1114 Northumbrian stated that there were several errors in Ofwat's approach to the retail margin adjustment. Northumbrian explained that Ofwat highlighted in its final determinations that the RCV was now essentially free of retail

assets. Therefore, in applying the appointee WACC to the RCV there was no double count of the retail margin unless:<sup>2996</sup>

- (a) the appointee beta reflected the systematic risk of an integrated wholesale/retail firm; and
- (b) the systematic risk of retail activities was materially higher than wholesale activities; and
- (c) the risks attributable to retail activities were fully remunerated by the permitted retail margin.

**Figure 9-23: Northumbrian: Ofwat retail margin adjustment sensitivity analysis**

Component	Calculation	Ofwat	KPMG low end pre-tax WACC, FD working capital	KPMG low end pre-tax WACC, Net working capital	KPMG high end pre-tax WACC, Net working capital
Fixed asset balance - retail (2020-25 average)	A	£386m	£386m	£386m	£386m
Cost of financing fixed assets	B	5.02%	5.91%	5.91%	6.25%
<b>1) Req. revenue for return on retail fixed assets</b>	<b>C = A x B</b>	<b>£19m</b>	<b>£23m</b>	<b>£23m</b>	<b>£24m</b>
Working capital	F = (D / 365) x E	£1,314m	£1,314m	£903m	£903m <sup>97</sup>
Working capital financing rate	G	3.06%	5.91%	5.91%	6.25%
<b>2) Req. revenue for return on working capital</b>	<b>H = F x G</b>	<b>£40m</b>	<b>£78m</b>	<b>£53m</b>	<b>£56m</b>
Total retail-specific capital costs	I = C + H	£60m	£100m	£78m	£82m
Retail margin allowed revenue apportioned to HH	J	£93m	£93m	£93m	£93m
<b>3) Req. return for additional systematic risk</b>	<b>K = lower of J – I and zero</b>	<b>£34m</b>	<b>£0m</b>	<b>£17m</b>	<b>£12m</b>
Average RCV	M	£84,125m	£84,125m	£84,125	£84,125m
<b>Retail margin adjustment</b>	<b>N = L / M</b>	<b>0.04%</b>	<b>0.00%</b>	<b>0.02%</b>	<b>0.01%</b>

Source: Northumbrian

9.1115 Northumbrian stated that making an adjustment to the WACC by carving out a portion of systematic risk that was driven by the inclusion of retail activities in the comparator firms may be spurious accuracy.<sup>2997 2998</sup>

9.1116 Northumbrian noted that Ofwat's 0.04% retail margin adjustment represented spurious accuracy and failed to account for several important considerations:

<sup>2996</sup> Northumbrian SoC, paragraphs 883–884. See also Figure 9-23 for KPMG's calculations submitted by Northumbrian.

<sup>2997</sup> Northumbrian Reply, paragraph 472

<sup>2998</sup> The company explained that the beta estimate is inherently imprecise, so it is unlikely that it is possible to accurately isolate the systematic risk of retail activities versus the activities of an integrated supplier.

- (a) Northumbrian said that Ofwat's assumption for the working capital financing rate (of 3.06%, nominal) was based on a simple average of the working capital rates taken from company business plans. It noted that there was considerable variation across the sector<sup>2999</sup> and that there were sound theoretical arguments which supported an application of the WACC to all capital employed.
- (b) Northumbrian argued that Ofwat's WACC used for fixed assets (5.02%) underestimated the market WACC and that the retail margin allowance was pre-tax so a pre-tax WACC should be applied.

9.1117 Northumbrian submitted that it presumed that the CMA's retail margin adjustment analysis relied upon Ofwat's calculations of working capital.<sup>3000</sup> Northumbrian stated that Ofwat calculated working capital using trade receivables and advance receipts but did not include measured income accrual balances alongside the trade debtor balances.<sup>3001 3002</sup>

9.1118 Northumbrian said that the measured income accrual is a debtor balance relating to water supplied to measured customers but not yet billed. It explained that it is the largest of the industry retail working capital balances. Northumbrian stated that if all the retail working capital balances are used and a weighted approach taken, it calculated 55 debtor days and 32 creditor days, a gap of 23 days which generates a material working capital requirement.<sup>3003</sup>

9.1119 Northumbrian stated that a preferable approach to calculating working capital is to take the values directly from the balance sheets in Ofwat's model for each company. Northumbrian argued that using values directly from the balance sheet as opposed to estimating working capital through metrics such as creditor days represents a more robust approach and explained that it is these balances that require financing.<sup>3004</sup>

9.1120 Furthermore, Northumbrian noted that it is important to recognise the nature of the retail creditor balance. Northumbrian stated that this represents money owed by retailers to wholesalers, who are part of the appointed business and so is matched by an equal debtor balance in the wholesale

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<sup>2999</sup> The financing rates range from 0.21% to 5% excluding outliers of 0% and 7% (three companies did not report a working capital financing rate).

<sup>3000</sup> Ofwat's working capital calculation. Current assets: Residential unmeasured trade receivables and Residential measured trade receivables. Current liabilities: Residential unmeasured advance receipts and Residential measured advance receipts.

<sup>3001</sup> Northumbrian's working capital calculation. Current assets: Debtor Balance Residential nominal and Measured income accrual balance Residential nominal. Current liabilities: Creditor balance Residential nominal and Advance receipts unmeasured balance Residential nominal and Advance receipts measured balance Residential nominal.

<sup>3002</sup> [Northumbrian's response to provisional findings](#), paragraph 314

<sup>3003</sup> [Northumbrian's response to provisional findings](#), paragraph 317

<sup>3004</sup> [Northumbrian's response to provisional findings](#), paragraph 321

business. Northumbrian said that when aggregated, the intra-retail-wholesale balances cancel out, removing the creditor balance from the net working capital calculation. Northumbrian explained that as the retail creditor is thus an artificial intra-company balance, it should be excluded from any working capital adjustments.<sup>3005</sup>

9.1121 Northumbrian highlighted that using its calculation of working capital, the working capital balance for the sector over AMP7 was £903m and this would generate a 3bp retail margin adjustment. Northumbrian said that removing the retail creditor balance would increase average industry working capital to £1,364m and result in a zero retail margin adjustment.<sup>3006</sup>

### *Yorkshire*

9.1122 Yorkshire told us that the retail margin adjustment was an unnecessary legacy from PR14, when the circumstances Ofwat was dealing with were materially different than PR19.<sup>3007</sup> The company highlighted that the original logic for the retail margin adjustment at PR14 was a transfer of retail assets to the wholesale RCV and that this rationale was no longer relevant as these assets have been fully depreciated.

9.1123 Yorkshire explained to us that it disagreed with Ofwat's assertion about the relative riskiness of wholesale and retail activities and highlighted that:

- (a) household retail was a regulated monopoly business, just like wholesale activities. Investors' basic perceptions of risk would therefore be shaped first and foremost by the fundamentals of regulation;
- (b) the underlying systematic risks that investors were exposed to in the provision of retail services to customers were not obviously different from the systematic risks that investors are exposed to in the provision of network service, bioresources and water resources; and
- (c) insofar as there were overarching systematic risks that were not related to demand (eg political risks), it was not at all clear why these risks were any lower for the wholesale business than they were for the retail business.

9.1124 Yorkshire stated that the 1% retail margin did not over-reward the retail business. The company observed that:

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<sup>3005</sup> [Northumbrian's response to provisional findings](#), paragraph 320

<sup>3006</sup> [Northumbrian's response to provisional findings](#), paragraph 322

<sup>3007</sup> [Yorkshire SoC](#), paragraph 245

- (a) the 1% figure came from benchmarking to the margins earned by other low-risk retail businesses;
- (b) Ofwat's calculations omitted key factors that create a requirement for retail profits;<sup>3008</sup> and
- (c) Ofwat also completely omitted tax from its calculations – ie the 1% margin paid in part for retail corporation tax.

9.1125 Yorkshire submitted that the CMA made several mistakes in calculation of the RMA in its Provisional Findings. Specifically, Yorkshire noted that the CMA:<sup>3009</sup>

- (a) made a computational error by using a vanilla WACC rather than a pre-tax WACC in its calculation of the required pre-tax retail margin;
- (b) failed to make allowance for the cost of financing investments in intangible assets; and
- (c) failed to make proper allowance for the cost of contingent financial capital.

9.1126 Furthermore, Yorkshire submitted:<sup>3010</sup>

- (a) The CMA should consider if an approach focused solely on return on capital employed (ROCE) makes sense for a business with the characteristics of a water retailer.
- (b) The CMA should apply its findings in this area by adjusting the retail margin directly rather than by adjusting wholesale price controls. When looked at in this way, the CMA might wish to compare its proposed 0.2% margin to the 1.5% margin that the Department for Transport is paying to train companies that take no revenue risk and no cost risk.

### *Bristol*

9.1127 Bristol submitted that the CMA's analysis implied a fair EBIT margin for retail of 0.24%. Bristol noted that Ofwat set the allowed margin in retail at 1% and stated that this was based on PwC analysis which illustrated the required margin to cover capital costs was between 0.55% and 1.1%. Bristol highlighted that the implied margin adjustment by PwC is therefore 0 to 4.5

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<sup>3008</sup> For example, there is no recognition of the capital that is required for retailers' security deposits, the cash buffers/facilities that retail businesses need to deal with unexpected cost/revenue shocks or the contingent support that shareholders provide more generally to retail businesses.

<sup>3009</sup> [Yorkshire's response to provisional findings](#), pp31–32

<sup>3010</sup> [Yorkshire's response to provisional findings](#), pp31–32

basis points. It stated that the CMA's overstatement of the adjustment is because it does not consider various factors that impact capital requirements for water retailers such as working capital and intangible assets.<sup>3011</sup>

9.1128 Bristol stated that the implication of the CMA's analysis is that the WACC of a retailer, reflecting the additional systematic risk of retail activities, is as much as 24%<sup>3012</sup>, which it said seems unlikely.<sup>3013</sup>

#### *Ofwat*

9.1129 Ofwat said that as the 1.0% retail margin separately provided the allowed return for the retail control, there would be double recovery without adjusting for this via a deduction from the appointee allowed return.<sup>3014</sup> Ofwat explained that this was because the beta used to set the appointee allowed return was estimated using listed comparators which were integrated across both wholesale and retail activities.<sup>3015</sup>

9.1130 In response to a CMA request for information, Ofwat said that it had made an oversight in its Final Determination retail margin adjustment calculation, specifically in its calculation of average annual debtor days in its required revenue for return on working capital calculations. Ofwat explained that working capital requirements for the retail control should reflect creditors as well as debtors. Ofwat stated that adjusting for this error would result in a higher retail margin adjustment of 7bps or 9bps.

9.1131 Ofwat explained that the difference in its 7bps or 9bps retail margin adjustment calculation was due to two different approaches it used to calculate working capital:<sup>3016</sup>

(a) 7bps - Ofwat calculated the sector average creditor days (25 days) and sector average debtor days (39 days) over the price control period. It then subtracted sector average creditor days from sector average debtor days to calculate a working capital requirement of 14 days of turnover.

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<sup>3011</sup> [Bristol's response to provisional findings](#), p16

<sup>3012</sup> Bristol calculated the 24% using the retail margin allowance of £93 million and the capital employed in retail of £386 million.

<sup>3013</sup> [Bristol's response to provisional findings](#), p16

<sup>3014</sup> Ofwat, *Risk and return - response to common issues in companies' SoC*, p88–89

<sup>3015</sup> Ofwat's reasoning was that where the retail margin fully compensates investors for the risks in the retail business, this could include a margin allowance greater than the margin allowance inferred by using the integrated cost of capital.

<sup>3016</sup> Both Ofwat approaches to its working capital calculation use the following: Current assets: Residential unmeasured trade receivables and Residential measured trade receivables. Current liabilities: Residential unmeasured advance receipts and Residential measured advance receipts.

(b) 9bps - Ofwat calculated the average of each company's net creditor/debtor days for the sector giving an average of -3 days over the price control period.

9.1132 Ofwat submitted that Northumbrian's revised range (0bp – 3bp) assumes that working capital is financed at the appointee allowed return on capital. Ofwat disagreed and explained that as an inherently short-term financing requirement, it considers that the cost ought to be significantly lower than the allowed cost of new debt.<sup>3017</sup>

9.1133 Ofwat also said that the items Yorkshire suggests the retail margin should cover - Intangible assets such as software and contingent financial capital – are to a large extent funded by allowed opex for the retail control, which covers cost to serve and bad debt.<sup>3018</sup>

9.1134 Furthermore, Ofwat stated that it did not agree with Yorkshire that it is appropriate to use the pre-tax appointee WACC as the financing cost of fixed assets. Ofwat argued that consistent with its approach to setting the allowed return for wholesale fixed assets, it is not appropriate to fund equity investors' cost of corporation tax in the return on equity. Ofwat said that this cost is funded as a separate building block of allowed revenue.<sup>3019</sup>

9.1135 In response to Bristol's post Provisional Findings submission, Ofwat submitted that the CMA's definition of retail margin does not include working capital and fixed asset finance costs in the £22m<sup>3020</sup>, therefore it is not an EBIT margin and is not comparable with Ofwat and PwC estimates. For the same reason, Ofwat argued that it also cannot be described as a WACC.<sup>3021</sup>

### *Citizens Advice*

9.1136 Citizens Advice said that Ofwat's retail margin of 1% was arguably too low and resulted in an unnecessarily low retail margin adjustment. Furthermore, it stated that Ofwat assumed that debtors were the only relevant working capital item for a retail business and that this failed to recognise that a substantial proportion of retail customers paid in advance for water services. Citizen's Advice stated that adjusting for Ofwat's working capital calculation error changed the retail margin adjustment from 4bp to 9bp.<sup>3022</sup>

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<sup>3017</sup> [Ofwat's reply to responses to the provisional findings – risk and return](#), p16

<sup>3018</sup> [Ofwat's reply to responses to the provisional findings – risk and return](#), pp15–16

<sup>3019</sup> [Ofwat's reply to responses to the provisional findings – risk and return](#), pp15–16

<sup>3020</sup> Our provisional findings calculations suggested that the required retail margin for the sector is approximately £22 million. [Provisional findings](#), paragraph 9.562

<sup>3021</sup> [Ofwat's reply to responses to the provisional findings – risk and return](#), p16

<sup>3022</sup> [Citizens Advice submission](#), p8 & pp48–51



## ***Retail Margin Adjustment – CMA assessment***

9.1137 In the CMA's Bristol PR14 Determination<sup>3023</sup> the CMA decided that financial theory would indicate that dividing a company into parts (retained under the same ownership) should not affect either its profitability or the returns it generates. Therefore, the CMA was not convinced that the implementation of separate controls should in itself require any increased returns.

9.1138 The CMA made one adjustment to Ofwat's wholesale-appointee adjustment based on the new investments being made during AMP6.<sup>3024</sup> It assumed that the retail business was able to generate a similar return on capital (3.7%) to the appointee business and for Bristol this would imply a return equivalent to 0.03% on the wholesale WACC. The CMA therefore found that a wholesale-appointee adjustment of 0.11% was appropriate.

9.1139 For PR19, we note that Ofwat changed its retail margin adjustment following a working capital calculation error highlighted by Citizen's Advice. Ofwat's proposal of a 7bps or 9bps retail margin adjustment represents a small adjustment to the overall WACC and, ultimately, customer bills. We also note that estimating opaque metrics such as relative exposure to systematic risk to this level of accuracy risks any sensible range of estimates being larger than the central estimate (thus making zero a realistic possibility).

9.1140 At the same time, the approach of focussing on the appointee returns that we followed in the CMA's Bristol PR14 Determination would suggest that a retail margin adjustment of zero would significantly over-reward the companies. In the real-world scenario where the financing of the appointee is still fully integrated, we are not persuaded that there is a benefit for customers for paying a higher profit to reflect the higher financing costs associated with a notional separation which has been put in place for other purposes.

9.1141 For our retail margin adjustment calculation, we start with the principle that there should be an allowed return reflecting a reasonable return on capital across the appointee businesses. If the notional retail margin of 1% for a separated retail business is different to the required allowance for a retail business as part of an integrated appointee, then this approach requires an adjustment to wholesale revenues. The size of the adjustment is calculated by starting with the notional retail margin (1%) and subtracting the actual required return for the retail business (based on ROCE).

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<sup>3023</sup> [Bristol PR14 Determination](#), pp340–342

<sup>3024</sup> Bristol estimated that the average capital in the retail business will be £3.4 million over the period, consisting of around £2 million of new assets, and around £1.4 million of working capital.

9.1142 The ROCE for the retail business comprises both:

- (a) **Return on fixed assets.** We assume a nominal cost of financing of 5.26% (in-line with our appointee allowed return on capital) for the return on fixed assets. We note Northumbrian's argument that the retail margin is a pre-tax figure and we should therefore use a pre-tax WACC. However, we do not believe it is appropriate to fund equity investors' cost of corporation tax in the return on equity.
- (b) **Return on working capital.** We consider it appropriate to update our approach to our working capital calculation in our Final Determination to include the measured income accrual. This was previously omitted at Provisional Findings as we based our analysis on the Ofwat calculation of working capital. From our bottom up analysis, we note that the majority of companies in the sector have a negative or low working capital requirement. We consider our decision on working capital to be an efficiency judgement and believe that we should place more weight on leading-edge companies' working capital management. We have not been presented with any evidence by the Disputing Companies to do otherwise. Furthermore, we consider that customers should not pay for water companies' inefficient working capital management. Consequently, we see no need to assume that a notionally efficient company should have an additional return to manage the costs of financing working capital balances.

9.1143 We were not persuaded by any of the arguments raised by Yorkshire or Bristol in their Provisional Findings responses:

- (a) As discussed in paragraph 9.1142(a), we do not believe it is appropriate to fund equity investors' cost of corporation tax in the return on equity;
- (b) Both companies failed to submit to us any evidence of a breakdown and quantification of intangible assets;
- (c) We do not consider the cost of contingent financial capital to be material for the retail business of a water company. Collateral can be an important part of capital employed for a general retailer (eg: a High Street retailer) as lenders to the business are likely to require collateral held against the possibility of the retailer defaulting. However, for a water company the probability of default is very low, and we would not envisage there to be a high collateral requirement;
- (d) We consider that ROCE is an appropriate approach to assessing the returns of an asset light business when the retail business is essentially a physical interface with customers that does not add any material

additional risk to the group. We therefore believe it is a suitable metric for assessing the returns of a water retailer; and

- (e) We set out clearly in our Provisional Findings why we thought our approach to adjusting the wholesale price control was appropriate and robust. We have not seen any evidence that would support a decision to change this approach to adjusting the retail margin directly.

9.1144 We were not persuaded by Bristol's argument that our analysis implied a WACC of 24% for a retailer. At Provisional Findings we adjusted wholesale revenues by £71mn and this implies a WACC for a retailer of 5.6%<sup>3025</sup>.

9.1145 Furthermore, we were not persuaded by Northumbrian's argument that the working capital calculation should adjust for retailer creditor balances. Our bottom up analysis highlighted that for the majority of companies in the sector the difference from removing retailer creditor balances from the working capital calculation is not material.

9.1146 Table 9-33 illustrates our retail margin adjustment calculation at the sector level.

**Table 9-33: CMA calculation of industry-level retail margin adjustment in % of RCV terms**

<i>Component</i>	<i>Formula</i>	<i>Units</i>	<i>Calculation Result</i>
Fixed Assets	A	£m	386
Cost of financing fixed assets	B	%	5.26
Required revenue for return on retail fixed assets	C = A * B	£m	20
Net debtor days (net of creditor days)	D	Days	0
Required revenue for return on working cap	E	£m	0
Total retail-specific capital costs	F = C + E	£m	20
Retail margin allowed revenue apportioned to Household	G	£m	93
Required return for additional systematic risk	H = G - F	£m	73
Average RCV	I	£m	84,125
Retail Margin Adjustment	J = H / I	%	0.08

Source: CMA analysis using Ofwat data

9.1147 As a result of our approach to financing fixed asset and working capital, our calculations suggest that the required retail margin for the sector is approximately £20 million.

9.1148 By comparison to the £93 million retail margin awarded by Ofwat, £20 million equates to a required retail margin of only 0.22% and suggests that water companies would be overcompensated for additional systematic risk by

<sup>3025</sup> £21.5mn (required revenue for the return on fixed assets)/£386mn (fixed assets) = 5.6%. [Provisional findings](#), paragraph 9.561.

an aggregate £73 million (£93 million minus £20 million) if no adjustment is made.

9.1149 This suggests that it is appropriate to make a sector-level downwards adjustment of £73 million to wholesale revenue, which is equivalent to an 8bps retail margin adjustment using Ofwat's approach. In our Final Determination, we will apply a downwards adjustment to wholesale revenues to each of the Disputing Companies equivalent to 8bps<sup>3026</sup> of RCV.

**Table 9-34: CMA and Ofwat retail margin adjustment**

	CMA	Ofwat PR19 final determination*
Retail margin adjustment (%)	0.08	0.04

Source: CMA Analysis and Ofwat PR19 final determination

\* Footnote: The retail margin adjustment published in the PR19 FD was 0.04%. As highlighted in paragraph 9.1130, Ofwat subsequently updated their estimates to a retail margin adjustment of 7bp or 9bp.

## Gearing Outperformance Sharing Mechanism

### *Introduction and PR19 Decision*

9.1150 Ofwat introduced the concept of a GOSM as part of its 'Putting the sector in balance: position statement'<sup>3027</sup> and introduced it into the water price control regime for the first time in PR19. Ofwat stated that equity investors benefit from higher equity returns that are associated with their increased risk, but that there is no substantive benefit passed to customers. In addition, Ofwat stated that where companies adopt high levels of gearing, they may reduce financial resilience and transfer some risk to customers and/or potentially taxpayers in the event that a company fails. To address this, Ofwat introduced a mechanism that it said would share the benefits of higher gearing with customers.<sup>3028</sup>

9.1151 For PR19, Ofwat updated the proposal laid out in its 'putting the sector in balance: position statement' by including a glide path for the gearing level which will trigger sharing payments.

9.1152 Under the PR19 GOSM mechanism, companies with gearing higher than specified trigger points will have to 'share' at a 50% rate the presumed benefit of gearing over 65% with customers through a payment based on the following equation:

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<sup>3026</sup> Our retail margin adjustment calculation comes out at just over 8.5bp. To avoid under-recovery, we have rounded to 8bp.

<sup>3027</sup> Ofwat (2018), [Putting the sector in balance: position statement on PR19 business plans](#), section 6

<sup>3028</sup> Ofwat (2019), [PR19 final determinations: Aligning risk and return technical appendix](#), section 9.3

Sharing payment amount = (Gearing – 65%) x 50% x (Allowed Nominal Cost of Equity – Actual Cost of Debt) x Closing RCV Nominal

9.1153 With the trigger points for involvement in the mechanism starting at 74% gearing in 2020-21 and reducing by 1% each year until 70% gearing for the year 2024-25.<sup>3029</sup>

9.1154 Ofwat explained that the design of the GOSM aims to identify excess returns to shareholders (Allowed Nominal Cost of Equity – Actual Cost of Debt) earned through the excess levels of gearing (Gearing – 65%) and share these excess returns equally (x50%) with customers. Multiplying the figure by the nominal RCV gives the pound sterling figure to be paid.

9.1155 The gearing levels for the Disputing Companies are set out in Table 9-35.<sup>3030</sup> At current gearing levels Ofwat's GOSM would therefore impact on Anglian and Yorkshire.

**Table 9-35: Ofwat data on Disputing Company gearing levels, March 2020**

<i>Company</i>	<i>Gearing Level</i>
Anglian	78.8
Bristol	68.3
Northumbrian	67.2
Yorkshire	76.9

Source: Ofwat

## ***Views on the GOSM***

9.1156 The Disputing Companies all questioned the GOSM's suitability and suggested that the GOSM should be removed from the price control.<sup>3031</sup> Parties made submissions in several areas relating to the introduction of the GOSM, including the effectiveness and appropriateness of the GOSM as a tool to reduce financial risk within the water industry and the presence and quantum of benefits available to be shared. We set out below a summary of relevant submissions from Ofwat, the Disputing Companies and third parties.

<sup>3029</sup> Ofwat (2019), *PR19 final determinations: Aligning risk and return technical appendix*, section 9.3

<sup>3030</sup> Data from Ofwat (2020), *Monitoring financial resilience 2019-20 - charts and underlying data*. All figures are at March 2020 and are presented to 1 decimal place.

<sup>3031</sup> *Anglian SoC*, paragraph 1402; *Bristol SoC*, paragraph 709; *Northumbrian SoC*, paragraph 910; *Yorkshire SoC*, paragraph 246

9.1157 In its FD, Ofwat argued that while companies and their investors are responsible for the decisions they make about their actual financial structure, companies that adopt high levels of gearing may reduce financial resilience and transfer some risk to customers and/or potentially taxpayers in the event that a company fails.<sup>3032</sup> Higher gearing may also reduce the ability of companies to adapt to changes in the regulatory framework that would be in customers' interests.<sup>3033</sup> Ofwat also told us that over-leveraged capital structures could impede effective management of water companies,<sup>3034</sup> as high leverage reduced financial headroom impacting on the ability of management to respond or maintain financial resilience where operational performance is poor, and that high leverage is likely to come with cumbersome securitised structures. We were also told that Ofwat experienced first-hand that, regardless of the level of the cost of capital, the structural arrangements of some of the investing funds with their underlying investors make it difficult to raise appropriate and substantial injections of new equity to recapitalise over-stretched structures.<sup>3035</sup> It said that without the gearing mechanism, the regulatory arrangements could distort company incentives on choosing financial structures without full consideration of the potential impacts on customers and wider stakeholders.<sup>3036</sup> In a paper submitted by Ofwat, Europe Economics also said that Ofwat's framework includes an embedded debt allowance, which has the consequence of partially shielding firms from financing risks on debt and creates an incentive to gear up to take advantage of this, thereby passing additional risk on to customers. It also proposed that potential benefits to firms might accrue from the ways high gearing creates pressure upon regulators to agree to allow higher prices in revenue controls, because higher gearing undermines the general financeability of firms.<sup>3037</sup>

9.1158 Ofwat stated that increasing gearing transfers risks to customers, who may suffer from service interruption and/or underinvestment if bondholders restrict future cash outlays during periods of financial stress. High gearing may also increase the perceived likelihood of companies triggering a re-opening mechanism of the regulatory price determination to increase funding

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<sup>3032</sup> Ofwat noted that to discourage companies from adopting excess gearing to benefit from the tax shield on debt it remunerated tax on the basis of the actual capital structure of each company (and claws back tax gains driven by financial restructuring). Ofwat disputed claims that this provides a benefit to customers, stating that tax is a small component of allowed revenues. [Ofwat's response to common issues in companies' SoCs: Risk and return](#), paragraph 5.15, 5.23.

<sup>3033</sup> Ofwat (2019), [PR19 final determinations: Aligning risk and return technical appendix](#), section 9.3.3

<sup>3034</sup> Ofwat told us it saw this high leverage to be correlated for a good number of companies with poor or declining service and undue constraints on management. Source: [Ofwat's final submission: cover letter](#)

<sup>3035</sup> [Ofwat's final submission: cover letter](#)

<sup>3036</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraphs 7.1-7.2

<sup>3037</sup> Europe Economics (2020), [Further Advice on the Allowed Return on Capital for the Water Sector at PR19 – Betas and Gearing](#), p9

where a firm is in financial distress.<sup>3038</sup> Ofwat argued that in a competitive market, customers may react to this shifting of risk by moving supplier, but that in the context of monopoly service provision it is the regulator who must reflect customer interests and provide constraints to replicate competitive market forces to address the downside consequences for customers from highly-g geared structures.<sup>3039</sup>

9.1159 Ofwat stated that ‘some commentators’ had suggested that the failure of one or more highly geared company could impact on investor sentiment for the sector, which could manifest in a higher cost of capital and higher bills for customers. Ofwat stated that this could mean that its previous policy on capital structure has been insufficient.<sup>3040</sup> Ofwat quoted a Department for Trade and Industry report<sup>3041</sup> (the DTI report) which argued that customers suffer when regulated companies are highly geared, as regulators may feel that they are unable to enforce a challenging regulatory settlement while still ensuring financeability. The DTI report also stated that even the suggestion of a government ‘backstop’ (in other words, support for investors otherwise facing financial distress) may decrease the cost of capital to investors (improving returns) while transferring risk to customers or the taxpayer.<sup>3042</sup>

9.1160 Ofwat acknowledged that the highly geared companies were resilient during the 2008 credit crunch (even if some required injections of equity to maintain covenant ratios) but argued that ‘concerns arise’ over companies’ ability to maintain resilience over a longer period of downward pressure on return’.<sup>3043</sup> It said while there are many factors that can impact on financial resilience, empirically, there can be little dispute that high levels of gearing reduce resilience to shocks or the consequences of ongoing poor performance. It said the GOSM is targeted only at those structures that may create greatest risks; based on gearing as at 31 March 2020 eight of the 17 regulated companies were above the 70% level.<sup>3044</sup>

9.1161 Ofwat said the primary purpose of the gearing mechanism was to address a gap in the regulatory framework – to incentivise companies to reduce gearing in response to perverse incentives that encourage companies and investors to have highly geared structures without bearing the full risks of

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<sup>3038</sup> Ofwat’s Response to common issues in companies’ SoCs: Risk and return, paragraph 5.16

<sup>3039</sup> Ofwat’s Response to common issues in companies’ SoCs: Risk and return, paragraph 5.18

<sup>3040</sup> Ofwat’s Response to common issues in companies’ SoCs: Risk and return, paragraph 5.4 including box and Figure 5.1

<sup>3041</sup> Department of Trade and Industry and HM Treasury (2004), *The drivers and public policy consequences of increased gearing*

<sup>3042</sup> Ofwat’s Response to common issues in companies’ SoCs: Risk and return, paragraph 5.11

<sup>3043</sup> Ofwat’s Response to common issues in companies’ SoCs: Risk and return, paragraph 5.4 including box and Figure 5.1

<sup>3044</sup> Ofwat’s response to the provisional findings – risk and return, paragraph 7.11



these structures.<sup>3045</sup> It said the gearing mechanism was not intended to address all financial resilience issues but was intended to complement other regulatory tools such as the regulatory ring-fence and the special administration provisions. It said there was nothing else in the regime that addresses the issue of companies and shareholders not bearing all the risks associated with deviating from the notional capital structure.<sup>3046</sup>

9.1162 Ofwat stated that the GOSM aimed to address a long-held concern that companies and their investors enjoy all the benefits of adopting financial structures where gearing levels are well in excess of the notional level, with little evidence of benefits to customers. It considered that in the absence of benefit sharing, the regulatory arrangements could distort company incentives on choosing financing structures without full consideration of the potential impacts on customers and wider stakeholders.<sup>3047</sup> It said the regulatory regime places considerable weight on incentives to align company and investor interests with those of customers. It stated a company could under the GOSM choose to stay highly geared and share benefits with customers, but once the benefits to investors of higher gearing are reduced, decisions on capital structure would be made for more rounded reasons.<sup>3048</sup>

9.1163 Ofwat submitted that investors in some companies have withdrawn significant amounts of equity from the sector by restructuring to include a greater proportion of debt finance. In 2011 it estimated the amount of equity extracted by such means to have exceeded £9 billion by 31 March 2010, equivalent to over 18% of the RCV. However, Ofwat told us that it had not quantified and did not think it would be possible to quantify the benefits which it thought the companies had earned from excess gearing.

9.1164 Ofwat said the mechanism provides tangible benefits to customers and reduces the incentives for choices of unduly risky structures by investors,<sup>3049</sup> and that its cost benefit analysis estimated that the benefit companies would transfer to customers was in the range £170 million to £230 million.<sup>3050</sup>

9.1165 It said the 50% rate provided equal sharing of benefits from gearing up between equity holders and customers. It also said it would consider the impact of these incentives on behaviour and how companies have responded in future price reviews,<sup>3051</sup> implying the equation and its parameters might be

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<sup>3045</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 7.7

<sup>3046</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 7.9

<sup>3047</sup> [Ofwat's further submission on common issues in companies' responses: Risk and return](#), paragraph 5.4

<sup>3048</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 7.13

<sup>3049</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 7.40

<sup>3050</sup> From its 'Putting the sector in balance: position statement', [Ofwat's response to the provisional findings – risk and return](#), paragraph 7.16

<sup>3051</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 7.40



adjusted over time. It said that the 50:50 sharing rate was necessary for the mechanism to have sufficient bite,<sup>3052</sup> and acknowledged that the choice of rate derived from some exercise of judgement, however this was a necessary part of aspects of the regulatory process.<sup>3053</sup>

9.1166 Ofwat stated that it disagreed with Modigliani-Miller-based<sup>3054</sup> objections to its mechanism, suggesting that in its view the cost of capital is not invariant to gearing levels.<sup>3055</sup> Ofwat suggested that the Modigliani-Miller theorem is underpinned by a set of highly restrictive assumptions which do not hold true of the water sector – specifically that there are no taxes, no costs of financial distress, no asymmetry of information and that there are perfect capital markets. Rather than invalidating the GOSM approach, Ofwat claimed that the absence of these simplifying assumptions proves that theorem does not hold in the water sector, supporting the case for the GOSM.<sup>3056,3057</sup>

9.1167 Ofwat stated that existing market protections, such as debt covenants, and regulatory protections, such as the regulatory ringfence<sup>3058</sup> and special administration,<sup>3059</sup> are imperfect and may leave customers facing unnecessary risks.

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<sup>3052</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 7.43

<sup>3053</sup> It noted, for example, the parallel to the choice of cost sharing rates. [Ofwat's response to the provisional findings – risk and return](#), paragraph 7.37

<sup>3054</sup> The Modigliani-Miller theorem suggests that as gearing rises shareholders of a company are exposed to more systematic risks (there is less of an equity buffer to deal with shocks), often measured as a rise in beta. This increasing risk to equity holders is described as a rising 'cost' of equity, in that higher returns are required to offset these higher risks. In the Modigliani-Miller-based WACC model used by regulators, overall WACC remains roughly flat, even as rising gearing increases the proportion of cheaper debt into the capital structure, as the remaining equity portion becomes increasingly expensive.

<sup>3055</sup> [Ofwat's response to common issues in companies' SoCs: Risk and return](#), paragraph 5.13

<sup>3056</sup> [Ofwat's response to common issues in companies' SoCs: Risk and return](#), paragraph 5.14

<sup>3057</sup> See also [Ofwat's response to the provisional findings – risk and return](#), paragraphs 7.27–7.28. Ofwat submitted a paper by Wright & Mason, which argued that 'a long literature has developed to examine the consequences of departures from the MM assumptions. In short, very few who work in the field believe that the MM theorem actually holds'. Ofwat also submitted a report - Europe Economics (2020), [Further Advice on the Allowed Return on Capital for the Water Sector at PR19 – Betas and Gearing](#), p9 - which states 'The conclusion of the Modigliani-Miller theorem is not that there is no such thing as an optimal level or range of gearing. Rather, it points us to factors that are or are not relevant in determining such an optimal level or range. There are a variety of corporate finance theories that attempt to account for differences in gearing choices by different firms in different sectors.'

<sup>3058</sup> The regulatory ring-fence consists of licence conditions which place specific obligations on a company, such as ensuring that it has sufficient financial and managerial resources to carry out its regulated activities (including the investment programme necessary to fulfil its regulatory obligations). Most recently, on 13 July 2020 Ofwat introduced new licence conditions to further tighten the regulatory ringfence to all company licences (with the exception of Wessex Water) – see Ofwat (2020), [Conclusions on section 13 of the WIA91 on proposed modification to ringfencing provisions](#).

<sup>3059</sup> The process for special administration is set out in the Water Industry Act 1991. It can be used where a company either fails to meet its legal obligations and does not or cannot take remedial action or is unable to finance its functions due to, for example, poor decisions by its management, significant unexpected changes to its costs (a 'cost shock') or an inability to raise or refinance its capital as required. In these circumstances, the Secretary of State, Welsh Ministers or (with appropriate consent) Ofwat can ask the High Court to appoint a special administrator to oversee the running of the company. The purpose of the special administration arrangements is to transfer the company's business as a going concern (and to carry out the functions of the

9.1168 Ofwat explained that the regulatory ringfence has two components: the first is to protect the regulated entity from external events including matters relating to the wider corporate group of which it is a part (for instance restrictions on the inappropriate extraction of financial resources by shareholders at times of financial strain); and the second requires the water company to maintain certain financial and management disciplines in respect of the business within the ring-fence (such as an obligation to maintain sufficient financial resources, management resources and systems for the operation of the business and a requirement to provide information to Ofwat about material matters or events affecting that business). It said that the customers of Wessex Water and Dŵr Cymru were protected following the failure of the respective owners of each company,<sup>3060</sup> but these two failures primarily resulted from financial difficulties that arose outside of the regulated business. It said these events provided a test of the first component of the regulatory ring-fence provisions but did not show that customers would be protected against poor financial or management practices within the ring-fence.

9.1169 Ofwat also said that special administration involves costs as longer-term planning and investment can be disrupted by the process, meaning that even if customers are shielded from the immediate risk of business failure, some costs may ultimately fall on customers or taxpayers, and these could turn out to be large. Ofwat quoted former Rail Regulator, Tom Winsor, as having suggested that the decision to renationalise Railtrack had cost the taxpayer £11-14 billion, while the failure of Metronet was estimated by the NAO to have cost £170-410 million.<sup>3061</sup>

9.1170 Ofwat told us that the existing regulatory protections were well placed to deal with problems once they had occurred but were not sufficient to prevent the bad decision-making that could bring a company into financial distress. It said the regulatory ring-fence is designed to help to mitigate the impact on customers from the failure of companies but does not reduce the likelihood of companies experiencing financial distress, nor does it provide incentives for companies or their investors to avoid failure. It said it held

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company in the interim). This differs from the standard administration regime, which applies to all companies, where other options are available including the company's assets being sold and the operations of the company terminated. Special administration is also different from standard administration in that it can be used where a company has not met its principal duties as well as for financial reasons.

<sup>3060</sup> Wessex Water was owned by Azurix, a subsidiary of Enron, at the time of Enron's failure in 2002. Following the failure of Enron, Wessex Water was sold to YTL Corporation of Malaysia. Ofwat told us that in 2000, Hyder, the owner of Dŵr Cymru and South Wales Electricity plc, got into financial difficulties following the windfall tax on company profits alongside a tougher PR99 determination. Dŵr Cymru was subsequently acquired by Western Power Distribution, and later sold to Glas Cymru, a company limited by guarantee.

<sup>3061</sup> [Ofwat's Response to common issues in companies' SoCs: Risk and return](#), paragraphs 5.19–5.23, including footnote 336

significant concerns that some companies have not been taking adequate steps to secure their long-term resilience. It said that credit rating agencies have a significant role to play in providing warning signals about potential failures, but this did not provide protection against the risk of failure, as was seen in the banking crisis and numerous other corporate failures. It also said the special administration process is an important safety net, but it is much better to have a steady-state resilient sector.<sup>3062</sup>

9.1171 Ofwat said that it chose to implement a sharing mechanism within the price control rather than alternative risk controlling measures such as a limit on gearing as such alternatives would require a licence change for which agreement from companies would be required. Ofwat did not think that it was realistic that it would achieve agreement on such changes. Ofwat also suggested that the incentive properties of the GOSM still allowed an element of choice by management and avoided the need for Ofwat to set exact limits on gearing. It said alternative solutions, such as a hard stop on the level of gearing or tightening the credit rating requirements, were significantly more intrusive than the GOSM and would require licence changes to implement.<sup>3063</sup>

9.1172 Ofwat stated that since PR14 it has signalled that companies with less resilient structures should consider taking steps to improve financial resilience in the context of an expected lower allowed return at PR19.<sup>3064</sup> It said the sector had had two years notice of its proposals and four years since first consultation on gearing mechanism in 2016, and it had also raised concerns about financial resilience and excess gearing with individual companies.<sup>3065</sup> Ofwat said that the introduction of the mechanism had been subject to appropriate consultation and a full assessment of the benefits and costs. It considered that the potential costs to customers, and therefore the benefits of companies reducing gearing, are far higher than the transfer of benefits through the gearing mechanism.<sup>3066</sup>

9.1173 In its responses to the Provisional Findings, Ofwat said that as the CMA had identified a problem arising from high gearing rates, it was appropriate for the CMA to substitute a different mechanism, or amend the existing mechanism, rather than leave the concern unaddressed.<sup>3067</sup> It said that the CMA was obliged to take the regulatory framework as it finds it, and

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<sup>3062</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraphs 7.18–20

<sup>3063</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 7.23

<sup>3064</sup> [Ofwat's Response to common issues in companies' SoCs: Risk and return](#), paragraph 5.4 including box and Figure 5.1

<sup>3065</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 7.45

<sup>3066</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraphs 7.49–7.50

<sup>3067</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 7.7

therefore it was not sufficient for the CMA to simply encourage Ofwat to consider alternative approaches to addressing financial resilience.

### *The Disputing Companies*

- 9.1174 Anglian and Bristol stated that there is no evidence that customers or the taxpayer face a greater risk due to high gearing,<sup>3068</sup> while Northumbrian pointed to how highly leveraged companies had successfully weathered the global financial crisis.
- 9.1175 Northumbrian said the GOSM is not consistent with well-established corporate finance theory and regulatory precedent, that it would impact on a long-standing regulatory precedent to optimise financial structures; and so would impact on regulatory stability, thereby increasing systematic risk in the sector.<sup>3069</sup>
- 9.1176 Anglian and Bristol stated that Ofwat's GOSM was a significant departure from regulatory practice, which traditionally set a WACC according to a notional level of gearing and then allowed companies to pick an actual level of gearing that suits their specific needs.<sup>3070</sup> Anglian noted that in the Bristol PR14 Determination, the CMA stated that it was for the shareholders and the management of the company to determine the most efficient financial structure and not for the regulators to second guess.<sup>3071</sup>
- 9.1177 Anglian and Northumbrian stated that the GOSM was inappropriately applied to all companies, regardless of financial risk or operational performance, and that for both companies there was no risk or performance issue to be addressed by this mechanism. Northumbrian told us that it would be more sensible for Ofwat to target improvements in financial resilience only at companies it recognises as presenting problems, noting that gearing was unlikely to be the only element of financial resilience at a company that may cause Ofwat concern.<sup>3072</sup> Bristol had suggested to Ofwat (during the PR19 process), that it would be more effective to pursue a targeted approach following assessment of individual company needs.<sup>3073</sup>
- 9.1178 All four Disputing Companies stated that the GOSM is not compatible with the Modigliani-Miller approach to the WACC used by regulators and commonly used by investors and corporate finance professionals. Specifically,

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<sup>3068</sup> [Anglian SoC](#), chapter K section 3.1.2; [Bristol SoC](#), paragraph 685

<sup>3069</sup> [Northumbrian's response to the provisional findings](#), paragraph 323

<sup>3070</sup> [Anglian SoC](#), paragraph 1311; [Bristol SoC](#), paragraph 683; [Northumbrian SoC](#), paragraph 899

<sup>3071</sup> [Anglian SoC](#), paragraph 1314

<sup>3072</sup> [Anglian SoC](#), chapter K section 4.4

<sup>3073</sup> [Bristol SoC](#), paragraph 671

the companies submitted that it is inappropriate to suggest that shareholders can benefit from increasing the gearing at a company, and that the Modigliani-Miller WACC model suggests a broadly flat WACC across gearing levels because the associated cost of equity (the return required to offset increased risks borne by shareholders) rises as the weight of equity falls, offsetting any potential benefit for shareholders.<sup>3074</sup>

9.1179 Yorkshire said that as the CMA had found (in the Provisional Findings report) there was no financial benefit to companies from high gearing, the original purpose of the GOSM, to allow consumers to share in the benefits that Ofwat considered companies achieved from higher gearing, had dropped away and there was no regulatory gap to be addressed.<sup>3075</sup>

9.1180 Anglian stated that many parameters drive managers' financing decisions and thus a company's capital structure depends on a range of managerial choices rather than a theoretical optimum that could be determined in advance. It also stated, referencing Brealey, Myers and Allen,<sup>3076</sup> that 'trade-off' theory suggests that a firm's financial structure results from a trade-off between tax benefits derived from gearing up and costs of financial distress associated with higher debt.<sup>3077</sup> According to this theory, firms with safe and tangible assets will tend to gear up as their debt is backed up by safer assets.<sup>3078</sup>

9.1181 Northumbrian stated that the multiple drivers of gearing levels help to explain why there is such diversity of gearing levels across the industry, with only Dŵr Cymru sitting below 60% gearing on Ofwat's 2019 numbers. Northumbrian submitted that this diversity is a healthy feature of an incentive-driven sector.<sup>3079</sup> It stated that, counter to Ofwat's claim, the introduction of a single capital structure on a diverse range of companies may actually increase financing risk if Ofwat fails to select the most optimal level of gearing for all companies. In addition, the GOSM would effectively stop the process of discovery through competitive efforts of companies to reduce their financing

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<sup>3074</sup> [Anglian SoC](#), paragraph 1372; [Bristol SoC](#), paragraph 688; [Northumbrian SoC](#), paragraph 898; [Yorkshire SoC](#), paragraph 251

<sup>3075</sup> [Yorkshire's reply to responses to the provisional findings](#), paragraph 3.1.4

<sup>3076</sup> Allen, F, Brealey, RA and Myers, SC (2011), *Principles of Corporate Finance*, chapter 18 section 4

<sup>3077</sup> The four Disputing Companies pointed out that tax is accounted for separately within the price control, and that they do not receive any tax benefit from gearing (which may have been a justification for assuming increased returns to shareholders from increased gearing under a certain version of the Modigliani-Miller theorem), and that this ultimately benefits customers through lower bills. [Anglian SoC](#), chapter K section 3.2.2; [Bristol SoC](#), paragraph 690; [Northumbrian SoC](#), paragraph 904; [Yorkshire SoC](#), paragraph 254

<sup>3078</sup> [Anglian SoC](#), chapter K, section 3.3.2

<sup>3079</sup> [Northumbrian SoC](#), paragraphs 902–903

costs and optimise their governance arrangements. This would be to the long-term detriment of consumers.<sup>3080</sup>

9.1182 Northumbrian cited the example of COVID-19 as a shock which may require a business to temporarily increase gearing in the interests of customers. This increase in gearing may now be discouraged by the presence of the GOSM, potentially to the detriment of customers.

9.1183 Anglian and Yorkshire stated that customers benefit from the highly covenanted structures at companies with high levels of gearing, and that the GOSM threatens this. Anglian and Yorkshire suggested that highly-covenanted companies have de-risking features such as additional ring-fencing measures, enhanced rights for secured creditors, automatic standstill periods and contractual dividend restrictions.<sup>3081</sup> Anglian acknowledged that these benefits offset the increased risks associated with higher gearing rather than provide a net reduction in risk compared to a company at lower levels of gearing but without such additional protections, and so are neutral from a customer point of view. It said that Ofwat had previously acknowledged the benefit of highly covenanted structures and that their benefits are recognised by credit ratings agencies who allow a 1-notch uplift above comparable unsecured and uncovenanted water and sewerage companies.<sup>3082</sup> Anglian quoted a Moody's report<sup>3083</sup> that stated that highly covenanted financial structures mitigate a range of risks, including those associated with higher leverage.

9.1184 The Disputing Companies told us that Ofwat had sufficient tools at its disposal to ensure financial resilience. In particular, the recent licence change relating to the regulatory ring-fence ensures that any company that could be close to facing financial difficulty would go into a dividend lock-up, thereby protecting its customers.<sup>3084</sup> Northumbrian said that the risks were already addressed by the ringfence and the obligation on companies to meet the investment grade rating. Yorkshire said that there are a range of regulatory protections already explicit within the licence conditions<sup>3085</sup> and these were also recognised by the NAO in its review of the water sector and provides further evidence to support the finding that there are sufficient existing protections already in place.<sup>3086</sup> Bristol said that Ofwat already has the regulatory tools to challenge companies on dividend policies and to

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<sup>3080</sup> [Northumbrian SoC](#), paragraphs 906–908

<sup>3081</sup> [Anglian SoC](#), chapter K section 5.2 and paragraphs 1323-1324 & 1332-1335; [Yorkshire SoC](#), paragraph 274; [Yorkshire's Reply to Ofwat's Response](#), section 8.2.10

<sup>3082</sup> [Anglian SoC](#), paragraphs 1321-1325

<sup>3083</sup> [Anglian SoC](#), paragraph 1327

<sup>3084</sup> [Anglian's response to the provisional findings](#), paragraph 104

<sup>3085</sup> [Yorkshire's reply to responses to the provisional findings](#), paragraph 3.1.5

<sup>3086</sup> [Yorkshire's reply to responses to the provisional findings](#), paragraph 3.1.6



encourage lower gearing (such as targeted discussions and establishing reporting requirements with the relevant companies),<sup>3087</sup> and its concerns about gearing were matters of Ofwat's ongoing regulation, not consequences of price review processes.<sup>3088</sup>

9.1185 Anglian stated that despite the introduction of a glidepath over PR19, the introduction of a GOSM does not take into account the costs and impracticality of reducing gearing in a short period of time.

9.1186 Yorkshire disagreed with Ofwat's request after Provisional Findings that we should find an alternative approach to limiting the risks arising from gearing levels if we were going to reject the GOSM. It said that asking the CMA to review the whole of the regulatory framework around company financing inappropriately sought to push the CMA beyond the bounds of the specific questions for redetermination in this reference.<sup>3089</sup>

### *Third Party submissions*

9.1187 There were mixed views on the GOSM proposals among third parties. South East Water submitted that Ofwat already has measures in place to sufficiently safeguard resilience and protect customers, and that the GOSM would actually undermine financial resilience by reducing the allowed return for highly geared companies<sup>3090</sup> and leaving them with lower resources available for risk management. It said the fact that even highly geared companies were able to navigate the global financial crisis of 2008/09 without evidence of financial distress or impact on customers evidenced that companies are financially resilient.<sup>3091</sup> It stated that there was no financial benefit that needed to be shared with customers. It also stated that there are many potential reasons for an increase in average gearing within the sectors, including to impose discipline on management, to seek higher equity risk and to take advantage of lower debt costs.<sup>3092</sup>

9.1188 Thames Water disagreed that gearing above 65% implies a lack of financial resilience, citing a lack of evidence from Ofwat, and said that the rationale for the GOSM was inconsistent with corporate finance theory, penalises highly levered companies with more efficient debt management and abandons the regulatory principle that financial arrangements are a matter for

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<sup>3087</sup> [Bristol's response to the provisional findings](#), paragraph 242

<sup>3088</sup> [Bristol's reply to responses to the provisional findings](#), p9

<sup>3089</sup> [Yorkshire's reply to responses to the provisional findings](#), paragraph 3.1.7

<sup>3090</sup> [South East Water submission](#), p20

<sup>3091</sup> [South East Water's response to the provisional findings](#), pp11–12

<sup>3092</sup> [South East Water submission](#)

companies.<sup>3093</sup> Thames Water and Southern Water stated that the GOSM was not consistent with financial theory, and that its introduction effectively abandons a long-standing regulatory principle that financial arrangements are a matter for individual companies – severely penalising companies with capital structures that deviate materially from the notional gearing assumption.<sup>3094</sup> Thames Water also pointed out that the GOSM specifically penalises highly geared companies who have achieved more efficient debt costs, as the spread is based on the actual costs of debt (rather than the notional cost of debt allowance). It stated that the GOSM is ‘at the very least’ an act of retrospective regulation, as it penalises companies for past decisions without allowing an appropriate time period in which to adjust. Southern Water stated that it has taken 30 years for companies to get to their current capital structures, and it would be hugely expensive to make changes.<sup>3095</sup>

9.1189 The ENA<sup>3096</sup> agreed with the removal of the GOSM and the Global Infrastructure Investor Association<sup>3097</sup> said the GOSM was at odds with established regulatory precedent, principle and theory.

9.1190 In contrast, South West Water stated that it was ‘very supportive’ of Ofwat’s GOSM proposals, that it had introduced a voluntary sharing mechanism in PR14 and that a benefit sharing mechanism was an important element in building trust and confidence in the sector. South West Water stated that it had long believed that high levels of gearing were not good for the sector and do not offer customers the right level of protection.<sup>3098</sup> South West Water submitted that gains made by companies that are essentially ‘unearned’ and sit outside of the regulatory framework should be returned to customers at 100% (not the 50% in the GOSM). South West Water submitted that at 50%, shareholders may still be incentivised to either retain a higher level of gearing or, perversely, companies with lower levels of gearing may be incentivised to increase gearing.<sup>3099</sup>

9.1191 CCWater was also supportive of the GOSM proposals. It said based on 2019–20 gearing, six companies had gearing over the 74% threshold. It estimated by virtue of companies’ reported gearing and debt in the 2015–20 price control period, that the customer benefit of GOSM would have been over £450m over the price control period had the mechanism been introduced at PR14. It said dropping the GOSM would remove any customer share of the

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<sup>3093</sup> [Thames Water submission](#)

<sup>3094</sup> [Southern Water submission](#); [Thames Water submission](#)

<sup>3095</sup> [Southern Water submission](#)

<sup>3096</sup> [ENA’s response to provisional findings](#), paragraph 11.1

<sup>3097</sup> [GLIA’s response to the cost of capital working papers](#), p2

<sup>3098</sup> [South West Water submission](#), paragraph 200

<sup>3099</sup> [South West Water submission](#)



benefit of higher gearing and remove any additional incentive for companies to lower gearing, increase financial resilience or consider the customer interest on financing decisions, which was not in the customer interest.<sup>3100</sup>

9.1192 Citizens Advice said it agreed that excessive gearing could be harmful to customers (and/or taxpayers), and therefore that Ofwat may wish to discourage excessively high gearing levels, although it did not support the GOSM as the right response. It said the underlying regulatory concern with both water companies and banks is that the essential nature of their activities – and prospect of significant costs to society resulting from their potential failure – means that debt-holders might assume that they are protected in the event of failure. Accordingly, such debt-holders have limited incentives to prevent such failure.<sup>3101</sup> However, Citizens Advice said that Ofwat’s mechanism should chiefly be viewed as a penalty to companies for having high levels of gearing (on top of other existing regulatory and market incentives for excessive gearing). It suggested that the chief driver of highly geared structures and withdrawal of equity from the water sector has been excessively high levels of past returns. It said such gearing and withdrawal of equity was, a mechanism for investors to capitalise – and crystallise – high allowed returns as an up-front capital dividend to investors. It said large equity withdrawal from the sector has now substantially ceased. Hence, the benefits of highly geared structures have now been taken by previous cohorts of investors.<sup>3102</sup>

9.1193 CCWater<sup>3103</sup> and Citizens Advice<sup>3104</sup> both indicated in response to our Provisional Findings that we should find viable alternatives (to the GOSM) that addressed the adverse impacts on financial resilience.

## **Assessment**

9.1194 We now assess whether to keep the GOSM, as envisaged by Ofwat, remove the GOSM or replace it with an alternative mechanism to address issues related to the level of gearing at water companies.

9.1195 We recognise that regulators hold legitimate concerns about the financial resilience of the companies they regulate, and it is appropriate to consider the potential risks and consequences, for customers and taxpayers, of a default event before they occur. We also recognise that high levels of gearing may reduce financial resilience and transfer some risk to customers

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<sup>3100</sup> [CCWater's response to the provisional findings](#), paragraphs 5.20 & 5.22

<sup>3101</sup> [Citizens Advice further submission](#), p55

<sup>3102</sup> [Citizens Advice further submission](#), p54

<sup>3103</sup> [CCWater's response to the provisional findings](#), paragraph 5.18

<sup>3104</sup> [Citizens Advice further submission](#), pp55–56

and/or potentially taxpayers in the event that a company fails. In addition, there could be possible adverse consequences ahead of that occurring:

- (a) Highly geared companies when financially stressed have little equity buffer and so will likely cut back investment (to the disadvantage of customers) since they may find it difficult to raise additional new equity.
- (b) Over-leveraged capital structures could impede effective management of water companies,<sup>3105</sup> as they would be constrained by the risk of losing their investment grade credit ratings. For example, companies may need to increase their focus on cash generation at the expense of investment or improvements in service.
- (c) High leverage is sometimes accompanied by restrictive securitised structures. The structural arrangements of some of the investing funds may make it difficult to raise appropriate and substantial injections of new equity to recapitalise over-stretched structures.<sup>3106</sup>
- (d) Higher gearing may also reduce the ability of companies to adapt to changes in the regulatory framework.<sup>3107</sup>
- (e) Public confidence in the sector could be harmed.

9.1196 In deciding on whether to adopt the GOSM or some alternative within our determinations, we need to consider the level of risk that high gearing could result in costs to customers and taxpayers, both in the likelihood of the event and scale of costs incurred. We also need to address whether the causes of any risks have been correctly diagnosed and whether possible solutions would be effective and proportionate. It appears to us that Ofwat's case for the introduction of the GOSM rests on four propositions:

- (a) high gearing increases the risk of financial failure and the GOSM is an effective mechanism for dealing with this increased risk;
- (b) customers and/or taxpayers will bear disproportionately the costs of financial failure that may follow from high gearing;
- (c) customers should share in the benefit of high gearing; and

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<sup>3105</sup> Ofwat told us it saw this high leverage to be correlated for a good number of companies with poor or declining service and undue constraints on management. Source: [Ofwat's final submission: cover letter](#)

<sup>3106</sup> [Ofwat's final submission: cover letter](#)

<sup>3107</sup> Ofwat (2019), [PR19 final determinations: Aligning risk and return technical appendix](#), section 9.3.3

- (d) highly geared companies when financially stressed have little or no equity buffer and so will likely cut back investment (to the disadvantage of customers) since they will find it difficult to raise additional new equity.

9.1197 We address these in turn below.

*High gearing increases the risk of financial failure and the GOSM is an effective mechanism for dealing with this increased risk*

9.1198 We acknowledge that in principle, higher gearing levels increase the risk of financial failure. However, a number of mechanisms and incentives already exist that mitigate the risk that companies will choose high levels of gearing.

- (a) The existing regulatory requirement to maintain an investment credit rating is a material constraint on companies when they are setting their financial arrangements. We would expect this to influence and limit inappropriate gearing over time. With the falls in the cost of capital, we are seeing a number of water companies coming under pressure on their credit ratings as the rating agencies consider downgrading companies or putting them on watch. This threat may already be exerting pressure on management and shareholders to reduce gearing.<sup>3108</sup>
- (b) Ofwat has reduced the gearing ratio for the WACC (applicable to the nominal company) from 62.5% to 60%. While this does not directly influence companies' gearing, it has served as a regulatory signal to companies and to ratings agencies that the regulatory financeability assessment will not support high gearing and is moving in the direction of lower gearing. This provides some incentive to reduce gearing.
- (c) It is likely that as firms take on further debt, at high levels there will be attached covenants restricting further use of debt, imposing automatic standstill periods and contractual dividend restrictions, and acting as a constraint on management's freedom of action and future options. This acts as a deterrence to excessive gearing.

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<sup>3108</sup> As an example, Moody's placed 12 of the UK water companies and two holding companies on review for downgrade in December 2019. Moody's highlighted Ofwat's PR19 determination's significant cut in allowed return and challenging performance targets as issues that would weigh on credit quality. See Moody's, [Moody's reviews 12 UK water groups for downgrade webpage](#) for further details. In addition, Ofwat (2020), [Monitoring financial resilience report](#) shows on p4 that Dŵr Cymru, Southern Water, Thames Water, Wessex Water and Bristol all received downgrades to their credit ratings in 2020.

(d) Covenanted companies have de-risking features such as additional ring-fencing measures, enhanced rights for secured creditors, automatic standstill periods and contractual dividend restrictions.

9.1199 The risk of losses to investors from default itself imposes a powerful constraint on investors and management from taking inappropriate risk, even without regulatory intervention.

9.1200 There are already regulatory protections under the licence conditions that should help mitigate financial risks and their consequences:

(a) First, the regulatory ringfence (see paragraph 9.1167 and associated footnote), which protects the regulated entity from external events including matters relating to its wider corporate group (for instance restrictions on the inappropriate extraction of financial resources by shareholders at times of financial strain), and requires the water company to maintain certain financial and management disciplines (such as an obligation to maintain sufficient financial resources).

(b) Second, special administration (see paragraph 9.1167 and associated footnote) can apply where a company is unable to finance its functions and allows for the transfer the company's business as a going concern.

9.1201 The examples of Wessex and Dŵr Cymru discussed in paragraph 9.1168 show that these tools – specifically ring fence measures – have been successfully deployed without obvious harm to either customers or taxpayers.

9.1202 We also note that water companies have large physical asset bases and, by their nature, suffer from little variability in demand. This suggests relatively high levels of gearing are likely to be sustainable. The valuable asset base, combined with a suitable cost of capital, also suggests that there should be sufficient demand from alternative investors if individual company owners were to go into a special administration process.

9.1203 Gearing has varied over time across the industry, but overall has been at roughly its current level for 10–15 years. As agreed by Ofwat (see paragraph 9.1160), even highly geared water companies were able to navigate the global financial crisis of 2008/09, arguably the most difficult financing environment in modern history, without evidence of financial distress or impact on either customers or the taxpayer. Nor has the COVID-19 pandemic pushed the highly geared water companies into crisis. Thus, there is no evidence of the likelihood of the type of hypothesised issue ever arising despite these two major disruptive events. Nor have we seen any reason to believe that the level of gearing in any of the four Disputing Companies is likely to represent a significant threat to their viability.

9.1204 We do not consider that the GOSM is in any event well-designed to address any risks of financial failure that result from high gearing. The design of the GOSM is based on the sharing of 'excess returns' from high gearing with customers. It is therefore also implicitly sharing the 'risk' of high gearing. While this will create incentives on companies, it does not necessarily prevent companies choosing to run relatively high gearing, as would occur with the imposition of licence conditions limiting gearing. If a company chooses to retain relatively high gearing, the GOSM does nothing to reduce the risks associated with the level of leverage.

9.1205 We are not persuaded that such a sharing system which provides a discount to customers but does not necessarily substantially reduce that risk is appropriate. Rather, customers may reasonably expect that measures will provide for high resilience.

9.1206 It is also possible that the design of the GOSM could exacerbate some of the risks, by taking money away from companies that Ofwat believes have poor financial resilience. If the payments reduce cashflow in times of distress and companies cannot raise additional equity, this approach could harm resilience and increase gearing.

9.1207 We also note the GOSM addresses only the level of gearing, whereas in practice there are other factors (for example, the types of debt instrument - such as derivatives - used, short maturities on debt, or issues related to the financial position of shareholders) that can influence the financial resilience of a water company and would therefore not be addressed by the GOSM. It is therefore possible that gearing, certainly in isolation, may not be the key unmet resilience issue. Therefore, there is a risk that even with the GOSM companies could still adopt financial structures that leave in place the risks that Ofwat is aiming to address.

*Customers and taxpayers will bear disproportionately the costs of financial failure that may follow from high gearing*

9.1208 Ofwat's view is that customers and taxpayers will bear disproportionately the costs of financial failure that may follow from high gearing.

9.1209 We recognise that the quantification of risks is difficult but we have not seen evidence suggesting that material harm to customers is likely should further default events occur in the water sector. Also, there is a very limited history of default by regulated companies. We do not consider the Railtrack or Metronet examples cited by Ofwat (see paragraph 9.1169) as particularly compelling given the significantly different circumstances and regulatory

framework in place for water companies compared with these entities.<sup>3109</sup> In the sectoral cases of Enron's distressed sale of Wessex Water in 2002 and Dŵr Cymru's sale by parent Hyder in 2001, we have not seen evidence that significant losses were transferred to either customers or taxpayers, albeit these sales were primarily driven by events outside the regulated entity. The root causes of the disposal of these entities was different from the problem that the GOSM is designed to address. We are also unpersuaded by the relevance of the DTI report in demonstrating that there is an evident problem of the potential for systemic industry crisis.<sup>3110</sup>

9.1210 The existing regulatory licence protections also mean that customers are less likely to bear these costs. As noted in paragraph 9.1167, the licence conditions requiring the ring-fencing of the regulated operations mean that the impact of Group problems are not likely to fall on customers or taxpayers. Special administration should allow water services to continue to be supplied to customers. Also, in terms of continuing operations, we note that the operation of water businesses in a regulated environment carries many attractions for investors; demand is stable, revenues are set in a regulated process, and a return is assured on the substantial regulated capital base. This indicates that it is likely that new equity investors could be readily found for a failed business. These factors do not indicate that customers are likely to bear disproportionately the costs of financial failure.

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<sup>3109</sup> Metronet had poorly structured PPP contracts, see for example House of Commons Committee of Public Accounts (2010), [Department for Transport: The failure of Metronet](#) which found the Department for Transport's (the Department's) oversight and management of risk on the Metronet contracts were inadequate. The causes of Railtrack's administration were possibly more varied (see House of Commons Library (2010), [Railways: Railtrack, 1994-2002](#)) but included asset condition and maintenance challenges, poor management, regulatory errors and Government control over investment decisions. These examples are not therefore illustrative of gearing risks or the water sector.

<sup>3110</sup> The DTI report is a valuable stocktake of the history of privatisation, regulation and the growth of leverage at the time it was written, in 2004. However, the theoretical concerns raised in the report are not obviously relevant to the water industry today and the question of whether or not the GOSM should be imposed. The report for example explores whether there might be the potential for 'systemic industry crises' in the regulated utilities due to high leverage (p25). However, nearly 20 years later we have seen no evidence that any such crises have occurred. This is despite the very significant financial shock that resulted from the global financial crisis in the intervening years, at a point in time when many of the water companies were already highly leveraged. Similarly, nearly a year into the COVID-19 crisis we have not seen any evidence of widespread financial distress in highly leveraged regulated utilities in general, or more specifically in the highly leveraged Disputing Companies involved in this procedure. The report is also in important respects outdated. For example, when considering the issue of the potential for risk transfers from investors to customers and taxpayers, the report notes that requirements for investment grade credit ratings would help limit the risk of such transfers. The report states that (at the time of writing) OFWAT had attempted to introduce this condition, but the proposals had been withdrawn (p34). This has now been applied, see paragraph 9.1184.

*Customers should share in the benefit of high gearing*

- 9.1211 The GOSM has been designed on the assumption that there is a certain level of outperformance from higher gearing which can be paid to customers.
- 9.1212 Ofwat was not able to present any analysis to identify and quantify any excess benefits from high gearing structures. It is consistent with corporate finance theory that the cost of equity will increase with gearing, and the GOSM that Ofwat has implemented, which assumes the cost of equity is broadly stable with gearing above a certain level, is not consistent with this theory.
- 9.1213 We note that the bulk of representations we have received in this area have centred on the application of the Modigliani-Miller approach to WACC, which suggests that the overall WACC is largely invariant to the level of gearing deployed, outside of tax, which is addressed separately through the tax clawback mechanism. Ofwat appears to have focused on the higher returns earned per unit of equity at higher levels of gearing, while the Disputing Companies have focused on the largely invariant WACC element of the calculation, suggesting that any increase in returns earned by equity holders is matched by increased risks to shareholders of volatile returns.
- 9.1214 We acknowledge that some observers believe a benefit arises from high gearing which could be shared, but we do not agree with Ofwat's characterisation of that benefit. Ofwat's approach of a 'sharing mechanism' with 50 per cent of the difference between the cost of equity and the cost of debt being passed to customers assumes that the cost of equity is invariant with gearing once borrowing increases above the trigger level of 70%. This assumption is difficult to reconcile with accepted finance theory. In Appendix D, we explain why Ofwat's economic approach to the application of the Modigliani-Miller theory in the GOSM is inconsistent with its own approach to estimating the cost of equity and WACC, and with standard regulatory practice in the UK. We accept the broad tenets of the Disputing Companies' interpretation of the Modigliani-Miller theory, specifically that increased per-unit returns earned by shareholders in a highly-g geared structure come with associated and offsetting risks to those returns (at least when dealing with a level of gearing that does not lead to material costs of financial distress or failure).<sup>3111</sup> We also accept that, as rising gearing leads to increasingly expensive equity being replaced with lower-cost debt, the assumption which is

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<sup>3111</sup> That is, rather than companies making 'extra' money at higher levels of gearing (profits may even decline because of the higher cost of debt payments), it seems more likely that they make the same amount of money but the return per unit of equity increases at a higher overall risk (where risk means variability of returns).

most consistent with the generally accepted approach to the cost of capital is that the WACC should be broadly unaffected by gearing.

9.1215 Overall, we have not seen evidence that shows that highly geared companies have achieved overall WACCs substantially lower than the notionally geared company, such that their shareholders are extracting enough excess returns on an ongoing basis to justify the benefit sharing functions of the GOSM as calibrated for PR19. Ofwat has not provided any analysis of what the associated risks with miscalibrating this mechanism may be.

9.1216 If there are no material excess benefits, then there is no 'sharing' within the GOSM and the sharing element underpinning the design of the mechanism falls away. Therefore, it appears from an investor's perspective that the mechanism in effect acts as a tax on gearing. While such a tax provides incentives, it may not remove the incentive to adopt higher gearing rates because only a proportion of the supposed benefits are allocated to customers. If the benefit of higher gearing was 'free' to the company, then it would be irrational for the company to give it up even if partly 'shared' with customers. Therefore, it is possible that the mechanism does not in practice effectively provide the protections that it is supposed to achieve if high gearing rates are none the less adopted by companies. In such a situation, the GOSM could then exacerbate problems because it would have the effect of taking cash away from the company at a time of financial stress.

*Highly geared companies when financially stressed have little or no equity buffer and so will likely cut back investment*

9.1217 This scenario could result in harm to customers where highly geared companies become financially distressed and have insufficient cash resources to support ongoing investment in the business. An inability to raise new equity to support investment in such a situation would be a significant concern.

9.1218 While plausible, we consider this scenario to be unlikely where the cost of capital is set correctly. With an appropriate cost of capital - and given the circumstances within the water industry of highly stable demand and revenues - this situation of financial stress is less likely to occur, and equity investors will likely have an appetite for water investments over a broader range of circumstances, including more adverse circumstances, than in unregulated sectors.

9.1219 We note that we are satisfied that the four Disputing Companies are financeable under our determinations, see paragraph 10.134



9.1220 Ofwat should also be able to place weight on Directors declarations on adequate access to financial resources. Companies are required to confirm in their business plans that they are able to finance themselves on the basis of actual rather than notional gearing. This is likely to prevent companies from approaching the circumstances we are describing. To be effective this requires that the declarations are properly founded and are fully checked by Ofwat.

9.1221 Ofwat's governance and annual performance reporting also provides scope for targeted interventions to mitigate this risk should any company find itself in such an extreme position.

### **GOSM – CMA assessment**

9.1222 For the reasons set out above, our decided not to adopt the GOSM (or adaptations to it) in our determinations.

9.1223 Our assessment found that there is weak evidence of a regulatory gap after considering the range of relevant regulatory tools. We acknowledge there is a risk that gearing can be too high. However, in this case, for the Disputing Companies and within the foreseeable future, we have not been presented with evidence demonstrating that either the risks or consequences of these companies experiencing financial failure are likely to be large. To the extent that there are risks of financial failure, we also have doubts over the effectiveness of the proposed mechanism to improve financial resilience - it does not reduce or eliminate financial risks (which in any event may not be exclusively caused by high levels of gearing) and may even exacerbate them. Further, the notion of sharing the benefits of higher gearing which underpins the mechanism's design is not supported by finance theory or practice. We are also concerned that a GOSM as proposed by Ofwat would represent a significant break from a well-established regulatory approach without offering enough evidence to justify doing so.

9.1224 There are different options open to Ofwat to address any concerns it may have about the consequences of high gearing and other factors affecting financial resilience. These include licence modifications which could be defined to directly limit gearing.<sup>3112</sup> While we cannot rule out that Ofwat may need to intervene at some time in the sector to reinforce its financial resilience

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<sup>3112</sup> This could for example be an absolute limit on gearing at some level above 70%. In general, financial resilience is addressed by regulators through licence conditions. We acknowledge that licence changes cannot be simply imposed by Ofwat (it requires the companies' consent, or the issue is referred to the CMA), and therefore easy implementation cannot be assumed. However, the fact that there are checks on the use of powers by Ofwat, does not, we consider, imply that we should accept the use of other measures which are less appropriate.

and that this may or may not involve some constraint on gearing, neither Ofwat nor any other party has presented us with sufficient evidence that an intervention on gearing is required within this price control in respect of the four Disputing Companies.

9.1225 In response to Ofwat's challenge that we should find an alternative to the GOSM (see paragraph 9.1173), we do not agree. We have not been convinced that the risks of high gearing for the Disputing Companies in current circumstances merit any additional mechanisms over and above those that are already available to Ofwat. Further, the fact that Ofwat chose to implement its proposed mechanism through the price control would not oblige the CMA to adopt the same approach. Other approaches outside the price control might be a better way to address the issues that concern Ofwat, but, even if we were convinced of their importance, such approaches are not within the scope of this redetermination.

## Selecting a point estimate of the cost of capital

### *A background to determining a point estimate for the WACC*

9.1226 There is a regulatory history of setting the cost of capital by using a range, and then picking a point estimate from the top half of that range, both in the UK and internationally. An approach of picking a point estimate higher than the midpoint was used in previous determinations by each of Ofwat, Ofgem and the CC/CMA. Examples include:

#### *Ofwat's PR04 determination*

We believe the evidence supports a cost of capital in the range of 4.2% to 5.3% post-tax. Companies need to access a wide range of sources of finance in order to fund their capital programmes and we would not wish to preclude them from doing so.

Consequently, we have used a cost of capital towards the high end of the range but not at the, on top. Our judgement is that a cost of capital of 5.1% (real post-tax) should allow companies to maintain access to the capital markets at reasonable rates and enable the water industry to remain attractive to a diverse range of finance, including equity.<sup>3113</sup>

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<sup>3113</sup> Ofwat (2004), [PR04 Final determinations](#), p220

### *Ofwat's PR09 determination*

The weighted average cost of capital includes a 7.1% post-tax cost of equity derived from measurements of the risk-free rate, equity risk premium and asset beta estimates. Our final determination cost of equity is at the high end of the Europe Economics pre-marked-up range (3.5% to 7.2%), but we believe that it is necessary to allow the industry to maintain access to finance in difficult economic times. This takes into account general expectations that current economic conditions will continue in the early part of 2010-15 and the need to ensure the cost of equity is sufficient to both keep equity in the sector and attract new equity.<sup>3114</sup>

### *Ofwat's PR14 determination (TMR)*

Regulatory decisions on TMR: there have been some developments regarding TMR both before and after the publication of the risk and reward guidance. The Competition Commission maintained their TMR range of between 5.0% to 6.5% between NIE's draft and final determination, but moved from the middle to the top of their range (6.5%). Ofgem, following a consultation on TMR, revised down their estimate of the cost of equity from 6.3% to 6.0% for ED1 draft determinations – holding beta constant, a TMR of 6.5% could be inferred. The ED1 final determinations maintained a 6.0% cost of equity. Overall we have decided not to change the 6.75% assumption for the TMR. We do however recognise that this remains at the upper end of any estimate based on the recent regulatory precedents.<sup>3115</sup>

### *CMA NIE determination in 2014 – the last full CMA redetermination*

We consider that the lower bound of 5 per cent for the expected return on the market was less well supported than the upper end of the range of 6.5 per cent. We consider that the weight of evidence tended to support numbers between 5.5 and 6.5 per cent for the expected market return. While we decided to retain 5 per cent as a possibility, we were less confident with this estimate

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<sup>3114</sup> Ofwat (2009), [PR09 Final determinations](#), p128

<sup>3115</sup> Ofwat (2014), [PR14 Final determinations – A7 Risk and reward](#), p34

and, as a corollary, with numbers at the low end of the WACC range.

Additionally we noted that the inflation assumption that we adopted in computing the cost of debt, based on OBR forecast inflation, was higher than indicated by some market-based forecasts. (See paragraph 13.24) While we considered that our use of the OBR forecast was reasonable and consistent with its use in other aspects of the price control, we acknowledge that the OBR estimate may be towards the upper end of the range. Given that a lower inflation forecast would tend to increase the real cost of debt and thus the WACC, we consider that this supports the choice of a number towards the upper end of the WACC range.

Bearing in mind the available evidence and other aspects of our final determination (see Section 17), we adopted the upper end of this range, 4.1 per cent, as the WACC for RP5.<sup>3116</sup>

9.1227 We also note that, while the 2018 UKRN report<sup>3117</sup> focussed on the cost of equity, the report explicitly identified reasoning for choosing a point estimate at a higher percentile than the 50<sup>th</sup> percentile in the range where the benefits of promoting efficient investment outweighed the costs. The authors did not identify any specific measures for determining the point estimate but provided a framework for calculating the point estimate. The views in the UKRN report can be summarised as that there is a case for a higher cost of equity where appropriate to promote investment, but this is more limited than indicated in a number of past regulatory decisions in the UK. This is, in their view, in part because the case is limited further by the extent to which regulators are able to incentivise investment through means other than setting the regulatory allowed return (RAR).<sup>3118</sup>

9.1228 A summary given in the UKRN report of the approach to assessing the case for aiming up is:<sup>3119,3120</sup>

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<sup>3116</sup> Competition Commission (2014), [NIE RP5 final determination](#), paragraphs 13.187-13.189

<sup>3117</sup> Wright, Burns, Mason and Pickford (2018), [Estimating the cost of capital for implementation of price controls by UK Regulators](#)

<sup>3118</sup> The regulatory allowed return (RAR) is described by the UKRN report authors as corresponding to what has in the past typically been referred to as the "allowed WACC". The RAR is described as the return on the regulatory asset base before allowing for the impact of outperformance or underperformance on cost or service level.

<sup>3119</sup> Wright, Burns, Mason and Pickford (2018), [Estimating the cost of capital for implementation of price controls by UK Regulators](#), p72

<sup>3120</sup> Two of the UKRN report authors (Wright and Mason) have indicated that they do not support the CMA's approach in this case, as discussed in paragraph 9.1350.

... if the regulator was only interested in incentivising new investment, for a range of different assumptions on the nature of demand for the regulated good, the RAR would be set at a value such that the regulatory expected return (RER)<sup>3121</sup> was above the 90th percentile of the regulator's range of estimates of the true WACC. However, it also argues that for sunk investment future financeability simply requires that existing capital earns the expected WACC— of which our best estimate is the midpoint of the range. So the target value of the RER should reflect the balance between new and sunk investment.

9.1229 In the recent round of price reviews, there is less direct evidence of regulators selecting a wide range and then deciding where in that range to choose the point estimate, in other words, whether to choose the midpoint or, as per the examples above, a point estimate in the top half of the range. Neither Ofwat's PR19 cost of capital assessment<sup>3122</sup> nor the CAA's PR3 Final Determination for NATS<sup>3123</sup> appear to comment on the question of where within the estimated range to set the WACC or cost of equity, and instead focus on identifying a suitable point estimate. Although there is no explicit reasoning provided, we note the following background to the Ofwat and CAA decisions:

- (a) First, as suggested by Ofwat, that there has been extensive evidence from market prices of publicly traded shares and private transactions, commonly described as MARs. Ofwat said that these trading prices indicate that actual returns through the cost of capital allowance are at least as high, and likely to be higher than required by investors, including following Ofwat's announcement of its cost of capital.<sup>3124</sup> We noted the evidence from MARs in our Provisional Findings, but we concluded it was not sufficient to counteract the arguments for picking an estimate about the midpoint, for reasons discussed below.
- (b) Second, that the level of detail associated with the calculation of the individual parameters comprising the estimation of the regulatory allowed WACC, combined with experience over multiple price control calculations, should mean, other things being equal, that there is greater confidence over time that the level of the cost of capital has not been set too low; and

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<sup>3121</sup> RER is the regulatory expected return. It is defined by the authors as the regulatory allowed return (RAR) "plus any expected increase to returns, mostly arising from outperforming the cost and service targets set by the regulator".

<sup>3122</sup> Ofwat (2019), [PR19 final determination: Allowed return on capital technical appendix](#), section 1.1

<sup>3123</sup> CAA (2019), [UK RP3 CAA Decision Document](#), chapter 7

<sup>3124</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraphs 2.8-2.11

- (c) Third, that following multiple periods of what appear to have been strong returns to investors, there is greater confidence in the regulatory regime and less need to ‘aim up’ with the broad aim of providing reassurance to investors. In the context of perceived high returns to investors, external reviews of regulators’ performance including by NAO<sup>3125</sup> and Citizens’ Advice<sup>3126</sup> have put more pressure on the regulators to ensure value for money when setting the cost of capital. At the same time, we note that the NAO identified that Ofwat had set the cost of equity at PR09 towards the top of the range, and does not appear to have raised concerns about this: its concerns were about the approaches to debt, inflation and taxation, all of which had led to windfall gains for the companies.

9.1230 The decision on the point estimate can be taken:

- (a) At the overall level of the cost of capital (or overall cost of equity and/or debt allowances); or
- (b) At the individual metric level.

Both approaches have the same impact on companies and customers in that they move the cost of capital allowance away from the midpoint estimate of allowed return.

9.1231 New Zealand energy regulation contains one of the clearest examples of explicitly adjusting the overall WACC outcome (rather than the individual metrics). The New Zealand Commerce Commission (NZCC) follows a policy of setting regulatory price controls in energy based on the 67<sup>th</sup> percentile of the WACC range. The NZCC suggest that it is appropriate to use a WACC significantly above the mid-point estimate for price-quality path regulation, stating that the potential costs of under-investment from a WACC that is too low are likely to outweigh the harm to consumers (including any over investment) arising from a WACC that is too high.<sup>3127</sup>

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<sup>3125</sup> National Audit Office (2015), *The economic regulation of the water sector*

<sup>3126</sup> Citizens Advice (2019), *Monopoly Money: How consumers overpaid by billions*

<sup>3127</sup> In the UK, Dobbs (2011), *Modeling welfare loss asymmetries arising from uncertainty in the regulatory cost of finance* forms the foundation for much of the customer harm debate. Dobbs concludes that there are two reasons for setting the appropriate allowed rate of return (AROR) above the mean value of the WACC distribution— firstly, because the value that maximizes economic welfare generally lies to the right of the mean of the WACC distribution – and secondly, because expected economic welfare is an asymmetric function; given the precise value of the optimal AROR is uncertain, for each percentage point the AROR is inadvertently set above the optimum, the welfare loss is less than that which arises from setting it an equal number of percentage points too low. It follows that the allowed rate of return on new investments should generally be set at a significantly higher percentile value of the WACC distribution – that is, at percentile values in the high 80s or 90s. Where the AROR is likely to be applied to business which involves a mix of both new and old assets, the proportions of sunk vis a vis new investment potential within the RRP will naturally influence the extent of uplift in the optimal choice of AROR compared to the WACC mean. However, the asymmetry in the welfare function for new investment (vis a

9.1232 NZCC states that the main reason to set a WACC percentile above the mid-point is to mitigate against the risk of under-investment relating to service quality generally, and of under-investment contributing to major supply outages in particular. However, compared to setting the WACC at the mid-point, a WACC uplift should also reduce the risk of under-investment in other types of investment as well.

9.1233 NZCC also notes that overseas regulators often exercise judgement by adopting a WACC above the mid-point of the range, sometimes by using estimates of individual parameters which are generous in favour of suppliers.<sup>3128</sup>

9.1234 We note that the New Zealand example pertains to energy rather than the water sector. Water and sanitation remain public services in New Zealand, so there are no comparable water price controls using the 67<sup>th</sup> percentile approach. The UKRN report also noted the New Zealand example, and did not identify any other practical examples where regulators had sought to measure the right level in a range using an analytical framework, rather than using judgement to determine the right level.

9.1235 In submissions in this determination, Ofwat and Ofgem highlighted that a more recent NZCC decision on fibre access proposed an alternative approach, with the cost of equity set at the midpoint.<sup>3129</sup> Our view is that this does not fully reflect all the relevant analysis in the NZCC decision, which explicitly recognises the differences between the effects of failure on the electricity network and the fibre network. Our reading of the NZCC's decision is that it recognises that the question on whether to set a point estimate above the midpoint is dependent on factors specific to the sector and the wider regulatory framework.<sup>3130</sup> As such, this is consistent with the approach that the CMA has taken in this and other determinations.

### ***Relevant considerations when setting the point estimate for the WACC***

9.1236 The key considerations for the CMA in setting a point estimate for the WACC are:

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vis that for sunk investment) is so strong that even if the proportions of potential new investment are quite small, this can still induce a significant uplift in the optimal choice for the AROR compared to the WACC mean.

<sup>3128</sup> Commerce Commission New Zealand (2014), [Amendment to the WACC percentile for price-quality regulation for electricity lines services and gas pipeline services](#), paragraphs X17-X20

<sup>3129</sup> Ofgem's response to the provisional findings, paragraph 10 including Figure 1; Ofwat's initial response to the cost of capital working papers, paragraph 1.15

<sup>3130</sup> Commerce Commission New Zealand (2020), [Fibre Input Methodologies-final decisions reasons paper](#), p495

- (a) The financing duty: the cost of capital needs to be sufficient for an efficient firm to finance the performance of its statutory functions;
- (b) The consumer objective: the protection of consumers; and
- (c) The resilience objective: if significant investment is required in resilience, the cost of capital needs to be sufficient to provide incentives to the firms to meet those investment requirements.

9.1237 In balancing these considerations, the CMA must determine what level of cost of capital is sufficient to achieve the benefits associated with the financing and resilience duties without being over-generous (and therefore potentially conflicting with the consumer objective which may be better served by a lower cost of capital resulting in lower bills).

*The cost of capital is subject to parameter uncertainty*

9.1238 The aim of any cost of capital determination is to set a point estimate for the cost of capital, which is then translated directly into returns for investors. We consider that the best approach to doing so is to use the CAPM in order to estimate the appropriate returns to equity.<sup>3131</sup> However, we note that use of this model comes with parameter uncertainty. The CAPM cost of equity is not directly measurable and the parameters are subject to both theoretical debate and statistical uncertainty.

9.1239 We follow the approach of all previous CMA redeterminations of recognising this parameter uncertainty by selecting a range for the key parameters.

9.1240 Arguments for picking a point estimate higher than the midpoint include:

- (a) To promote short- or long-term investment in the water sector, and address the risk of an exit of capital if the cost of equity is set too low;
- (b) To reflect structural asymmetry in the overall determination, specifically around the definition of ODIs; and

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<sup>3131</sup> As the cost of debt allowance is predominately set by or heavily influenced by historical metrics (embedded debt costs and proportion of existing debt to be refinanced), and as the cost of new debt is subject to a true-up mechanism through AMP7, we feel comfortable setting one central estimate for our cost of debt allowance. In picking a point estimate for the WACC we focus on the much more uncertain cost of equity, which is an estimate of an unknown future costs based on a series of underlying estimates.



- (c) To take into account a cross-check on market data and financeability ratios.

9.1241 In the following paragraphs we will examine the evidence and views submitted by Ofwat, the Disputing Companies and Third Parties in relation to these arguments and provide our own analysis of the costs and benefits of picking a cost of capital other than the midpoint of our range.

### ***Promoting Investment***

#### ***Ofwat***

9.1242 Ofwat stated that the CMA's provisional decision to set the cost of equity 50bp higher than the midpoint was equivalent to a £1.9 billion increase in the cost to customers during AMP7 if applied across the sector. Ofwat said that any benefits from doing so have not been demonstrated, and in any case that any positive impact has not been shown to be enough to outweigh this cost.<sup>3132</sup>

9.1243 Ofwat said that there is no benefit in the water sector from providing enhanced incentives for investors to put money into the businesses, either now or over the longer term. Ofwat said that there are clear mechanisms to encourage investment within the price control process, and that there is limited or no evidence that companies will do more if it sets a higher cost of capital.<sup>3133</sup>

9.1244 In support of this, Ofwat commissioned a report from Brian Williamson, a telecoms consultant. Williamson summarised the relevant consideration for using a higher cost of capital to promote investment as follows:<sup>3134</sup>

To promote investment where the consumer and social costs of more versus less investment are asymmetric, for example where insufficient investment might involve insufficient supply leading to shortages or significant environmental harm. In this case aiming up is one way of compensating for the asymmetry of consequences of not investing.

9.1245 In Williamson's view, the reasons for aiming up on this basis in the water sector are insufficient because:

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<sup>3132</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 3.12

<sup>3133</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 3.11

<sup>3134</sup> Williamson (2020), [Aiming up on the WACC and prices: the welfare and incentive impacts for the water industry](#)

- (a) There is extensive external scrutiny of water investments, by the Environment Agency as well as Ofwat and others;
- (b) In the current period, this suggests that investment is optimal, and anything that results in a WACC above the expected level will result in over-investment;
- (c) Beyond the current period, or even in the case of a significant shock during the current period, there are existing levers which could be triggered to promote investment;
- (d) Whilst there is a theoretical risk that setting the WACC estimate too low could lead to a collapse in investment involving asymmetric welfare costs, in practice this seems most unlikely, given existing approaches to estimation of the WACC and aiming straight in setting price controls.

9.1246 Ofwat's advisors, Europe Economics, also suggested that the efficacy of aiming to encourage investment depended on the nature of the sector in question. Europe Economics argued that one key reason given for aiming-up in sectors such as communications is that the costs to consumers of delays in new products when prices are slightly too low (because the WACC has been under-estimated) are greater than the costs to consumers of prices being slightly too high (because the WACC has been over-estimated). However, water is intrinsically a much simpler product, and many of the most relevant innovations are those that reduce water prices or make services more reliable rather than providing profoundly new products. Europe Economics stated that this means, other things being equal, we should expect the optimal degree of aiming up to be materially less in the water sector than is the case for sectors such as communications.

9.1247 Ofwat made an additional point relating to the additional risk that can arise if the cost of capital is set too high. A high return on existing assets may result in a premium for current shareholders, if it is expected to continue over multiple periods. If current shareholders sell out to a new investor on that basis, then the new investor gets no benefit from the aiming up, as it has been reflected in the asset price, and also faces the additional risk that the level of aiming up changes over time. In other words, a higher cost of capital in AMP7 is less likely to have a benefit in terms of attracting new investors to acquire stakes in the companies, although it provides incentives for existing investors to put in new equity or forego dividends and grow the RCV.

9.1248 Ofwat cited PwC<sup>3135</sup> and McKinsey<sup>3136</sup> reports which suggested that there was significant and sufficient investor demand for infrastructure investment. The PwC report referenced \$200 billion of capital raised in 2019, with a marked upward trend. The McKinsey report commented that fund raising in private infrastructure had grown faster than any other asset class (at 17% annual) in the past 5-years, noting that many investors seek infrastructure opportunities which many believe offer government bond-like risk coupled with superior yields. The McKinsey report also noted that capital committed but not deployed had growth by 14% annually since 2014.<sup>3137</sup>

9.1249 Both Ofwat<sup>3138</sup> and Ofgem<sup>3139</sup> suggested that aiming materially higher than the midpoint would put the CMA at odds with recent regulatory settlements from similar regulatory regimes from across the world. In particular, Ofwat noted Moody's research in relation to European regulatory allowed returns of 6% nominal and Australian nominal return falling to the 'mid-4% areas for the five-year period starting in July 2020'.

### *Disputing Companies*

9.1250 The Disputing Companies' primary submissions were that the CMA had not, in practice, suggested a point estimate higher than a more realistic (in the opinion of the companies) midpoint of the likely cost of equity. In broad terms the companies agreed with the CMA's focus on ensuring adequate investment in the sector.

9.1251 Anglian made reference to the Department for Environment, Food and Rural Affairs (Defra)'s SPS, which it considered requires us to 'sustain long term investor confidence in the sector with the aim of protecting customer interest'.<sup>3140</sup>

9.1252 Northumbrian noted that a deficit of investment would clearly not be in the long-term customer interest, and quoted the National Infrastructure Commission's 2018 report as highlighting that with the costs of drought estimated between £25 billion and £40 billion, it was worth spending upfront to avoid such a risk. The report suggested that the cost of proactive long-term resilience improvements range from £18 billion to £21 billion.<sup>3141</sup>

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<sup>3135</sup> PwC (2020), [Unlocking capital for Net Zero Infrastructure](#)

<sup>3136</sup> McKinsey (2020), [A new decade for private markets](#)

<sup>3137</sup> [Ofwat's submission following the second main party hearings – risk and return](#), paragraphs 2.5-2.8

<sup>3138</sup> [Ofgem's response to the provisional findings](#), paragraph 10 including Figure 1. [Ofwat's response to the provisional findings – risk and return](#), paragraphs 2.16-2.17, including Figure 2.4

<sup>3139</sup> [Ofgem's response to the provisional findings](#), paragraph 10

<sup>3140</sup> [Anglian's response to the provisional findings](#), paragraph 381

<sup>3141</sup> [Northumbrian's final response to the cost of capital working papers](#), paragraphs 35-36

9.1253 Northumbrian also noted that in an environment where the cost of capital is set too low, management teams would be more incentivised to look at more short term ‘sticking plaster’ type investment approaches versus more appropriate and sustainable long-term investment strategies.

9.1254 KPMG, on behalf of the companies, submitted that PwC’s analysis<sup>3142</sup> demonstrated that the toughest price control settlements (more specifically PR99) with the lowest financeability ratios had led to significant underperformance or underspend relative to the capex allowance, as demonstrated by Figure 4.4 of the October 2020 PwC report.

### *Third Parties*

9.1255 Citizens Advice disagreed with the CMA’s concerns about risk to long-term investment and capital availability should the cost of capital be set ‘too low’. Citizens Advice stated that setting the cost of equity at the mid-point of the cost of equity range would not create a material risk of the cost of capital being too low – and that this risk should be addressed by regulators by mechanisms such as requiring delivery outcomes, reconciliation adjustment processes and forms of enforcement.

9.1256 Citizens Advice countered arguments about the potential benefits to customers from ensuring investment by stating that that COVID-19 presented a material risk to customers’ ability to pay their water bills. Citizens Advice quoted Ofwat’s assessment that aiming above the midpoint would cost customers approximately £1 billion if the CMA’s approach was applied across the sector, and stated that any decision would also need to reflect the impact on additional consumer costs. Citizen’s Advice also noted that companies could address any apparent in-period underfunding via reopener processes.<sup>3143</sup>

9.1257 Ofgem stated that, in its view, an allowed return on capital that materially exceeds the cost of capital does not appear to be an effective or targeted method of securing higher investment, particularly in the absence of agreed or specified investments.

9.1258 Ofgem highlighted the NAO report into RIIO-1 published in 2020, in which the NAO concluded that Ofgem had ‘aimed-up’ its cost of equity allowances. Ofgem stated that the result of this aiming was that licensees consistently underspent their allowances and did not undertake further investment. Ofgem concluded from this that once a price control is set, the

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<sup>3142</sup> PwC (2020), [Review of the relationship between financing allowance and water company performance](#),

<sup>3143</sup> [Citizens Advice response to the cost of capital working papers](#), pp2-3

totex incentive tends to dominate the cost of capital in governing levels of spending by networks. For instance, it is possible to show that in order to counteract a totex incentive rate of 50% at the margin (in other words, to encourage a network company to spend more than it needs to in order to meet its licence obligations and quality of service targets, just so that it can add to its RCV, it would take many years for the surplus earned under aiming up (say 0.5% above the cost of capital) to outweigh the benefit of underspending, as remunerated through the incentive.

9.1259 Ofgem recognised that the CMA's concern may be that companies faced with a powerful totex incentive may inefficiently underspend (ie not invest enough) during AMP7 in ways that cause consumer detriment if the cost of capital is set too low. However, given that the consumer interest is protected by quality of service targets and licence obligations, Ofgem considered it was difficult to see how this could happen without companies facing high fines or penalties from breaching their obligations and targets.

9.1260 Ofgem suggested that if identification of future investment projects remained a material concern for the CMA then a more targeted approach to incentivise planning and identification of projects would be more appropriate than an adjustment to the allowed return.<sup>3144</sup>

9.1261 The CMA also received a number of submissions from infrastructure investment organisations and individual investors, some of whom have current investments in the four Disputing Companies. These submissions generally supported the need to provide sufficient incentives to ensure high levels of investment into the sector. For example, the Global Infrastructure Investor Association (GIIA) noted that it was fundamentally important for regulation to ensure that the UK is able to attract the level of investment required to build resilience against climate change impacts and to meet the legally binding commitment to achieve Net Zero carbon emissions by 2050. GIIA expressed concern that inadequate returns (through a lack of or insufficient 'aiming-up') would not be aligned with the Government's strategic objectives for investment as outlined within the recently released National Infrastructure Strategy.<sup>3145</sup>

9.1262 For the Disputing Companies, Yorkshire investors Corsair Capital and DWS expressed concerns about the direction of regulation in UK water and a belief that the risks for the sector in attracting capital are currently high. Anglian investors CPP Investments, Dalmore Capital, First Sentier Investors and IFM Investors noted the sector's historic attractions to global

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<sup>3144</sup> [Ofgem's response to the cost of capital working papers](#), paragraphs 11-21

<sup>3145</sup> [GIIA's response to the cost of capital working papers](#)

infrastructure investors, but suggested that recent regulatory developments had caused a deterioration in the attractiveness of UK water as an investment proposition relative to other opportunities. GLIL Infrastructure, also an investor in Anglian, also noted the need to promote investment and that the cost to consumers from dis-incentivising investment should be considered.<sup>3146 3147</sup>

9.1263 Similar sentiments were expressed by current and former investors in water companies not subject to the CMA's redetermination process.<sup>3148</sup>

### *CMA Analysis*

9.1264 We disagree with Ofwat's assessment of the implied sector-level cost of the CMA's decision to aim away from the midpoint of the range. Specifically, we note that:

- (a) the cost of equity was set 50bps above the midpoint at the provisional finding stage of our redetermination. As equity represents 40% of the total capital of the notional company structure on which the WACC is set, this represents an uplift to the WACC of 20bps. Assuming a March 2020 industry RCV of approximately £77.5 billion,<sup>3149</sup> this would equate to roughly £150 million a year or £755 million over the life of the price control. Given expected RCV growth over the 2020-2025, the total impact across the sector would equate to around £800 million, so less than half of the impact calculated by Ofwat in support of its submissions; and
- (b) as the provisional cost of debt point estimate was below the midpoint, the CMA's point estimate of total WACC was only 10bps higher than the midpoint suggested by the calculated ranges. On this basis, the increase in costs as the result of aiming (if applied to the entire sector) would have been approximately £76 million annually or £378 million across the price control based on RCV values at the start of the price control period. As above, after RCV growth the figure would be closer to £400 million over the period.

9.1265 We also note that Ofwat's and Citizens Advice's analysis does not fully reflect the effect of our provisional approach regarding the cost of capital on

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<sup>3146</sup> All published investors submissions can be found on [our webpage](#).

<sup>3147</sup> Note, iCON Infrastructure, investor in Bristol, made a submission focused more specifically on the needs of small water only companies. This issue is addressed in the Bristol company specific adjustment section at paragraphs 9.1052-9.1102.

<sup>3148</sup> See submissions by Morrison & Co, OP Trust and USS Investment Management on [our webpage](#).

<sup>3149</sup> Based on Ofwat's RCV of £77.479 billion referenced in Ofwat (2020), [Regulator capital values 2020 data](#). We note that Ofwat's analysis would roughly correspond to the total difference in WACC at the PFs (3.50%) and Ofwat's PF19 FD (2.96%) – however, this difference would incorporate both the 'aiming' impact discussed above and broader differences in estimated WACC parameters.

bills. We provisionally concluded that the change to the cost of equity supported financeability and meant that the PAYG adjustments made by Ofwat were unnecessary. Taking the two adjustments together, bills using our Provisional Findings approach to the cost of capital would have been lower for some customers than under Ofwat's approach, even if we assumed that the whole of the cost of equity uplift to the point estimate was related to the same objective of improving financeability.<sup>3150</sup> The net effect across the sector of our Provisional Findings approach would have been much smaller than implied by Ofwat's calculations. Whilst it is possible that Ofwat's approach to PAYG adjustments could be fully reversed in future periods, we have not seen any analysis that suggests that this can be assumed with confidence.

9.1266 Ofwat and Ofgem also highlighted the level of the cost of equity used in financing infrastructure in other countries as a relevant benchmark when considering incentives for investors to put new capital into the sector. In support, we were told that many of the current and potential water investors are infrastructure capital specialists who will compare the risks and returns available to them in the UK water sector with those available to them from investments elsewhere.

9.1267 Whilst it is feasible that some level of international comparisons could be included in the cross-checks to be made when testing whether an appropriate cost of capital has been set, we were not persuaded that the comparisons provided by Ofwat and Ofgem were particularly useful. A number of the comparator levels of return provided were not like-for-like, and in any case the regulatory frameworks are very different. We also noted that some higher comparators were not included in the data. Overall, we do not agree that the international comparisons provided help in setting the cost of equity for AMP7.

9.1268 In the following paragraphs, we consider two potential mechanisms where a higher cost of capital could affect the level of investment and bring benefits to customers.

(a) The first is that investors will be unwilling to put money in to deliver specific and large new investments which will provide benefits to customers but require extra capital, for example as occurred with the construction of the Thames Tideway; and

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<sup>3150</sup> For example, Yorkshire's PAYG adjustment was £85m, which is a greater revenue effect than a 0.5% increase in the cost of equity over AMP7.

- (b) The second is to address the risk of a move towards a low-investment environment, with investors seeking to remove capital and shrink rather than grow or maintain the RCV;

*Identifying a mechanism for the effect of the point estimate on future investment levels*

9.1269 The argument for aiming up to ensure capital availability for future investments is as follows:

- (a) That there is substantial uncertainty over the level of the WACC, as recognised in the estimated ranges around the cost of equity;<sup>3151</sup>
- (b) That there is also uncertainty around the optimal level of investment that may be required, now and in the future, but with a material probability that companies will need to design and invest in an enhanced capital programme in the coming periods, in particular to meet the challenges raised by climate change;
- (c) That if investors do not expect to be fully compensated for future investments over their life, then they may be unwilling to invest in the future to meet these requirements, with two possible scenarios with an adverse effect on consumers:
  - (i) That investors choose to exit the sector or are unwilling to put in further capital at the allowed WACC, resulting in a higher cost of capital from new investors who are willing to put money into the sector, or a need to pay a premium in future price controls; or
  - (ii) That the wider social benefits of investment are lost, either because companies do not identify investments or put resources into planning for them, or because the finance to deliver those investments is unavailable.

9.1270 The majority of submissions from Ofwat and its advisors appeared to focus on (c,ii) above. This appears to be the scenario which Brian Williamson describes as ‘most unlikely’, and which Ofwat and Brian Williamson flag as being addressed by the existence of processes designed to incentivise

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<sup>3151</sup> For example, the CMA’s PF (CPIH real) range for the cost of equity was 3.56 to 5.60%, a high-low spread of 2.04%. By comparison, Ofwat’s risk and reward guidance for PR14 suggested a (RPI real) cost of equity range of 4.9% to 5.7% (a spread of 0.8%), while the PR19 final methodology included an (RPI real) cost of equity range of 3.41% to 4.69% (a spread of 1.28%).



long-term water planning, and authorities able to secure they take place, such as the Environment Agency.

9.1271 They stress the difference between the risks associated with lack of investment in the water sector and other sectors like the energy sector, pointing to a lack of similar societal risks arising from extreme adverse events, like those associated with ‘blackouts’ and other extreme events in the energy sector.<sup>3152</sup>

9.1272 They argue there is more limited evidence that this is an important concern in water in the UK, where the network is enhanced incrementally over time consistent with long-term plans developed following wide stakeholder consultation. Major ‘one-off’ projects are rare, the technology is well understood, and there are 17 companies designing and sharing best practice. The wider obligations imposed by the government and regulators on the sector to develop long-term investment plans should create sufficient incentives to maintain and improve services without an additional financial incentive through an adjustment to the cost of capital. There are alternative mechanisms to ensure that investment is maintained with a lower cost to consumers, such as:

- (a) Making adjustments to price controls and/or performance commitments to ensure long-term resilience and provide incentives to deliver the investment required; or
- (b) Changes to the wider framework for promoting resilience, including the statutory obligations on the water companies, and the WRMP and WINEP processes.

9.1273 We recognise that if the cost of capital is set too low, this may only have a limited effect on investment in the short term. However, the cost of capital today may have a knock-on impact on investment planning during AMP7 that will be actioned (or not) in subsequent price controls. As discussed in the next section, expectations of insufficient investment returns based on the current cost of capital may discourage companies from identifying and proposing otherwise desirable investment projects. If overall water asset health deteriorates as a result, this may lead to higher required investment (and so higher investor returns) in future periods. In this way, the current cost of capital can have a direct impact on the level of future investment and the future costs to customers.

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<sup>3152</sup> Commerce Commission New Zealand (2014), [Amendment to the WACC percentile for price-quality regulation for electricity lines services and gas pipeline services](#), paragraph 5.63

9.1274 We also agree that the existence of the long-term planning mechanisms designed to address the risk of under-investment will mitigate some of the risks to resilience of the networks. The risks associated with water are different to energy, and there is no direct comparator to the cost of 'blackouts'. However, water is an essential service and there are long-term risks to water customers (and the environment) associated with the performance of deteriorating or inadequate water infrastructure. The nature of water infrastructure means that there are additional challenges in measuring water asset health effectively. We therefore do not agree that long-term planning mechanisms address these risks entirely, as is suggested by Ofwat's submissions. We consider this further in the next section.

*Risk of an exit of capital over time from the sector*

9.1275 Potentially more important than the risk of under-investment in specified projects or areas of network resilience is that a low WACC over multiple periods will lead to an opex bias and a gradual reduction in investment, with limited RCV growth. The mechanism by which a cost of capital set too low could have adverse effects would be:

- (a) Investors have a choice of options in where to invest their capital;
- (b) Where the cost of capital is low, the preference will be to withdraw capital rather than to increase the level of invested capital over time. This might be achieved, for example, through a high dividend pay-out policy;
- (c) In water, there is likely to be some flexibility around the balance between capex and opex, and the sector as a whole will prefer solutions requiring less investment when returns are assumed to be low;
- (d) New investments can often bring wider benefits to customers and society, particularly during a period of change, such as is expected with climate change over the coming periods;
- (e) Therefore, there will be a risk associated with the cost of capital being too low over time that there will be foregone benefits.

9.1276 The effects on customers if there is an actual reduction in investment over time are likely to be higher, because investment can bring additional wider benefits. For example, if a low cost of capital environment resulted in a lower level of investment in climate change resilience over time across the sector, and more of a focus on existing assets, then the lost benefits would include the broader externalities associated with the foregone investment.

9.1277 On the other hand, this effect could be symmetric as highlighted in Brian Williamson's submissions. In other words, a higher cost of capital could lead to over-investment and customers may pay for investments which do not bring sufficient benefits and therefore destroy value. This applies where the wider benefits (or positive externalities) from more capital investment are assumed to be small, and accordingly any diversion from the actual cost of capital will destroy value for customers.

9.1278 As with much of the analysis of the level of the point estimate, this indicates that regulators, including the CMA in this determination, are making a series of complex and difficult judgements when making a decision on a single parameter. It is not practical to estimate the extent of bias between new investment and exploitation of current assets from a small adjustment in the cost of capital. Nor is it practical to measure the size of externalities. However, these externalities do not have to be large to justify a small difference in the WACC of, say, 0.1%, if that is expected over time to result in more investment.

9.1279 We understand from Ofwat's submissions that it concludes there are a number of reasons why this scenario is not realistic. The processes for identifying investments and the balance of capital and operating costs are extensive and involve the companies, their customers and multiple regulatory bodies. Ofwat has put in place totex regulation for the purpose of addressing the risk of distortion between one form of spend and another and has signalled this is expected to continue over multiple periods.

9.1280 However, it is our view that there is also some flexibility for the companies, and it is not realistic to expect that the regulator can perfectly measure the balance between capital investment and managing the existing assets. More specifically, while a resource constrained regulator may be effective in conducting cost-benefit analysis of a project explicitly proposed in a company business plan, it is unlikely that such a regulator would have sufficient resources or location-specific knowledge in order to consistently identify where projects should be included in business plans, but have been excluded due to a perception of insufficient returns. Given the expected scale of investment needed to address climate change, there can be expected to be a long-term benefit where the expected returns are sufficient to provide incentives to identify investments over time.

9.1281 We agree that this is a matter of judgement, and the benefits cannot be accurately measured. However, the current context of a material reduction in the cost of equity at the same time as a growth in investment points to a need to proactively address the risks associated with setting the cost of capital too low. On balance, while we agree that the size of the effect may be modest in

the context of the longer-term plans for the sector, we also acknowledge that there are some benefits from a more cautious approach to setting the point estimate of the cost of capital.

9.1282 The UKRN report which supported aiming up in principle highlighted that in practice the benefits from a higher cost of capital will be optimised if they apply only to new investment.<sup>3153</sup> We also noted the risk of over-rewarding investment in existing assets in our NATS/CAA Final Report.<sup>3154</sup> Under Ofwat's framework, in common with that generally followed by other regulators, there is no way to separate the returns on new and existing assets as the same return is applied to all RCV assets. In practice, undertaking new investments is likely to incur additional risks over managing existing assets if cost targets are set in a way which provides strong efficiency incentives.

9.1283 The use of a single, average cost of capital assumes that these effects will balance out over time, but there is no evidence to show that this will be the case in practice. Another way to address the risk of under-investment in future periods would therefore be through an alternative mechanism to reward investors for the additional risk associated with new investments. We have not considered this in our redetermination, as it would require wider changes to the regulatory framework, and for AMP7 as a standalone period would not change incentives.

#### *Picking a point estimate to promote investment – CMA assessment*

9.1284 We have reviewed Ofwat and its expert advisers' submissions on the relevance of the WACC in promoting investment. We agree that there are a wide range of other mechanisms to provide incentives to the companies to invest, and that with perfect foresight the choice of WACC should have only a limited effect on the level of investment.

9.1285 However, as noted by Ofwat, regulatory price controls suffer from unavoidable uncertainty and information asymmetry. We consider that Ofwat's approaches do not directly address the long-term concerns we have about an exit of capital from the sector over time, if the cost of capital is set too low. This is potentially important at a time when there has been a material decline in returns and there remains significant uncertainty over the measurement of the cost of equity. We consider this as part of our overall assessment in paragraphs 9.1300 to 9.1318 below.

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<sup>3153</sup> Wright, Burns, Mason and Pickford (2018), [Estimating the cost of capital for implementation of price controls by UK Regulators](#), p72

<sup>3154</sup> [NATS/CAA](#), paragraph 13.296

## ***Asymmetry in the choice of parameters***

### ***Ofwat***

9.1286 Ofwat stated that uncertainty over the cost of capital does not in itself require aiming up.<sup>3155</sup> As long as the regulator aims straight on a consistent basis over multiple periods, the expected return over these multiple periods will be equal to the required return. The uncertainty does not in itself mean that the allowed return is insufficient to meet the financing duty, and this was the approach taken by the CMA in NATS/CAA, where the CMA concluded that the midpoint was appropriate.

9.1287 Ofwat said that our level was aimed up by more than we had said, as a result of the underlying cost of cost equity metrics estimate ranges being above those suggested by its determination. In Ofwat's view, the CMA's stated ranges for TMR, debt and the RFR gives a midpoint that lies well into the upper end of the distribution of plausible values. Ofwat stated that the CMA's approach constituted an implicit layer of aiming up before the choice to pick the point estimate from the upper end of the stated range<sup>3156</sup>

9.1288 Ofwat's advisers, Europe Economics as well as Wright and Mason also believed that the CMA's underlying cost of capital ranges were skewed to the upside prior to aiming above the midpoint. For example, Wright and Mason argued that the CMA had:

- (a) set the TMR range higher than can readily be supported by the evidence;
- (b) over-estimated the RFR owing to inconsistent use of the CAPM;
- (c) over-estimated the beta through the beta estimation and regearing process; and
- (d) been generous in estimating the cost of embedded debt.

9.1289 Wright and Mason and Europe Economics also disagreed with the assumptions underpinning aiming for a particular percentile of the overall range, stating that such an approach was inappropriate to apply to ranges with non-uniform probability distributions and correlated components.

9.1290 In response to the CMA's working paper on selecting a point estimate of the cost of capital, Ofwat said that while it still disagreed with any need to aim above the midpoint, Ofwat suggested that an uplift of 15bps (rounded) to

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<sup>3155</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 3.14

<sup>3156</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 5.3

approximately the 67<sup>th</sup> percentile would be more consistent with regulatory decisions such as the approach taken by the New Zealand Commerce Commission.<sup>3157</sup>

### *Disputing Companies*

9.1291 Northumbrian said that the CMA's Provisional Findings we were at the 47<sup>th</sup> percentile<sup>3158</sup>, not the 58<sup>th</sup>. Anglian said that the CMA's Provisional Findings were around the midpoint.<sup>3159</sup> Yorkshire said that it would be more appropriate to set the individual parameters at an appropriate level, and in its view, the CMA's Provisional Findings point estimates for each of RFR, TMR and beta were the right point estimates, rather than being high 'aimed up' levels.<sup>3160</sup>

9.1292 In response to our working paper assessment that a cost of equity of around 25bp above the midpoint would be around the 82<sup>nd</sup> percentile, the Disputing Companies disagreed with our calculation. In their view, our modelling underestimated the range for the cost of equity, and it was wrong to imply that the 25bp uplift represented the 82<sup>nd</sup> percentile. Anglian<sup>3161</sup> and Northumbrian<sup>3162</sup> suggested that its modelling showed that based on its updated assessment of the correct range for each component metric, picking a point estimate 25bps above the midpoint would only reach the 57<sup>th</sup> percentile of the overall range.

9.1293 Anglian<sup>3163</sup> and Northumbrian<sup>3164</sup> also said that our assessment was wrong because we had double counted the effect of a higher cost of capital with the adjustment for ODI asymmetry. After asymmetry was properly accounted for, we were told that we had aimed up by no more than 10bp. Yorkshire also noted that the CMA's asymmetry range of 0.1% to 0.2% was insufficient comparison to the likely outcome.<sup>3165</sup>

9.1294 Anglian Water and Northumbrian Water provided a paper from Alan Gregory and colleagues in support of their view that we had underestimated the range for the cost of equity. The paper and associated modelling seeks to demonstrate that:

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<sup>3157</sup> [Ofwat's initial response to the cost of capital working papers](#), paragraphs 1.19-1.20

<sup>3158</sup> [Northumbrian's response to the provisional findings](#), paragraph 258

<sup>3159</sup> [Anglian's response to the provisional findings](#), paragraph 383

<sup>3160</sup> [Yorkshire's response to the provisional findings](#), paragraphs 3.3.17-3.3.18

<sup>3161</sup> [Anglian's initial response to the cost of capital working papers](#), paragraph 131-132

<sup>3162</sup> [Northumbrian's initial response to the cost of capital working papers](#), paragraphs 24-25

<sup>3163</sup> [Anglian's initial response to the cost of capital working papers](#), paragraph 100

<sup>3164</sup> [Northumbrian's initial response to the cost of capital working papers](#), paragraph 29

<sup>3165</sup> [Yorkshire's initial response to the cost of capital working papers](#), paragraph 2.2.4

- (a) If the CMA is seeking to aim up to the 75<sup>th</sup> percentile, as per PFs, then the level of 'aiming up' would be 50bp;
- (b) If the CMA were to follow the NZCC approach of the 67<sup>th</sup> percentile, as proposed by Ofwat, then the level of 'aiming up' would be 34bp.

9.1295 The approach taken by Gregory et al is to model the equity beta based on statistical analysis of betas; the beta is calculated using an OLS regression of share price data against market data. There is a standard error around the point estimate which is calculated using this regression, and Gregory et al have estimated the range for the cost of equity using the probability distribution for the equity beta with the same standard error.

9.1296 On this basis, both Anglian and Northumbrian said that we needed to increase the level of aiming up, if we were to have regard to the ranges implied by Monte Carlo analysis when setting the point estimate for the cost of capital.

### *Third Parties*

9.1297 Ofgem considered that we had effectively aimed up on the cost of debt, and provided some Monte Carlo-style analysis which indicated that our provisional cost of equity estimate was likely to be normally (or close to normally) distributed and therefore that the 75<sup>th</sup> percentile would be much closer to the midpoint than had been suggested in the Provisional Findings. Its analysis suggested that 20bp would be sufficient to represent the 75<sup>th</sup> percentile and that an uplift of 51bp was really the 96<sup>th</sup> percentile.<sup>3166</sup>

9.1298 Citizens Advice stated that the CMA has taken a cautious view with regard to its cost of equity metrics, effectively 'aiming-up' on the majority of the constituent parts of the cost of capital calculation.<sup>3167</sup>

9.1299 ENA suggested that the underlying cost of equity component ranges identified by the CMA had been incorrectly skewed by the inclusion of demonstrably erroneous data points and the exclusion of valid data points. ENA stated that the effect of the CMA's omissions and errors was a cost of equity that was materially too low.<sup>3168</sup>

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<sup>3166</sup> [Ofgem's response to the provisional findings](#), paragraphs 63-69

<sup>3167</sup> [Citizens Advice's response to the provisional findings](#)

<sup>3168</sup> [Energy Networks Association's response to the provisional findings](#), paragraph 3.2

## *CMA analysis*

9.1300 We first considered the points raised by Ofwat about risk balancing out over multiple periods. Ofwat's view appears to assume that the reasons for the cost of capital being different to the midpoint are ones which will in practice average out over time. For example, it is possible that beta may be higher or lower than indicated by a regression of historical data, and that this will average out over time. We agree that for some parameters this is a reasonable assumption, and discuss this further in response to company submissions at paragraph 9.1308 below.

9.1301 Some measures, such as risk-free rate and TMR, are subject to more uncertainty about the right theoretical approach, and in practice different investors may have different required returns that reflect this uncertainty. It is therefore possible that some of the potential reasons that the cost of capital may be too high or low might persist over multiple periods. This can be observed in practice with the approach to risk-free rate and TMR in current determinations both being structurally lower than in past periods.

9.1302 Ofwat, the Disputing Companies and Ofgem raised points in relation to the definition of the range for the WACC. There are two contributing factors to these responses.

- (a) First, whether we have really picked a range which has the 'most likely' number as its mid-point. In other words, if we used a range of 6.2% to 7.2%, is 6.7% really the most likely point?; and
- (b) Second, whether there is an equal chance of all points in the range. Ofgem provide some Monte Carlo-style analysis which indicates that the cost of equity parameters are more likely to be normally distributed and therefore that the 75<sup>th</sup> percentile will be much closer to the mid-point. The Disputing Companies provided analysis that the range was much wider than assumed by Ofgem.

9.1303 As a starting point, we have proposed ranges for each of the parameters where we considered that there was comparable likelihood of the actual value being higher or lower in the range. Table 9-36 summarises the key uncertainties and the judgement in deciding whether the range is evenly balanced:



**Table 9-36: Parameter uncertainty in the cost of equity**

<i>Metric</i>	<i>Range</i>	<i>Case for low</i>	<i>Case for high</i>
Beta	0.28 to 0.30	Shorter averages	Longer averages
TMR	6.15% to 7.46%	Historic ex-ante estimates	Historic ex-post and CED/RPI estimates
Debt Beta	0.10 to 0.05	Implied from debt premia	Market evidence
RFR	-1.34 to -1.05%	ILG yields	AAA yields

Source: CMA PFs

Note: lower debt beta implies higher cost of equity

9.1304 These ‘ranges’ are determined on the basis that there is a fundamental uncertainty in how to measure the cost of equity using the CAPM. The ranges for each metric involve the overlay of judgement, and are defined in order to help the CMA to ‘build-up’ a sensible overall cost of equity estimate through the CAPM. This process makes the cost of equity calculation largely incompatible with Monte Carlo-type analysis. For example, while we consider 6.2% to 7.5% to be a sensible and balanced estimate range for the TMR, there is no probability ‘cliff’ outside of this range.

9.1305 However, we acknowledge that Monte Carlo analysis may provide a useful cross-check to our thinking. The approach followed by Ofgem helps to remind us that while our estimates face uncertainty and are unlikely to be perfectly accurate over the price control, they may be inaccurate in different directions. For example, our estimate of the beta may be too high but our estimate of the RFR may be too low. In this way, Ofgem’s analysis does provide some insight into identifying the probability that a cost of equity is too low. For example, if we accept that independent variables trend towards a normal-like distribution when combined, Ofgem’s analysis would indicate that if we are trying to identify the level at which the probability that the cost of equity is ‘too low’ is only 25%, then the cost of equity premium is likely to be something like 20 to 30bp, rather than the 50bp the CMA considered in its provisional findings.

9.1306 We have replicated analysis comparable to that submitted by Ofgem in response to the Provisional Findings and have reached broadly comparable results. Our own modelling which follows a similar approach suggests that a cost of equity of around 25bp above the mid-point would in practice be around the 77th percentile on a probability-weighted basis.<sup>3169</sup> In other words, based on these modelling assumptions, if we chose a value 25bp above the midpoint, that there would be only around a 25% risk of the cost of capital being set too low.

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<sup>3169</sup> Monte Carlo simulation is based on applying a uniform distribution for three parameters (TMR between 6.15% and 7.46%; RFR between -1.63% and -1.05%; Debt Beta between 0.10 and 0.05) and a normal distribution for one parameter (Unlevered Beta with a mean of 0.29 and a standard deviation of 0.0033, equivalent to one third of the difference between the mean and the end of the range).

- 9.1307        There are a number of limitations to the interpretation of this analysis. There is no robust way of measuring the uncertainty for the reasons discussed in 9.1303 above, and in any case we are not trying to construct a statistical analysis of the probability distribution for the cost of equity, but to identify a point estimate for the cost of equity which balances a number of objectives. Nevertheless, within these limitations, we have concluded that this is a useful illustration of the scale of risk of setting the cost of equity too low.
- 9.1308        We have considered the submissions from the Disputing Companies that our analysis understates the size of uncertainty around the choice of the cost of equity. Although the Disputing Companies' submissions suggested that our analysis was wrong – in practice what they are proposing is an alternative approach to defining a range for the cost of equity, having regard to a statistical distribution of the range for the equity beta.
- 9.1309        Our view is that the approach taken by Gregory et al is measuring something different to the parameter uncertainty considered in the CMA's assessment. We understand that there is a range around the measurement of beta, and this reflects our decision to use a number of alternative statistical measures for the beta. Not only is beta only measurable with a standard error, there is evidence that beta changes over time, and there is no single 'correct' view of the right period over which to measure it.
- 9.1310        However, it is well understood how to measure the central estimate for beta, for a chosen measurement period. In our view, the role of the range is to reflect the uncertainty over the choice of measure of beta and the cost of equity more broadly, not to reflect the statistical ranges around these measurements. It is well understood that actual returns will vary over time, that beta may change to reflect this variation, and the cost of capital is updated each five years to take account of new data. The standard error is an example of risk which will be symmetric and which investors should expect to be addressed in future periods, whether it results in higher or lower betas. In this respect, we agree with Ofwat's view that investors do not need to be compensated for risks that are symmetric over multiple periods, and in our view the wider ranges indicated in the Disputing Companies' submissions represent an example of such a symmetric risk.
- 9.1311        We therefore do not agree that the decision to set a point estimate needs to include a premium to reflect the kind of statistical error included in the Gregory et al analysis.

## *Parameter uncertainty – final assessment*

- 9.1312 In the Provisional Findings and the updated paper we gave indications of our understanding of the ‘percentile’ which was represented by our point estimate within the range, and therefore the size of the risk that we had set the cost of equity too high or too low. We did not use the percentile to determine the level of the point estimate – however expressing the point estimate as a percentile is informative in illustrating the risk of error associated with the range in the cost of equity.
- 9.1313 We consider our estimates ranges to be broadly balanced around the midpoint of the range. However, we would flag some areas of particular uncertainty in relation to the application of the CAPM model.
- 9.1314 Our approach to TMR, and the approach generally adopted by regulators, assumes a broadly constant TMR over time – with a falling RFR translating into a higher equity risk premium (ERP). While the historic evidence suggests that this assumption is an oversimplification in light of a certain degree of cyclicity in returns, we agree with the authors of the UKRN Report that it remains preferable to the alternative approach that assumes a constant ERP. The use of this methodology may provide an upward biased TMR estimate in the current low RFR environment. The forward-looking evidence also supports the view that the historic average achieved returns exceed current expectations for returns over the next few years.
- 9.1315 Conversely, our estimates of TMR and RFR result in a lower cost of equity than is likely to have been the case using the same data in previous periods. Although market rates have fallen, the majority of this reduction relates to the change in weight given to different data sources. Whilst, in theory, this should have no effect on the right choice of a cost of capital, if there is clear evidence in support of the change, this material reduction in the level of the cost of equity makes the interpretation of market data used as a cross-check more difficult. We recognise that there may be risks associated with implementing material changes of this type.
- 9.1316 A related concern is that some of the analysis put to us suggests that the use of ranges may in itself be the wrong approach if the consequence is that regulators are expected to only give weight to the midpoint of the range. In other words, if the implication of the submissions from Ofwat, Ofgem and Citizens Advice is that the right level of the cost of capital should always be the midpoint, then this implies that the only decision that matters is the choice of the two ends of the range, and ensuring that they are of identical probability. This is not how we have constructed our ranges, and if this had been the intention it would be better to start with a point estimate for clarity

and transparency. We discuss this further as part of the overall assessment below.

9.1317 We recognise that there is an argument that choosing a point estimate for parameter uncertainty and asymmetry should be considered separately. However, on balance, we do not agree that it is necessary to assess these two amounts separately and combine them. Our primary concern in setting the point estimate in the upper half of the range is to provide sufficient incentives for incremental investment, which will earn the allowed cost of capital. We also recognise that in the current period, this will provide an additional allowance, which gives greater confidence that the expected return is at least equal to the WACC, and likely to be above.

9.1318 We explain the reasons for our final decision in paragraph 9.1387 below. Overall, our view is that the submissions on the range associated with parameter uncertainty illustrate some of the challenges with seeking to model the cost of capital range too exactly. We have selected a range, and considered a number of reasons why we would choose a number in the upper half of the range. Our reference to the Monte Carlo analysis was as a useful cross-check on the risk that we had chosen a figure that was in practice below the true cost of capital. We have considered the uncertainties identified in this section and which are inherent to estimating the unobservable parameters in a model which is the best approximation for the actual cost of equity, but which does not perfectly reflect investors' assumptions. Overall, our assessment is that, while any point in the range could be supported as an objective interpretation of the data, the central point has the lowest overall risk of error, and the independent assessment of RFR, TMR and beta means that the central points in the range are more likely than the outside points in the range.

### ***Asymmetry of risk in the package***

9.1319 In our Provisional Findings we considered that the overall ODI package was asymmetric, as it included significant asymmetric (largely penalty-only) incentives. We assumed that the rest of the package was broadly symmetric, although in practice this is a balanced judgement, since there are other aspects of asymmetry, such as the cost sharing incentives.

### ***Ofwat***

9.1320 Ofwat said that in practice, supported by past performance, Disputing Companies would overachieve against the performance incentives in AMP7, and in particular that they would focus effort on areas where they could achieve rewards and that this would offset the penalties associated with

underperformance.<sup>3170</sup> Ofwat highlighted three reasons why it did not expect negative ODI payments for an efficient firm:

- (a) The CMA's expectation of 0.1% to 0.2% of RoRE underperformance is incorrect as a result of assuming that the distribution of performance is symmetric around the performance commitment level;
- (b) There are a number of reasons why operational performance should offset any asymmetry in ODI rates, including management action to mitigate the impact of underperformance, companies planning for outperformance and improvements in resilience;
- (c) Empirical evidence of 2015 to 2020 company performance shows that where outperformance occurs, it is on average twice as great as underperformance – despite the fact that companies said they expected negative payments at PR14.

9.1321 Ofwat also argued that past overall company outperformance has historically been dominated by financing outperformance. Ofwat stated that the scope for financing outperformance was significant, and had been equivalent to a notional RoRE impact of +1.26% in 2010 to 2015 and +1.78% in 2015 to 2020. On the basis of the CMA's 'overstated' required returns on capital, there would be material scope for the notional companies to outperform due to financing.<sup>3171</sup>

9.1322 In addition, while outcome incentives had been set with a downside skew, the actual performance of companies had not been skewed to the downside. Ofwat quote a PwC report in stating that while the ODI risk range from the PR14 final determination was skewed down at -1.7% to 0.6% on RoRE, the actual average performance of the sector over the price control was 0.0%.<sup>3172</sup>

9.1323 As a more general point, Ofwat noted that regulators are at an informational disadvantage in setting price control determinations; companies have a better understanding of their costs and context within which they operate. Ofwat stated that the National Infrastructure Commission recommended regulators should not overlook these asymmetries. Ofwat also flagged that Ofgem's RIIO-2 approach includes a downward adjustment to take account of expected outperformance.<sup>3173</sup>

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<sup>3170</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraphs 3.55-3.59

<sup>3171</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraphs 3.44-3.54

<sup>3172</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraphs 3.48-3.49

<sup>3173</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 3.51

9.1324 Ofwat stated that if the CMA were concerned by asymmetric performance outcomes, it would be more appropriate to adjust the incentive mechanisms rather than adjust the allowed return.<sup>3174</sup>

### *Disputing Companies*

9.1325 The Disputing Companies stated that they would not be able to achieve the package of ODI targets, and therefore that the asymmetry was worse than the CMA had assumed. They provided a range of evidence supporting different levels of asymmetry. Much of this analysis was based on the assumption that the companies would not be able to outperform their business plans to meet the targets that Ofwat had set and we had largely supported based on industry comparisons.

9.1326 Anglian<sup>3175</sup> and Northumbrian<sup>3176</sup> stated that it should not be controversial that there is asymmetry in the CMA's determination which should be either addressed or priced into the WACC, and that such an approach is consistent with both theory and regulatory precedent. As a result, the CMA's calculated 10 to 20bps RoRE downside (which the companies said is actually understated) should be a floor to any increase in the point estimate over the midpoint of the cost of equity range.

9.1327 Bristol stated that Ofwat's claim that there is scope for outperformance on financing is irrelevant on a notional basis since the settlement should be such that a notionally-financed company should be able to earn the required return on capital. In addition, the CMA's overall package indicated at PFs suggested an under/outperformance range of -3.10% to +0.63%, slightly worse than Ofwat's -2.90% to +0.77% range. As a result, it was clear to Bristol that absent aiming up the package would not represent a 'fair bet' for investors.<sup>3177</sup>

9.1328 Yorkshire stated that it considers performance risk to be the main source of downside asymmetry on ODIs for an efficient firm, and that this was a more material source of risk than penalty-only ODIs or asymmetric penalty/reward rates. As a result, the CMA's approach (which excludes performance risk) would understate any downside skew relating to ODIs.

9.1329 In addition, Yorkshire challenged Ofwat's evidence of PR14 operational outperformance as being any indicator of likely performance at PR19. Yorkshire stated that PCL targets (levels or rate of change) at PR19 are, on

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<sup>3174</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraphs 3.61-3.62

<sup>3175</sup> [Anglian's reply to responses to the provisional findings](#), paragraph 86

<sup>3176</sup> [Northumbrian's reply to responses to the provisional findings](#), paragraphs 97 & 126

<sup>3177</sup> [Bristol's reply to responses to the provisional findings](#), paragraphs 34-37

the whole, considerably more challenging than those set at PR14. Yorkshire also challenged Ofwat's view that any adjustments should be made directly to the incentive packages rather than uplifting the WACC, noting that it would be impractical for the CMA to collect new customer evidence or fully analyse the entire package of ODIs in detail in the time available.<sup>3178</sup>

- 9.1330 Yorkshire provided further submissions from Economic Insight, which had provided it with its analysis of the RoRE ranges as part of the business plan assessment. Economic Insight's analysis demonstrated that, based on Yorkshire's projected performance against the PCs, the asymmetry was significantly greater than as indicated by the CMA's estimates of 0.1% - 0.2%.

### *Third Parties*

- 9.1331 Ofgem agreed with the CMA that the cost of capital could be adjusted for asymmetry and noted at its hearing that it has also adjusted the cost of capital for asymmetry in its RIIO-2 determinations, although in the energy sector it expects company outperformance. It agreed with Ofwat that in practice it was likely that, given the existence of incentives for outperformance, companies would not face net penalties.<sup>3179</sup>
- 9.1332 Citizens Advice stated that the information and broader asymmetric nature of the regulatory regime for water had driven persistent levels of excessive outperformance. Citizens Advice disagreed that there is any asymmetry-related justification for aiming above the midpoint, and suggest that the PR19 regime already contained multiple mechanisms for transferring risk from shareholders to customers. Such mechanisms justified 'aiming down' in favour of customers rather than 'aiming up' in favour of investors.<sup>3180</sup>
- 9.1333 South East Water<sup>3181</sup> joined the Disputing Companies in questioning whether the CMA's 0.1% to 0.2% of RoRE estimate of asymmetry was sufficient. Thames Water<sup>3182</sup> agreed with the CMA's approach, noting that they had made the same point to Ofwat using the PR19 process.

### *CMA analysis*

- 9.1334 In respect of Ofwat's submissions, we accept the premise that management might respond to incentives and this might result in

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<sup>3178</sup> [Yorkshire's reply to responses to the provisional findings](#), paragraphs 15-20

<sup>3179</sup> [Ofgem's response to the provisional findings](#), paragraph 61

<sup>3180</sup> [Citizens Advice's response to the provisional findings](#)

<sup>3181</sup> [South East Water's response to the provisional findings](#)

<sup>3182</sup> [Thames Water's response to the provisional findings](#)

outperformance for at least some companies against an expectation of penalties. However:

- (a) Incentives are part of normal regulation and operational outperformance is a desirable outcome. If companies are able to outperform, this delivers benefits to customers both from the actual improvements and from Ofwat being able to use the evidence in its comparisons in future periods.
- (b) The approach to PCs in PR19 is very different to previous periods, and includes extensive analysis from customers, overlaid by comparisons across the companies. The analysis of the PCs suggests that they have been deliberately set at stretching levels to produce benefits for consumers. We are not persuaded it is consistent for Ofwat to both set new and increasingly stretching targets for PCs in PR19 and also to assume that companies will outperform against those targets.
- (c) We also observed that Ofgem said that it had taken an approach of assuming outperformance based on historical performance, and that its approach differed from Ofwat's which had explicitly decided not to assume any outperformance.

9.1335 Similarly, we are not persuaded by the Disputing Companies' arguments that they face a structural expectation of underperformance. We have responded to certain challenges on individual ODIs, but overall the framework has been designed to provide a stretching but achievable challenge across the portfolio. We recognise that the companies' plans suggest that they need to outperform to achieve the ODIs across the group. Again, it is normal regulatory practice to set stretching targets on costs and outputs and there is no reason to believe in this case that this cannot be applied here.

9.1336 There might be individual companies that are unable to achieve the same level of performance as others. All the companies have told us that they expect on average to fail to achieve the target levels and to incur more penalties than we assumed in our asymmetry analysis. We have considered this evidence, but at the moment we are not persuaded that any of the individual companies are exposed to a particularly unfair balance on the ODIs, and in any case a company-specific imbalance would be better addressed in the ODI package than a company-specific cost of capital adjustment.

9.1337 We recognised that there were some examples given from the companies of individual ODIs where the balance of risk is likely to not be truly



symmetrical, such as supply interruptions.<sup>3183</sup> However, we were not persuaded that this implied that the package of PCs as a whole could be reliably assumed to be more or less asymmetric that we had assumed. Neither were we persuaded that the examples provided were any more compelling than Ofwat's evidence that some companies have been able to outperform incentives in the past. We would also accept that the consequences of all the risks are at least partially controllable, and the aim of the financial ODIs is to ensure that companies have the incentives to manage the effects on consumers whether they are above or below the PC targets. To the extent that the PCs have been set at reasonable targets, and the financial ODIs are symmetric, we have concluded that this should represent a fair balance of risk across the package of incentives.

9.1338 We have also made some changes to the cost assessment and to the ODIs, both of which are designed to address the examples where we did find that there was evidence in support of a change in balance of risk in Ofwat's determination. In our view, our determination on costs and outcomes appropriately balances the risks for the companies.

9.1339 In addition to all these points which relate to the treatment of actual risk faced by the companies, we also consider that the WACC should be set for a notional company. Much of the supporting evidence provided by the companies relates to company-specific concerns which are not well suited to be addressed when setting the WACC. In setting the allowed return, our duty is to consider whether investors in a notional company, acting efficiently, have a reasonable expectation of a return equal to its WACC. Our assessment is that those investors would also take into account structural asymmetry in the package of incentives when considering expected returns on investment.

9.1340 Overall, we conclude that expected returns on ODIs should reflect the balance of rewards and penalties. Accordingly, we would expect negative ODI-related returns on average. Therefore, for the expected return to be consistent with the cost of capital, we would expect a small premium to be required.

9.1341 Ofwat also criticised our measurement of the size of asymmetry (0.1%-0.2%). Our analysis was based on an indicative assumption, where we gave a 10% weighting to a 10% downside scenario for all asymmetric incentives. In theory, this could be supported by more complex analysis, including:

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<sup>3183</sup> Bristol highlighted supply interruptions as an area of asymmetric risk in its Monte Carlo analysis. See [Bristol Water's response to the Provisional Findings](#), Table AN2.3

- (a) The additional probability of smaller penalties on penalty-only incentives;
- (b) The potential for an asymmetric distribution of outperformance and underperformance on particular PCs;
- (c) A more critical scrutiny of the calculation of P10s.

9.1342 We recognise that our estimate of 0.1%-to 0.2% RORE was a broad estimate of scale of the structural asymmetry resulting from ODIs, to be included in an 'in-the-round' assessment of the cost of capital. We have no basis on which to form a view of more accurate probability distributions which could be used to perform a more granular assessment, and we noted that Ofwat and the Disputing Companies provided conflicting views on the likely distribution of performance against the package of ODIs. Our view is that a more detailed analysis will not in practice better inform the overall assessment.

9.1343 An adjustment to the cost of capital is not the only option to address asymmetry – this could be done in other ways, although the alternative which would change the balance of risk rather than only the presentation of any asymmetry adjustment would be instead to change to the structure of ODIs to reduce or remove the asymmetry in the financial incentives. Having consulted on retaining the Ofwat approach of including extensive penalty-only or asymmetric ODIs, we consider that a change to the structure of ODIs would be very difficult to implement effectively.

#### *Asymmetry - CMA assessment*

9.1344 Based on the analysis above, we consider that asymmetry continues to be potentially relevant to the choice of a point estimate for the cost of capital. Overall, the assessment in this section illustrates the importance of retaining a measure of judgement in the choice of the point estimate for the cost of capital. The overall degree of structural asymmetry in the ODIs, and otherwise in the determination, should be reflected in the choice of point estimate of the cost of capital.

#### ***Cross-checks on the level of the WACC***

9.1345 In this section we consider three cross-checks on the level of the WACC, and their implications for the point estimate on the cost of capital. These are market prices for assets (MARs), broker estimates and financeability. We also consider a cross-check on the difference between the cost of equity and the cost of debt which has been put to us by Oxera on behalf of the ENA.

## Ofwat

9.1346 Ofwat said that cross-checks on the market prices of assets counter the risk that the cost of capital is too low. Ofwat provided a PwC report<sup>3184</sup> that examined 20 years of company transactions. This illustrating that, over time, investors' willingness to pay premia for the assets has gradually increased. Figure 9-24 reproduces Ofwat's analysis of transaction MARs over the last 20 years.

**Figure 9-24: Ofwat's analysis of the premia paid for equity investments in water**



Source: Ofwat

9.1347 Ofwat's own analysis suggested that current premiums at the two listed companies had averaged 17% in 2020, well above the 2005 to 2020 average of 9%. Ofwat also suggested that publication of the CMA's provisional determination had contributed to a c.11% increase in energy company prices.<sup>3185</sup>

9.1348 Ofwat commissioned Europe Economics to carry out further analysis of current MARs. Using models assuming 0.8% totex outperformance by Severn Trent and 1.2% underperformance by United Utilities and analysis at September 2020, Europe Economics found a MAR of 1.18 at Severn Trent and 1.02 at United Utilities (a 2% to 18% premium over asset value once expected performance had been factored in). Europe Economics also used

<sup>3184</sup> PwC (2020), [Review of the relationship between financing allowance and water company performance](#)

<sup>3185</sup> Ofwat's reply to responses to the provisional findings – risk and return, paragraphs 2.9-2.14

variation of the model that included Barclays data and/or methodology, and generated premiums ranging from 9% to 17%.

9.1349 In an extension of their analysis, Europe Economics ran scenarios limiting performance assumptions to either the end AMP7 or the end of AMP8, generating premiums of 3% to 40% and 3% to 35% respectively.

9.1350 Ofwat asked Wright and Mason, two of the authors of the UKRN report that supported 'aiming up' as a principle, for their views on the CMA's reasons for aiming up. Wright and Mason said that there is no evidence that suggests broader concerns about the level of investment in the water sector. Wright and Mason refer to the data from the publicly traded firms (UU and Severn Trent) as evidence that there is no lack of appetite in investing in water companies at Ofwat's PR19 cost of capital.

### *Disputing Companies*

9.1351 The Disputing Companies said that there was insufficient evidence from this market data to support or disprove the need to aim away from the midpoint. There are a wide range of reasons why prices may rise and fall over time, and the companies in question are fast track companies with low debt costs. Interpreting from one equity price to a particular cost of capital assumption is therefore difficult.

9.1352 Anglian also disputed Ofwat's suggestion that energy company prices had been influenced by the CMA's provisional findings, stating that Ofwat's evidence was misleading through not showing the previous share price reductions and the overall return to a largely unchanged position.<sup>3186</sup>

9.1353 Bristol stated that MARs cannot be considered as conclusive evidence on the appropriateness of the allowed WACC. Bristol also suggested that Mason and Wright, consulting for Ofwat, had themselves acknowledged that they could not say how much of any observed premia related to the allowed WACC.<sup>3187</sup>

9.1354 Northumbrian further argued that it was wrong to directly interpret water company share price moves as being driven by specific factors (such as the Ofwat or the CMA's findings). Northumbrian provided a graph of share price moves at a selection of listed utilities from the UK and other markets,

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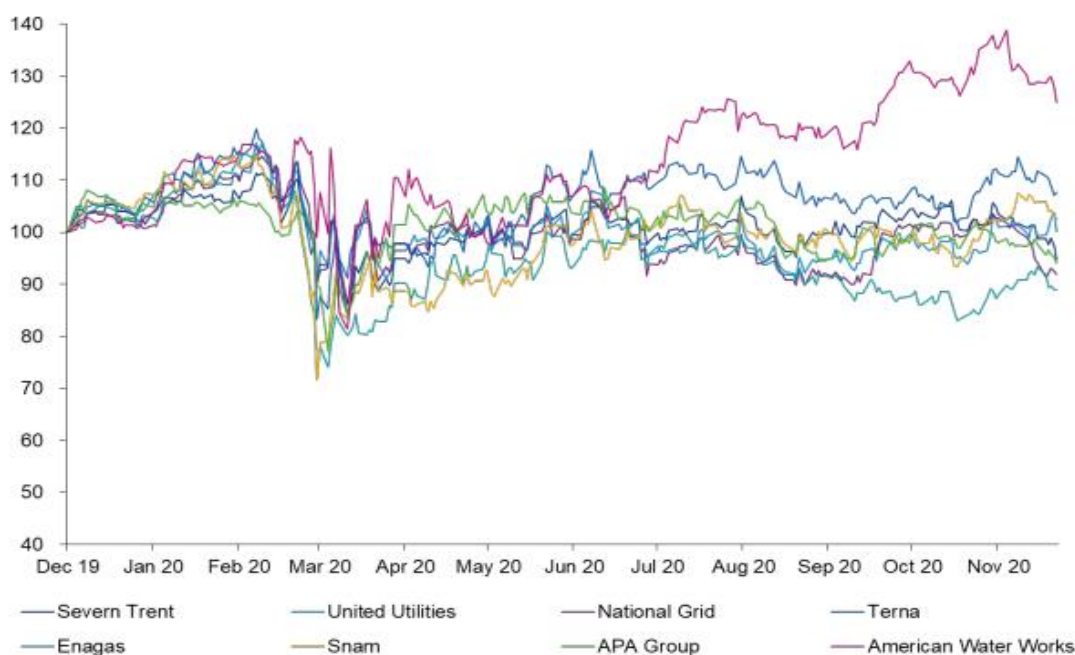
<sup>3186</sup> [Anglian's reply to responses to the provisional findings](#), paragraphs 105-106

<sup>3187</sup> [Bristol's reply to responses to the provisional findings](#), p33

demonstrating a largely correlated pattern of behaviour across markets, see Figure 9-25.<sup>3188</sup>

**Figure 9-25: Northumbrian chart showing share price movements at various utilities in UK and foreign markets**

**Figure 7 Share price performance – rebased to 100 at 13<sup>th</sup> December 2019**



Source: Analysis of data from Thomson Reuters Eikon

Source: Northumbrian

9.1355 Northumbrian submitted its own analysis of MARs measured between February and March 2020<sup>3189</sup> and then May to November 2020<sup>3190</sup>. Northumbrian found post-expected outperformance MARs ranged from 0.93 – 1.08 (a 7% discount to an 8% premium) in the first analysis and 0.93 – 1.03 (7% discount to 3% premium) in the later period.

9.1356 Yorkshire stated that Europe Economics' updated analysis of MARS (suggesting a range of 1.02 – 1.17 for United Utilities and 1.09 – 1.18 for Severn Trent) had been achieved only by revising assumptions about future totex outperformance. Yorkshire suggested that these assumptions were arbitrary and unsubstantiated and suggested that Europe Economics had attempted to 'backfit' to desired conclusions.

<sup>3188</sup> Northumbrian's submission following the second main party hearings, paragraph 139

<sup>3189</sup> Northumbrian's reply to Ofwat's response, paragraphs 428-430

<sup>3190</sup> Northumbrian's submission following the second main party hearings, paragraph 142

9.1357 Yorkshire also disputed Ofwat's claim of a 17% MAR premium in September 2020 (see paragraph 9.1347), suggesting that this was based on market capitalisation plus net debt, rather than adjusting for variables such as the value of unregulated business, pension fund surpluses and debt outperformance. Yorkshire labelled the resulting headline figures as 'meaningless'.<sup>3191</sup>

#### *CMA assessment*

9.1358 On balance, we remain cautious about using market prices to determine the point estimate for the cost of equity or overall cost of capital, particularly in determining the suitability of a relatively minor adjustment (for example, 10 to 20bps on WACC).

9.1359 We agree with Ofwat and Wright and Mason that there is little evidence to suggest categorically that either Ofwat or the CMA's cost of equity allowance is materially lower than is required by investors. However, this evidence relies on the market view of only two companies, both of which have lower than average embedded debt costs.<sup>3192</sup>

9.1360 The difficulty of correctly interpreting MAR data is illustrated by Europe Economics analysis. Using its own data and model, and after making assumptions about expected outperformance based on historical outperformance, Europe Economics estimate a premium of 2% at United Utilities and 18% at Severn Trent. Does this analysis suggest that there is little no excess return based on the finding at United Utilities, or significant excess return based on Severn Trent? The variation between these two companies that are often categorised as being similar suggests to us that an average of just these two is unlikely to give a sufficiently clear picture of whether the cost of capital allowance is higher or lower than is required across all companies in the sector.

9.1361 In addition, as share prices should reflect the long-term cash flow generation of a company, we do not consider methodologies that consider outperformance over just one or two AMPs is likely to be superior to models that do not apply this constraint.

9.1362 In the round, we do not consider any of the parties' MAR analysis to represent sufficient evidence to determine whether the CMA or Ofwat's cost of capital is more appropriate for the entire water sector, nor to arbitrate between

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<sup>3191</sup> [Yorkshire's reply to responses to the provisional findings](#), p54

<sup>3192</sup> We estimate embedded debt cost of 3.68% at Severn Trent and 3.51% at United Utilities, below both Ofwat's 4.47% allowance and the CMA's 4.52% allowance. As all companies are paid the same allowance, we would expect companies with lower embedded debt costs would reasonably trade at a premium to asset value.

an allowance that is at the midpoint or one that is 0.1% higher in WACC terms. As a result, we have therefore not given the MAR analysis significant weight in coming to a final view on the point estimate.

#### *Broker forecasts*

##### *Ofwat*

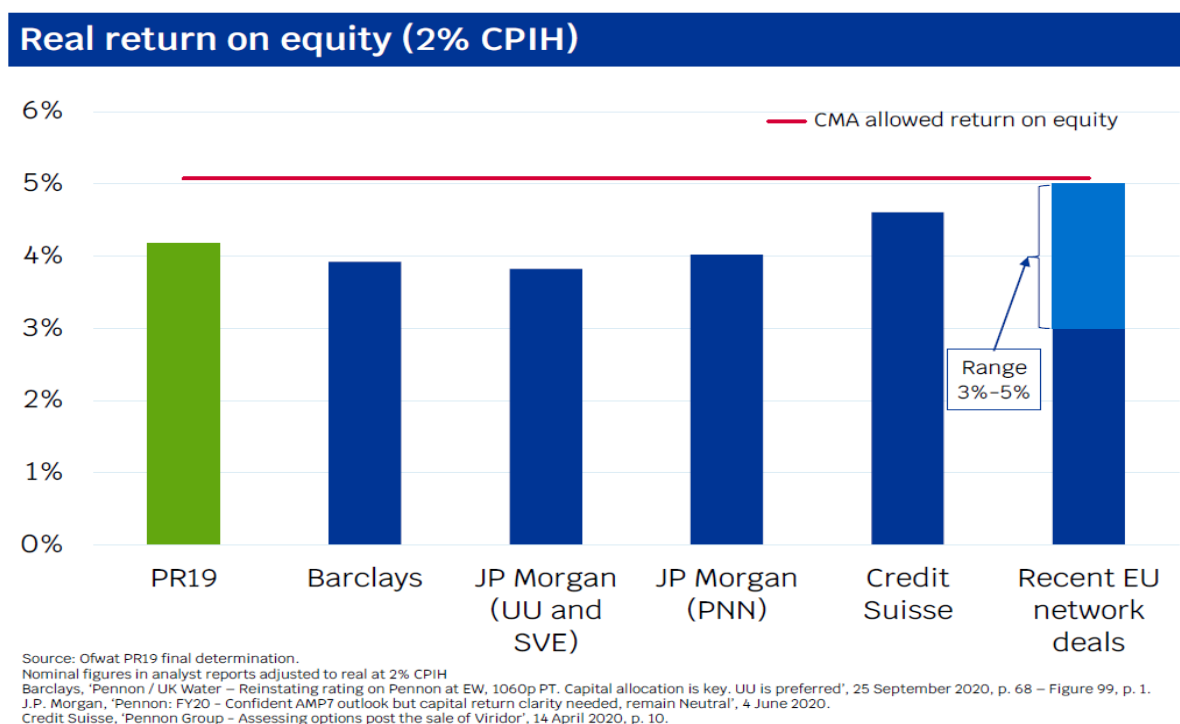
9.1363 Ofwat stated that assumptions used by market analysts indicated an allowed cost of equity consistent with its nominal allowance of 6.27% rather than the CMA's 7.18%. Ofwat noted that<sup>3193</sup>:

- (a) Barclays suggests a 6.0% nominal cost of equity is sufficient with an expectation that listed companies should trade at 25-30% premia to RCV based on a nominal achieved return on regulatory equity of 9-10%.
- (b) In June 2020, J.P. Morgan based its valuation of United Utilities on a cost of equity of 5.9%, Severn Trent on 5.9% and Pennon on 6.1%, and that all of these figures were lower than Ofwat's PR19 figure.
- (c) Bank of America's May 2020 assumption of a 6.2% nominal investor cost of equity for valuation purposes (while also factoring in 2.8% annual asset base growth and 1% RORE outperformance).
- (d) Credit Suisse used a nominal 6.7% cost of equity and a 4.8% WACC when assessing Pennon in April 2020, and that both of these figures were below the CMA's estimates.

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<sup>3193</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraph 2.18

Figure 9-26: Ofwat graph showing sell-side estimates of the cost of equity



Source: Ofwat presentation to the CMA

### Disputing Companies

9.1364 In response to Ofwat's submissions on broker forecasts, Yorkshire stated that Equity analysts do not have the cost of capital expertise that the CMA possesses, and that any estimates analysts have published should not be elevated above the detailed analysis conducted by the CMA.<sup>3194</sup>

### CMA assessment

9.1365 We consider that caution is warranted when interpreting broker forecasts of the cost of equity in relation to utility companies. As with MAR analysis, such forecasts focus on only two companies. These estimates may also prove to be no more accurate than our own assessment, or may be specifically tailored to particular investors or house views rather than representing the cost of capital demanded by the average or marginal investor in the sector. In addition, there may be circularity in these estimates if analysts assume costs of equity close to those set by the regulator rather than conducting their own assessments.

<sup>3194</sup> Yorkshire's reply to responses to the provisional findings, p55



9.1366 However, as with the MAR data above, while this data cannot conclusively show that either Ofwat or the CMA's cost of capital allowance has been set too high, the data from broker estimates certainly does not indicate that market participants believe that the allowance has been set materially too low.

### *Financeability*

#### *Ofwat*

9.1367 Ofwat said that it would be disproportionate and untargeted to make adjustments to the cost of capital to address financeability concerns. Ofwat pointed to previous reviews where it had made financeability uplifts, and where in its view the consequence had only been benefits for shareholders.

9.1368 Ofwat stated that there were approaches to ensuring financeability that would better balance the customer interest, including changing the level of notional gearing, changing the notional use of index linked debt, increasing the speed of transition to CPIH-indexing or assuming some level of equity issuance.<sup>3195</sup>

#### *Disputing Companies*

9.1369 The Disputing Companies supported the CMA's recognition of the importance of assessing financeability in the context of maintaining strong credit ratings, and that Ofwat's solutions to financeability shortfalls could not be relied upon to improve credit ratings.

9.1370 Anglian stated that the CMA's approach confirms best regulatory practice for assessing financeability, in particular the recognition of WACC as the key determinant of financeability as well as adherence to rating agency methodologies.<sup>3196</sup>

9.1371 Bristol agreed with the CMA's more realistic, market-based approach to financeability testing as a cross check on the adequacy of the overall settlement in supporting companies to secure investment grade credit ratings based on the notional capital structure.<sup>3197</sup>

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<sup>3195</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraphs 3.69-3.82

<sup>3196</sup> [Anglian's response to the provisional findings](#), paragraph 458

<sup>3197</sup> [Bristol's response to the provisional findings](#), paragraphs 244-245

9.1372 Northumbrian agreed with the CMA testing financeability through checking that the allowed return supports a strong Baa1 investment grade credit rating under the notional structure.<sup>3198</sup>

9.1373 Yorkshire stated that the CMA's approach to addressing financeability 'in the round' was appropriate. In addition, the CMA was right to identify the WACC as being central to achieving financeability and to match its approach to the actual methodologies used by the credit ratings agencies. Yorkshire described this as a rigorous and transparent approach which would set a clear benchmark for future price reviews.<sup>3199</sup>

### *Third Parties*

9.1374 Ofgem stated that they would caution the CMA against 'aiming-up' its equity allowance in order to deal with perceived financeability constraints. Ofgem stated that this was particularly relevant as interest rates had been falling for a long time, meaning that the CAPM implied cost of equity was near historic lows while regulated companies' debt books included fixed rate debt that was contracted at higher rates. Ofgem argued that as higher rate debt is replaced with lower cost debt over time, it would expect financeability ratios to improve over subsequent price controls. Therefore, it was 'perfectly possible' that for single price controls, certain financeability metrics may appear relatively weak while other metrics remain strong.

9.1375 Ofgem stated that temporary or mixed financeability positions could be addressed through adjustments to notional gearing or PAYG rates, rather than through aiming-up equity allowances. In Ofgem's view, returns that were too high risked undermining the legitimacy of the water sector and creating market distortions relative to other businesses that operate in competitive environments with more risk.<sup>3200</sup>

9.1376 Citizens Advice stated that it agreed with the CMA that, as a matter of principle, if the WACC is set at a reasonable level, both debt and equity investors should earn sufficient returns to cover the cost of financing. As a result, if the cost of capital is set correctly, there is no financeability justification for subsequent 'aiming-up', and any such adjustment would only result in the cost of capital being too high.<sup>3201</sup>

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<sup>3198</sup> [Northumbrian's response to the provisional findings](#), paragraph 25

<sup>3199</sup> [Yorkshire's reply to responses to the provisional findings](#), paragraphs 2.1.1-2.1.2

<sup>3200</sup> [Ofgem's response to the provisional findings](#), paragraphs 74-76

<sup>3201</sup> [Citizens Advice's response to the provisional findings](#)

## *CMA assessment*

- 9.1377 As discussed in the financeability section, our assessment has been focussed on whether the notional company is financeable. We recognise that there are differences between the financial position of the notional company and the actual companies, including the Disputing Companies. We have followed an approach that the overall determination, including the WACC, should ensure that the notional company is financeable.
- 9.1378 Our analysis of the cost of equity, including the ranges that result from parameter uncertainty, illustrates that the CAPM model could be used to derive a wide range of potential options for the cost of equity. It is likely that the lower end of this wide range of estimates would ultimately result in ratios which are lower than necessary to support investment-grade credit metrics at the notionally-structured company. The overall determination, in the round, needs to include a consideration of whether the WACC assumptions chosen are consistent with the credit rating assumed throughout the determination. We therefore disagree with Ofwat's submission that the need to maintain credit metrics can never be part of the WACC assessment.
- 9.1379 In addition, our assessment of Ofwat's PAYG advancement and RCV run-off financeability adjustments suggests that they result in higher bills for current customers, without actually improving credit quality according to at least some of the credit rating agencies. It would seem inconsistent to adopt an approach that leads to customers paying more for their water while not providing the intended support to the financeability of the notionally-structured company.
- 9.1380 Despite the apparent benefits of an NPV-neutral adjustment, we are concerned that it is not obvious that there will be 'excess' cashflow in future period that will allow the 'pay back' of cashflows brought forward through such financeability levers. As discussed in section 10, our review of the approach of the credit rating agencies suggests that, under their methodology, accelerating revenue in one period while reducing revenue in future periods will not necessarily improve overall credit quality. This is because it does not increase the funds available to repay debt investors. However, if accelerating revenues from future price controls through the use of financeability levers does improve credit quality in AMP7, there must be an opposite effect of reducing credit quality in future periods, and therefore future customers may also face the same uplift to bills while companies are more likely to be downgraded by the rating agencies.
- 9.1381 Although Ofwat has pointed us to concerns raised in respect of previous NPV-positive financeability adjustments, this appears to be a very

different concern from testing whether the return in AMP7 is expected to be high enough to support the financeability of the notional company. We understand that the previous examples referred to by Ofwat relate to previous examples of allowing higher returns to some but not all companies, to reflect financeability considerations.

9.1382 We agree that the aim of the financeability test should not include allowing some companies a higher total return on capital than others, which would be the implication of an NPV-positive financeability adjustment applied on a case-by-case basis. Our approach is to assess whether the WACC is set at a level which is consistent with the financing duty at a sector level, and therefore is consistent with the broader approach to the cost of capital and the finance duty being assessed on a notional basis.

9.1383 We therefore continue to assume that financeability should be a valuable cross-check when picking an appropriate point estimate from a calculated cost of capital range.

*Difference between cost of equity and cost of debt*

9.1384 In response to our Provisional Findings and updated analysis on the point estimate for the cost of equity, ENA highlighted analysis from Oxera on the relationship between the cost of equity and the cost of debt. The Oxera analysis highlights the relationship between the ARP (asset risk premium) and DRP (debt risk premium). In a sector where equity returns are relatively low, Oxera's analysis highlights that equity investors will always be taking greater risk, and therefore it is important to check whether the gap between ARP and DRP implied by our determination is high enough.

9.1385 Oxera's analysis suggests that market data can be used to demonstrate that the gap between ARP and DRP indicated by Ofwat's analysis is too low, being at the 17<sup>th</sup> percentile of historical data. Oxera calculates that the CMA's point estimate results in a gap which is still well below the median of that suggested by this market data.

9.1386 The Oxera analysis is based on what seems like a logical principle: that for a regulated business with capped returns, the cost of equity used in the WACC should still be assumed to remain sufficiently above the current cost of debt to promote equity investment in the sector. We agree that this is conceptually sensible, and the principle that the ARP should be at a premium to the DRP is also potentially relevant to the choice of risk-free rate and the approach to de-gearing and re-gearing. However, we do not agree that the evidence provided by Oxera is sufficient in itself to justify an adjustment to the cost of equity. The calculation provided is itself based on a particular set of

assumptions for ARP, which are different to those used in the CMA's approach. It is unsurprising that the CMA's approach identifies a different ARP to DRP differential. In our view, given the number of assumptions required to estimate the ARP to DRP differential, the measure implied by the CMA's determination is of a sufficiently comparable scale to Oxera's sample that this analysis does not in itself suggest that we need to adjust the cost of equity.

#### *Overall assessment of a point estimate for the cost of capital*

9.1387 We have examined evidence from the parties on the potential influences on the choice of a point estimate for the cost of capital. In making our overall assessment, we further consider the following points:

- (a) The mechanisms by which the choice of point estimate might affect the level of investment in the water sector;
- (b) Whether there is asymmetry within the WACC range; and
- (c) What is the correct interpretation of the distribution of parameter uncertainty when setting a point estimate for the WACC?

#### *Level of investment*

9.1388 Our concerns in respect of the level of investment relate to two, related issues:

- (a) First, that regulation should create a supportive long-term investment environment. The long-term investors in infrastructure that the companies need to attract to support a long-term low cost of capital will not be attracted if there are frequent sharp changes to the way regulators determine the cost of capital. An approach which is both cautious in responding too quickly to market fluctuations and is consistent over time should ultimately deliver benefits to both investors and, through a low cost of capital, to customers.
- (b) Second, that the allowed return needs to be set in a way that encourages the right level of new investment. If the WACC is set too low, companies will not have the incentive to identify, develop and implement new and often complex investment programmes. This was the point identified in the analytical framework supporting the UKRN report and previous studies on the approach to the WACC. However, we agree with Ofwat that there are risks if the WACC is set too high (which we consider could relate to over-investment or excess returns to shareholders), and that the challenge is getting an appropriate balance between these two risks.

- 9.1389 We have considered further how these considerations might affect the choice of a point estimate for the cost of equity for AMP7. On balance, our updated view is that the level of the point estimate we proposed in our Provisional Findings was higher than necessary to meet these objectives.
- 9.1390 We continue to be concerned that there needs to be an appropriate level of caution in making significant changes to the cost of capital. The midpoint of our cost of equity range in PFs was around 30% lower than in AMP6, with much of this reduction due to changes in the methodology for calculating the cost of equity. However, we have also considered further evidence on market prices and broker forecasts, all of which indicates that the range which we proposed in the PFs, at least at this point, appears to be in line with market expectations. There is also evidence that there continues to be significant availability of new capital for further investment in infrastructure, should it become necessary. We therefore consider that the risk of an exit of capital is relatively low over AMP7.
- 9.1391 In respect of the incentives on firms to identify new capital and grow the RCV where it benefits customers, there remains a risk that a WACC that is too low will not provide these incentives. We continue to be of the view that, at the margin, owners and their management will have some discretion in how appropriate capital projects are identified and designed, and that there needs to be sufficient financial incentives to sure that this is done at a desirable level. This would be particularly the case if Ofwat required a step change in investment to meet changing resilience requirements in the face of climate change challenges or other stresses on existing infrastructure.
- 9.1392 We also considered these points in the CAA/NATS Provisional Determination. Although we concluded that the midpoint was appropriate in that review, this was because of the way that the investment programme was designed, involving government and wider stakeholders in relevant governance. We also highlighted in CAA/NATS the risk that, in other contexts, customers' interests could be served by a small premium to the cost of capital to avoid an 'opex bias'.<sup>3202</sup>
- 9.1393 We recognise, as highlighted in the NATS review and also the UKRN report, that these incentives are created most directly by the expected return on new investment, whereas the WACC applies to existing and new investment. Whilst in theory the incentives for new investment should also be

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<sup>3202</sup> [CAA/NATS Provisional Determination](#), paragraphs 12.288-12.290

created by the choice of WACC over the life of the new assets, this relies on a consistency of approach over multiple periods.

9.1394 Accordingly, we consider that the need to promote investment should be a consideration in setting the point estimate, but that there are balancing factors which mean that the effect on the choice of point estimate in AMP7 would be small. In summary:

- (a) We continue to be of the view that there are risks of an exit of capital from the long-term investors in the sector, should the cost of capital be set too low;
- (b) We also believe that there are risks that there will be underinvestment in new assets, if the expected return on capital on new investment in AMP8 and beyond does not provide incentives to reinvest capital and maintain or grow the asset base over time; and
- (c) Balanced against this, we consider that the market evidence on investors' expectations indicates that the risks from a) and b) during AMP7 are relatively low, and therefore that the CMA should be able to take an approach that is suitably cautious without setting the point estimate materially above the mid-point in AMP7.

### *Asymmetry*

9.1395 We consider that setting a point estimate for the cost of capital should be considered 'in-the-round', and that this includes a view on the overall balance of the settlement. In our view, a package of asymmetric incentives should be considered as part of an 'in-the-round' assessment of the package, including the cost of capital. If the package includes significant asymmetric incentives, such as large penalty-only incentives, then the expected return will be lower than the allowed cost of capital.

9.1396 We note that Ofgem has taken a comparable view that the symmetry of the package of incentives is relevant to the final assessment of allowed returns on the regulated asset base, although it did not take the same view on the balance of risk in its recent determination – instead calibrating the allowed return in relation to the higher likelihood of outperformance in the energy sector.<sup>3203</sup>

9.1397 One potential form of asymmetry is in the definition of the range for the cost of capital; the risk that it is too high may be different from the risk it is too

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<sup>3203</sup> Ofgem (2020), *RIIO-2 Final Determinations – Finance Annex*, paragraph 3.155

low, because there is asymmetry within the ranges for the parameters chosen. We have considered further and largely consider that these are symmetric, at least in respect of the risks that the actual measure may be at the higher and lower points in the range.

- 9.1398 We have some concern about the risks associated with the size of reduction in the estimates of the risk-free rate and total market return since AMP6. Given that the majority of these changes do not relate to changes in market data, there remains a residual risk around how we have updated this analysis of the cost of equity. We recognise that there are also risks that we have not gone far enough – but given our concerns about consistency and caution across regulatory decisions, our view is that this is better addressed in future periods when more evidence on the effects of the decisions in PR19 and this redetermination becomes available.

### *Financeability*

- 9.1399 We consider financeability to provide a relevant cross-check on the choice of the cost of equity. The use of credit ratios at least provides a check on whether the cost of equity appears to be of a level which is broadly consistent with the high-quality credit ratings required by Ofwat and implied in the cost of debt.
- 9.1400 In this case we note that our proposed approach to the WACC is likely to result in the notional company achieving strong investment-grade credit ratings without accelerating PAYG from future periods. This is based on the use of a point estimate for the cost of equity which is in the higher end of the range for the other reasons included in this section. Setting the WACC at our updated point estimate, but without the need to accelerate PAYG, should largely offset the effect on bills in AMP7, relative to Ofwat's approach, for those companies which had large PAYG adjustments.
- 9.1401 In our final financeability assessment we note that there are potentially small gaps for some companies between an individual ratio and the target level during AMP7. Overall, these gaps are not significant enough to mean that the WACC cannot support financeability. As discussed in more detail in section 10, the assessment from the rating agencies is wide-ranging. We have concluded that the notional company would still be able to achieve a high-quality investment grade rating based on the balance of risk and reward in our final determination.



## WACC - Final choice of a point estimate

- 9.1402 As described above, we consider that there are a number of benefits from choosing a point estimate of the cost of equity above the middle of the range. Our view is that this will result in an appropriate balance of risk in the round across the determination, including addressing the level of risk to investment in the sector associated with setting the cost of equity too low, particularly in the context of a sharp reduction since AMP6, and also addressing asymmetry in the broader financial settlement. We have also concluded that a decision to set a point estimate above the middle of the range will address the risks to financeability which would increase from setting the cost of equity at lower levels within the range.
- 9.1403 As described in the section on parameter uncertainty above, there is no single way to calculate a value of the cost of equity which correctly addresses all these concerns and the decision is a matter of judgement. If we were to use a figure 0.15% above the midpoint, as indicated by Ofwat as sufficient if we were to make any adjustment to the mid-point at all, we have concluded that this would be insufficient to address all these concerns. However, we have also indicated that we disagree with the assessments of the Disputing Companies which suggest a much higher point estimate is necessary, as the reasons given would in our view include compensating investors for risks which can reasonably be expected to balance out over time.
- 9.1404 Taking these considerations together, our final decision is to use a cost of equity point estimate 0.25% above the middle of our 3.76% to 5.21% range, which results in a point estimate of 4.73%
- 9.1405 As described above, we have set a cost of embedded debt allowance of 2.47%, a cost of new debt allowance of 0.19% and an issuance and liquidity cost allowance of 0.1%. We assume a 17% average proportion new debt over the price control. Combined, these factors amount to a cost of debt allowance of 2.18%.
- 9.1406 At our assumed 60% notional level of gearing, our cost of equity and cost of debt allowances lead to an overall appointee WACC of 3.20%. This cost of capital allowance is 0.24% higher than Ofwat's 2.96% PR19 determination, but is within Ofwat's consultant's proposed range of 2.44% to 3.41%.<sup>3204</sup>

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<sup>3204</sup> Ofwat (2019), [PR19 final determinations: Allowed return on capital technical appendix](#), p6. 2.44% - 3.41% range calculated from Europe Economics' 4.49% - 5.48% as quoted by Ofwat, deflated by 2% to give a CPIH-real equivalent figure.

**Table 9-37: CMA's Final Determination WACC metrics compared to Ofwat's PR19**

<i>CPIH-Real</i>	<i>CMA Final Determination</i>	<i>Ofwat PR19 final determination</i>
TMR	6.81%	6.50%
RFR	-1.34%	-1.39%
ERP	8.15%	7.89%
Unlevered beta	0.29	0.29
Debt beta	0.075	0.125
Equity beta	0.71	0.71
Cost of new debt	0.19%	0.53%
Cost of embedded debt	2.47%	2.42%
Proportion of new debt	17%	20%
Issuance and Liquidity costs	0.10%	0.10%
Impact of picking a point estimate above the midpoint	0.25%	-
<b>Pre-tax cost of debt</b>	<b>2.18%</b>	<b>2.14%</b>
<b>Post-tax cost of equity</b>	<b>4.73%</b>	<b>4.19%</b>
Notional Gearing	60%	60%
<b>Appointee Allowed Return on Capital (Vanilla)</b>	<b>3.20%</b>	<b>2.96%</b>
Retail margin adjustment	0.08%	0.04%
Wholesale Allowed Return on Capital (Vanilla)	3.12%	2.92%

Source: CMA analysis and Ofwat PR19 Final Determination

Note: All CMA cost of equity component metrics represent the midpoint of the range

9.1407 For the ease of comparison, we present our decisions in nominal, CPIH-real and RPI-real terms in Table 9-38.

**Table 9-38: CMA's WACC decisions in Nominal, CPIH-real and RPI-real terms**

<i>WACC Metrics</i>	<i>Nominal</i>	<i>CPIH-Real</i>	<i>RPI-Real</i>
TMR	8.94%	6.81%	5.85%
RFR	0.63%	-1.34%	-2.22%
ERP	8.31%	8.15%	8.07%
Unlevered beta	0.29	0.29	0.29
Debt beta	0.075	0.075	0.075
Equity beta	0.71	0.71	0.71
Cost of new debt	2.19%	0.19%	-0.70%
Cost of embedded debt	4.52%	2.47%	1.56%
Proportion of new debt	17%	17%	17%
Issuance and Liquidity costs	0.10%	0.10%	0.10%
Impact of picking a point estimate above the midpoint	0.25%	0.25%	0.25%
<b>Pre-tax cost of debt</b>	<b>4.22%</b>	<b>2.18%</b>	<b>1.27%</b>
<b>Post-tax cost of equity</b>	<b>6.82%</b>	<b>4.73%</b>	<b>3.79%</b>
Notional Gearing	60%	60%	60%
<b>Appointee Allowed Return on Capital (Vanilla)</b>	<b>5.26%</b>	<b>3.20%</b>	<b>2.28%</b>
Retail margin adjustment	0.08%	0.08%	0.08%
Wholesale Allowed Return on Capital (Vanilla)	5.18%	3.12%	2.20%

Source: CMA analysis and Ofwat PR19 Final Determination

Note: All CMA cost of equity component metrics represent the midpoint of the range. All CMA metrics have been set in CPIH-terms and then individually inflated by 2% to show nominal terms or deflated by 0.9% to show RPI-real terms. Calculating the nominal allowance in this way gives a minutely different result than inflating or deflating the total costs of equity and debt as used in the financial modelling of the determination. For example, inflating the calculated CPIH-real debt figure would give a result of 4.226% rather than the 4.224% underlying figure used in this table.

## Our WACC decision in context

### The impact on customer bills

9.1408 As a result of our approach, and in conjunction with the other decisions within this determination, customer bills at the four Disputing Companies will fall by an average of 9.5% in this price control.

9.1409 Using Ofwat's PR19 cost of capital allowance would have resulted in customer bills at the four Disputing Companies falling by approximately 12.6% on average. However, due to the issues discussed above and in the coming Financeability section, we consider our cost of capital allowance achieves the right balance for customers, who benefit not only from lower bills but also from continued investment in the water and sewerage networks

### The CMA's WACC versus PR19 and PR14

9.1410 In the following paragraphs we compare our cost of capital allowance to Ofwat's PR19 decision and the cost of capital allowance at Ofwat's previous price control, PR14. For ease of comparison across time periods, we compare all figures in RPI-real terms, not the CPIH-real we have used elsewhere in this section.<sup>3205</sup>

**Table 9-39: CMA cost of capital estimates versus PR19 and PR14 allowances**

<i>RPI-Real</i>	<i>CMA Midpoint</i>	<i>Ofwat PR19</i>	<i>Ofwat PR14</i>
TMR	5.85%	5.47%	6.75%
RFR	-2.22%	-2.35%	1.25%
ERP	8.07%	7.81%	5.50%
Unlevered beta	0.29	0.29	0.30
Debt beta	0.075	0.125	0.00
Equity beta	0.71	0.71	0.80
Cost of new debt	-0.70%	-0.45%	2.00%
Cost of embedded debt	1.56%	1.43%	2.65%
Proportion of new debt	17%	20%	25%
Issuance and Liquidity costs	0.10%	0.10%	0.10%
Impact of picking a point estimate above the midpoint	0.25%	-	-
<b>Pre-tax cost of debt</b>	<b>1.27%</b>	<b>1.15%</b>	<b>2.59%</b>
<b>Post-tax cost of equity</b>	<b>3.79%</b>	<b>3.18%</b>	<b>5.65%</b>
Notional Gearing	60%	60%	62.5%
<b>Appointee Allowed Return on Capital (Vanilla)</b>	<b>2.28%</b>	<b>1.96%</b>	<b>3.74%</b>
Retail margin adjustment	0.08%	0.04%	0.14%
<b>Wholesale Allowed Return on Capital (Vanilla)</b>	<b>2.20%</b>	<b>1.92%</b>	<b>3.60%</b>

Source: CMA analysis and Ofwat PR14 final determination and Ofwat PR19 final determination

<sup>3205</sup> PR19 and PR14 metrics presented as reported. CMA metrics calculated as CPIH-based estimates deflated by 0.9% to give an RPI-real figure. Differences in the 'wedge' between RPI and CPI over time may make some metrics difficult to compare with accuracy. Differences between the CMA and Ofwat's PR19 determination are slightly larger in these terms than is the case on a more comparable 2% CPIH-real basis.

- 9.1411 As demonstrated in Table 9-39, our appointee cost of capital allowance of 2.28% (RPI-real) is 0.32% higher than Ofwat's PR19 decision but represents a significant 1.46% reduction in comparison to the allowance awarded to companies in PR14.
- 9.1412 In RPI terms, our cost of debt allowance is 0.12% higher than Ofwat's PR19 decision. This higher estimate is the result of a slightly higher cost of embedded debt, market price falls in the benchmark for the cost of new debt and our decision to lower the proportion of new debt to 17% (versus Ofwat's 20%).
- 9.1413 In RPI terms, our cost of debt allowance is 1.32% lower than Ofwat's PR14 decision, predominately on the basis of a reduction in overall borrowing costs since 2014.
- 9.1414 In RPI terms, our cost of equity allowance is 0.61% higher than Ofwat's PR19 decision. This difference is the result of higher individual metric estimates, particularly on TMR and RFR, and our decision to pick a point estimate for the cost of equity 0.25% higher than the midpoint of the range.
- 9.1415 In RPI terms, our cost of equity allowance is 1.86% lower than the allowance companies received in PR14. This is primarily the result of a structurally lower estimate of TMR on the basis of new thinking about historic inflation data, the inclusion of a debt beta in our estimates and falls in the market level of the RFR.

## 10. Financeability

### *Introduction*

- 10.1 In this section we assess the financeability of the four Disputing Companies under our determinations. One of the five principal duties under Section 2(2A) of the WIA91 requires Ofwat, and therefore the CMA, to decide the reference in accordance with its duty to ensure that a company is able to finance the proper carrying out of its functions (in particular, by securing reasonable returns on its capital). This is often referred to as the Finance Duty or ensuring 'financeability'. In this section, we highlight the financeability approach taken by Ofwat and the key arguments from the Main Parties, before undertaking our own assessment of the financeability of each of the companies.

### *Background and Ofwat's approach at PR19*

- 10.2 Ofwat interprets its financing duty as a duty to secure that efficient companies that meet their service and performance commitments will earn the allowed return. Ofwat stated that it conducts a financeability assessment to check that, when all the individual components of its determination are taken together (including totex, allowed return and retail margin, as well as its proposals for PAYG and RCV run-off<sup>3206</sup>), an efficient company can finance its functions.
- 10.3 Ofwat set its cost of capital using a notional gearing of 60%, which is generally lower than the actual gearing of the regulated water companies. Ofwat assessed whether allowed revenues, relative to efficient costs, were sufficient for a company to finance its investment on reasonable terms and to deliver its activities in the long term, while protecting the interests of existing and future customers.
- 10.4 Ofwat's PR19 Methodology stated that it expected each company to provide Board assurance that its plan is financeable on both its actual capital structure and on the notional capital structure. Ofwat expected these Board statements to set out the steps taken to provide the required assurance and explain the credit rating that they have targeted and the associated level of financial ratios which are required. If companies needed to take action to address issues of actual financeability, then Ofwat would expect companies to set out how they have addressed these issues and provide compelling evidence of their financeability at the time they submit their business plan.

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<sup>3206</sup> PAYG and RCV run off both involve advancing revenues from future price controls in order to cover cashflow deficits in the current price control.

- 10.5 Ofwat considered that companies facing a financeability constraint under the notional capital structure would need to demonstrate in their business plans how this would be addressed, including the underlying cause, and actions to mitigate the constraint. Ofwat identified a range of actions that it considered companies could take to address a financeability constraint including the use of PAYG/RCV run-off, restriction of dividends and equity injections.
- 10.6 Ofwat stated that the financeability challenge was particularly acute at PR19 because the return related to the RPI-linked part of the RCV was low in real terms. Ofwat stated that the ratio of cash return to inflation return for the RPI-linked part of the RCV, at 39%, was materially lower than at any previous determination.
- 10.7 Ofwat stated that for PR19, the transition to inflate part of the RCV by CPIH mitigates the financeability challenge to some extent. Ofwat stated that, assuming the average transition to CPIH by the end of the period was 63.6% of RCV, the real return on a blended RPI/CPIH basis would result in an implied adjusted interest cover ratio (AICR)<sup>3207</sup> for PR19 consistent with PR14. However, this would vary between companies depending on the relative proportions of RCV that are inflated by RPI and CPIH.<sup>3208</sup>
- 10.8 In assessing how to improve the financial ratios in its financeability assessment, Ofwat considered increasing its assumption on the use of index-linked debt. However, Ofwat noted that changes to such an assumption could have a material impact on the financeability assessment, which in its view showed that 'guidance' (from credit rating agencies) on the level of adjusted interest cover should not be interpreted as a strict minimum requirement.
- 10.9 Ofwat also considered a quicker transition to CPIH within its FD, but concluded that its planned transition managed the needs of companies, investors and the impact on customer bills.<sup>3209</sup>
- 10.10 In its financeability assessment, Ofwat focused on what it considered to be the key measures of indebtedness and ability to service and repay debt which were: gearing, interest cover, and funds from operations (FFO) to net debt ratios. This was consistent with the approach taken by companies in their business plans and by credit rating agencies that apply higher weightings to similar financial measures. Ofwat took into consideration the financial ratios

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<sup>3207</sup> The Adjusted Interest Cover Ratio (AICR) is sometimes referred to by Parties as the Adjusted Cash Interest Cover Ratio (ACICR). Within this section we will refer to it as AICR to avoid confusion and in line with the terminology used by Ofwat.

<sup>3208</sup> Ofwat (2019), *PR19 final determinations: Aligning risk and return technical appendix*, section 6.3 including table 6.2

<sup>3209</sup> Ofwat (2019), *PR19 final determinations: Aligning risk and return technical appendix*, section 6.3

deemed most significant by companies and the level of those ratios upon which the company has provided Board assurance of financeability and long-term financial resilience.

- 10.11 In addition, Ofwat made an adjustment to the adjusted interest cover ratio for companies that recover capitalised infrastructure renewal expenditure (IRE)<sup>3210</sup> through PAYG revenue. Ofwat did this to ensure that the cash flow included in the calculation of funds from operations was more comparable across companies. It also excluded pension deficit repair costs that were not funded by customers.
- 10.12 Ofwat stated that if financeability challenges resulted from insufficient levels of cash flow headroom, then the appropriate response was to alter cash flows through the use of NPV-neutral changes to PAYG or RCV run-off rates, provided that the use of these levers did not lead to a material depletion of the RCV.
- 10.13 In addition, Ofwat assumed that a notional company with higher RCV growth should finance some of that growth with retained earnings. Where companies had material RCV growth (real growth greater than 10% over 2020 to 2025) and gearing increased above the opening notional assumption of 60%, Ofwat made an adjustment to the dividend yield to target 60% gearing at 31 March 2025.<sup>3211</sup>

#### *Ofwat's decisions on PAYG and RCV run-off rates*

- 10.14 The PAYG rate is the proportion of a company's totex allowance that is funded through revenue, rather than added to the RCV. The related concept, the 'RCV run-off rate', represents the rate at which the RCV is depreciated.
- 10.15 In PR19 Ofwat said that each company's choice of rates should reflect the company's own expenditure and investment plans within each control. Ofwat said that its methodology required companies to explain the assumptions that underpinned their PAYG and RCV run-off rates and any proposed departure from natural rates.<sup>3212</sup> Ofwat did not set out a definition of natural rates for PAYG or RCV run-off rates,<sup>3213</sup> but during its assessment of business plans

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<sup>3210</sup> IRE maintains the serviceability of underground assets. Companies had different approaches to how this expenditure was reported in their statutory accounts and how it was recovered through PAYG or through RCV runoff. For draft determinations Ofwat accepted companies' specific approaches to recovering any capitalised infrastructure renewal expenditure through PAYG revenue or over the longer term through RCV run-off. Ofwat accepted that this could have an impact on certain financial ratios where there is a mismatch between PAYG revenue and operating expenditure, and so made adjustments to ensure that financial ratios were more comparable across companies.

<sup>3211</sup> Ofwat (2020), [PR19 final determinations: Aligning risk and return technical appendix](#), section 6.3

<sup>3212</sup> Ofwat (2017), [Delivering Water 2020: Our final methodology for the 2019 price review](#), p82

<sup>3213</sup> Ofwat (2020), [PR19 final determinations: Aligning risk and return technical appendix](#), p31

Ofwat noted that it may require more evidence if companies proposed PAYG rates in excess of the ratio of operating expenditure and infrastructure renewal expenditure to totex.

- 10.16 Ofwat has not made changes to the RCV run-off rates submitted by companies in their business plans, and the companies have not raised challenges about these assumptions.
- 10.17 During its assessment, Ofwat increased PAYG rates for 12 companies, including three of the Disputing Companies. Ofwat considered that its adjustments were modest and did not affect intergenerational fairness and it submitted a report from its advisor that estimated prospective credit ratios in PR24 in support of this view.
- 10.18 The following PAYG adjustments were made to the PAYG rates of three Disputing Companies: Anglian £80 million (1.3% of allowed revenue); Northumbrian £25 million (0.7% of allowed revenue); Yorkshire £85 million (1.6% of allowed revenue) as set out in Table 10-1. No adjustment was made with respect to Bristol.

**Table 10-1: PAYG adjustments applied by Ofwat**

<i>Company</i>	<i>Amount £m</i>	<i>% allowed revenue</i>
Anglian	£80m	1.3%
Northumbrian	£25m	0.7%
Yorkshire	£85m	1.6%

Source: Ofwat

### ***Ofwat's submissions on the CMA approach***

- 10.19 Following the publication of the CMA's Provisional Findings, Ofwat raised several concerns with the CMA's provisional approach to financeability, including our statement, as explained further below, that the WACC was the most important determinant of financeability. Ofwat stated that there were alternative mechanisms which could be considered by the CMA, including changes to the notional structure, lowering the gearing assumption or increasing Ofwat's conservative assumption for the proportion of index-linked debt.
- 10.20 Ofwat also stated that increasing returns to aid financeability at PR04 had ultimately led to windfall gains for investors, and that as a result it (and



Ofgem) had focused on financeability approaches that were net present value neutral to companies and customers over the long term.<sup>3214</sup>

10.21 Following the publication of the CMA's consultations on the costs of debt and picking a point estimate for the cost of capital, Ofwat stated that the CMA appeared to accept the position of the credit rating agencies uncritically, and had given too much weight to specific ratios. Ofwat stated that such an approach raised fundamental questions about the relationship between the role of the regulator and the role of the credit rating agencies. Ofwat stated that the credit rating agencies 'are not wholly independent from the companies'.<sup>3215</sup>

10.22 Ofwat noted that the 2.12% (in CPIH terms) cost of debt used in the CMA's costs of debt consultation<sup>3216</sup> was higher than Ofgem's recent decision in relation to energy companies (1.82% in CPIH terms). Ofwat stated that solving financeability constraints through the cost of equity allowance would result in an allowed cost of equity that was higher in water than in energy (for a given level of gearing). Ofwat stated that this approach would contrast with evidence from Ofgem's RIIO-2 determination showing that beta observations in water are lower than for energy, suggesting a lower cost of equity should apply in water.<sup>3217</sup>

### ***Financeability – Disputing Companies' Views***

10.23 Each of the Disputing Companies stated that its business plan was not financeable under Ofwat's FD.

#### ***Anglian***

10.24 Anglian stated that under PR19 it would fall 'well short' of meeting the thresholds to maintain a Baa1 rating under key AICR and FFO/Net Debt credit metrics on the basis of the notional capital structure.

10.25 Anglian stated that Ofwat had used a number of 'artificial and unjustified' adjustments and assumptions in order to conclude that Anglian was financeable on a notional basis. These included advancing £80 million of revenues through a PAYG adjustment that would be discounted by credit agencies in their assessment.

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<sup>3214</sup> [Ofwat's response to the provisional findings – risk and return](#), paragraphs 3.78–3.82

<sup>3215</sup> [Ofwat's initial response to the cost of capital working papers](#), paragraph 1.17

<sup>3216</sup> [Working paper: cost of debt](#), paragraph 263

<sup>3217</sup> [Ofwat's initial response to the cost of capital working papers](#), paragraphs 1.16–1.18

- 10.26 Anglian stated that even if Ofwat's assumptions and adjustments were correct, there was insufficient headroom in relation to key credit metrics to conclude that Anglian was financeable on the basis of the notional capital structure. Specifically, under Ofwat's calculations, Anglian would have an AICR of only 1.5x (the lowest end of the 1.5x–1.7x range required for a Baa1 rating) while its FFO/Net Debt of c.9.5% was already below the 10% threshold needed for a Baa sub factor rating on the Moody's scale.
- 10.27 Anglian stated that the significant increase in the totex efficiency challenge relative to PR14, and the asymmetric downward skew in Anglian's regulatory incentives and cost-sharing ratios, meant that there was a significant risk of underperformance which would trigger a downgrade (and worsen the terms on which Anglian could borrow). Anglian stated that it was not credible for Ofwat to contend that any outperformance or underperformance is 'neutral' given where Ofwat had 'put the bar' in the FD.<sup>3218</sup>
- 10.28 Anglian also stated that Ofwat had misallocated c.£157 million of opex as capex in its FD, thus overstating the revenues that would be available to Anglian in AMP7. Anglian stated that the result of this misallocation would be that it would be able to recover less PAYG revenue than would be required to be spent in AMP7, harming Anglian's financeability during the period.<sup>3219</sup>
- 10.29 Following publication of the CMA's Provisional Findings, Anglian believed that the CMA had gone 'some way' to addressing its concerns. However, Anglian still had concerns that the CMA's allowances were set at the minimum requirements to achieve Baa1 rating, with insufficient headroom on key credit ratios.<sup>3220</sup>
- 10.30 Following the publication of the CMA's consultations on the cost of debt and picking a point estimate for the cost of capital, Anglian stated that the CMA's updated cost of debt allowance would have materially negative consequences for Anglian's 'notional' financeability.<sup>3221</sup> In addition, Anglian stated that the notional companies would also not be financeable from an equity perspective as equity will be needed to fund the shortfall on embedded debt and thus will not be able to earn its required return.<sup>3222</sup>

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<sup>3218</sup> [Anglian SoC](#), Chapter J, Overview

<sup>3219</sup> [Anglian SoC](#), Chapter E.5

<sup>3220</sup> [Anglian's response to the provisional findings](#), paragraphs 455–467

<sup>3221</sup> [Anglian's initial response to the cost of capital working papers](#), paragraph 14

<sup>3222</sup> [Anglian's final response to the cost of capital working papers](#), p16

## *Bristol*

- 10.31 Bristol stated that Ofwat had failed to meet its financing duty as the result of cost of capital errors, cost allowance errors and balance of risk errors.<sup>3223</sup>
- 10.32 Bristol stated that Ofwat's notionally efficient company had a notional financing structure which bore little resemblance to that of a small water only company, contrary to the CC's Bristol 2010 Determination and the CMA's Bristol PR14 Determination precedents. In addition, Bristol stated that Ofwat's financeability assessment relied on mitigation strategies that are not applicable or available to Bristol. Notably, Ofwat assumed that problems with financial ratios likely result from the timing of investment or a mismatch between company actual financing and their notional assumptions. As such, Ofwat suggest that companies should adjust their financing, for instance reducing and paying off debt and increasing equity to resolve this mismatch between real returns and their actual cost of debt.
- 10.33 Bristol stated that its gearing had fallen in recent years due to its shareholders retaining equity in the business, and its debt level was consistent with the notional gearing assumptions. Additionally, it was not efficient under any scenario to repay early and replace its long-term debt known as Artesian debt,<sup>3224</sup> which was efficiently incurred at the time it was raised. Bristol stated that the only debt that was capable of being repaid is short-term debt, a minority of its capital structure, which has the cheapest cost and thus offers little benefit to ratios.
- 10.34 Bristol stated that Ofwat had failed to properly check that the Baa1 credit rating it set for its determination of the cost of capital was achievable. Bristol stated that when the tests were correctly applied, it was evident that the core ratios used by Moody's (AICR) and S&P Global's (FFO/net debt) to support this rating were not achieved.
- 10.35 Bristol also stated that insufficient cost of capital allowances meant that Ofwat had failed to secure sufficient financial headroom over debt service requirements to allow Bristol to withstand foreseeable adverse events, while Ofwat's cost of equity allowance was insufficient to allow Bristol to secure equity funding.
- 10.36 Following publication of the Provisional Findings, Bristol believed that the CMA's approach was based on a clear, market-based approach that recognised the importance of ensuring that core parameters were calibrated

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<sup>3223</sup> [Bristol SoC](#), Executive Summary, section 5

<sup>3224</sup> See paragraph 9.943 and associated footnote for more details on Bristol's Artesian debt.

such that they supported a financeable outcome. However, Bristol stated that higher risks at smaller companies meant that further increases to its cost of equity allowance would be required in order to withstand 'plausible shocks'.<sup>3225</sup>

- 10.37 Following the publication of the CMA's consultations on the cost of debt and picking a point estimate for the cost of capital, Bristol stated that a cost of equity of 7.7% – 7.8%, as well as updated allowances for costs and ratios of debt, would be required in order to ensure financeability at a small company.<sup>3226</sup>
- 10.38 In response to the CMA's provisional financial model for the determination, Bristol stated that the CMA's approach to allocating opex and capex was inappropriate given the adjustment for the Canal & River Trust costs. Bristol stated that the CMA's adjustments should be added exclusively to opex to avoid creating a material misaligning with Bristol's accounting and fettering its ability to perform against the opex allowance.

#### *Northumbrian*

- 10.39 Northumbrian stated that Ofwat had failed in its financing duty as a result of a combination of cost allowances which were unrealistically low, challenging and stretching performance targets, an asymmetric and downwardly skewed package, and an unprecedentedly low cost of capital.<sup>3227</sup>
- 10.40 Northumbrian stated that because of these issues, it could not, on average, expect to earn a reasonable level of return in the base case, achieve a credit rating that was consistent with the rating assumed in the cost of debt allowance, or have sufficient financial headroom, as reflected in projected credit metrics, to be resilient to plausible downside scenarios including those prescribed by Ofwat. It stated that, overall, this would impact on its ability to finance its functions at the allowed level of financing costs (both for equity and debt).
- 10.41 Northumbrian stated that Ofwat's attempts to address the financeability concerns at PR19, specifically the adjustment of PAYG rates to bring forward revenues from future price controls, were not a sustainable solution and would risk the future financial resilience of the company by reducing the RCV and associated returns in the future. Northumbrian also noted that ratings agencies do not take PAYG or run-off rate adjustments into account, and that

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<sup>3225</sup> [Bristol's response to the provisional findings](#), paragraphs 244–251

<sup>3226</sup> [Bristol's final response to the cost of capital working papers](#), paragraphs 68–71

<sup>3227</sup> [Northumbrian SoC](#), section 10

excess (above natural rate) PAYG is stripped out from revenues when calculating coverage metrics.

- 10.42 Northumbrian stated that adjusting projected metrics to strip out bringing cash forward resulted in a negative impact on the key credit ratios and implied that, on the basis of a notional financial structure, Northumbrian would only achieve a Baa2 rating (at best) based on the latest Moody's rating methodology. This resulted in an inconsistency between the projected credit rating for the company with a notional financial structure based on the final determination and Ofwat's own allowed cost of debt based on an average of 'A' and 'BBB' bonds ie BBB+/Baa1. This meant that (1) credit quality of the notional company would decline, reducing financial resilience; and (2) the company would incur higher costs of financing than assumed by Ofwat in setting the allowed cost of new debt.
- 10.43 Following publication of Provisional Findings, Northumbrian supported the CMA's assessment of debt financeability based on the methodologies applied by the independent rating agencies. However, Northumbrian stated that the package was just financeable, and that a lower cost of capital would not support a stable Baa1 rating of the financial resilience required to manage the scale of risks given the toughness inherent in the price control.<sup>3228</sup>
- 10.44 Following the publication of the CMA's consultations on the cost of debt and picking a point estimate for the cost of capital, Northumbrian stated that the CMA's updated determination would become 'barely financeable' under the base case, with AICR metrics for the notional company at almost exactly 1.5x. The result of this would be no downside buffer for reasonable shocks and little if any explicit recognition of the clear asymmetry in the package.<sup>3229</sup>
- 10.45 In response to the CMA's provisional financial model for the determination, Northumbrian stated that if the CMA decided to exclude its proposed scheme in relation to reduced risk of sewer flooding, the associated £64m adjustment should be made to capex only to avoid misstating the required opex:capex split within the determination.

## *Yorkshire*

- 10.46 Yorkshire stated that Ofwat's financing duty requires that a notionally efficient firm should be able to earn profits in line with its cost of capital and the

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<sup>3228</sup> [Northumbrian's response to the provisional findings](#), Section 8

<sup>3229</sup> [Northumbrian's final response to the cost of capital working papers](#), paragraph 47

efficient firm's cash flows should enable it to raise finance on reasonable terms, including by maintaining an investment grade credit rating.<sup>3230</sup>

- 10.47 Yorkshire stated that its decision to reject Ofwat's FD was driven by Ofwat's failure to assemble a price control package which, in the round, offered investors a reasonable chance of earning a profit in line with the cost of capital. Yorkshire stated that multiple features of Ofwat's FD contributed to a likely shortfall in return, including the under-estimation of expenditure of an efficient company, the overstatement of the performance levels that an efficient company could achieve, and a rate of return on the RCV that fell short of the required WACC. Combined these issues resulted in inadequate interest cover and a financeability problem.
- 10.48 Yorkshire stated that Ofwat's use of revenue acceleration would not allow it to access the long-term debt finance required for AMP7, as its covenant definitions specifically exclude the benefit of any accelerated revenues when calculating interest cover ratios. In addition, Moody's would disregard Ofwat's use of revenue acceleration in their ratings assessments.
- 10.49 Yorkshire stated that its AICR under PR19, when calculated as per Moody's approach, would be well below the minimum 1.5x threshold that Moody's has indicated a company needs in order to obtain a Baa1 rating. Yorkshire stated that it falls to the CMA's determination to ensure that Yorkshire's appointed business has sufficient cashflows to obtain and maintain investment-grade credit ratings, pursuant to the statutory duty to secure that companies are able to finance their activities.
- 10.50 Following publication of Provisional Findings, Yorkshire stated that the CMA's approach to addressing financeability 'in the round' was appropriate. Yorkshire also stated that the CMA's approach of following the methodologies used by the credit rating agencies was correct. However, Yorkshire noted that there was limited headroom on key metrics and that the overall package remained challenging.<sup>3231</sup>
- 10.51 Following the publication of the CMA's consultations on the cost of debt and picking a point estimate for the cost of capital, Yorkshire stated that the CMA's updated views on WACC and asymmetry meant that the notional firm was highly unlikely to be financeable. Yorkshire stated that failure to address these concerns would lead to increased costs for customers over the longer-term

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<sup>3230</sup> Yorkshire SoC, paragraphs 260–281

<sup>3231</sup> Yorkshire's response to the provisional findings, paragraphs 2.1.1–2.4.2

and exacerbated concerns about investor confidence in the UK water sector.<sup>3232</sup>

- 10.52 In response to the CMA's provisional financial model for the determination, Yorkshire stated that it disagreed with the CMA's proposed allocation of totex adjustments within the model. Yorkshire provided its updated assessment of natural PAYG levels, which it calculated as 'opex + IRE'.

### ***Financeability – Third Party Views***

- 10.53 Citizens Advice submitted that it strongly agreed with Ofwat that financeability should be based on the structure of a notional capital-efficient company. Citizens Advice considered the fact that 13 of the 17 water companies had accepted the price control and allowed rates of return indicated that Ofwat's approach was reasonable.
- 10.54 Citizens Advice submitted that there was significant evidence that investor appetite for UK water industry assets remains very high even after the allowed level of return in the PR19 price controls, and that it should be beyond dispute that Ofwat's allowed rates of return were adequate for all water companies to finance themselves.
- 10.55 Citizens Advice submitted that all the water companies, including the four Disputing Companies, continue to be able to raise investment grade debt. Citizens Advice did not agree with the Disputing Companies' submissions suggesting that they would not be able to finance their on-going activities or new investment, or even that there is a risk they will now be unable to. Citizens Advice stated that it had seen no convincing evidence in support of the Disputing Companies' views, and that if they were right, we should have been able to see financial markets reacting by 'slashing the prices' for debt and equity.<sup>3233</sup>
- 10.56 CCWater submitted that it supported Ofwat's financeability assessment based on a notional capital structure. It also submitted that it agreed that Ofwat's financeability assessment should reflect no out/under performance, and that companies and their investors should bear the consequences of inefficiency and underperformance in delivery of their obligations and commitments to customers.
- 10.57 CCWater submitted that it recognised that Ofwat's use of PAYG and RCV run-off ratios is similar to approaches that other regulators use. CCWater

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<sup>3232</sup> [Yorkshire's final submission](#), paragraphs 1.1.2–1.1.3

<sup>3233</sup> [Citizens Advice submission](#)



stated that it had previously advised Ofwat that the PAYG ratio should reflect the balance of long- and short-term cost recovery, relative to a company's balance of operational activity and long-term capital investment. CCWater stated that it was important that revenues that were advanced were done so on an NPV neutral basis.<sup>3234, 3235, 3236, 3237</sup>

- 10.58 CCWater stated that if the CMA persisted with an approach to financeability, as perceived by CCWater, that boosted financial metrics above and beyond those modelled in Ofwat's FD, that the CMA should be transparent about metrics under a 'pure' financeability approach versus the intention behind aiming up.<sup>3238</sup>
- 10.59 Ofgem disagreed with the view that the WACC assumptions were the only relevant considerations for determining whether the price control was 'in the round' consistent with the credit rating assumed. In Ofgem's view, all other policy decisions that influence revenue and cashflow were relevant to an assessment of whether the price control assumptions were consistent with the credit rating assumed.<sup>3239</sup>
- 10.60 Ofgem cautioned against a narrow interpretation of particular ratio levels being absolute 'thresholds' below which it would not be possible to be rated in the given category, noting that the credit rating agencies base their overall rating on a number of factors. Ofgem noted specifically that Ofwat's notional gearing of 60% corresponded to the strong end of the A3 category, which may allow the AICR ratio to slip below 1.5x and still allow the average implied rating to equal Baa1. Ofgem also noted that the water licences did not require ratings from any particular agencies, and that the different views on the importance of certain ratios was shown in the fact that a number of companies had different overall ratings from different agencies.<sup>3240</sup>
- 10.61 Ofgem also noted that current market rates may suggest perceived constraints that may not be genuine financeability concerns. Ofgem flagged that costs of equity were set on current interest rates that were at historic lows, while regulated companies' debt books included fixed debts contracted at higher rates. While this dynamic would stretch ratios in the short-term, the AICR would be expected to improve over time as higher-cost debt is replaced by lower-cost debt over time. Ofgem stated that it was therefore 'perfectly

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<sup>3234</sup> CCWater response to Anglian SoC

<sup>3235</sup> CCWater response to Bristol SoC

<sup>3236</sup> CCWater response to Northumbrian SoC

<sup>3237</sup> CCWater response to Yorkshire SoC

<sup>3238</sup> CCWater Response to the CMA's working paper on the Cost of Capital, paragraphs 3.2.3.1–3.2.3.3

<sup>3239</sup> Ofgem's response to the cost of capital working papers, paragraphs 35–36

<sup>3240</sup> Ofgem's response to the provisional findings, paragraphs 71–72



possible' that for single price controls, certain metrics (such as AICR) may appear relatively weak while other metrics remain strong. Ofgem considered it appropriate to view ratios in the round as a result and, if necessary, to make some adjustment to notional gearing or PAYG rates as mitigation.<sup>3241</sup>

10.62 Conversely, ENA submitted that, in addition to errors made in the calculation of the WACC, Ofwat had erred in its financeability assessment in several ways. ENA suggested that the financeability assessment must consider beyond the AMP7 and AMP8 periods as well as the short term. ENA submitted that financeability must be assessed using current credit rating agency methodologies including their focus on core financial metrics, and that there should be consistency between the credit ratings achieved and the benchmarks used to set debt funding allowances. ENA also submitted that a margin above the minimum credit ratings thresholds should be included in the financeability assessment.<sup>3242</sup>

10.63 Water UK submitted that the degree of stretch being placed on the financeability of the sector was demonstrated by the near uniformity of company responses to the Draft Determinations that without change those Determinations would be unfinanceable (while recognising there was some movement in the FD), and by the extensive use of PAYG rates that are disregarded by credit ratings agencies.

10.64 Water UK submitted that this stretch was driven by the combination of simultaneous pressure on costs, outcomes, risks and returns. Water UK submitted that Ofwat's approach at PR19 risked eroding the long term investability of the sector as one with a reasonable prospect of an appropriate balance of risk and returns, potentially resulting in shorter-term perspectives from investors.

10.65 Water UK submitted that avoiding this outcome was all the more important given the scale of investment that will be needed over the coming decades to address the challenges from climate change and population growth, and which is expected to be privately funded. Water UK also submitted that a further risk was the erosion of the headroom needed for the sector to be resilient to shocks, such as the significant effects of the COVID-19 pandemic on the sector.<sup>3243</sup>

10.66 Southern Water submitted that it considered that Ofwat's PR19 FD had weakened the sector's financeability and financial resilience, and that this

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<sup>3241</sup> [Ofgem's response to the provisional findings](#), paragraphs 74–75

<sup>3242</sup> [ENA second submission](#)

<sup>3243</sup> [Water UK submission](#)

could be seen very clearly through the 'notional' company's credit rating as assessed by Moody's, Fitch and S&P Global. Southern Water submitted that this was, in part, a consequence of Ofwat's mechanistic approach to assessing the cost of capital, along with the introduction of material downside ODI risks, with the aim of significantly reducing potential equity returns over the period.

- 10.67 Southern Water submitted that the need to rely on the acceleration of cashflow from future periods in order to meet the thresholds for Ofwat's target credit rating of BBB+ pointed to the need for a broader analytical perspective in setting required returns.<sup>3244</sup>
- 10.68 Wessex Water submitted that Ofwat's FD has seen a material reduction in its credit quality, and that of the wider industry, leaving ongoing financial resilience at the margins of acceptability. Wessex Water submitted that this will leave future generations to bear the increased financing costs.<sup>3245</sup>
- 10.69 We also received several submissions from current and former investors in the sector following the publication of our consultation documents on the cost of debt and picking a point estimate for the cost of capital. These submissions generally agreed with the approach to financeability taken in our Provisional Findings, but expressed subsequent concerns about the impact of the CMA's updated and lowered cost of capital allowances.<sup>3246</sup>

### ***Financeability – CMA approach***

- 10.70 Our assessment of the Disputing Companies' ability to finance the performance of their functions takes into account all the factors considered in these determinations, in particular the assessment of the WACC, the wholesale totex allowances and RCV adjustments. This financeability assessment provides a cross-check on the effect of these decisions. In this section we summarise our approach, in the following sections:
- (a) background and effect of our provisional decisions on financeability;
  - (b) treatment of PAYG and RCV run-off rates when assessing financial ratios;
  - (c) approach to measuring and interpreting credit ratios;

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<sup>3244</sup> [Southern Water submission](#)

<sup>3245</sup> [Wessex Water submission](#)

<sup>3246</sup> These submissions are published on our case page [here](#).

- (d) modelling of the Disputing Companies' credit ratios and implications for the companies' financeability; and
- (e) decision on financeability.

*Background and effect of our provisional decisions on financeability*

10.71 As discussed above, Ofwat considered that its FD was financeable. Ofwat's decision was based on a combination of Board assurance statements, modelling of key financial ratios, and, where appropriate, PAYG adjustments. Ofwat noted that Board assurance statements and company representations were made in the context of Ofwat's draft determinations, but that its financeability assessment was made in the context of changes made in its FD.

10.72 Our starting point is that the WACC is the primary factor in the redetermination ensuring that an efficient firm can finance its functions. If the WACC is set at a level which properly reflects the cost of debt and cost of equity for the investors in the sector, both debt and equity investors will earn sufficient returns to cover the costs of financing, and therefore the companies will be financeable.

10.73 However, in addition to considering the level of the WACC, we also consider a number of other factors in making our assessment in the round, including other factors that influence the overall balance of risks and reward within the price control. This 'in the round' assessment is important for a number of reasons:

- (a) First, there is uncertainty about the measurement of the required return, particularly the level of the cost of equity, as reflected by the use of a range. The financeability analysis therefore provides a valuable cross-check on the point estimate for the cost of equity.
- (b) Secondly, the cost of debt and cost of equity are measured in different ways: the cost of equity is forward-looking, whereas the cost of debt is based on measuring costs of debt incurred in previous periods. If, as is currently the case, forward-looking returns are lower than backward-looking returns, this may adversely affect financial ratios calculated using this approach.
- (c) Third, we recognise the importance of maintaining investment-grade credit ratings. We also therefore need to cross-check our assumptions on how the credit rating agencies would interpret our decisions against any statements they have made or actions they have taken relating to the broader regulatory framework.

- (d) Fourth, we recognise that the actual credit ratings will be influenced heavily by the ability of the water companies to achieve the cost and outcomes targets set for AMP7. It is therefore important to consider whether the assumptions made about costs and outcomes are likely to be achievable in practice, and whether the balance of risk for the companies is consistent with those credit ratings. We have also modelled downside scenarios to assess financial resilience to a reasonable downside in operational performance.

10.74 Overall, we consider that there are a number of aspects of the decisions we have outlined in Sections 4 to 9 which should benefit the Disputing Companies in comparison to Ofwat's FD. The main changes which we consider will support financeability are:

- (a) Cost of capital assumption – Section 9 sets out our redetermination of the cost of capital, and accordingly our financeability assessment assumes a vanilla WACC of 3.2% in CPIH terms.<sup>3247</sup> The increase in WACC relative to Ofwat's determination is largely due to our assumption of a higher cost of equity, and this contributes favourably towards financeability by providing an additional equity buffer against the risks faced by the Disputing Companies.
- (b) Totex – Our determinations result in an increase in the totex allowance for each of the Disputing Companies. The companies' totex allowances are based on an econometric model which creates a best estimate for efficient costs. Our decisions to include more up-to-date data and also to slightly relax some of the efficiency targets provide the companies with totex allowances closer to their business plans. This reduces the risk that our use of a cost benchmarking model has in fact underestimated the correct costs for the Disputing Companies. If the companies would have incurred this cost in any case, our decision means that they will recover these additional allowances from customers, rather than the additional costs over the final determination allowances representing a shortfall in returns for investors. Our decisions are summarised in Table 10-2.

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<sup>3247</sup> 3.2% is the industry-level appointee WACC. Our assessment for Bristol assumes a 3.37% WACC on the basis of a company specific adjustment to Bristol's cost of embedded debt and issuance and liquidity allowances. See paragraphs 9.905 – 9.1103 for further details on Bristol's request for a company specific adjustment to their cost of capital allowance.

**Table 10-2: Four Disputing Companies' Totex wholesale allowances**

Company	£m		
	Ofwat	CMA	Variance
Anglian	5,065	5,169	108
Bristol	405	431	27
Northumbrian	2,630	2,742	112
Yorkshire	4,053	4,211	158

Source: CMA

(c) **Cost-sharing rates.** As set out in Section 6, we have also adjusted the cost-sharing rates for the Disputing Companies, which improves financeability because it distributes the costs of underperformance more evenly between customers and investors. This reduces the size of the exposure of the companies to worsening financial ratios as a result of potential totex overspend. We also made some changes to the penalty-only ODIs which Ofwat put in place, although these have only a small effect on the overall balance of risk in ODIs.

10.75 We have also removed the GOSM for the four Disputing Companies. During the PR19 process, the GOSM was raised by the credit rating agencies as having an adverse effect on the stability of credit ratings for the sector. Following the introduction of the GOSM and in the context of the overall approach to PR19, Moody's published a review of the sector in May 2018. In that review, Moody's said that the proposal to introduce the GOSM and to exercise additional control of companies' financial structures 'evidence a modest deterioration in the stability and predictability of the regulatory regime and companies will need to demonstrate stronger financial metrics if they are to maintain credit quality'. In this update, Moody's changed its ratio guidance for a Baa1 company. It reduced the target gearing ratio from  $\leq 75$  to  $\leq 72\%$  and increased the minimum target AICR ratio from  $\geq 1.4x$  to  $\geq 1.5x$ .

10.76 Although the GOSM would not apply to the notional company, we note the decision to remove it may offset at least some of the increased downside risk which led the credit rating agencies to state publicly that the risk associated with the sector was increasing, and to reflect this in more demanding ratio targets.

#### *Treatment of PAYG and RCV run-off rates when assessing financial ratios*

10.77 The PAYG rate is the proportion of a company's totex allowance that is funded through revenue, rather than added to the RCV, and is therefore comparable to operating expenditure, which companies will normally seek to recover from customers in the period in which it is incurred. The related concept, the 'RCV run-off rate', represents the rate at which the RCV is

depreciated. The rate of depreciation of an asset also reflects a cost which firms have to recover from current customers if they are to make a profit.

- 10.78 PAYG and RCV rates are considered in two key ways within this determination. One is the 'natural' split of the two rates, roughly approximating the relative opex and capex needs within the AMP. The other is the adjustment of the relative weights of these rates in order to improve in-period cashflows for the purposes of financeability.

*Adjusting PAYG rates for financeability reasons*

- 10.79 Ofwat increased the PAYG rate above the 'natural' rate at Anglian, Northumbrian and Yorkshire.<sup>3248</sup> All three companies criticised this approach, stating that increasing the PAYG rate would not improve their credit ratings. In support the companies referred to statements from Moody's.
- 10.80 The reason for this is that the Moody's calculation removes capital charges when it defines cash flow, thus eliminating any benefit of advancing revenue. Moody's has stated that it does not consider PAYG advancement as credit-enhancing and excludes such adjustments from its calculation of credit metrics while making rating decisions.
- 10.81 By contrast, S&P Global has indicated that adjusting PAYG can increase cash flow in the near term which can temporarily boost credit metrics although this means the company will forgo some of the growth it forecasts in RCV. However, we have previously noted S&P Global's view that excessive use of financeability levers could increase business risk if a company is maximising its near-term cashflows at the expense of long-term investment,<sup>3249</sup> and that companies expect S&P Global to require higher ratios if PAYG levers have been used.<sup>3250</sup>
- 10.82 We do not agree with Ofwat's approach of advancing future cash flows to AMP7 to address financeability concerns. We doubt the extent to which accelerating cash flows from future periods can improve the credit quality of a regulated business, as there is no change in the revenues available to meet financing obligations over time. Given that the objective of comparing credit ratios to the targets stated by the rating agencies is to understand the likely consequences for credit ratings, we have concluded it is appropriate to take account of the agencies' stance on whether or not advancing revenue by

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<sup>3248</sup> Ofwat (2019), *PR19 final determinations: Aligning risk and return technical appendix*, Table 6.4

<sup>3249</sup> *Bristol PR14 Determination*, paragraph 11.14

<sup>3250</sup> Dŵr Cymru, IAP Response – Target Credit Rating. Available [here](#).

adjusting PAYG rates (or equivalently, RCV-run off rates) would affect a credit ratings assessment.

- 10.83 As a result, we have concluded that Ofwat's approach in AMP7 of advancing revenues through increasing the PAYG rate risks increasing customer bills without leading to a practical improvement in the water companies' ability to secure a strong investment grade rating. As discussed in section 9 (see paragraph 9.1380), we were not persuaded that the change in revenues between periods would achieve Ofwat's stated objective of improving credit ratings, but also if an NPV-neutral does improve credit quality in AMP7 then there must be an opposite effect of reducing credit quality in future periods, and therefore future customers may also face the same uplift to bills while companies are more likely to be downgraded by the rating agencies.
- 10.84 Accordingly, in our financeability assessment we have calculated credit ratios consistent with the approach taken by both Moody's and S&P Global credit ratings agencies, and we do not apply PAYG or RCV rate adjustments for the purpose of financeability.

#### *Decision on natural rates of PAYG*

- 10.85 In its SoC, Anglian provided evidence that Ofwat's FD adjustments relative to the Anglian business plan had led to a 'natural' PAYG rate that would suggest a material misallocation of opex and capex, and that the result would be Anglian receiving insufficient cashflows within this price control. We have decided that Anglian has submitted sufficient evidence of a structural misallocation between opex and capex, and as a result we have made an adjustment to Anglian's PAYG rate to address this specific issue.
- 10.86 Following the publication of the Provisional Findings we received additional submissions from the remaining Disputing Companies raising specific arguments for adjusting their respective PAYG rates, disputing Ofwat's original opex:capex allocation which were based on the companies' business plans.
- 10.87 We have decided not to apply any adjustments to PAYG rates for the other three companies. The Anglian adjustment above reflects our best understanding of its natural PAYG rate, taking into account the breadth of interventions made into its business plan at the point of Ofwat's FD. The other companies, by contrast, raised isolated examples of specific schemes. We did not consider that these examples were sufficient to demonstrate a need to change the overall PAYG rate, given the wider changes to the cost assessment in our determination. Accordingly, we do not accept that making these individual changes would result in an overall improvement in reflecting

the natural rate, and so retain the PAYG rates used in Ofwat's FD for Bristol, Northumbrian and Yorkshire.

### *Approach to measuring and interpreting credit ratios*

- 10.88 In this section, we describe our approach to the use of credit ratios in the financeability assessment.
- 10.89 As highlighted above, the WACC should be the primary factor in the redetermination in determining whether an efficient firm which meets its cost and outcome targets can finance its functions. As a matter of principle, if the WACC is set at a reasonable level, both debt and equity investors should earn sufficient returns to cover the costs of financing.
- 10.90 We also recognise that credit ratio analysis plays a supporting role: it provides cross-checks to help consider whether the allowed return is in practice high enough to be consistent with the investment-grade credit quality (as required by the licence with respect to debt financing). Credit ratio analysis is also able to assess whether other aspects of the determination, such as the amount of cash generated from regulated activities, are consistent with rating agency expectations. In considering credit ratios relevant to financeability, we are not suggesting that the assessment of the relevance of any particular credit ratio should not be considered carefully by the CMA or Ofwat, and we recognise the credit rating agencies will have different objectives in assessing the credit quality of the companies. However, we do consider it of assistance to have regard to the judgements and assessments made by the agencies in making our overall assessment.
- 10.91 We note that the underlying definitions of ratios and the accounting conventions used to present inputs are important. In particular the interaction between regulatory concepts (such as totex, PAYG rates and RCV run-off) and accounting concepts (in relation to whether a particular cost is expensed in a single year or capitalised and subject to a periodic depreciation charge) affects the values of credit ratios. Accordingly, the point value of a single credit ratio at a particular point in time is not likely to be determinative in itself of the conclusion on financeability.
- 10.92 Ratings agencies consider a range of quantitative and qualitative factors in order to place corporate debt issuers and individual financial instruments in a credit ratings band. The band represents a relative indicator of financial risk that is intended to apply across a wide range of industries to support lenders and debt investors allocating capital. The labelling schema used by two credit ratings agencies for investment grade and non-investment grade assessment,



with risk profile increasing from left to right of the table are shown in Figure 10-1.

**Figure 10-1: Credit ratings bands**

	Investment grade										Non-investment grade					
S&P	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-
Moody's	Aaa	Aa1	Aa2	Aaa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3

Source: CMA

10.93 We note that Bristol<sup>3251</sup> and Northumbrian<sup>3252</sup> have referred to advice from KPMG which seeks to establish further gradation by splitting bands, to label a 'stable' band and an 'at risk' band in addition to the standard band, and that KPMG has ascribed values for credit ratios that it considers to be compatible with each of the ratings bands which we recognise as consistent with various credit rating agency publications.

10.94 We consider that the overall assessment of a credit rating requires judgement about the overall quality of credit with respect to a broad range of factors that contribute to a ratings assessment. While financial ratios play an important role in the assessment of credit ratings, these are not applied mechanistically by agencies, nor in isolation from a wide range of other relevant factors. Of the three major ratings agencies, S&P Global, Moody's and Fitch, only Moody's is explicit in applying a 40% weighting to the results of credit ratios with its methodology. We consider that caution is required in a financeability assessment to avoid placing undue emphasis on the value of a particular ratio.

10.95 For example, we note that some of the public statements from the agencies are supportive of the view that the ratios should be considered together as part of a broader assessment, rather than seeing each as a constraint, with the rating being linked to the lowest possible level. In its response to Anglian's SoC, Ofwat highlighted an example where Moody's had stated this explicitly in a rating assessment for Portsmouth Water.<sup>3253</sup>

10.96 Our review of the rating agency reviews of the Disputing Companies also suggests that in practice the credit rating agencies follow an approach of considering the different rating indicators together. For example, Moody's decision to set Bristol's credit rating at Baa2, despite interest cover ratios

<sup>3251</sup> Bristol SoC, p21, table A1

<sup>3252</sup> Northumbrian SoC, p182, paragraph 1008

<sup>3253</sup> Ofwat's response to Anglian SoC, p176, footnote 425

weaker than this level, included a reference to the offsetting headroom against the gearing targets for the ratio as a mitigating factor to *'help to offset credit pressure of an AICR slightly below guidance'*.<sup>3254</sup>

- 10.97 Ofwat did not specify target levels for credit ratios but in its FD it provided a summary of representations it had received about the financeability assessment. We have reviewed these representations and concluded that there is a reasonable degree of common ground between the parties that Ofwat was targeting a BBB+/Baa1 credit band, which is two credit bands higher than the threshold for an investment grade credit rating. In its downside scenario, Ofwat was testing financeability against a threshold for interest cover ratio of 1.0, but it noted that this may not be a floor, and that in some cases a lower ratio could be compatible with a financeable company.<sup>3255</sup>
- 10.98 We also consider that the values of two particular ratios were given particular attention in Ofwat's assessment. It appears common ground that Ofwat was targeting a BBB+/Baa1 credit rating by testing corresponding ratios for AICR, a ratio used by Moody's, (at least 1.5x) and FFO to net debt, a ratio used by S&P Global (at least 9%). We also noted that a BBB/Baa2 investment grade credit rating corresponds with the following credit ratios: AICR at least 1.3x and FFO / Net Debt at least 8%; and that for BBB-/Baa3 rating, the threshold for an investment grade credit rating, the corresponding ratios are: AICR at least 1.1x and FFO / Net Debt at least 6%.
- 10.99 We note that water companies have maintained investment grade credit ratings whilst having actual gearing ratios in excess of the notional gearing that Ofwat has applied in its price determination, and the actual performance against the other credit ratios tests also varies across the sector. This can be observed in Ofwat's monitoring reports that track credit ratings and a number of ratios for the water sector as a whole.<sup>3256</sup> In Ofwat's 2019/20 monitoring report, it observed:
- (c) Gearing for the 17 water companies averaged 70.3% over the period 2016 to 2020, with a minimum of 56% and a maximum of 83%. This range relates to a notional target level from the credit rating agencies of around 65-70%.
  - (d) Moody's AICR for the 17 water companies has averaged 2.1 over the period 2016 to 2020, with a minimum 0.15 and a maximum of 3.3. The target ratio for strong investment-grade has been indicated as at least 1.5.

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<sup>3254</sup> Moody's (2020), [Moody's downgrades Bristol Water to Baa2, negative outlook](#)

<sup>3255</sup> Ofwat (2019), [PR19 final determinations: Aligning risk and return technical appendix](#)

<sup>3256</sup> [Ofwat Monitoring financial resilience report 2019-20 – charts and underlying data](#)

(e) S&P Global's ratio of FFO/Net debt for the 17 water companies has averaged 10% over the period 2016 to 2020, with a minimum of 5% (excluding Hafren Dyfrdwy which had a nil value in 2019) and a maximum of 18%. The target ratio for strong investment-grade has been indicated as at least 9%.

10.100 In our credit ratio analysis we have considered the overall framework that supports an investment grade credit rating. We have followed Ofwat and the Disputing Companies in measuring these ratios against the ratios consistent with investment grade credit ratings, with a target rating of BBB+/Baa1, which is two notches above the minimum level for investment-grade. However, as indicated by the credit ratings agencies and the evidence from the range of actual ratios, the credit rating is based on a range of relevant factors including credit ratio analysis. We have tested our determinations against the target values above, and then considered the results as part of an in-the-round assessment.

10.101 In order to calculate ratios, we have used Ofwat's financial model which calculated the ratios that reflects our decisions on totex allowances and cost of capital. We have retained Ofwat's assumptions in respect of other company specific items, including dividends and the ratio of capex:opex within totex because these represent a reasonable starting point for the testing of ratios. We have not updated the modelling for the expected lower rates of inflation in 2020 to 21, as, outlined in 9.36, we have concluded that at this should either average out over time, or if has a material impact on the operations or financeability of water companies, that this should be addressed by Ofwat at the sector level.<sup>3257</sup> We have adopted Ofwat's approach to modelling including the use of PAYG, non-PAYG and RCV run-off to calculate revenues and RCV roll-forward. We have also as a result increased Anglian's PAYG ratio to reflect its submissions on the proportion of opex in our determination, as discussed in paragraphs 10.85. However, as discussed in paragraph 10.83, we have not included the PAYG adjustments that Ofwat applied to promote financeability.

### *Downside sensitivity*

10.102 In understanding whether our determinations impose reasonable financial risks on the water companies, financial exposure that the companies face to downside risks is relevant. We have considered the size of exposure

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<sup>3257</sup> For further details of our approach to COVID19 see paragraph 3.86.

of the Disputing Companies' modelled financial ratios to reasonable downside scenarios.

10.103 As a downside sensitivity for the exposure on ODIs, we have modelled the impact of a 1% RoRE penalty on the credit ratios for each company, if it were incurred by the firm in each year of the price control. We consider this scenario of a significant penalty in each year to be a severe downside case, which is likely to overestimate potential penalties that companies under-performing against the determination may experience in each of the five years of the price control period. In practice we consider that companies may be expected to respond in order to avoid such a circumstance occurring throughout each year of the control.

10.104 We also found in our analysis of PCs and ODIs that an average performing company may expect to face some penalties, due to the number of asymmetric and penalty-only ODIs. We indicated that the scale of these penalties might be around 0.1%-0.2% of RoRE. If this was applied to the base case as a measure of expected performance, the effect would be around 10%-20% of the total downside sensitivity. We consider this would not change our conclusions about the financeability of the base case ratios, as the impact on all the credit ratios of including a penalty of 0.1-0.2% should not be sufficiently large to affect the implied credit ratings.

10.105 We have also considered separately the consequences for the Disputing Companies of totex overspend on the modelled financial ratios. If the companies overspend against totex allowances, they face a penalty of 55% of the overspend under the cost sharing mechanism. As discussed in paragraph 10.32, there will also be some timing differences depending on how the agencies treat actual changes in capex and opex, relative to penalties that will be imposed in future periods. However, for the purposes of understanding the underlying effect on the financial position of the notional company, we conclude that the net effect after applying the cost sharing mechanism is a better measure of the downside risk. Based on submissions from the companies and a review of the variability of actual spend to allowances, we consider that 2% of totex represents a reasonable downside sensitivity.<sup>3258</sup>

### ***Results and interpretation of credit ratio analysis***

10.106 This section shows the ratios calculated by Ofwat for each company and the ratios that stem from them, sets out the results of the financial ratio

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<sup>3258</sup> [Anglian Water response to PFs](#), [Yorkshire Water response to PFs](#), [Bristol Water response to PFs](#), [Northumbrian Water response to PFs](#)

analysis that we have undertaken, and our interpretation of each set of ratios. The results are derived from five-year averages of financial estimates. We have followed what we understand to be the approaches followed by Moody's and S&P to modelling interest cover ratios.<sup>3259</sup>

10.107 The ratio analysis contained in the tables for each company is as follows:

- Our ratios reflecting CMA's final determination (ref. 1)
- Our ratios from our determinations under a downside scenario that includes a 1% RoRE penalty (ref. 2)
- Our ratios reflecting our determinations under a downside scenario that includes a 2% totex overspend (ref. 3)
- Ofwat's ratios from its FD (ref. 4)

10.108 In this assessment we have provided the averages over the 5-year period for each of the ratios that we have measured and considered in our assessment. Our analysis of the ratios also suggests that the underlying measures of interest cover (AICR and FFO/Net Debt) are generally improving over the period, as a result of the shift to greater CPIH-linked revenues. This is partly offset by the increases in gearing for those companies that are investing in a growing RCV.

### *Anglian*

10.109 Ofwat said that RCV growth in Anglian's final determination prior to adjustments for financeability exceeded 10% and that it considered it was appropriate for equity to contribute to the funding of this growth, and as a consequence Ofwat assumed a dividend yield of 1.84% and dividend growth of 1.18%. Ofwat's financial modelling of the notional company suggested that Anglian faces a financeability constraint. Therefore, consistent with the approach in the PR19 methodology, its FD increased PAYG rates to bring forward £80 million of revenue to improve cash flows and financial ratios.

10.110 Our analysis of Anglian's credit ratios is set out in Table 10-3. We have followed the same approach as Ofwat with respect to dividends, but have adjusted the natural rate of PAYG. The revised cost of capital and totex allowance produce a ratio for FFO/Net Debt above 9% which is consistent

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<sup>3259</sup> For Moody's, we do not assume any benefit from PAYG acceleration above the 'natural rate', unlike Ofwat. For S&P, we follow the treatment of IRE in Ofwat's models, which we understand is consistent with S&P's approach.

with a BBB+/Baa1 credit rating, and an AICR ratio of just below 1.45 which is slightly below Moody's target for this ratio and credit rating. The impact of our 1% RoRE penalty downside scenario is to reduce the value of key financial ratios, with AICR reducing to 1.3 and FFO/Net Debt to 8.4%, a level consistent with an investment grade credit rating of BBB/Baa2.

10.111 As a cross-check of our assessment that Anglian could achieve a strong investment grade rating at the notional gearing of 60%, we note that at March 2020 Anglian had gearing of 79%, and a Baa1 rating with Moody's.<sup>3260</sup> In July 2020, Moody's noted that Anglian's Baa1 rating was supported by its record of strong operational performance and the creditor protections incorporated in its financing structure, with offsetting factors including high levels of gearing and the likelihood of significantly weaker interest coverage over AMP7 due to PR19's significant reduction in the cost of capital and more challenging operational targets.<sup>3261</sup>

**Table 10-3: Ratio analysis for Anglian**

Ref	Ratio	Gearing	Interest cover	AICR	FFO/Net debt	Dividend cover	RCF/Net debt
1	CMA FD	61.1%	3.9	1.4	9.2%	0.8	7.1%
2	CMA FD + 1% RoRe penalty	62.3%	3.7	1.3	8.4%	0.5	6.4%
3	CMA FD + 2% Totex overspend	61.5%	3.8	1.4	9.0%	0.7	6.9%
4	Ofwat FD	60.0%	4.0	1.5*	9.5%	1.4	8.3%

Source: CMA

Note: CMA sensitivities take into account the adjustment to PAYG rate made for 'opex:capex misallocation'. Ofwat ratios are consistent with its approach to the final determination and include a benefit of accelerating PAYG in the interest cover ratio.

## *Bristol*

10.112 Ofwat said it considered that Bristol's final determination is financeable based on the allowed revenues which include a reasonable allowed return on capital, and it did not make any adjustments to PAYG rates.

10.113 Our analysis of Bristol's ratios is set out in Table 10-4. This analysis shows base case ratios which are compatible with an investment grade credit rating of BBB+/Baa1. In the downside scenario, Bristol's ratios are consistent with at least a BBB/Baa2 credit rating. We consider that, having regard to the range of ratios that are considered by the rating agencies, and allowing for a reasonable downside scenario, that the financial ratios in Table 10-4 in the round appear consistent with an investment-grade credit rating.

<sup>3260</sup> Ofwat Monitoring financial resilience report 2019-20 – charts and underlying data

<sup>3261</sup> Moody's (2020), [Moody's announces completion of a periodic review of ratings of Anglian Water Services Ltd](#)

10.114 As a cross-check of our assessment that Bristol could achieve a strong investment grade rating at the notional gearing of 60%, we note that at March 2020 Bristol had gearing of 68%, and was downgraded to a Baa2 rating by Moody's. In setting the rating at Baa2, below the notional target ratio of Baa1, Moody's review explicitly referred to Bristol's specific circumstances, including 'expensive existing debt, and [their] smaller size means that they access financial markets less frequently and are, thus, not able to benefit fully from lower interest rates today'. As discussed in section 9, we have in part addressed these concerns by our decision to allow Bristol a CSA to reflect its smaller size and the consequences for its cost of debt. We have also increased its cost allowance to a level that is very close to its Business Plan.

**Table 10-4: Ratio analysis for Bristol**

<i>Ref</i>	<i>Ratio</i>	<i>Gearing</i>	<i>Interest cover</i>	<i>AICR</i>	<i>FFO/Net debt</i>	<i>Dividend cover</i>	<i>RCF/Net debt</i>
1	CMA FD	58.4%	5.1	1.6	14.3%	2.9	11.6%
2	CMA FD + 1% RoRe penalty	59.8%	4.7	1.3	13.1%	2.6	10.9%
3	CMA FD + 2% Totex overspend	59.2%	4.9	1.4	13.7%	2.7	11.4%
4	Ofwat	58.8%	5.4	1.5	13.5%	2.8	11.4%

Source: CMA

Note: Ofwat ratios are consistent with its approach to the final determination. CMA FFO/Net Debt ratios were calculated in line with Ofwat's approach to IRE for the period.

### *Northumbrian*

10.115 Ofwat said its financial modelling of the notional company suggested that Northumbrian faced a financeability constraint. Northumbrian sets out in its representations that certain rating agencies look through PAYG adjustments in calculating adjusted interest cover ratios. Ofwat's FD increased PAYG rates to bring forward £25 million of revenue to improve cash flows and financial ratios in 2020 to 25.

10.116 Our analysis of Northumbrian's credit ratios is set out in Table 10-5. The revised cost of capital and totex allowance produces an AICR and FFO/Net Debt ratio which are consistent with a BBB+/Baa1 credit rating. The impact of the downside scenario is to reduce the value of key financial ratios, with these lower ratios being consistent with an investment grade credit rating of BBB/Baa2. We consider that, having regard to the range of ratios that are considered by the rating agencies, and allowing for a reasonable downside scenario, the financial ratios in Table 10-5 in the round appear consistent with an investment-grade credit rating.

10.117 As a cross-check of our assessment that Northumbrian could achieve a strong investment grade rating at the notional gearing of 60%, we note that at

March 2020 Northumbrian had gearing of 67%, and a Baa1 rating with Moody's and BBB+ with S&P.<sup>3262</sup> In December 2020, Moody's confirmed Northumbrian's Baa1 rating, but changed the outlook to 'negative'. Moody's stated that the negative outlook reflected the continuing uncertainty over allowed revenues during the redetermination process. Moody's stated that Northumbrian's revenues would continue to be based on Ofwat's determination until the CMA's determination takes effect, and that Moody's expected credit metrics at Northumbrian to be below guidance for Baa1 in 2020-21 and 2021-22.

10.118 Moody's also noted the decision by shareholders in Northumbrian Water Group Limited (NWG), Northumbrian's parent company, to convert outstanding shareholder loans to equity – reducing NWG's consolidated leverage by 23ppt as of March 2021 and improving NWGs AICR. As a result, improved credit metrics at NWG were supportive of Northumbrian's rating. Moody's also noted that, in its view, the balance of business risk was supportive of the rating.<sup>3263</sup>

**Table 10-5: Ratio analysis for Northumbrian**

Ref	Ratio	Gearing	Interest cover	AICR	FFO/Net debt	Dividend cover	RCF/Net debt
1	CMA FD	59.5%	4.2	1.5	10.0%	2.3	7.8%
2	CMA FD + 1% RoRe penalty	62.0%	3.9	1.3	9.1%	1.6	7.1%
3	CMA FD + 2% Totex overspend	61.1%	4.0	1.4	9.3%	2.1	7.2%
4	Ofwat	59.5%	4.2	1.5*	10.0%	1.8	6.9%

Source: CMA

Note: Ofwat ratios are consistent with its approach to the final determination and include a benefit of accelerating PAYG in the interest cover ratio.

## Yorkshire

10.119 Ofwat said its financial modelling of the notional company suggested that Yorkshire faced a financeability constraint. Therefore, its FD increased PAYG rates to bring forward £85 million of revenue to improve cash flows and financial ratios.

10.120 Our ratio analysis shows ratios for AICR and FFO/Net Debt which straddle the two investment-grade credit rating bands of BBB+/Baa1 and BBB/Baa2. The AICR that we have calculated of around 1.45 is marginally

<sup>3262</sup> [Ofwat Monitoring financial resilience report 2019-20 – charts and underlying data](#)

<sup>3263</sup> Moody's (2020), [Moody's confirms ratings of Northumbrian Water, outlook negative](#). In respect of operational performance, Moody's said 'Northumbrian also has a solid track record of operational performance, which resulted in around GBP 16 million rewards for the company's performance against ODIs and customer service measures over AMP6. Northumbrian could achieve additional net rewards over AMP7, although these will require the company to exceed more challenging cost and operational targets.'



below BBB+/Baa1, and the other ratios are consistent with BBB+/Baa1 ratings.

10.121 In our downside scenario, Yorkshire's AICR ratio reduces to levels which are consistent with BBB/Baa2 ratings. This remains an investment grade credit rating but indicates limited headroom for key credit ratios and suggests that management may need to consider mitigating actions to maintain their credit rating. We consider that, having regard to the range of ratios that are considered by the rating agencies, and allowing for a reasonable downside scenario, the financial ratios in

10.122 Table 10-6 in the round appear consistent with an investment-grade credit rating.

10.123 As a cross-check of our assessment that Yorkshire could achieve a strong investment grade rating at the notional gearing of 60%, we note that at March 2020 Yorkshire had gearing of 77%, and a Baa2 rating with Moody's.<sup>3264</sup> In August 2020, Moody's noted that Yorkshire's Baa2 rating was supported by the creditor protections incorporated in its financing structure, with offsetting factors including high levels of gearing and an additional £2 billion of notional value derivatives with a significant negative 'mark-to-market', reflecting funding costs significantly above current market rates.<sup>3265</sup> We note that Yorkshire's gearing is well above the target level for Baa1, and therefore nearly 20% above the gearing ratio assumed for the notional company, in addition to its financial position being adversely affected by out-of-the-money swaps. We therefore consider that an actual rating of Baa2 is consistent with an assumption that the notional company with gearing at 60% having a rating of Baa1.

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<sup>3264</sup> Ofwat Monitoring financial resilience report 2019-20 – charts and underlying data

<sup>3265</sup> Moody's (2020), [Moody's announces completion of a period review of ratings of Yorkshire](#)

**Table 10-6: Ratio analysis for Yorkshire**

<i>Ref</i>	<i>Ratio</i>	<i>Gearing</i>	<i>Interest cover</i>	<i>AICR</i>	<i>FFO/Net debt</i>	<i>Dividend cover</i>	<i>RCF/Net debt</i>
1	CMA FD	60.6%	4.1	1.4	9.9%	1.9	7.9%
2	CMA FD + 1% RoRe penalty	62.0%	3.9	1.3	9.1%	1.6	7.1%
3	CMA FD + 2% Totex overspend	61.3%	4.1	1.4	9.7%	1.8	7.6%
4	Ofwat	60.5%	4.2	1.5*	10.1%	2.0	8.1%

Source: CMA

Note: Ofwat ratios are consistent with its approach to the final determination and include a benefit of accelerating PAYG in the interest cover ratio. CMA FFO/Net Debt ratios were calculated in line with Ofwat's approach to IRE for the period.

### **Overall conclusions on financeability**

10.124 In this conclusion, we outline our overall assessment of financeability, both the review of the financeability of our overall determination, and our assessment of the credit ratio analysis which we have used as a cross-check on financeability.

10.125 Our view is that we have taken an approach to the wider determination which properly takes account of the risks of setting allowances too high and too low, and which is consistent with both the finance duty and the consumer objective. We have made an assessment of the WACC and wholesale totex requirements, in each case providing an increased allowance compared to Ofwat's FD. This represents a reasonable level of costs that each of the Disputing Companies could be expected to incur. We have reduced some of the downside risks which were transferred to the companies under Ofwat's FD, including moderating the cost sharing rates to rebalance risk between customers and investors and not introducing a GOSM. Each of these factors improves financeability.

10.126 In line with regulatory practice, we have also completed a financial ratio analysis consistent with that which would be undertaken by the credit rating agencies (in particular regarding the level of cash flow), and concluded that this supports the view that our redeterminations are financeable. Although much of this ratio analysis focuses on interest coverage and debt servicing ratios, we note that water companies are generally able to sustain investment grade credit ratings with higher ratios of actual gearing than the 60% we assume in the notional capital structure.

10.127 In our ratio analysis we applied the RCV run-off selected by companies in their business plans. We have modelled PAYG using the same PAYG rates as Ofwat, other than for Anglian – where we accepted that a higher rate of PAYG than used by Ofwat would better reflect the 'natural' rate. In light of the Disputing Companies observations about how credit ratings agencies may

consider PAYG adjustments, we have followed Moody's stated approach to the definition of interest coverage in order to consider the scenario in which changes to PAYG rates do not improve Moody's credit ratios.

10.128 Our base case ratio analysis produces ratios broadly consistent with a strong investment grade credit rating (BBB+/Baa1) without a need to make adjustments to the timing of cash flows. The S&P ratios and gearing are consistent with BBB+/Baa1. Moody's AICR ratio is towards the top of the stated range for one rating notch lower (BBB/Baa2) for two of the companies, and in the range of BBB+/Baa1 for the other two companies. We note that the guidance on Moody's AICR ratio was recently raised to reflect increased uncertainty following the introduction of Ofwat's GOSM, which we have not implemented in our determination. We also note that our notional gearing of 60% would be equivalent to the top end of Moody's guidance for a (stronger) A3 rating. We also conclude that the variation of 'actual' ratings at individual companies, and even between agencies' ratings of the same company, corroborates our view that there are no over-riding factors that conclusively justify one rating or another.

10.129 Taken together with all the other ratios indicating BBB+/Baa1 or better, we are confident that these ratios are consistent with a strong investment-grade rating. We have also concluded that these ratios are consistent with the cost of debt that we have assumed, which we have assessed by reference to the actual cost of debt for the sector.

10.130 We have also responded to a number of the points that the agencies raised in highlighting a more challenging credit rating environment during AMP7. These changes should be positive for these companies in retaining a strong investment-grade credit rating.

10.131 Under our redetermination, the financial ratios that we have produced for all Disputing Companies are also compatible with values that correspond to investment grade credit ratios in a downside scenario. The downside scenario results in ratios that correspond with investment grade credit ratings spanning the bands from BBB+/Baa1 to BBB-/Baa3, and in our view this is likely to represent an overly pessimistic scenario. We also noted that in Ofwat's assessment of downside scenarios, it had considered an interest coverage ratio of 1.0,<sup>3266</sup> which is lower than the threshold which we have applied.

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<sup>3266</sup> Ofwat (2019), *Aligning risk and return technical appendix*

- 10.132 We also note that some credit ratios, in particular the AICR, are currently impacted by the unusual differences between higher historic and lower current interest rates, which reduces the ratio of equity costs to debt costs. We expect these ratios to improve as companies add lower cost debt to their capital structure over time. We also expect that the ratios will continue to improve beyond AMP7, in line with the planned transition to CPIH-linked revenues.
- 10.133 As a result, in addition to finding that the average ratios for AMP7 are consistent with strong-investment grade, our view is also that our determinations are consistent with a positive trend in the companies' financial position. Our view is that that rating agencies would be less likely to react to a temporary weakness in ratios if they were expected to be resolved during AMP7. The agencies have referred to 'persistent' weakness in credit ratings being a signal for a risk of downgrade.
- 10.134 We also consider that the Disputing Companies would have a number of options to address any shortfall in ratios which the rating agencies did raise as threats to a strong investment-grade rating. Whilst our financeability analysis is based on the notional company, the water companies also have a licence condition to maintain an investment grade credit rating for their debt, and we consider that if any of the Disputing Companies were facing a financeability constraint, they would be in a position to consider a range of mitigating actions to address impact. This could include absorbing headroom in credit ratios, or requiring a contribution from equity, eg to forego dividends or inject fresh capital.
- 10.135 Overall, we consider that the assumptions used in conducting this analysis result in a determination under which each Disputing Company is financeable and which fulfils our statutory duties.

## 11. Other issues

### Introduction

11.1 In this section we discuss various other issues including some raised by the Disputing Companies. The section is structured as follows:

- (a) taxation;
- (b) PR14 Reconciliation – Revenue Forecasting (WRFIM) – Yorkshire only;
- (c) potential Grants and Contributions Error – Northumbrian only; and
- (d) separate Price Controls.

11.2 We also set out our decision on the extent to which the Disputing Companies can reclaim their costs of the redetermination process through the price control.

### Taxation

#### *Introduction*

11.3 As part of the redeterminations, we have reviewed Ofwat's approach to taxation at PR19 and consulted with Ofwat and the Disputing Companies about the position on taxation in Ofwat's FD, together with an alternative approach based on pass-through arrangements for taxation.

#### ***Ofwat's PR19 Final Determination Approach***

11.4 Ofwat introduced a tax reconciliation mechanism, which takes account of any changes to corporation tax or capital allowance rates from those assumed at PR19. This captures significant drivers of the tax allowance, that are beyond company control. The tax reconciliation is an end-of-period reconciliation that takes the form of a revenue adjustment. This means any adjustment required will be made at PR24 and would affect companies' allowed revenue over the 2025-2030 period. Ofwat intends to recalculate the tax allowance for each year for each company, to reflect changes to either the headline corporation tax rate or to the writing down allowances available on capital expenditure. Ofwat's FD position on taxation was a change to the policy used in the 2015--2020 period, where no ex-post tax reconciliation was undertaken.

## ***Views of Disputing Companies***

- 11.5 The Disputing Companies were supportive or content with Ofwat's new tax reconciliation mechanism and have not raised in their SoCs a suggestion that this should be re-considered. They did however note that Ofwat's FD was based on an assumed corporation tax rate of 17% for the period 2015-20, whereas the current rate has, to date, remained at 19%.

## ***Our Review of Alternative Pass-through Arrangements***

- 11.6 We asked the Main Parties for their views on an alternative approach to taxation that is more aligned to cost pass-through. This is an approach taken in other regulated utility sectors and the NAO suggested that Ofwat consider this as an approach to adopt at PR19.<sup>3267</sup>
- 11.7 The Disputing Companies were supportive of a cost pass-through approach but noted that they had no major objections to the principle of Ofwat's tax reconciliation approach. They also noted that although the financial implications of any differences between the two approaches were not anticipated to be significant, it would mainly be a timing issue. Ofwat said that cost pass-through could have some additional benefits for customers and companies, and that this had been considered as an option when it was devising its methodology for PR19. However, Ofwat also expressed some concern that pass-through arrangements could reduce the incentive for water companies to be tax efficient and would make customers bear tax risks which it felt should be properly in the control of the companies. Therefore, on balance, Ofwat preferred its tax reconciliation mechanism.

## ***Our Assessment and Decision***

- 11.8 Having considered the responses to our review of an alternative approach to taxation based more on pass-through principles, we decided to retain Ofwat's tax reconciliation mechanism in the determinations. Implementing an alternative pass-through approach would be an unnecessary complication, as it would lead to the Disputing Companies having different taxation treatment to the other thirteen. While the alternative of a full pass-through would have some potential benefits, we agree with Ofwat that this is a balanced decision, and that Ofwat's approach has some marginal benefits in terms of the incentives on companies to properly manage their tax affairs.

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<sup>3267</sup> National Audit Office (2015), [The Economic Regulation of the Water Sector](#)

- 11.9 We decide to adjust the corporation tax rate to the current actual rate of 19% for the Disputing Companies. We consider that this change to 19% should be made regardless of whether the reconciliation is in-period or end-of-period given it is the current rate. If the rates change to 17%, this will be captured through the reconciliation in PR24. Similarly, the increase in the rate of corporation tax to 25% in 2023 which was announced in the Budget<sup>3268</sup> published on 3 March 2021 will be captured through the reconciliation in PR24.
- 11.10 Three of the Disputing Companies did not respond to our Provisional Findings on taxation. Northumbrian was in support of the amendment of the corporation tax rate from 17% to 19% for the 2020-25 period, and stated that the taxation calculation should be taken from Ofwat's financial model to ensure that all the consequential impacts of our final determinations on taxation were considered.<sup>3269</sup>
- 11.11 Ofwat told us that it would use the tax reconciliation tool at PR24 to calculate the adjustment required to take account of any changes to corporation tax rates or capital allowance rates after our final determinations. It also told us that the tool required a populated financial model representing the most recent determination along with a copy of the model with any required tax rates inputted. Therefore, to enable Ofwat to use the tax reconciliation tool at PR24 for the Disputing Companies, it asked us to use its populated financial model, as the reconciliation depended on comparing one version of the model with another.<sup>3270</sup> We agree with Ofwat that we should use its financial model to model the outcomes of our final determinations.

## **PR14 Reconciliation – Revenue Forecasting (WRFIM) – Yorkshire only**

### ***Introduction***

- 11.12 In this section we review an issue relating to the Wholesale Revenue Forecasting Incentive Mechanism (WRFIM). This issue relates to Yorkshire only.
- 11.13 This section is structured as follows:
- (a) We first set out the background to the issue.

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<sup>3268</sup> See [Budget 2021: Overview of tax legislation and rates](#)

<sup>3269</sup> [Northumbrian's response to the provisional findings](#), p77

<sup>3270</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p75

(b) We set out Yorkshire's case and Ofwat's views.

(c) We set out our assessment of the issue and our decision, including the value of any adjustment required.

11.14 Yorkshire's case is set out in its SoC (including Annex 11 to Yorkshire's SoC, which is a forensic accountant's report to the CMA by Mark Ballamy FCA dated 2 March 2020 containing an independent opinion as to whether an error made by Yorkshire in preparing its PR14 submission was unambiguous), and a reply to Ofwat's Response.<sup>3271</sup> We also obtained further written information from both Yorkshire and Ofwat, questioned both parties on this issue in the main party hearings, and received responses following Provisional Findings from both parties.

## **Background**

11.15 The WRFIM was introduced at PR14. Its purpose is to reduce the impact of deviations on customer bills arising from revenue forecasting errors by:

(a) adjusting companies' allowed revenues each year to take account of differences between actual and projected revenues (that is, there is an adjustment to reflect previous revenue under- or over- recovery); and

(b) incentivising companies to avoid revenue forecasting errors by applying a penalty to variations that fall outside the set revenue flexibility threshold (if there is more than a 2% difference between the recovered and adjusted allowed revenues, there is the potential for a financial penalty).<sup>3272</sup>

11.16 The revenue which Yorkshire claims was erroneously excluded from its submission relates to connection charges income. Section 45 of the WIA91 provides that the owner of a building can serve a notice on a water company to make a connection for the supply of water and that where the water company does so, it is entitled to recover from the person who requested the connection an amount equal to the expenditure reasonably incurred by the water company in carrying out the works. The charges levied by water companies to recoup the costs incurred in performing connection works in compliance with their duty under section 45 of the WIA91 are referred to as 'connection charges (s45)'.

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<sup>3271</sup> Yorkshire SoC, paragraphs 204-215

<sup>3272</sup> Ofwat (2016), [Update to the PR14 reconciliation rulebook policy document](#), p21



## **Yorkshire's reasoning**

- 11.17 Yorkshire stated that in PR14 it made a data input error in its submission to Ofwat: it mistakenly included £4.44 million per annum of s45 income as 'third party income' rather than 'infra & connection charges (revenue)'. This figure is contained in the amount of £5.612 million outlined in red at line 8 in 'Table 3.1 – PR14 data table W9 – Yorkshire's revised business plan'.<sup>3273</sup> Yorkshire claimed that this error incorrectly reduced the amount of revenue that it was entitled to recover from its customers.
- 11.18 This error was uncovered while Yorkshire was preparing its APR for 2015/16 during AMP6.<sup>3274</sup> Yorkshire told us that it immediately notified Ofwat of the error and requested guidance on how to proceed. Yorkshire told us that three options to resolve the issue were discussed:
- (a) change the wholesale price control to include the forecast for s45 income;
  - (b) deviate from the APR methodology and exclude s45 income; or
  - (c) include an amended calculation to exclude s45 income and include a note from Yorkshire's actual capital grants and contribution reporting with a narrative explaining why the performance in the 2015/16 APR was incorrect.
- 11.19 Yorkshire told us that Ofwat and Yorkshire discussed these options; Yorkshire told us that it was instructed by Ofwat to take option (c).
- 11.20 Yorkshire told us it considered that Ofwat acknowledged Yorkshire had clearly made an error as part of that review process. In the Monitoring Financial Performance reports in 2015/16 and 2016/17, Ofwat included the adjusted revenue performance. Yorkshire claims that Ofwat agreed with Yorkshire that this adjusted revenue performance would be reflected within the WRFIM in PR19.
- 11.21 Yorkshire told us that it made an adjustment to the WRFIM to account for the error made at PR14 and Ofwat's proposed approach to accounting for the error from the 2015/2016 APR onwards. However, Ofwat disallowed the claim

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<sup>3273</sup> Ofwat (2019), [Ofwat PR19 final determinations. Yorkshire Water - accounting for past delivery additional information](#), p4

<sup>3274</sup> Annex 11 of Yorkshire's SoC explains that, up to and including 2014/15, Yorkshire reported income from connection charges in its statutory financial statements as a component of revenue, not as a component of capital grants and contributions. To reflect this accounting treatment, Yorkshire included its projected income from connection charges in table W9 under third party services which is a component of third party income (that is, included in line 8, not line 2). In 2015/16 Yorkshire changed its accounting treatment for income from connection charges as a component of revenue to income as a component of capital grants and contributions. This change of accounting treatment alerted Yorkshire to the fact that it had made a mistake when preparing Table W9 in its PR14 submission.

in its draft determination, stating that the errors were made by the company in completing its business plan tables for connection expenditure at PR14 and considering it to be outside the reconciliation mechanism's scope.

11.22 In Ofwat's FD, it explained that it believed the error was not an 'unambiguous error' and it disallowed the claim on those grounds. In the Yorkshire-specific paper published by Ofwat in March 2020, Yorkshire told us that Ofwat submitted the following: <sup>3275</sup>

- (a) it did not consider the error was unambiguous as the information supplied by Yorkshire was not sufficiently disaggregated;
- (b) the correction was not unambiguous because Yorkshire took no account of the potential impact on allowed totex at PR14; and
- (c) Yorkshire's proposed approach would remove the impact of the incentive to forecast accurately.

#### *Unambiguous error*

11.23 Yorkshire claimed that its error was unambiguous. It provided evidence in the forensic accountant's report to the CMA which showed the £4.44 million of s45 connection charges included in the £5.612 million total. At the hearing Yorkshire stated:

- (a) 'it was made very clear that this was a data input error'
- (b) 'a number was put in a wrong line in a schedule'.

#### *Incentive to forecast accurately*

11.24 Yorkshire told us that there was no risk of creating a precedent of a company using an error reported retrospectively to avoid a forecasting penalty, as this was a simple data input error; and that there was a vast difference between a data input error in this situation and a forecasting error. Even if it were an error in forecasting, Yorkshire said that it pointed out the error to Ofwat and explored options to address the problem at the 2015/16 APR, before the majority of the proposed adjustment's value had accrued. Yorkshire also told us that it supported Ofwat's objective of improved forecasting accuracy but did not believe this was relevant in this instance given the nature of the original

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<sup>3275</sup> Ofwat (2020), [Reference of the PR19 final determinations: Explanation of our final determination for Yorkshire Water](#)

error; allowing the WRFIM adjustment for a simple data input error did not negate its function as a mechanism to incentivise accurate forecasting.

### *Good faith*

11.25 Yorkshire told us that it had ‘in good faith followed Ofwat’s guidance in its APR reporting for the whole of the AMP6 period’ and that ‘this changing of the goalposts [undermined] Yorkshire’s confidence in the stability, effectiveness and fairness of the regulatory system.’

### *Provision of information*

11.26 Yorkshire also told us that it had responded with all the information Ofwat had requested during the last four years and that it was unclear to Yorkshire what further information could be required by Ofwat.

### *Ofwat’s views*

11.27 Ofwat told us that it had not been able to find any records of correspondence that indicated any possible treatment in the WRFIM was discussed or agreed at any point during the 2015-20 period; and that Yorkshire did not escalate this issue beyond a reporting level concern it had in completing the APR.

### *Unambiguous error*

11.28 Ofwat told us that the error was not unambiguous. In the Yorkshire -specific paper published in March 2020,<sup>3276</sup> Ofwat stated: ‘We did not consider that this error was unambiguous as the data the company provided at PR14 is not sufficiently disaggregated to allow us to verify the amount of connection charges it claimed to omit from the business plan.’ In its response to Provisional Findings,<sup>3277</sup> Ofwat stated: ‘The CMA does not explain adequately why it considers the error to be wholly free from ambiguity.’

### *Provision of information*

11.29 Ofwat’s reasoning for disallowing the correction of the PR14 error contained in the draft determination states: <sup>3278</sup> ‘the claim relates to the errors the company made in completing its business plan tables for connection expenditure at

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<sup>3276</sup> Ofwat (2020), [Reference of the PR19 final determinations: Explanation of our final determination for Yorkshire Water](#), p43

<sup>3277</sup> Ofwat’s response to the provisional findings – cost and outcomes, p75

<sup>3278</sup> Ofwat (2019), [PR19 draft determinations: Yorkshire Water – Accounting for past delivery actions and interventions](#), pp6–7

PR14 and we consider this to be outside of the reconciliation mechanism's scope' and 'the company does not provide compelling evidence that the amendment is appropriate and so we are removing the amendment'.

- 11.30 Ofwat told us that Yorkshire had failed to evidence what its forecasts were in a compelling way and had not presented documents from 2014 with the forecasts it would have made.

#### *Incentive to forecast accurately*

- 11.31 Ofwat told us that taking the error into account removed any incentive for accurate forecasting, which was the whole reason for the WRFIM. It acknowledged that there might have been a reporting error but considered the evidence presented regarding the connection charges forecast was not compelling.
- 11.32 Ofwat told us that, given the risk of creating a precedent of a company using an error reported retrospectively to avoid a forecasting penalty, Ofwat did not amend the revenue recovered in the WRFIM model to correct for the error in Yorkshire's PR14 forecasts.

#### ***Third Party Views***

- 11.33 We received no Third Party views on this issue.

#### ***Our assessment***

- 11.34 Our assessment has two stages: we first consider whether the error should be corrected. We then consider what adjustment is required if we decide that the error needs to be corrected.
- 11.35 Yorkshire's case was that there was an implied agreement that Ofwat had accepted there was an error and that it would be corrected at PR19. Yorkshire said it had approached Ofwat and agreed an approach through telephone discussion. It told us that the informal way it approached the resolution of this error was the way it worked with its regulator to resolve matters, constructively, and acknowledging that the regulator can determine how a solution is reached.
- 11.36 Ofwat told us that there was no agreement to correct the error at PR19 arising from the discussions around May 2016. It told us that although Yorkshire may have approached Ofwat to discuss this narrative disclosure, Ofwat did not agree that Yorkshire could report differently to other companies, neither did

Ofwat allow Yorkshire to include any narrative disclosures that were not already set out in the APR reporting guidance.

- 11.37 Both parties acknowledge that there was no agreement in writing, and there is no documentary evidence to allow us to determine whether or not there was any agreement. However, that does not mean there was no error to be corrected.
- 11.38 We also considered the issue of the need for a company to provide accurate forecasts. Ofwat told us that taking the error into account removed any incentive for accurate forecasting, which was the whole reason for the WRFIM. Yorkshire told us that it agreed that a water company should provide accurate forecasting and it supported Ofwat's objective of using the WRFIM to improve forecasting accuracy. It also told us that this error was a simple data input error, and not an error in forecasting; rather, it was incorrectly added into the wrong row of a spreadsheet.
- 11.39 We decided that this was a data input, not forecasting error.
- 11.40 We considered two issues in making our assessment: whether there was an unambiguous error, and whether sufficient information had been provided by Yorkshire.

#### *Unambiguous error*

- 11.41 Ofwat has said the error was not a data input error, although it acknowledged 'there might have been a reporting error',<sup>3279</sup> and it has subsequently clarified that there is no distinction between a reporting error and a data input error. We agree that there is no distinction between a reporting error and a data input error. Yorkshire has been unequivocal that the error was quite simply a data input error, not a forecasting error.
- 11.42 In its response to the Provisional Findings, Ofwat said that we had provided an inadequate explanation for our provisional decision that the data input error for Yorkshire's 2014 business plan was unambiguous when it referred only to its forensic report of actual data from 2012/13 and set out no evidence that the error of the same magnitude was transferred to every year of its PR14 business plan.
- 11.43 We note appendix 3 of the forensic accountant's report contains a table entitled 'Table W9 - Breakdown of revenue projections for water services – Third party services'. This shows a breakdown of amounts for 2012/13

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<sup>3279</sup> [Ofwat's response to Yorkshire's SoC](#), paragraph 7.16

totalling £5.612m including an amount of £4.44m for 's45 – connection charges'.

11.44 Yorkshire confirmed that the value of £5.612m in the 2012/13 accounts had been rolled forward into the forecast for the 2015-20 period, and that its forecasts were based on 2012/13 income.<sup>3280</sup> Yorkshire reiterated this in its response to Ofwat's reply to the Provisional Findings.<sup>3281</sup>

11.45 Yorkshire included data table W9 in its PR14 submission, entitled 'Wholesale revenue projections for water service'.<sup>3282</sup> This table shows, for each of the years 2014/15 to 2019/20, at line 2, no amounts for connection and infrastructure charges, and at line 8, £5.612m for third party services.

11.46 We consider that:

- (a) the above evidence clearly shows that Yorkshire forecast income from connection charges for the 2015-20 period in its accounts, based on its 2012/13 figures, and
- (b) Yorkshire simply made an error by inputting the forecast income from connection charges into table W9 into the wrong line, thereby categorising the income as third party income (line 8) instead of as income for connection and infrastructure services (line 2).

11.47 We therefore consider that Yorkshire made a data input error, and that this error is unambiguous.

### *Provision of sufficient information*

11.48 Ofwat told us that Yorkshire had not provided compelling evidence that the amendment was appropriate.<sup>3283</sup> Yorkshire told us that it had responded with all the information that Ofwat had requested on this issue during the last four years.<sup>3284</sup>

11.49 As noted at paragraph 11.43, the forensic accountant's report shows the £4.44 million projected revenue in respect of 'connection charges (s45)' included in the total of Yorkshire's projected income in respect of third party services of £5.612 million for water services. Although there is no breakdown, nor evidence of how the figure was arrived at, we note that Ofwat told us that

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<sup>3280</sup> [Yorkshire's Reply to Ofwat's Response](#), paragraph 10.3

<sup>3281</sup> [Yorkshire's reply to responses to the provisional findings](#), paragraph 6.2.1

<sup>3282</sup> This table is also included as table 3.1 in Ofwat (2019), [PR19 draft determinations: Yorkshire Water – Accounting for past delivery actions and interventions](#), p4

<sup>3283</sup> [Ofwat's response to Yorkshire's SoC](#), paragraph 7.9

<sup>3284</sup> [Yorkshire's Reply to Ofwat's Response](#), paragraph 10.2.1

it did not request a breakdown of third party services within the relevant schedule which set out the line items included in the wholesale water price control, because it was not required for the purposes of the review.

11.50 We have seen Yorkshire's responses to the initial assessment of plans and Ofwat's draft determination and consider that it did provide the information Ofwat requested, and consider that this is sufficient evidence.

#### *Decision on error*

11.51 We decide that the error is unambiguous and needs to be corrected. We now consider the value of the adjustment.

#### ***Value of adjustment***

11.52 The total adjustment Yorkshire is claiming is approximately £44 million.

11.53 Yorkshire told us that the £44m was made up of:

- (a) £36.7m, being the difference between Ofwat's WRFIM assessment in Ofwat's FD and Yorkshire's expected outcome given the resolution under option (c) (see paragraph 11.18(c)) that it understood was agreed (based on the removal of actual connection charges income when performing the WRFIM assessment for 2015/16 to 2018/19); and
- (b) £7.3m, being Yorkshire's calculated impact of the blind year reconciliation for the WRFIM assessment, since Ofwat's WRFIM model did not include forecast s45 income for 2019/20.<sup>3285</sup> Ofwat told us that there were knock-on effects throughout the PR14 final determination that Yorkshire had not considered. It calculated a £27 million revenue adjustment,<sup>3286</sup> and stated there was a knock-on effect on the RCV reducing it by between £6.5 million and £10 million, depending on the assumptions Ofwat made about the menu choice Yorkshire would have made in the light of differences between Ofwat's FD and revised figures taking the error into account.

11.54 Yorkshire stated in its SoC that it disagreed with Ofwat's assertion that it had been provided with a higher totex allowance at PR14 that would partially offset the claim, and that there should be no adjustment to the PAYG or RCV values.

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<sup>3285</sup> Yorkshire also told us that these amounts would be £36.1m and £7.2m if calculated using the CPIH 2017–18 average.

<sup>3286</sup> Calculated using the 2012–13 RPI average.

- 11.55 Yorkshire told us that it believed the appropriate approach to correct the error would be to correct the PR14 price control for the error and calculate the resulting revenue adjustment using the WRFIM.<sup>3287</sup> Ofwat told us that the correct way was to make a revenue adjustment and a separate adjustment to RCV.<sup>3288</sup>
- 11.56 Although in theory both approaches should come to the same answer, we considered that the method suggested by Ofwat was clearer and more straightforward. Thus we decided to correct the error in the way Ofwat suggested.
- 11.57 In this section we consider the effects that a correction of the error might have on:
- (a) allowed revenues, due to lower third party income, and grants and contributions;
  - (b) allowed PAYG revenue, resulting from higher totex allowances;
  - (c) RCV, resulting from higher totex allowances; and
  - (d) Blind year adjustments.
- 11.58 Allowed revenues (gross effect) and allowed PAYG revenues (effect on third party income on totex) ((a) and (b) above) can be netted off against each other to result in allowed revenues (net effect).
- 11.59 Our figures are in 2012/13 prices, which was the price base of PR14. Both Ofwat and Yorkshire agree that the adjustment for PR19 should be based on the relevant price base for PR19, and therefore the numbers below would be higher by approximately 20% to reflect the effect of inflation.

#### *PR14 Revenues (gross effect)*

- 11.60 Yorkshire included £22 million in third party income, which reduced allowed revenues. If correctly inputted, this should have been included in grants and contributions which would have increased allowed revenues. The direct effect on allowed revenue would therefore have been £44 million.

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<sup>3287</sup> [Yorkshire's response to the provisional findings](#), paragraph 7.3.2

<sup>3288</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), pp. 75-77



*PR14 PAYG (effect of third party income on totex)*

- 11.61 We understand from both parties that the process followed within the WFRIM where the error occurred would also have had the effect of reducing the allowed totex to reflect an amount directly related to the £22 million third party income.
- 11.62 Third party costs are calculated by reference to third party income. Ofwat told us that it was always its intention that third party revenues should reflect third party costs, with charges to third parties cost reflective such that other customers are not subsidising or gaining from third party activities. We understand that this means that the ratio of third party costs to third party revenues should be 100%.
- 11.63 Ofwat told us that at PR14 it was clear that companies had historically collected revenue that either over or under-recovered their third party costs; it was not clear why this was the case but resolving it was not a subject of review in the 2014 price revenue. In developing independent PR14 allowances for third party costs it therefore used company forecasts of third party revenue alongside each company's own ratio of revenue to costs to derive an appropriate independent cost estimate. Third party costs were outside the PR14 menu and Ofwat's main aim in estimating them was to ensure it had the right level of costs inside the menu and thus within the scope of cost sharing with customers. Ofwat consulted on its approach at the PR14 draft determinations and no company made representations on how it derived its third party cost allowance.
- 11.64 Although both parties agreed that third party costs were calculated by reference to third party income, Ofwat and Yorkshire disagreed on what data should have been used to arrive at this ratio.
- 11.65 Ofwat told us that the totex allowance should have been reduced by £25 million, which is 114% of £22 million, the 114% based on historical reported recovery rates (the ratio of third party costs to third party income) for 2006/7 to 2020/11, the most recent five-year time period for matching costs and income at the time of preparing PR14. Yorkshire told us that, if there were such a reduction, it should be £20.5 million, which is 93% of £22 million, the 93% based on forecast data submitted at PR14 (the ratio of third party costs to total other income).
- 11.66 From the submissions received, it appears to be agreed that there would have been a reduction to totex, had the error had been corrected in PR14. We considered in Provisional Findings that we should use the 93% recovery rate

as it was better supported by contemporaneous data which would have resulted in a reduction in totex of £20.5 million.

11.67 However, having revisited Ofwat's and Yorkshire's submissions and reviewed responses to Provisional Findings, we consider that we should use the 114%<sup>3289</sup> ratio. This is because it was based on actual historical data, not forecast data, and to the extent that we are correcting an error, we have concluded that Ofwat's approach more accurately reflects what would have happened in the absence of that error. This would have resulted in a reduction in totex of £25.3 million.

11.68 Based on Yorkshire's PAYG rates for PR14, this would have resulted in PAYG and therefore revenue being £15.9 million lower than actual PR14 allowances.

*PR14 Revenues (net effect)*

11.69 The net effect on PR14 revenues would have been £28.1 million (£44 million less the PAYG of £15.9 million). This would be equivalent to £33.7 million in PR19 prices.

*PR14 RCV (effect of third party income on totex)*

11.70 The reasoning that supports a PAYG adjustment also supports an adjustment to the non-PAYG element of totex, namely the RCV. Ofwat submitted that the higher totex allowance as a result of the error also resulted in a higher RCV, and therefore there should be a downwards adjustment to the RCV.

11.71 Yorkshire told us that we should make an additional adjustment for totex to include the impact of the connections charges within the 'costs excluded from the menu'; this would have resulted in a netting off against the reduction in PAYG to zero, and meant there should be no adjustment to the PAYG or RCV values.<sup>3290</sup>

11.72 It stated that, as the costs were gross capital costs, it should follow the same process as business rates and third party costs and remain as an exclusion from the totex allowance calculation; this total should then be added back to the totex as an allowed totex menu adjustment.

11.73 Ofwat told us that Yorkshire's explanation of the PR14 approach to cost assessment and menu exclusions was not accurate. Although it did not

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<sup>3289</sup> Ofwat showed us the data it used for its calculations for third party costs at PR14. It noted in hindsight that it should have used 114.83% rather than 114%, and thus we use 114.83% in our calculation to arrive at third party costs.

<sup>3290</sup> [Yorkshire's Reply to Ofwat's Response](#), paragraph 10.5.2 (b)

differentiate between revenue and capital contributions (it treated everything as income), it took a different approach for third party costs and income. Its totex allowance was gross of third party revenue contributions, that is, it made a gross allowance for third party costs and adjusted for any third party contributions later in the financial model. Ofwat's totex allowance approach used its reported third party income revenue numbers (that was affected by the reporting error) to calculate a third party cost allowance. The company error in reporting an overly high level of third party revenue resulted in Ofwat making an overly high totex allowance for third party costs.

11.74 We do not agree with Yorkshire that costs associated with connection charges should be offset against a reduction to PR14 totex, and we therefore maintain our approach of making a downwards adjustment to totex.

11.75 With a fall in totex of £25.3 million and an average PAYG rate of around 63%, the closing RCV falls by approximately £9.3 million. Ofwat has since told us that there is more than one way to arrive at this figure because of Yorkshire's menu choices and it calculated reductions of between £6.5 million and £10 million. We do not propose to speculate on the effect on Yorkshire's menu choices, and propose an adjustment of £9.3 million. This would be equivalent to £11.2 million in PR19 prices.

#### *Blind year adjustments*

11.76 Blind year adjustments are those made in relation to the difference between the actual performance of 2019/20 (the final year of the PR14 price control, or the blind year) and the performance assumed in the PR19 final determinations.

11.77 Yorkshire also claimed an adjustment of £7.2 million (price base 2017/18 CPIH) (see paragraph 11.53(b)) relating to its calculated impact of the blind year reconciliation for the WRFIM assessment, as Ofwat's model did not include forecast s45 income for 2019/20. Ofwat told us in its response to Provisional Findings that any adjustment should either be included in our redetermination or be applied by Ofwat within the period, and that Ofwat was required by licence to publish the blind year adjustment before 15 November each year to allow the companies sufficient time to consult on charges for 2021/22.<sup>3291</sup> Yorkshire did not make any representations in its response to Provisional Findings regarding the deadline of the blind year adjustments.

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<sup>3291</sup> [Ofwat's response to the provisional findings – cost and outcomes](#), p72

11.78 Given the timescales required, we agreed with Ofwat that any blind year adjustments would be made by Ofwat in its models before our final determinations and thus we did not consider that further adjustments should be made by us.

### ***Our decision on value of adjustment***

11.79 Based on our understanding of the direct consequences of the PR14 error, we decide to make an adjustment to Yorkshire's PR19 allowances to offset the effect of the error. The effects we have found are:

(a) £33.7 million (PR19 prices) for the revenue adjustment; offset by

(b) £11.2 million (PR19 prices) for the RCV adjustment.

11.80 At Provisional Findings we invited submissions on whether it would be more appropriate to net off these two adjustments to a single AMP7 revenue adjustment, or offset the effect of the error with two separate adjustments to revenue and the RCV. In agreement with Ofwat's and Yorkshire's responses to Provisional Findings on this point, we propose to make the adjustments to revenue and the RCV separately.

## **Potential Grants and Contributions Error – Northumbrian only**

### ***Introduction***

11.81 In this section we review an issue relating to an error that Northumbrian claims was made by Ofwat during PR19 relating to grants and contributions.

11.82 This section is structured as follows:

(a) We first set out the background to the issue.

(b) We then set out Northumbrian's case and Ofwat's views.

(c) Finally, we set out our assessment of the issue and our decision, including the value of any adjustment required.

11.83 Northumbrian's reasoning is set out in its SoC and reply to Ofwat's Response.<sup>3292,3293</sup> We also obtained further written information from both Northumbrian and Ofwat, questioned both parties on this issue in the main

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<sup>3292</sup> See [Northumbrian SoC](#) paragraphs 963–977

<sup>3293</sup> See [Northumbrian's reply to Ofwat's response](#) paragraphs 626–629

party hearings and received responses following our Provisional Findings from both parties.

## **Background**

11.84 Grants and contributions are amounts paid by developers to water companies in relation to new developments, to carry out the following works: <sup>3294</sup>

- (a) reinforce the network as a consequence of new properties being connected;
- (b) connect a new property (eg the meter and connection pipe);
- (c) provide new water mains or public sewers (ie requisitions); and
- (d) move an existing main or sewer or other apparatus at the request of a third party (ie diversions).

11.85 Ofwat's treatment of grants and contributions is set out in its draft determination.<sup>3295</sup> Companies receive grants and contributions from developers towards the costs of 'new developments', expenditure to reinforce the network, and 'new connections' expenditure to connect a property, for example the meter and connection pipe. Ofwat calculates the grants and contributions receivable by applying a recovery rate to its view of new developments and new connections expenditure, which ensures that developers pay a fair share towards costs to connect new properties. Ofwat uses this calculation of grants and contributions receivable from developers to ensure that the amounts billed to water and wastewater customers correctly reflect only that share of any new development spend which should be borne by them.

## **Northumbrian's reasoning**

11.86 Northumbrian told us that at PR19 Ofwat made an adjustment to its model to add a one-off contribution of £14.4 million to the grants and contributions component of the projected water network plus control. It told us that this adjustment was an error as it double-counted a contribution that was already included in the infrastructure charge receipts. The grants and contributions model showed Northumbrian's projected water infrastructure charges of £13.6 million that were set to recover the £14.4 million of costs over the five

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<sup>3294</sup> Ofwat (2019), [PR19 final determinations: Northumbrian Water final determination](#), p64-65

<sup>3295</sup> Ofwat (2019), [PR19 draft determinations: Northumbrian Water Draft Determination](#), p46 onwards

years (less an underspend adjustment). This £13.6 million amount was then added to the £14.4 million which created a double-count.

- 11.87 Northumbrian told us that the £14.4 million of infrastructure network reinforcements was recovered from developers via infrastructure charges (and thus not recovered through requisition charges or any other one-off developer income), and that if the adjustment was not reflected in the redetermination, then it would have to cover a £14.4 million material shortfall in revenue during 2015-20.
- 11.88 Northumbrian provided further detail as to the background to the error. In its business plan, Northumbrian added an additional line – a free form line – where it split out infrastructure network reinforcement contribution, which was a subcomponent of its total infrastructure charge income. Northumbrian thought it would be helpful to show that additional breakdown; it did this for both water and wastewater. However, Ofwat only saw that line for water and thought it should have been included in infrastructure charges; Ofwat did not realise that it had already been included. Ofwat therefore classed the £14.4 million as an addition to an infrastructure charge line which already included that sum, therefore double-counting it.
- 11.89 Northumbrian also told us that it was clear in its business plan that this was a number to note; it was not an additional sum. Northumbrian told us that Ofwat did not interpret this in the way Northumbrian had intended, although for wastewater, it said that Ofwat did seem to understand Northumbrian's point.
- 11.90 Northumbrian originally stated that this error was not made in the draft determination which was why it did not comment on it before Ofwat's FD. It later told us that it did not realise that the error had been included in the draft determination, and that there was some more text in Ofwat's FD which drew its attention to it.
- 11.91 Northumbrian told us that this was a technical error in Ofwat's models and that it did not believe that Ofwat was contesting that this was an error.
- 11.92 Northumbrian told us that the adjustment should be removed from the grants and contributions model and that the lower grants and contribution amount for Water Networks should be fed into the financial model. It also told us that there was a material impact on revenue, customer bills and RCV from the adjustment.

### ***Ofwat's views***

- 11.93 Ofwat stated that Northumbrian submitted the £14.4 million of expenditure in a free-form enhancement line within its original business plan submission rather

than in the new developments line. This led Ofwat to make the ‘reasonable and justifiable assumption’ that the company had not captured this expenditure within grants and contributions. Ofwat told us it made its assumption clear within the draft determination and that Northumbrian did not raise any queries in relation to the assumption made. As a result, there was no obvious reason to change its approach for its final determination.

11.94 Ofwat originally told us, based on the new evidence provided by Northumbrian in its SoC, it was unable to confirm if the £14.4 million adjustment made to its grants and contributions was already included in the company’s grants and contributions. It told us that this added to several other instances where Northumbrian had failed to report data accurately and/or in line with other companies, which undermined Ofwat’s confidence in its business plan.

11.95 Ofwat told us the issue was relatively immaterial due to the use of a single till approach – as a result, removing the one-off contribution would only have a relatively minor impact on PAYG revenue and RCV additions. Ofwat recommended that we should not make an adjustment given the lack of confidence in the information provided by Northumbrian.

11.96 Ofwat later told us (in the hearing) that it accepted the possibility that the adjustment made was an error, and if the CMA found that there was a double-count, it should be removed.

### ***Third Party views***

11.97 We have received no Third Party views on this issue.

### ***Our assessment***

11.98 Our assessment has two stages: the first considers whether an error has occurred. The second considers what adjustment is required if we decide that an error has occurred.

#### ***Has an error occurred***

11.99 We looked at Ofwat’s approach to grants and contributions in its final determination.<sup>3296</sup>

- (a) Grants and contributions before the deduction of income offset allowances (gross grants and contributions) are used to calculate net

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<sup>3296</sup> Ofwat (2019), [PR19 final determinations: Northumbrian Water Final Determination](#), p47 onwards

totex for cost sharing and within the developer services reconciliation adjustment (explained in 'our approach to regulating developer services').

- (b) Grants and contributions after the deduction of income offset allowances (net grants and contributions) are used to calculate net totex for use in the financial modelling. This ensures that income offset allowances, that are funded by existing customers rather than developers, are captured within net totex that is used to calculate PAYG revenue and RCV additions. Developer services costs that are funded by developers are excluded from net totex, and are instead treated as grants and contributions within the financial model.

11.100 Ofwat stated that table 4.15 showed its assumed amounts of 'gross' grants and contributions (price control) that was used to calculate net totex for cost sharing;<sup>3297</sup> Ofwat stated that this included a one-off contribution equal to £14.4 million that Northumbrian did not originally include within grants and contributions in its business plan.

11.101 Ofwat stated that Northumbrian included £14.4 million as supply-demand balance expenditure despite its business plan suggesting that this expenditure related to investment directly connected with housing developments; Northumbrian's business plan commentary also stated that this expenditure was paid for by developers through infrastructure charges; therefore Ofwat considered this to be growth related expenditure and assumes it was recovered from developers (Water network plus: £14.4 million).

11.102 We examined Ofwat's grants and contributions model for Northumbrian. Line 93 of the worksheet InpOverride shows annual amounts of £2.88 million for the years ended 31 March 2021 to 2025 and a total amount of £14.4 million, entitled 'One-off contribution to capex – water network – price control.'<sup>3298</sup> This ultimately feeds through to the worksheet Adjustments Log, where there is the following explanation against the £14.4 million: '£14.4 million reallocated to growth is stated as being recoverable from developers in the NES business plan. An adjustment of £14.4 million has been added to the water network price control capex. This is added after grants & contributions have been calculated to give a final figure.' Line 61 of the worksheet InpActive shows annual amounts of £2.72 million for the years ended 31 March 2021 to 2025 and a total amount of £13.6 million, entitled 'Infrastructure charge receipts (s146)'.

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<sup>3297</sup> Ofwat (2019), [PR19 final determinations: Northumbrian Water final determination](#), p67

<sup>3298</sup> £2.8798 million is hard-coded in the worksheet.



11.103 Adding the £14.4 million for 'One-off contribution to capex – water network – price control' is a double-count, as the contribution is already included in the £13.6 million. Therefore, we consider that this adjustment is an error and should be corrected.

11.104 Ofwat said that it had a lack of confidence in the information provided by Northumbrian. However, in respect of this matter, we do not consider that Ofwat has given us reasons not to be confident in Northumbrian's submissions to the CMA.

#### *CMA decision on error*

11.105 We decide that this adjustment is an error and needs to be corrected. We now consider the value of the adjustment.

#### *Adjustment required*

11.106 Northumbrian told us that, in order to remove the £14.4 million grants and contributions offset amount, adjustments needed to be made both to the RCV and to appointee total revenues across the five-year period 2020-25. As the grants and contributions amount was an offset against customer charges, there needed to be a corresponding increase in appointee total revenue.

11.107 Northumbrian told us that while the single till aspect of the revenue control rebalanced the majority of the reduction, there was a material impact on revenue, customer bills and RCV of the adjustment and that the impact of the changes were spread across the whole of AMP7.

11.108 Northumbrian told us in its SoC that a decrease in the revenue controls of £3.346 million across the 2020-25 period and an increase in the RCV of £5.293 million were required.

11.109 We note that Ofwat did not disagree with Northumbrian's figures in its response to Northumbrian's SoC. It did, however, later state in a response to a request for information that the grants and contributions figure would also flow into the PAYG model. This model would need to be recalculated as the input pull would be different based on the new grants and contributions figure and natural water network PAYG rate. With the PAYG uplift in the final determination as 0.93% and brought forward £25 million in revenue, the uplift would be 0.96% with £26 million revenue brought forward.

11.110 The adjustments to revenue and RCV are shown in Table 11-1.

**Table 11-1: Net adjustment to total revenue and the RCV for G&C double counting (2017-18 CPIH deflated prices)**

							£m
		2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	Total
Revenue	Ofwat RFI 014	668.4	669.5	671.7	674.3	677	3,360.9
	Ofwat's FD	670.98	671.86	673.87	676.33	678.8	3,371.84
	Difference	-2.58	-2.36	-2.17	-2.03	-1.80	-10.94
	NES SoC (for info)	670.14	671.00	673.14	675.78	678.43	3,368.49
RCV	Ofwat RFI 014	3,984.6	4,036.0	4,100.6	4,201.5	4,239.3	
	Ofwat's FD	3,981.97	4,030.85	4,093.05	4,191.68	4,227.3	
	Difference	2.63	5.15	7.55	9.82	12.00	12.00
	NES SoC (for info)	3,983.15	4,033.23	4,096.54	4,196.14	4,232.59	

Source: Ofwat, Northumbrian, CMA analysis

11.111 This results in a decrease in the revenue controls of £10.94 million across the 2020-25 period and an increase in the RCV of £12 million. Our review of Ofwat's submissions suggests that it is correct to include the additional effects that it has indicated. The net effect on Northumbrian is small, because under both Ofwat's and Northumbrian's assumptions, there is a small net positive effect, with an RCV adjustment that outweighs the revenue reduction by £1-2 million. We propose to follow Ofwat's approach.

### **Our decision**

11.112 We decide that the adjustment is an error and it should be corrected. The adjustments required are a decrease in the revenue controls of £10.94 million across the 2020-25 period and an increase in the RCV of £12 million.

11.113 In our Provisional Findings we welcomed submissions on whether it would be more appropriate to net off these two adjustments to a single AMP7 revenue adjustment, or offset the effect of the error with two separate adjustments to revenue and the RCV. In agreement with Ofwat's and Northumbrian's responses to the Provisional Findings on this point, we propose to make the adjustments to revenue and the RCV separately.

### **Separate Price Controls**

11.114 In a change from PR14, at PR19 Ofwat set separate price controls for water resources and bioresources, wholesale water, wholesale wastewater and residential retail, and business retail in Wales. The water resources and wholesale control have been covered extensively in our findings. For retail and bioresources, we proposed to de-prioritise these in our Approaches Document and respondents agreed this was pragmatic. A short explanation of our position on these is provided below.

## ***Retail Price Controls***

- 11.115 For retail, representing the customer service and developer services functions of water companies, Ofwat has set separate binding price controls, which it also did at PR14. Retail accounts for around 7% of water companies' expenditure. For business retail services in England (but not Wales), there is competition allowing customers to switch their supplier. This competition has led to consolidation of market providers. The Disputing Companies have all exited the non-household retail market and so this component of price controls is not relevant to our redeterminations.
- 11.116 Ofwat applied a different approach to determine the retail price control compared to that for wholesale services. This control was based on a retail cost to serve, a unit cost approach, rather than being based on total allowed revenue. There is no RCV in retail, as depreciation of retail assets is included in the cost to serve allowance. With no RCV, the cost of capital is therefore not relevant. Instead the retail allowance includes a net margin covering tax and the return.
- 11.117 The Disputing Companies have not suggested in their SoCs or responses to our Provisional Findings that this approach should be reconsidered.
- 11.118 For Anglian, Bristol, Northumbrian and Yorkshire, our position on retail is therefore aligned to Ofwat's FD. This includes the household retail expenditure allowance and the outcome measures relating to C-MeX and D-MeX.
- 11.119 While we have not made any changes to Ofwat's retail margin of 1%, we have reconsidered the approach taken by Ofwat to the wholesale profit, which takes account of a potential double-count at the appointee level. Ofwat described this as a retail margin adjustment. We present our analysis of the overall profit, including this adjustment, in paragraphs 9.1104 to 9.1149.
- 11.120 Finally, we note that Ofwat's approach to calculating retail revenue included the wholesale figures as an input. As we have changed aspects of the wholesale determinations, this has a consequential impact on retail allowances. We have calculated these consequential changes, as shown in Table 11-2.

**Table 11-2: Consequential changes in retail revenues in our final determination**

	£m			
	<i>Anglian</i>	<i>Bristol</i>	<i>Northumbrian</i>	<i>Yorkshire</i>
Retail revenue	427.7	51.3	257.2	321.2
Change vs Ofwat's FD	+1.7	+0.4	+1.0	+1.2

Source: CMA calculations; Ofwat's FD company final determinations, Table 6.2

### ***Bioresources (sludge)***

11.121 For bioresources, representing sludge treatment and disposal, Ofwat has set separate binding price controls for the eleven WASCs. Bioresources accounts for around 5% of WASCs expenditure. The bioresources control was set based on the modified average revenue per unit rather than the total allowed revenue. It also includes a forecasting accuracy incentive with an adjustment to fixed costs. This is based on an adjustment after the financeability modelling to split this allowance into a fixed and variable component. The variable component will then be (ex-post, at PR24) scaled to reconcile with actual volumes of sludge. This acts as a risk mitigation mechanism around the uncertainty of actual outturn volumes. The adjustment mechanism is symmetrical, and it is anticipated to lead only to modest financial changes.

11.122 The three Disputing WASCs have not suggested in their SoCs or responses to the Provisional Findings that this approach should be reconsidered, nor has any Third Party, and we have not identified apparent problems with this approach.

11.123 For Anglian, Northumbrian and Yorkshire, our position on bioresources is therefore aligned to Ofwat's FD, subject to our review of the bioresources totex levels. We review Anglian's company-specific submission on bioresources investment at paragraphs 5.628 to 5.663.

### **Company costs in respect of the redetermination**

11.124 We are required by section 12 (3A) WIA91 to decide to what extent it is reasonable to take account in our final determination costs incurred by the Disputing Companies in connection with our redeterminations. In doing so we must have regard to the extent to which, in our view, our final determinations are likely to support the Disputing Companies' (rather than Ofwat's) claims in relation to the final determinations.

11.125 The Disputing Companies provided us with details of both the internal and external costs incurred by them in the redeterminations. All of the

Disputing Companies utilised external legal, economic and other specialist advisers during the process (as is to be expected).

11.126 We decide that only external costs should be considered when allowing the Disputing Companies to recover costs as part of the final determinations. We consider that internal management and staff costs are already funded by customers through base expenditure and to include them in our allowed costs risks customers having to double-fund this activity.

11.127 Looking at external costs, Anglian's costs for the redetermination amounted to approximately £7.6 million, Bristol's costs were approximately £3.5 million, Northumbrian's costs were around £6.5 million, and Yorkshire's costs were approximately £8.3 million.

11.128 We considered whether the company costs are reasonable in the circumstances. Some of the external costs incurred by the companies appeared high, for example we were concerned that some companies may have over-engaged external advisors. We considered whether there could be a basis for making an explicit adjustment but concluded that to do so would require more evidence than it was practicable or proportionate to gather, given in particular that there are other incentives on the Disputing Companies to only incur costs efficiently. The rate of costs we award in paragraphs 11.129 and 11.130 (which is not dissimilar to the range of costs awarded in previous water redeterminations) mean that the Disputing Companies cannot recover the majority of the costs they incurred.

11.129 We consider that the key areas where we have supported the claims of the WASCs (Anglian, Northumbrian and Yorkshire) are broadly similar. Overall we have made an in the round judgement and decide that it is reasonable to take into account in our final determination 25% of the costs incurred by the WASCs. Most of the areas where our determinations support their cases were common to all of them (for example on aspects of the WACC and the GOSM). However, we rejected a large number of the arguments put by the Disputing Companies and in particular, a large proportion of the amount sought in increased allowances in specific areas by all companies.

11.130 In respect of Bristol, we decide that it is reasonable to take into account a larger proportion of its costs in our final determination, reflecting the narrower range of issues raised, the closeness of our award to its totex request, and our decision to award a CSA. We decide to take into account 50% of the costs incurred by Bristol in our final determination.

- 11.131 Ofwat estimated its costs for the redetermination process at approximately £2.8 million. Ofwat cannot claim any costs directly against the Disputing Companies.
- 11.132 The Disputing Companies are required to pay in full to the Secretary of State under the conditions of their licences a CMA fee for the redetermination process which is defined as Ofwat's estimate of the costs incurred by the CMA in carrying out the redeterminations. We estimate the CMA's costs will amount to approximately £3.1 million across the four determinations. Some of our costs can be attributed to the determination for a particular Disputing Company, but most of the costs relate to addressing issues relevant to more than one company. After consulting with us, Ofwat has told us it intends to set the CMA fees by charging Anglian, Northumbrian and Yorkshire a two-sevenths share of the general (unassigned) costs and Bristol one-seventh, in addition to all their assigned costs.
- 11.133 These fees are part of the Disputing Companies' costs in relation to the redetermination, and so we have included these in our determination in the same proportions as other company costs (25% for the WASCs and 50% for Bristol).
- 11.134 We therefore decide to include the following total costs in the determinations (and hence the Disputing Companies can recover the following redetermination costs from their customers): Anglian £2.125 million; Bristol £1.964 million; Northumbrian £1.838 million; and Yorkshire £2.293 million. These costs are excluded from cost sharing arrangements.

## 12. The final determination for Anglian

- 12.1 This section provides a summary of our individual final determination for Anglian. In this, we set out our final determination, but we do not fully restate the explanation or rationale for our decisions; many methodologies are common between the individual companies, and we cross-reference to the relevant earlier sections of our report to identify where we have explained these rationales.
- 12.2 In reaching our decisions we have taken account of the same statutory duties as applied to Ofwat, and we have had regard to the principles of best regulatory practice and the need to act in accordance with the SPS, but have exercised our own regulatory discretion in appropriately complying with these statutory duties.

### Introduction

- 12.3 Anglian is the largest WASC in England and Wales by geographic area and the fourth largest in terms of its RCV. It supplies services to more than three million connected properties in the east of England, which it said is one of the driest regions in England and Wales. At 31 March 2020, Anglian directly employed 4,834 full-time equivalent staff.<sup>3299</sup>

### *Approach to the determination*

- 12.4 As originally proposed in our approach to the determinations document,<sup>3300</sup> we are using the same regulatory building blocks as Ofwat used in its determinations. In particular, we have maintained:<sup>3301</sup>
- (a) Ofwat's approach of setting four wholesale price controls (water resources, water network plus, wastewater network plus, and bioresources);<sup>3302</sup>
  - (b) separating our assessment into its major component parts around costs, outcomes, and financial returns;<sup>3303</sup>
  - (c) managing bioresources as an average revenue control;<sup>3304</sup> and

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<sup>3299</sup> See paragraphs 2.38 to 2.46

<sup>3300</sup> [CMA approach to water redeterminations](#), paragraph 29; also see paragraphs 3.37 to 3.50 in this report.

<sup>3301</sup> See paragraph 3.5

<sup>3302</sup> See paragraph 11.114. We note that these separate controls are specified in Anglian's licence conditions.

<sup>3303</sup> See paragraphs 2.102 and 3.2 to 3.20

<sup>3304</sup> See paragraphs 3.43 and 11.121 to 11.123

(d) setting a separate retail control.<sup>3305</sup>

12.5 The rest of this section sets out the final decisions we have applied to Anglian, grouped into:

(a) totex allowances;

(b) outcomes;

(c) WACC and financeability; and

(d) calculations of revenue, with implications for k and bills in the period.

## **Totex allowances**

12.6 In setting Anglian's totex allowance in our final determination, we have considered four main cost areas:

(a) modelled base costs (including growth);

(b) unmodelled base costs;

(c) enhancement costs; and

(d) other costs.

## **Modelled base costs**

12.7 Water companies conduct many routine activities in order to run their businesses and provide a base level of service to customers. We adopt an econometric modelling approach to assess most of the costs of Anglian's base level of service, using data from across the sector. Comparative benchmarking allows us to estimate the efficient costs for these day-to-day operations, rather than relying on individual company data or forecasts. Our modelling approach is similar to Ofwat's, although we adjust the econometric models and expand the dataset by including data from 2019/20. This 2019/20 data was not available to Ofwat when it set the FD.<sup>3306</sup>

12.8 Our cost models estimate how much it would cost the averagely efficient water company to cover base operations. However, we want to set cost allowances for a water company that is more than merely averagely efficient, and so we apply a 'catch up' efficiency challenge. Our decision is to use the

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<sup>3305</sup> See paragraphs 3.41 and 11.115 to 11.120

<sup>3306</sup> See paragraphs 4.2 to 4.403



company at the upper quartile as the benchmark, which we consider sets a challenging benchmark whilst acknowledging the limitations of our econometric modelling (and the consequent risk that the company will have insufficient allowed revenue to ensure a base level of service).<sup>3307</sup>

12.9 Future costs are likely to differ from the historical benchmarks because of changes to productivity levels and input costs. We therefore:

- (a) Apply a 'frontier shift' which reduces the modelled allowance by 1% per year to reflect expected productivity gains from improvements in technology and new ways of working;<sup>3308</sup> and
- (b) Provide an RPE adjustment for labour costs. We also include a reconciliation mechanism for these labour costs to protect both customers and the company if there are differences between forecasts and actual wage inflation.<sup>3309</sup>

12.10 Serving new properties involves additional costs for water companies: both the costs of installing new connections, and from the demand increase, necessitating reinforced or additional infrastructure. We therefore:

- (a) increase Anglian's allowance due to forecast growth being above industry average (using updated ONS forecast figures);<sup>3310</sup> and
- (b) include a reconciliation mechanism to protect against differences between forecasts and actual growth. We use an expanded scope for this reconciliation mechanism, compared with Ofwat's FD, to better reflect the costs associated with growth.<sup>3311</sup>

12.11 Ofwat's historical data collection approach contained no distinction between base opex and enhancement opex. Therefore, Ofwat's modelled base costs could double-count Anglian's enhancement opex if an adjustment was not applied. We decide to use the same approach as Ofwat used in its FD, which is to estimate an implicit allowance for enhancement opex and adjust the companies' allowance accordingly.<sup>3312</sup>

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<sup>3307</sup> See paragraphs 4.404 to 4.495

<sup>3308</sup> We have also applied this adjustment to other elements of totex, not just base costs; See paragraphs 4.496 to 4.652.

<sup>3309</sup> We have also applied this adjustment to other elements of totex, not just base costs; See paragraphs 4.653 to 4.740.

<sup>3310</sup> See paragraphs 4.741 to 4.878

<sup>3311</sup> See paragraphs 4.805 to 4.859

<sup>3312</sup> See paragraphs 4.879 to 4.905

- 12.12 The overall effect of our modelling changes described above is to increase Anglian's base allowances by around £19 million compared to the allowances in Ofwat's FD.<sup>3313</sup>
- 12.13 Finally, we recognise that our approach is reliant on models which are based on a limited set of explanatory variables and, like any econometric model, are subject to some limitations and a degree of uncertainty in their final estimates. While we have reflected this already in earlier decisions (such as selection of the catch up benchmark), we have also reviewed a number of specific issues raised by Anglian as base cost adjustment claims in relation to capital maintenance, sludge transport, APH, load treated, leakage, and smart metering. Of these, the only one for which we allow additional totex is leakage (£42.6 million), for the reasons explained in paragraph 12.40.<sup>3314</sup>
- 12.14 The combination of modelling changes and cost adjustment claims results in an overall increase of £62 million for Anglian compared with Ofwat's FD.<sup>3315</sup>

### ***Unmodelled base costs***

- 12.15 In designing our base models discussed above, we exclude certain costs that are unsuitable for modelling where, for example, there is insufficient data for modelling or where exceptional circumstances apply to particular companies. We refer to these as unmodelled base costs. These include costs associated with abstraction, business rates, compliance with the IED and Traffic Management Act.<sup>3316</sup>
- 12.16 Ofwat made an allowance for Anglian's unmodelled base costs, and we decide that these are largely appropriate.<sup>3317</sup>
- 12.17 We do not apply a frontier shift to business rates or abstraction charges as we conclude that these costs were in the most part outside of company control. However, we apply a frontier shift to other unmodelled base costs of 1% together with a labour RPE. We consider that our approach does not give rise to any double-counting necessitating an adjustment. Our frontier shift is slightly below the level which Ofwat set in its FD and, combined with our decision not to apply this to unmodelled abstraction charges or business rates, results in an increase in Anglian's allowances of around £10 million compared to Ofwat's FD.<sup>3318</sup>

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<sup>3313</sup> See Table 6-3; sum of all changes except for cost adjustment claims.

<sup>3314</sup> See paragraphs 4.907 to 4.958, 8.48 to 8.82, and 5.558 to 5.564

<sup>3315</sup> See Table 6-3

<sup>3316</sup> See paragraphs 4.971 to 4.1131

<sup>3317</sup> See paragraphs 4.1128 to 4.1131 and Table 6-4

<sup>3318</sup> See paragraphs 4.652 and 4.975, and Table 6-5

12.18 Due to management having a more limited degree of control than over other costs, we apply a cost-sharing rate of 90/10 (customer/company) for business rates, rather than using the 75/25 sharing rate that Ofwat set in its FD.<sup>3319</sup>

### **Enhancement costs**

12.19 We provide additional allowances to Anglian where we have been persuaded that it is undertaking necessary investment for the purpose of enhancing the capacity or quality of service beyond a base level.<sup>3320</sup>

12.20 In our review of enhancement expenditure, we generally focus on areas where Ofwat and Anglian have provided conflicting views and where we need to resolve these in coming to our determination. To help us reach our own view, our assessment often involves considering additional evidence or arguments, which were not available to Ofwat at the time that it made its FD. For other enhancement expenditure, including major schemes which met Ofwat's evidential threshold to receive additional enhancement funding, we adopt the same approach as Ofwat did in its FD.<sup>3321</sup>

12.21 We make use of comparative data (including econometric modelling, engineering comparisons and cost benchmarking comparisons) where available to develop our best estimate for efficient enhancement costs. In particular, for P-removal and WINEP allowances more generally, we have used benchmarking in our assessment to test the efficiency of companies' proposals for these large and broadly-comparable programmes of work. Our decision is to make adjustments to Ofwat's P-removal allowances using a broader range of model specifications but to adopt the same overall approach. This results in no change to Anglian's allowance compared to Ofwat's FD.<sup>3322</sup>

12.22 We apply efficiency challenges and reduce allowances where we are concerned about the robustness of the evidence provided for enhancement schemes. In doing so we are seeking to ensure that customers do not overpay for inefficient service whilst also ensuring sufficient allowance is available to achieve the enhanced level of service/quality. This results in our decision to apply a shallow-dive efficiency factor based on Anglian's estimated base costs efficiency, and a deep-dive efficiency factor of 10%.<sup>3323</sup>

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<sup>3319</sup> See paragraphs 4.1054 to 4.1077

<sup>3320</sup> See paragraphs 5.5 to 5.8 for a description of how enhancement allowances fit into the broader price review framework.

<sup>3321</sup> See paragraphs 5.4 and 5.16 to 5.17

<sup>3322</sup> See paragraphs 5.27 to 5.111, and 5.151 to 5.163

<sup>3323</sup> See paragraphs 5.164 to 5.203; Table 5-29

12.23 Anglian raised a number of specific projects which we have assessed in greater detail. We make the following decisions:

- (a) **Strategic Interconnectors Programme:** Anglian proposed to build a series of interconnectors to transport water around its region in order to provide for an improved supply-demand balance and increased resilience. We are supportive of this aim and the benefits it will bring customers. After careful review, we consider that Anglian has demonstrated its plans are prudent and costs are efficient. We provide Anglian with its full requested additional allowance for this scheme.<sup>3324</sup>
- (b) **Smart Metering Scheme:** Anglian proposed to install smart meters in nearly all properties in its region by 2030, which would particularly assist with reducing leakage and water consumption in an area of the country which has relatively little rainfall. We are supportive of Anglian's proposal but concerned that certain elements of its requested allowance would result in customers paying twice for the same activities as metering forms an element of base activities. We therefore allow Anglian an additional enhancement allowance to reflect the cost of installing smart meters but reject its request for additional funding through a base cost adjustment.<sup>3325</sup>
- (c) **Water Resilience Scheme:** Anglian included a request for additional funds for the replacement of certain assets within its WTW, and development of a new risk planning tool. Our decision is that these activities represent incremental improvements which the sector has delivered, and continues to deliver, as part of its day-to-day operational functions, and so we reject Anglian's request for additional allowance for this scheme.<sup>3326</sup>
- (d) **Security-related activities:** Anglian included a request for additional funds for the delivery of certain water security-related activities. We do not increase Anglian's allowances on SEMD activities since these have been funded already in PR14. For non-SEMD activities we provide an additional allowance, but with an efficiency challenge on aspects where the evidence provided on cost efficiency is insufficiently robust.<sup>3327</sup>
- (e) **Bioresources Scheme:** Anglian proposed to expand one of its sludge treatment centres to accommodate expected increases in the level of sludge being produced in the future. We find that this proposal is

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<sup>3324</sup> See paragraphs 5.430 to 5.512

<sup>3325</sup> See paragraphs 5.513 to 5.582

<sup>3326</sup> See paragraphs 5.583 to 5.598

<sup>3327</sup> See paragraphs 5.599 to 5.627

reasonable given the limited availability of alternative capacity from other suppliers, and reflects an efficient whole-life approach to the issue identified. However, we challenge certain costs which are not directly associated with the scheme or are already funded through the rest of the determination. We therefore provide Anglian with the majority of its requested allowance for this scheme, but reject costs which we consider do not require additional funding.<sup>3328</sup>

12.24 Together, these decisions result in an increase of around £50 million in Anglian's enhancement allowance compared with Ofwat's FD, before the application of frontier shift.<sup>3329</sup>

12.25 When providing companies with specific funding to undertake additional activities, there is a risk that the company does not subsequently choose to proceed with the scheme while customers nonetheless bear the cost. In order to ensure that the higher level of service being funded by these schemes is delivered, we include a number of scheme-specific mechanisms to protect customers from non- or under-delivery of these schemes. For the Strategic Interconnectors Programme, the Smart Metering Scheme, non-SEMD, and Bioresources Scheme, we include a PC and ODI in order to protect customers from the risk of non-delivery on these schemes.<sup>3330</sup>

12.26 In addition to the above schemes, we have considered Anglian's costs for removing metaldehyde from water, following the reintroduction of a ban on the use of this pesticide part way through the price control period. We consider that Anglian has atypically high costs due to metaldehyde's extensive use in its region. We allow £12.7 million to ensure Anglian is funded for the water treatment and product substitution activities necessary until metaldehyde is no longer in the environment.<sup>3331</sup>

12.27 We also considered Anglian's exposure to uncertainty in relation to its Elsham scheme, and the potential to deliver this in-house. We decide that the arrangements which Ofwat has put in place provide an appropriate means to resolve this issue, and so make no associated changes to totex allowances, PCs, or ODIs as part of our determination.<sup>3332</sup>

12.28 As discussed in paragraph 12.40, we consider that Anglian requires an additional enhancement allowance (as well as a base cost adjustment) in

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<sup>3328</sup> See paragraphs 5.628 to 5.663

<sup>3329</sup> See Table 5-29

<sup>3330</sup> See paragraphs 5.505 to 5.511, 5.575 to 5.579, 5.627, and 5.663

<sup>3331</sup> See paragraphs 5.669 to 5.700

<sup>3332</sup> See paragraphs 5.701 to 5.721

order to meet its leakage PC. We calculate this enhancement requirement as being £64 million, £7 million less than Ofwat's FD figure of £71 million.<sup>3333</sup>

12.29 Consistent with our decision on base costs above, we apply a frontier shift of 1% together with a labour RPE on all enhancement costs (not just to WINEP and metering as Ofwat did). We consider that our approach does not give rise to any double-counting which would necessitate an adjustment for Anglian. This frontier shift results in a decrease of around £14 million in Anglian's enhancement allowances.<sup>3334</sup>

12.30 The combination of enhancement changes results in an overall increase of £41 million for Anglian compared with Ofwat's FD.<sup>3335</sup>

### **Other costs**

12.31 As well as the three cost areas discussed above, there are a number of other cost categories which contribute to Anglian's totex allowance.<sup>3336</sup>

12.32 Anglian has not raised any concerns with any of these cost categories, and we have no evidence to support the use of alternative figures, and so we decide to use the figures in Ofwat's FD (updating Grants & Contribution figures to reflect consequential changes of our decisions).

### **Overall totex**

12.33 Our determination of Anglian's wholesale total totex allowance is shown in Table 12-1.

**Table 12-1: Totex cost allowances by wholesale price control**

	<i>Water resources</i>	<i>Water network plus</i>	<i>Wastewater network plus</i>	<i>Bioresources</i>	<b>Total</b>
Modelled base allowance (including CAC)	134	1,224	1,698	375	<b>3,430</b>
Unmodelled base allowance	63	186	104	14	<b>367</b>
Enhancement allowance	39	680	734	13	<b>1,466</b>
Other totex allowances*	22	-15	-109	12	<b>-90</b>
<b>Total totex</b>	<b>257</b>	<b>2,075</b>	<b>2,427</b>	<b>413</b>	<b>5,173</b>

Source: CMA analysis

<sup>3333</sup> See paragraphs 8.83 to 8.174

<sup>3334</sup> See paragraphs 5.722 to 5.742; Table 5-29

<sup>3335</sup> See Table 5-29

<sup>3336</sup> Operating lease adjustments; strategic regional water resources solutions and other cash items; third party costs; non-section 185 diversions; ex-ante cost sharing adjustment; grants and contributions (after adjustment for income offset); and pension deficit recovery costs; see Table 3.2 of [Ofwat \(2019\), PR19 final determinations: Anglian Water final determination](#).

\* Footnote: Other totex allowances include: operating lease adjustments; strategic regional water resources solutions and other cash items; third party costs; non-section 185 diversions; ex-ante cost sharing adjustment; grants and contributions (after adjustment for income offset, updated for our determination); and pension deficit recovery costs; see Table 3.2 of Ofwat (2019), [PR19 final determinations: Anglian Water final determination](#).

Note: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

12.34 As shown in Table 12-2, our total totex allowance is around £108 million higher than Ofwat's FD.

**Table 12-2: Totex cost allowances compared with Ofwat's FD**

	Ofwat FD	CMA final decision	£m <b>Delta</b>
Modelled base allowance (including CAC)	3,368	3,430	<b>+62</b>
Unmodelled base allowance	357	367	<b>+10</b>
Enhancement allowance	1,425	1,466	<b>+41</b>
Other totex allowances	-85	-90	<b>-5</b>
<b>Total totex</b>	<b>5,065</b>	<b>5,173</b>	<b>+108</b>

Source: Table 3.2 of Ofwat (2019), [PR19 final determinations: Anglian Water final determination](#), CMA analysis

Note: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

12.35 In order to mitigate the risk that we set a totex allowance that turns out to be either too low or too high, we include an overall totex cost-sharing mechanism which applies to the majority of totex. Under the cost-sharing mechanism, if a company underspends its allowance, customers share in the saving made. Conversely, if the company needs to overspend to deliver the necessary services, it can recover part of the costs from customers. Cost-sharing enables us to rely less on other mechanisms in the price control that provide some protection from uncertainty.<sup>3337</sup>

12.36 The totex cost-sharing rates we set for Anglian are 45% outperformance and 55% underperformance for both water and for wastewater.<sup>3338</sup>

## Outcomes

12.37 Overall, we decide that the package of performance commitments and delivery incentives imposed by Ofwat should largely remain in place, having found no evidence to suggest that those are inappropriate.<sup>3339</sup>

12.38 We focus our assessment on the Common PCs and the related ODIs and conclude that the PC levels for the three common performance measures set at the forecast upper quartile level are appropriate. We consider that it is normal regulatory practice to make assessments using comparative

<sup>3337</sup> See paragraphs 6.70 to 6.107

<sup>3338</sup> See paragraphs 6.70 to 6.107

<sup>3339</sup> See paragraphs 7.45 to 7.140 and 7.311 to 7.320

regulation, and that upper quartile is a common measure used when promoting improvements in efficiency.<sup>3340</sup>

12.39 However, we make the following determinations based on our investigation of specific PCs and ODIs:

- (a) **Adjustments to Common PCs and ODIs (other than leakage):** For a small number of Anglian's Common PCs and ODIs we alter the company's collars and deadbands in order to protect the company against small variations in performance beyond management's control, while maintaining strong incentives to invest.<sup>3341</sup> We also welcome the common PC linked to vulnerable customers that encourages companies to identify those customers most likely to need additional support. A thorough and up-to-date Priority Services Register may also prompt companies to identify further innovations that will allow the sector better to help vulnerable customers.<sup>3342</sup>
- (b) **Bespoke PCs and ODIs:** We have reviewed Anglian's water quality contacts PC, and its bathing water quality PC, and decide that customer views and comparative evidence support adopting the same approach that Ofwat used in this area.<sup>3343</sup> Finally, we also welcome Anglian's Bespoke PCs to support the delivery of appropriate services to vulnerable customers.<sup>3344</sup>

12.40 In relation to leakage specifically, we decide to retain the leakage PC at the level set by Ofwat, but in doing so conclude that Anglian requires additional allowance to achieve the required level of performance.<sup>3345</sup> In particular:

- (a) We conclude that there is a link between maintaining higher performance on leakage and costs such that the base cost model we use will not adequately compensate companies that are maintaining performance above the upper quartile. Since Anglian meets this criterion, we increase its base cost allowance by £42.6 million.<sup>3346</sup>
- (b) We conclude that Anglian requires enhancement cost funding for achieving the leakage reductions it committed to, and so should be allowed the efficient cost of doing so. We estimate the efficient costs

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<sup>3340</sup> See paragraphs 7.141 to 7.194

<sup>3341</sup> See paragraphs 7.141 to 7.261

<sup>3342</sup> See paragraphs 7.247 to 7.261

<sup>3343</sup> See paragraphs 7.263 to 7.288

<sup>3344</sup> See paragraph 7.253

<sup>3345</sup> See paragraphs 8.31 to 8.175 and 8.205

<sup>3346</sup> These figures are included in the totex allowances discussed earlier; see paragraphs 8.48 to 8.82.



using a bottom-up approach, and conclude on a figure of £64.1 million for Anglian's leakage enhancement totex.<sup>3347</sup>

- (c) We also consider the ODI rates relating to the leakage PC and in blind outperformance in this area. As explained above, we conclude that leakage improvements will require additional funding and so will impose costs on customers. In the circumstances, and in the absence of evidence for the cost-benefit trade-off of further leakage reductions, we consider it would not be appropriate to use Enhanced ODIs to shift the frontier in this area. We also make adjustments to increase Anglian's penalty rates for underperformance ODIs, as we conclude that this would make the calibration of the ODIs more consistent with our determination on enhancement costs.<sup>3348</sup>

12.41 For the purposes of this determination, we do not list every PC and/or ODI to which Anglian is subject. Instead, we provide a list of the changes we make to Ofwat's FD.<sup>3349</sup> If we do not reference a PC or ODI, our determination is that we have seen no evidence to support adopting a different approach to that used by Ofwat, and so we apply the same requirement that Ofwat included in its FD.

12.42 The summary of changes we make to PCs and ODIs in Ofwat's FD (excluding scheme-specific PCs) is set out in Table 12-3.<sup>3350</sup>

**Table 12-3: Summary changes on outcome requirements**

<i>Unique reference</i>	<i>Description of commitment</i>	<i>Description of intervention</i>
PR19ANH_3	Water quality compliance (CRI)	Set an underperformance deadband at Ofwat's DD level (For each year of AMP7: 2.0, 2.0, 1.5, 1.5, 1.5)
PR19ANH_5	Leakage	Remove enhanced ODI; provide additional totex; and amend Tier 1 penalties
PR19ANH_8	Pollution incidents	Raise underperformance collar to 41.6
PR19ANH_11	Mains repairs	Set an underperformance deadband of 10 repairs per 1,000km above the PCL (For each year of AMP7: 150.1, 148.1, 146.2, 144.2, 142.3)
PR19ANH_12	Unplanned outage	Set an underperformance deadband of 1.2x PCL (2.81)

Source: CMA

12.43 We considered whether the overall reward cap on ODIs from Ofwat's FD was appropriate, and concluded that no change was necessary.<sup>3351</sup>

12.44 Finally, we have considered whether there are other scheme-specific PCs and ODIs which required recalibration as a result of broader changes in our

<sup>3347</sup> These figures are included in the totex allowances discussed earlier; see paragraphs 8.83 to 8.174.

<sup>3348</sup> See paragraphs 8.176 to 8.204

<sup>3349</sup> The list of PCs and ODIs which Ofwat included in its FD is available here: Ofwat (2019), [PR19 final determinations: Anglian Water - Outcomes performance commitment appendix](#)

<sup>3350</sup> See Table 7-17 and paragraph 8.205

<sup>3351</sup> See paragraphs 7.305 to 7.310

determination (most notably the difference in cost-sharing rates compared with Ofwat's FD). For Anglian, these are shown in Table 12-4.<sup>3352</sup>

**Table 12-4: Updated ODI rates for scheme-specific PCs**

<i>Company</i>	<i>Unique ID</i>	<i>Description</i>	<i>ODI rate</i>
Anglian	PR19ANH_42	Partnership working on pluvial and fluvial flood risk	-0.0595

Source: CMA

Note: all ODI rates are expressed as £m per unit, where the measurement unit is described in the relevant company's respective outcomes performance commitment appendix from PR19 FD.

## WACC and financeability

### WACC

#### *Cost of equity*

12.45 We have used the CAPM to determine the cost of equity. The CAPM is an established methodology with well-understood theoretical foundations and which makes use of observable market data as far as possible. The CAPM is used by all UK regulators when calculating the cost of capital, and was the framework used in Ofwat's FD. We perform our own assessment of each of the parameters of this model, using up-to-date market data.<sup>3353</sup>

12.46 The main components of the cost of equity on which we decide are (in inflation adjusted CPIH-real terms):

- (a) **The TMR (6.2% to 7.5%):** To calculate the TMR, we place the most weight on historical ex post returns (from 1900 to the present day), as well as on the historic ex-ante approach when selecting our range. We place less weight on the forward-looking evidence,<sup>3354</sup>
- (b) **The RFR (-1.6% to -1.0%):** We calculate an RFR by placing weight on both long-tenor index-linked gilts and AAA-rated non-government bonds (the highest quality commercial debt) and taking into account up-to-date market data;<sup>3355</sup> and

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<sup>3352</sup> See Table 5-26

<sup>3353</sup> See paragraphs 9.5 to 9.14

<sup>3354</sup> See paragraphs 9.267 to 9.397

<sup>3355</sup> See paragraphs 9.46 to 9.266

- (c) **The equity beta (0.69 to 0.74):** We calculate an equity beta based on a range of approaches of analysing the observable market data of WASC comparators, including a potential debt beta.<sup>3356</sup>

12.47 Based on the above, we calculate a range for the cost of equity over the period of the price control of 3.76% to 5.21%. We pick a point estimate 0.25% above the mid-point of this range. Our judgement of the point estimate of the cost of equity is based on the following considerations:<sup>3357</sup>

- (a) promoting investment, and specifically addressing the risk of an exit of capital from the sector if the cost of capital were set too low;
- (b) the asymmetry of risk in the package of ODIs;
- (c) the scale of parameter uncertainty in estimating the cost of equity, particularly in the context of a sharp decline in equity returns since PR14; and
- (d) cross-checks, including the need for the WACC to be sufficiently high to support financeability, which we concluded was a more appropriate mechanism than Ofwat's decision to increase bills by advancing cash-flows from future periods.

12.48 We also consider other cross-checks against market data, although we conclude that these were insufficiently robust to change the choice of point estimate which we assessed based on the factors above.<sup>3358</sup>

### *Cost of debt*

12.49 We set an allowance for the total industry cost of debt at 2.18% in CPIH-real terms, marginally higher than Ofwat's 2.14%. We reach this figure by considering the costs of debt already incurred by the industry (embedded debt), the new debt costs that companies will face during the price control, the appropriate ratio of new and embedded debt and the costs of fees in relation to issuance and liquidity costs.<sup>3359</sup>

12.50 Evidence submitted by the Parties following Provisional Findings and our subsequent consultation on the costs of debt, as well as our own analysis, has allowed us to base our cost of embedded debt allowance on actual costs.

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<sup>3356</sup> See paragraphs 9.398 to 9.532

<sup>3357</sup> See paragraphs 9.1226 to 9.1415

<sup>3358</sup> See paragraphs 9.1345 to 9.1401

<sup>3359</sup> See paragraphs 9.533 to 9.904

We then cross check our estimates against the iBoxx A/BBB benchmark over 15- and 20-year trailing averages.<sup>3360</sup>

12.51 In relation to new debt costs, we set an allowance relative to an iBoxx A/BBB 10+ benchmark, measured over the first 6-months of the price control. Unlike Ofwat, we consider there to be insufficient evidence to apply an outperformance wedge in order to reduce this allowance. We agree with the use of a true-up mechanism for the cost of new debt in the next price control process and would expect this to be conducted on a like-for-like basis (with no performance wedge applied when calculating the true-up).<sup>3361</sup>

12.52 We apply a ratio of 17% new debt to 83% embedded debt in our calculations, slightly lower than the 20% of new debt used by Ofwat. We set the issuance and liquidity cost allowance at 0.1%, in line with Ofwat.<sup>3362</sup>

### *Appointee WACC*

12.53 As part of this assessment, we decide on levels for related metrics, particularly inflation (CPIH of 2%, with a 0.9% RPI-CPI wedge)<sup>3363</sup> and notional gearing (60%).<sup>3364</sup>

12.54 The CMA point estimates for its WACC parameters are therefore shown in Table 12-5, alongside Ofwat's FD figures. Our final point estimate for Anglian's Appointee Vanilla WACC is 3.20% (in CPIH-Real terms).

**Table 12-5: CMA point estimates of WACC components versus Ofwat PR19, CPIH-Real**

	<i>Ofwat PR19</i>	<i>CMA Point Estimate</i>	<i>Delta</i>
TMR	6.50%	6.81%	<b>+0.31%</b>
RFR	-1.39%	-1.34%	<b>+0.05%</b>
ERP	7.89%	8.15%	<b>+0.26%</b>
Equity Beta	0.71	0.71	-
Cost of New Debt	0.53%	0.19%	<b>-0.34%</b>
Cost of Embedded Debt	2.42%	2.47%	<b>+0.05%</b>
Proportion of New Debt	20%	17%	<b>-3%</b>
Issuance and Liquidity Costs	0.10%	0.10%	-
Impact of picking a point estimate above the midpoint	-	0.25%	<b>+0.25%</b>
Pre-tax Cost of Debt	2.14%	2.18%	<b>+0.04%</b>
Post-tax Cost of Equity	4.19%	4.73%	<b>+0.54%</b>
Gearing	60%	60%	-
<b>Appointee-level Vanilla WACC*</b>	<b>2.96%</b>	<b>3.20%</b>	<b>+0.24%</b>

Source: CMA analysis and Ofwat PR19 FD

\* Footnote: 'Vanilla' here refers to a WACC set using a pre-tax cost of debt and a post-tax cost of equity.

<sup>3360</sup> See paragraphs 9.538 to 9.795

<sup>3361</sup> See paragraphs 9.796 to 9.828

<sup>3362</sup> See paragraphs 9.829 to 9.903

<sup>3363</sup> See paragraphs 9.15 to 9.36

<sup>3364</sup> See paragraphs 9.37 to 9.45

12.55 We note that our WACC figure is around 42bps lower than Anglian proposed to us in its SoC, equivalent to us closing around 36% of the difference between Ofwat and the company.<sup>3365</sup>

### ***Retail margin adjustment***

12.56 Our view is that using the unadjusted Appointee WACC and a retail margin of 1% would result in water companies being overcompensated by receiving returns on their notional retail assets twice, as the retail margin includes compensation for risks which would be faced by an independent retail business but which are in practice mitigated for a vertically integrated appointee business.<sup>3366</sup>

12.57 We calculate the extent of this overcompensation as being equivalent to 8bps of RCV, and accordingly our decision is to reduce Anglian's allowed revenues by this amount as a retail margin adjustment.<sup>3367</sup>

### ***Gearing outperformance sharing mechanism***

12.58 Ofwat introduced a GOSM for the first time in PR19. Ofwat stated that equity investors benefit from higher equity returns that are associated with their increased risk, but there is no substantive benefit passed to customers. In addition, Ofwat stated where companies adopt high levels of gearing, they may reduce financial resilience and transfer some risk to customers and / or potentially taxpayers in the event that a company fails. To address this, Ofwat introduced a mechanism that it said would share the benefits of higher gearing with customers.<sup>3368</sup>

12.59 We consider that the GOSM as designed was ineffective either as a benefit-sharing mechanism or as a tool to improve financial resilience. First, we consider that Ofwat had not adequately evidenced the existence of the benefits from high gearing that it said would be available to share. Second, to the extent that high gearing reduces financial resilience, the GOSM works only to encourage a reduction in gearing rather than to require a reduction in gearing. Moreover, we note that there are already multiple licence conditions which, together with a large and stable asset base, provide protection to consumers from excessive gearing. While we do not rule out that Ofwat may need to intervene at some time in the sector to reinforce its financial resilience and that this may or may not involve some constraint on gearing, for the

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<sup>3365</sup> See Table 9-1

<sup>3366</sup> See paragraphs 9.1104 to 9.1149

<sup>3367</sup> See paragraphs 9.1104 to 9.1149

<sup>3368</sup> See paragraphs 9.1150 to 9.1155

purposes of this price control, we were not presented with evidence that an intervention on gearing is currently required in respect of the Disputing Companies or that the GOSM is the appropriate mechanism for such an intervention.<sup>3369</sup>

## **Financeability**

12.60 We are required to ensure that companies can continue to finance their functions. We therefore completed an in-the-round assessment of the financeability of the Disputing Companies, including a financial ratio analysis similar to that which would be undertaken by the credit rating agencies. The outputs of this ratio analysis for Anglian are shown in Table 12-6.<sup>3370</sup>

**Table 12-6: Credit ratio analysis for Anglian**

<i>Ref</i>	<i>Ratio</i>	<i>Gearing</i>	<i>Interest cover</i>	<i>AICR</i>	<i>FFO/net debt</i>	<i>Dividend cover</i>	<i>RCF/Net debt</i>
1	CMA FD	61.1%	3.9	1.4	9.2%	0.8	7.1%
2	CMA FD + 1% RoRe penalty	62.3%	3.7	1.3	8.4%	0.5	6.4%
3	CMA FD + 2% Totex overspend	61.5%	3.8	1.4	9.0%	0.7	6.9%
4	Ofwat FD	60.0%	4.0	1.5*	9.5%	1.4	8.3%

Source: CMA analysis

Note: CMA sensitivities take into account the adjustment to PAYG rate made for 'opex:capex misallocation'. Ofwat ratios are consistent with its approach to the final determination and include a benefit of accelerating PAYG in the interest cover ratio.

12.61 Our analysis of Anglian's ratios suggests that, based on our determination and the assumption of a notional capital structure, Anglian would achieve financial ratios which are consistent with a strong investment-grade credit rating. In the downside scenarios, Anglian should still achieve ratios consistent with an investment grade credit rating of BBB/Baa2.<sup>3371</sup>

12.62 We have made an assessment of the WACC and wholesale totex requirements, in each case providing an increased allowance compared to Ofwat's FD. This represents a reasonable level of costs that each of the Disputing Companies could be expected to incur. We have also de-risked the determination, including moderating the cost-sharing rates to rebalance risk between customers and investors. Each of these factors improves financeability.

12.63 In measuring credit ratios, we took account of the credit rating agencies' stance on whether or not advancing revenue by adjusting PAYG rates would affect a credit ratings assessment. We concluded that Ofwat's approach of increasing the PAYG rate risks increasing customer bills without leading to a

<sup>3369</sup> See paragraphs 9.1156 to 9.1225

<sup>3370</sup> See Table 10-3 and paragraphs 10.88 to 10.101

<sup>3371</sup> See paragraphs 10.109 to 10.111

practical improvement in the water companies' ability to secure a strong investment grade rating, and we did not make PAYG adjustments.<sup>3372</sup>

12.64 We find that Anglian should be able to achieve strong investment-grade credit ratings based on the notional capital structure, and this is consistent with our assumptions in the WACC for the cost of debt. We also find that under a reasonable downside scenario, Anglian's ratios are worse than the baseline model but still investment-grade. We consider that companies facing a financeability constraint, such as to address a downside scenario, may adopt a range of mitigating actions to address impact, such as absorbing headroom in credit ratios, or increasing the contribution of equity either by forgoing dividends or injecting fresh capital. We conclude that this supports the view that our determination for Anglian is financeable.<sup>3373</sup>

## **Implied calculations of revenue and implications for k and bills**

### ***Revenue adjustments***

12.65 The majority of a water company's wholesale revenue is derived from the totex and WACC figures discussed above. However, there are certain additional elements which affect Anglian's revenue allowance in AMP7.<sup>3374</sup>

12.66 For the majority of these revenue categories, Anglian has not raised any concerns and we have no evidence to support the use of alternative figures, and so we decide to use Ofwat's figures. In doing so, we note that certain figures have changed since Ofwat's FD. This is the result of 'blind year adjustments', in which Ofwat conducts a reconciliation for company performance in the final year of the last AMP – this uses data which was not available at the time of Ofwat's FD. We include these adjustments in our final determination, which results in a £18.7 million reduction in Anglian's revenue for the period.<sup>3375</sup>

12.67 However, we have received submissions in one area, which we consider support a different approach. Ofwat's FD used a corporation tax rate of 17% on the expectation that the rate was going to drop from the current figure of

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<sup>3372</sup> See paragraphs 10.77 to 10.87

<sup>3373</sup> See paragraphs 10.109 to 10.111 and 10.123 to 10.134

<sup>3374</sup> Revenue adjustments for PR14 reconciliations; Tax; Grants & contributions after adjustment for income offset (price control); Non-price control income; Innovation competition; Revenue re-profiling; see Table 4.1 of Ofwat (2019), *PR19 final determinations: Anglian Water final determination*.

<sup>3375</sup> See [https://www.ofwat.gov.uk/wp-content/uploads/2020/11/In-period-adjustment-model\\_ANH\\_BYRun2.xlsx](https://www.ofwat.gov.uk/wp-content/uploads/2020/11/In-period-adjustment-model_ANH_BYRun2.xlsx), 'abatements and deferrals' tab; we note that Ofwat has also made adjustments to the company's RCV but that these will occur at the end of AMP and so do not affect in-period revenues. Furthermore, the adjustment we made to Anglian's wastewater network plus revenue differs slightly from the published figure due to the outcome of a recent court case which has not yet been reflected in Ofwat's published documents – we have reflected the updated results.

19%. However, the rate has remained at 19%, and we consider it appropriate to use the prevailing rate. Accordingly, we decide to use a corporation tax rate of 19%. This, along with other changes in our determination which impact tax allowances, results in an increase in Anglian's wholesale revenue compared to Ofwat's FD of around £5 million. We also adopt the same approach as Ofwat of including a reconciliation mechanism which reflects subsequent increases or decreases in the corporation tax rate.<sup>3376</sup>

12.68 We also allow Anglian to recover a proportion of its costs for the determination process, which includes an allocation of our own costs. This represents around £2.1 million (which is excluded from totex cost-sharing).<sup>3377</sup>

### ***Implied Anglian revenue in AMP7 and calculations of k***

12.69 In order to calculate Anglian's revenue figures, we need to include a PAYG rate to split totex into in-period recovery and RCV additions. Our starting point for this is to use the 'natural rates' included in Ofwat's FD. However, we adjust this rate to address Anglian's concerns around a £156 million 'opex/capex misallocation'.<sup>3378</sup>

12.70 Table 12-7 shows Anglian's resulting wholesale allowed revenue.

**Table 12-7: Calculation of Anglian's wholesale allowed revenue**

					£m
	<i>Water resources</i>	<i>Water network plus</i>	<i>Wastewater network plus</i>	<i>Bioresources</i>	<b>Total</b>
PAYG	205	1,138	1,035	344	<b>2,722</b>
RCV Run-off	50	585	1,164	96	<b>1,896</b>
Return on Capital (incl RMA)	27	401	612	42	<b>1,082</b>
Reconciliation	0	6	-1	0	<b>5</b>
Tax	1	1	3	1	<b>5</b>
Grants and contributions	0	108	133	0	<b>241</b>
Deduct non-Price control income	-17	-39	-6	-2	<b>-64</b>
Innovation competition	0	8	13	0	<b>21</b>
Revenue reprofiling	0	4	4	0	<b>8</b>
<b>Wholesale revenue</b>	<b>266</b>	<b>2,213</b>	<b>2,955</b>	<b>482</b>	<b>5,916</b>

Source: CMA analysis.

Footnote: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

12.71 This calculation results in Anglian's wholesale revenue over the AMP being around £208 million higher than Ofwat's FD.<sup>3379</sup>

<sup>3376</sup> See paragraphs 11.3 to 11.11

<sup>3377</sup> See paragraphs 11.124 to 11.134. We note that this has been modelled as an increase in totex, with these costs being considered entirely opex (and so recovered in period). This results in a small change in the PAYG rates purely for the purpose of modelling this specific cost recovery.

<sup>3378</sup> See paragraphs 10.85 to 10.87

<sup>3379</sup> Ofwat's FD included wholesale revenues for Anglian of £5,708 million; see Table 1.3 in Ofwat (2019), [PR19 final determinations: Anglian Water final determination](#).



12.72 In relation to the retail price control, neither Anglian nor any of the other Disputing Companies have raised any concerns that Ofwat's approach should be re-considered. Our decision is to align our approach with Ofwat's FD19. This includes the household retail expenditure allowance and the outcome measures relating to C-MeX and D-MeX.<sup>3380</sup> Therefore, we maintain Ofwat's approach of calculating retail allowances based on wholesale, which results in a small incremental allowance of £1.7 million for Anglian (£427.7 million in our determination compared to £426.0 million in Ofwat's FD).<sup>3381</sup>

12.73 The estimated effect of these changes on average annual customer bills is shown in Table 12-8, compared to Anglian's historical bills and Ofwat's FD.<sup>3382</sup>

**Table 12-8: Indicative impact of our determination on Anglian's annual customer bills\***

	£			
	<i>Anglian historical bills (2019/20)</i>	<i>Anglian average bill in April business plan†</i>	<i>Anglian average bill under Ofwat FD</i>	<i>Anglian average bill under CMA decision</i>
Average annual bill (water and sewerage)	422	418	386	400

Source: CMA calculations; Anglian business plan bills taken from Ofwat (2019), [PR19 final determinations: Anglian Water final determination](#), Table 1.1.

\* Footnote: The numbers in this table reflect the average amount per customer charged, expressed at constant (inflation adjusted) prices (2017-18 CPIH deflated). Individual customer bills will vary depending on a number of factors such as the whether the property is metered or not and, for metered customers, the amount of water consumed.

† Footnote: The April business plan figure here is taken from Ofwat's published documents, and may not align with all of the implications of the company's submissions in its SoC.

12.74 The bill in our determination is higher than Ofwat's FD by around £13 per year. Under our determination, Anglian's average bills are still £22 per year lower than they were in 2019/20 (and £18 per year lower than Anglian's April business plan), which should assist customers who were struggling with the affordability of this essential utility.

12.75 Having determined the revenue allowances over the whole AMP, we profile it between individual years in order to provide customers with a better view of the potential impact, and to allow for an annual calculation of K. In doing so, we choose to implement a consistent annual increase in nominal bills over the course of the remaining years in the AMP.<sup>3383</sup> This defers some of the bill increases until later years, which is likely to be particularly beneficial to

<sup>3380</sup> See paragraphs 11.115 to 11.120

<sup>3381</sup> See Table 11-2; Table 6.2 of Ofwat (2019), [PR19 final determinations: Anglian Water final determination](#)

<sup>3382</sup> The price control sets revenue allowances for the individual companies. This determines the average bill that the company can charge its customers. Individual bills will vary depending on the charging scheme adopted by the company, see Ofwat's [information on charging](#).

<sup>3383</sup> We note that due to the timing of the redetermination, Anglian will not be able to implement our final determination until the third year of the AMP, which will result in larger increases in the later years than would be the case otherwise.

customers affected by the COVID-19 pandemic, whilst also avoiding any specific ‘spike’ in customer bills in a single year.<sup>3384</sup>

12.76 The results of this profiling, as well as the impact on K and bills,<sup>3385</sup> is shown in Table 12-9 and Table 12-10.

**Table 12-9: Anglian’s Base Revenue and K factors by charging year**

	Base (£m)	2020-21	2021-22	2022-23	2023-24	2024-25
Water resources	52.3	0.00	-1.56%	+2.61%	+2.28%	+3.07%
Water network plus	408.2	0.00	+3.22%	+4.92%	+4.67%	+4.64%
Wastewater network plus	557.9	0.00	+0.12%	+3.38%	+6.00%	+6.84%

Source: CMA calculations  
Note: 2017-18 CPIH deflated

**Table 12-10: Anglian’s indicative annual bills**

	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
Customer bills	422	394	388	397	405	415

Source: CMA calculations  
Note: 2017-18 CPIH deflated

12.77 In addition, we update Anglian’s bioresources control such that its TDS revenue average is set to £606.7 in years 3 to 5 of the AMP. Applying the variable vs fixed split from Ofwat’s FD (53%)<sup>3386</sup> results in a variable revenue of £319.5 / TDS.

12.78 Finally, we emphasise that while we have looked at individual components in detail, and necessarily made decisions on each of these, we have also considered any cross-cutting or interconnected issues when making such decisions. In particular, the inter-relationship between cost and service, as well as risk, return and financeability have influenced our decisions in each of the major areas of the determination (totex, outcomes and WACC). This is a determination of a whole package ‘in the round’, and we consider that this determination secures compliance with all our duties.

<sup>3384</sup> Paragraph 3.5 of [The Consumer Council for Water’s response to the provisional findings](#) noted that ‘customers prefer a smooth profile to any bill increases rather than experiencing spikes in any one year’.

<sup>3385</sup> The price control sets revenue allowances for the individual companies. This determines the average bill that the company can charge its customers. Individual bills will vary depending on the charging scheme adopted by the company, see Ofwat’s [information on charging](#).

<sup>3386</sup> [https://www.ofwat.gov.uk/wp-content/uploads/2019/12/Bioresources-Revenue\\_ANH\\_FD.xlsx](https://www.ofwat.gov.uk/wp-content/uploads/2019/12/Bioresources-Revenue_ANH_FD.xlsx)

## 13. The final determination for Bristol

- 13.1 This section provides a summary of our individual final determination for Bristol. In this, we set out our final determination, but we do not fully restate the explanation or rationale for our decisions; many methodologies are common between the individual companies, and we cross-reference to the relevant earlier sections of our report to identify where we have explained these rationales.
- 13.2 In reaching our decisions we have taken account of the same statutory duties as applied to Ofwat, and we have had regard to the principles of best regulatory practice and the need to act in accordance with the SPS, but have exercised our own regulatory discretion in appropriately complying with these statutory duties.

### Introduction

- 13.3 Bristol is a WOC based in the South West, sourcing, treating and distributing water for a population of 1.2 million people across more than half a million connected properties in Bristol and the surrounding area. At 31 March 2020, Bristol directly employed 560 full-time equivalent staff.<sup>3387</sup>

### *Approach to the determination*

- 13.4 As originally proposed in our approach to the determinations document,<sup>3388</sup> we are using the same regulatory building blocks as Ofwat used in its determinations. In particular, we have maintained:<sup>3389</sup>
- (a) Ofwat's approach of setting four wholesale price controls (water resources, water network plus, wastewater network plus, and bioresources);<sup>3390</sup>
  - (b) separating our assessment into its major component parts around costs, outcomes, and financial returns;<sup>3391</sup>
  - (c) managing bioresources as an average revenue control;<sup>3392</sup> and

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<sup>3387</sup> See paragraphs 2.47 to 2.52

<sup>3388</sup> [CMA approach to water redeterminations](#), paragraph 29; also see paragraphs 3.37 to 3.50 in this report.

<sup>3389</sup> See paragraph 3.5

<sup>3390</sup> See paragraph 11.114. We note that these separate controls are specified in Bristol's licence conditions.

<sup>3391</sup> See paragraphs 2.102 and 3.2 to 3.20

<sup>3392</sup> See paragraphs 3.43 and 11.121 to 11.123

(d) setting a separate retail control.<sup>3393</sup>

13.5 The rest of this section sets out the final decisions we have applied to Bristol, grouped into:

(a) totex allowances;

(b) outcomes;

(c) WACC and financeability; and

(d) calculations of revenue, with implications for k and bills in the period.

## **Totex allowances**

13.6 In setting Bristol's totex allowance in our final determination, we have considered four main cost areas:

(a) modelled base costs (including growth);

(b) unmodelled base costs;

(c) enhancement costs; and

(d) other costs.

## ***Modelled base costs***

13.7 Water companies conduct many routine activities in order to run their businesses and provide a base level of service to customers. We adopt an econometric modelling approach to assess most of the costs of Bristol's base level of service, using data from across the sector. Comparative benchmarking allows us to estimate the efficient costs for these day-to-day operations, rather than relying on individual company data or forecasts. Our modelling approach is similar to Ofwat's, although we adjust the econometric models and expand the dataset by including data from 2019/20. This 2019/20 data was not available to Ofwat when it set the FD.<sup>3394</sup>

13.8 Our cost models estimate how much it would cost the averagely efficient water company to cover base operations. However, we want to set cost allowances for a water company that is more than merely averagely efficient, and so we apply a 'catch up' efficiency challenge. Our decision is to use the

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<sup>3393</sup> See paragraphs 3.41 and 11.115 to 11.120

<sup>3394</sup> See paragraphs 4.2 to 4.403

company at the upper quartile as the benchmark, which we consider sets a challenging benchmark whilst acknowledging the limitations of our econometric modelling (and the consequent risk that the company will have insufficient allowed revenue to ensure a base level of service).<sup>3395</sup>

13.9 Future costs are likely to differ from the historical benchmarks because of changes to productivity levels and input costs. We therefore:

- (a) Apply a 'frontier shift' which reduces the modelled allowance by 1% per year to reflect expected productivity gains from improvements in technology and new ways of working;<sup>3396</sup> and
- (b) Provide an RPE adjustment for labour costs. We also include a reconciliation mechanism for these labour costs to protect both customers and the company if there are differences between forecasts and actual wage inflation.<sup>3397</sup>

13.10 Serving new properties involves additional costs for water companies: both the costs of installing new connections, and from the demand increase, necessitating reinforced or additional infrastructure. We therefore:

- (a) increase Bristol's allowance due to forecast growth being above industry average (using updated ONS forecast figures);<sup>3398</sup> and
- (b) include a reconciliation mechanism to protect against differences between forecasts and actual growth.<sup>3399</sup>

13.11 Ofwat's historical data collection approach contained no distinction between base opex and enhancement opex. Therefore, Ofwat's modelled base costs could double-count Bristol's enhancement opex if an adjustment was not applied. We decide to use the same approach as Ofwat used in its FD, which is to estimate an implicit allowance for enhancement opex and adjust the companies' allowance accordingly.<sup>3400</sup>

13.12 The overall effect of our modelling changes described above is to increase Bristol's base allowances by around £24 million compared to the allowances in Ofwat's FD.<sup>3401</sup>

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<sup>3395</sup> See paragraphs 4.404 to 4.495

<sup>3396</sup> We have also applied this adjustment to other elements of totex, not just base costs; See paragraphs 4.496 to 4.652.

<sup>3397</sup> We have also applied this adjustment to other elements of totex, not just base costs; See paragraphs 4.653 to 4.740.

<sup>3398</sup> See paragraphs 4.741 to 4.878

<sup>3399</sup> See paragraphs 4.805 to 4.859

<sup>3400</sup> See paragraphs 4.879 to 4.905

<sup>3401</sup> See Table 6-3; sum of all changes except for cost adjustment claims.

13.13 Finally, we recognise that our approach is reliant on models which are based on a limited set of explanatory variables and, like any econometric model, are subject to some limitations and a degree of uncertainty in their final estimates. While we have reflected this already in earlier decisions (such as selection of the catch up benchmark), we have also considered cost adjustment claims for Bristol in relation to leakage and its reliance on the G&S canal:

(a) Bristol's leakage cost adjustment claim is discussed in paragraph 13.35.<sup>3402</sup>

(b) Bristol also made a cost adjustment claim to reflect the atypical costs it pays for abstraction of raw water from the G&S Canal, which had been only partially accepted by Ofwat in its FD. We agree that Bristol bears additional costs in relation to purchasing water from the G&S canal and that management has limited influence over the level of these costs. These costs have also risen since the Ofwat FD due to a backdated cost increase from the supplier, CRT. However, we also find that Bristol benefits from implicit allowance within modelled base costs which contributes to these costs. The outcome, once we correct for 2019/20 data, is an increase in Bristol's cost allowances of £9.7m (£3.8 million higher than Ofwat's FD).<sup>3403</sup>

13.14 The combination of modelling changes and cost adjustment claims results in an overall increase of £27 million for Bristol compared with Ofwat's FD.<sup>3404</sup>

### ***Unmodelled base costs***

13.15 In designing our base models discussed above, we exclude certain costs that are unsuitable for modelling where, for example, there is insufficient data for modelling or where exceptional circumstances apply to particular companies. We refer to these as unmodelled base costs. These include costs associated with abstraction, business rates, compliance with the IED and Traffic Management Act.<sup>3405</sup>

13.16 Ofwat made an allowance for Bristol's unmodelled base costs, and we decide that these are largely appropriate.<sup>3406</sup>

13.17 We do not apply a frontier shift to business rates or abstraction charges as we conclude that these costs were in the most part outside of company control.

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<sup>3402</sup> See paragraphs 8.48 to 8.82

<sup>3403</sup> See paragraphs 4.984 to 4.1025

<sup>3404</sup> See Table 6-3

<sup>3405</sup> See paragraphs 4.971 to 4.1131

<sup>3406</sup> See paragraphs 4.1128 to 4.1131 and Table 6-4

However, we apply a frontier shift to other unmodelled base costs of 1% together with a labour RPE. We consider that our approach does not give rise to any double-counting necessitating an adjustment. Our frontier shift is slightly below the level which Ofwat set in its FD and, combined with our decision not to apply this to unmodelled abstraction charges or business rates, results in an increase in Bristol's allowances of around £1 million compared to Ofwat's FD.<sup>3407</sup>

- 13.18 Due to management having a more limited degree of control than over other costs, we apply a cost-sharing rate of 90/10 (customer/company) for business rates, rather than using the 75/25 sharing rate that Ofwat set in its FD.<sup>3408</sup>

### **Enhancement costs**

- 13.19 We provide additional allowances to Bristol where we have been persuaded that it is undertaking necessary investment for the purpose of enhancing the capacity or quality of service beyond a base level.<sup>3409</sup>

- 13.20 In our review of enhancement expenditure, we generally focus on areas where Ofwat and Bristol have provided conflicting views and where we need to resolve these in coming to our determination. To help us reach our own view, our assessment often involves considering additional evidence or arguments, which were not available to Ofwat at the time that it made its FD. For other enhancement expenditure, including major schemes which met Ofwat's evidential threshold to receive additional enhancement funding, we adopt the same approach as Ofwat did in its FD.<sup>3410</sup>

- 13.21 We make use of comparative data (including econometric modelling, engineering comparisons and cost benchmarking comparisons) where available to develop our best estimate for efficient enhancement costs.<sup>3411</sup>

- 13.22 We apply efficiency challenges and reduce allowances where we are concerned about the robustness of the evidence provided for enhancement schemes. In doing so we are seeking to ensure that customers do not overpay for inefficient service whilst also ensuring sufficient allowance is available to achieve the enhanced level of service/quality. Reflecting our shallow dive efficiency factors results in an increase in Bristol's allowances of

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<sup>3407</sup> See paragraphs 4.652 and 4.975, and Table 6-5

<sup>3408</sup> See paragraphs 4.1054 to 4.1077

<sup>3409</sup> See paragraphs 5.5 to 5.8 for a description of how enhancement allowances fit into the broader price review framework.

<sup>3410</sup> See paragraphs 5.4 and 5.16 to 5.17

<sup>3411</sup> See paragraphs 5.24 to 5.163

£0.4 million, whilst our decision to apply a deep-dive efficiency of 10% makes no difference to Bristol's allowed costs compared to Ofwat's FD.<sup>3412</sup>

13.23 As discussed in paragraph 13.35, we consider that Bristol requires an additional enhancement allowance in order to meet its leakage PC. We calculate this enhancement requirement as being £4.7 million, slightly less than Ofwat's FD figure of £4.8 million.<sup>3413</sup>

13.24 Consistent with our decision on base costs above, we apply a frontier shift of 1% together with a labour RPE on all enhancement costs (not just to WINEP and metering as Ofwat did). We make a small adjustment (£0.1 million) to avoid confirmed double-counting concerns. The net effect of this is a decrease of around £0.6 million in Bristol's enhancement allowances.<sup>3414</sup>

13.25 The combination of enhancement changes results in an overall decrease of £0.3 million for Bristol compared with Ofwat's FD.<sup>3415</sup>

### **Other costs**

13.26 As well as the three cost areas discussed above, there are a number of other cost categories which contribute to Bristol's totex allowance.<sup>3416</sup>

13.27 Bristol has not raised any concerns with any of these cost categories, and we have no evidence to support the use of alternative figures, and so we decide to use the figures in Ofwat's FD (updating Grants & Contribution figures to reflect consequential changes of our decisions).

### **Overall totex**

13.28 Our determination of Bristol's wholesale total totex allowance is shown in Table 13-1.

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<sup>3412</sup> See paragraphs 5.164 to 5.203; Table 5-29

<sup>3413</sup> See paragraphs 8.83 to 8.174

<sup>3414</sup> See paragraphs 5.722 to 5.742; Table 5-29

<sup>3415</sup> See Table 5-29

<sup>3416</sup> Operating lease adjustments; strategic regional water resources solutions and other cash items; third party costs; non-section 185 diversions; ex-ante cost sharing adjustment; grants and contributions (after adjustment for income offset); and pension deficit recovery costs; see Table 3.2 of Ofwat (2019), [PR19 final determinations: Bristol Water final determination](#).



**Table 13-1: Totex cost allowances by wholesale price control**

			£m
	<i>Water resources</i>	<i>Water network plus</i>	<b>Total</b>
Modelled base allowance (including CAC)	56	311	<b>367</b>
Unmodelled base allowance	21	22	<b>43</b>
Enhancement allowance	6	23	<b>30</b>
Other totex allowances*	2	-9	<b>-7</b>
<b>Total totex</b>	<b>85</b>	<b>347</b>	<b>432</b>

Source: CMA analysis

\* Footnote: Other totex allowances include: Operating lease adjustments; strategic regional water resources solutions and other cash items; third party costs; non-section 185 diversions; ex-ante cost sharing adjustment; grants and contributions (after adjustment for income offset, updated for our determination); and pension deficit recovery costs; see Table 3.2 of Ofwat (2019), [PR19 final determinations: Bristol Water final determination](#).

Note: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

13.29 As shown in Table 13-2, our total totex allowance is around £27 million higher than Ofwat's FD.

**Table 13-2: Totex cost allowances compared with Ofwat's FD**

			£m
	<i>Ofwat FD</i>	<i>CMA final decision</i>	<b>Delta</b>
Modelled base allowance (including CAC)	340	367	<b>+27</b>
Unmodelled base allowance	42	43	<b>+1</b>
Enhancement allowance	30	30	<b>-</b>
Other totex allowances	-6	-7	<b>-1</b>
<b>Total totex</b>	<b>405</b>	<b>432</b>	<b>+27</b>

Source: Table 3.2 of Ofwat (2019), [PR19 final determinations: Bristol Water final determination](#), CMA analysis

Note: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

13.30 In order to mitigate the risk that we set a totex allowance that turns out to be either too low or too high, we include an overall totex cost-sharing mechanism which applies to the majority of totex. Under the cost-sharing mechanism, if a company underspends its allowance, customers share in the saving made. Conversely, if the company needs to overspend to deliver the necessary services, it can recover part of the costs from customers. Cost-sharing enables us to rely less on other mechanisms in the price control that provide some protection from uncertainty.<sup>3417</sup>

13.31 The totex cost-sharing rate we set for Bristol is 45% outperformance and 55% underperformance.<sup>3418</sup>

<sup>3417</sup> See paragraphs 6.70 to 6.107

<sup>3418</sup> See paragraphs 6.70 to 6.107

## Outcomes

- 13.32 Overall, we decide that the package of performance commitments and delivery incentives imposed by Ofwat should largely remain in place, having found no evidence to suggest that those are inappropriate.<sup>3419</sup>
- 13.33 We focus our assessment on the Common PCs and the related ODIs and conclude that the PC levels for the three common performance measures set at the forecast upper quartile level are appropriate. We consider that it is normal regulatory practice to make assessments using comparative regulation, and that upper quartile is a common measure used when promoting improvements in efficiency.<sup>3420</sup>
- 13.34 However, we make the following adjustments to PCs and ODIs (other than leakage): For a small number of Bristol's Common PCs and ODIs we make different decisions: (i) altered the company's deadbands in order to protect the company against small variations in performance beyond management's control, while maintaining strong incentives to invest, and (ii) adjusted the calibration of Bristol's per capita consumption ODI to reflect the overlap between this PC and meter penetration.<sup>3421</sup> We also welcome the common PC linked to vulnerable customers that encourages companies to identify those customers most likely to need additional support. A thorough and up-to-date Priority Services Register may also prompt companies to identify further innovations that will allow the sector better to help vulnerable customers.<sup>3422</sup> Finally, we also welcome Bristol's bespoke PCs to support the delivery of appropriate services to vulnerable customers.<sup>3423</sup>
- 13.35 In relation to leakage specifically, we decide to retain the leakage PC at the level set by Ofwat, but in doing so conclude that Bristol requires additional allowance to achieve the required level of performance.<sup>3424</sup> In particular:
- (a) We conclude that there is a link between maintaining higher performance on leakage and costs. While Bristol is a higher performer on leakage which could justify additional allowances, we conclude that the costs which it said it needed to maintain low levels of leakage are funded through the overall base cost allowances, once the base cost modelling has been updated to include the most recent data.<sup>3425</sup>

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<sup>3419</sup> See paragraphs 7.45 to 7.140 and 7.311 to 7.320

<sup>3420</sup> See paragraphs 7.141 to 7.194

<sup>3421</sup> See paragraphs 7.195 to 7.215

<sup>3422</sup> See paragraphs 7.247 to 7.261

<sup>3423</sup> See paragraph 7.253

<sup>3424</sup> See paragraphs 8.31 to 8.175 and 8.205

<sup>3425</sup> These figures are included in the totex allowances discussed earlier; see paragraphs 8.48 to 8.82.

(b) We conclude that Bristol requires enhancement funding for achieving the leakage reductions it committed to, and so should be allowed the efficient cost of doing so. We estimate the efficient costs using both top-down and bottom-up approaches, and conclude on a figure of £4.7 million for Bristol's enhancement totex.<sup>3426</sup>

(c) We also make adjustments to increase Bristol's penalty rates for underperformance ODIs, as we conclude that this would make the calibration of the ODIs more consistent with our determination on enhancement costs.<sup>3427</sup>

13.36 For the purposes of this determination, we do not list every PC and/or ODI to which Bristol is subject. Instead, we provide a list of the changes we make to Ofwat's FD.<sup>3428</sup> If we do not reference a PC or ODI, our determination is that we have seen no evidence to support adopting a different approach to that used by Ofwat, and so we apply the same requirement that Ofwat included in its FD.

13.37 The summary of changes we make to PCs and ODIs in Ofwat's FD (excluding scheme-specific PCs) is set out in Table 13-3.<sup>3429</sup>

**Table 13-3: Summary changes on outcome requirements**

<i>Unique reference</i>	<i>Description of commitment</i>	<i>Description of intervention</i>
PR19BRL_PC01	Water quality compliance (CRI)	Set an underperformance deadband at Ofwat's DD level (For each year of AMP7: 2.0, 2.0, 1.5, 1.5, 1.5)
PR19BRL_PC18	Leakage	Provide additional totex; and amend Tier 1 penalties
PR19BRL_PC19	PCC	Reduce ODI rates to £-0.03m and £0.025m
PR19BRL_PC03	Mains repairs	Set an underperformance deadband of 10 repairs per 1,000km above the PCL (For each year of AMP7: 148.4, 146.5, 144.6, 142.7, 140.7)
PR19BRL_PC04	Unplanned outage	Set an underperformance deadband of 1.2x PCL (2.81)

Source: CMA

13.38 We considered whether the overall reward cap on ODIs from Ofwat's FD was appropriate, and concluded that no change was necessary.<sup>3430</sup>

13.39 Finally, we have considered whether there are other scheme-specific PCs and ODIs which required recalibration as a result of broader changes in our determination (most notably the difference in cost-sharing rates compared with Ofwat's FD). For Bristol, these are shown in Table 13-4.<sup>3431</sup>

<sup>3426</sup> These figures are included in the totex allowances discussed earlier; see paragraphs 8.83 to 8.174

<sup>3427</sup> See paragraphs 8.176 to 8.204

<sup>3428</sup> The list of PCs and ODIs which Ofwat included in its FD is available here: Ofwat (2019), [PR19 final determinations: Bristol Water – Outcomes performance commitment appendix](#).

<sup>3429</sup> See Table 7-17 and paragraph 8.205

<sup>3430</sup> See paragraphs 7.305 to 7.310

<sup>3431</sup> See Table 5-26

**Table 13-4: Updated ODI rates for scheme-specific PCs**

<i>Company</i>	<i>Unique ID</i>	<i>Description</i>	<i>ODI rate</i>
Bristol	PR19BRL_PC20	Meter penetration [clawback]	-0.453
Bristol	PR19BRL_PC20	Meter penetration [outperformance]	0.554
Bristol	PR19BRL_PC24	WINEP Compliance [delay]	-0.00238
Bristol	PR19BRL_PC28	Glastonbury Street network resilience	-0.0531

Note: all ODI rates are expressed as £m per unit, where the measurement unit is described in the relevant company's respective outcomes performance commitment appendix from PR19 FD.

## WACC and financeability

### WACC

#### *Cost of equity*

13.40 We have used the CAPM to determine the cost of equity. The CAPM is an established methodology with well-understood theoretical foundations and which makes use of observable market data as far as possible. The CAPM is used by all UK regulators when calculating the cost of capital, and was the framework used in Ofwat's FD. We perform our own assessment of each of the parameters of this model, using up-to-date market data.<sup>3432</sup>

13.41 The main components of the cost of equity on which we decide are (in inflation adjusted CPIH-real terms):

- (a) **The TMR (6.2% to 7.5%):** To calculate the TMR, we place the most weight on historical ex post returns (from 1900 to the present day), as well as on the historic ex-ante approach when selecting our range. We place less weight on the forward-looking evidence;<sup>3433</sup>
- (b) **The RFR (-1.6% to -1.0%):** We calculate an RFR by placing weight on both long-tenor index-linked gilts and AAA-rated non-government bonds (the highest quality commercial debt) and taking into account up-to-date market data;<sup>3434</sup> and
- (c) **The equity beta (0.69 to 0.74):** We calculate an equity beta based on a range of approaches of analysing the observable market data of WASC comparators, including a potential debt beta.<sup>3435</sup>

13.42 Based on the above, we calculate a range for the cost of equity over the period of the price control of 3.76% to 5.21%. We pick a point estimate 0.25%

<sup>3432</sup> See paragraphs 9.5 to 9.14

<sup>3433</sup> See paragraphs 9.267 to 9.397

<sup>3434</sup> See paragraphs 9.46 to 9.266

<sup>3435</sup> See paragraphs 9.398 to 9.532

above the mid-point of this range. Our judgement of the point estimate of the cost of equity is based on the following considerations:<sup>3436</sup>

- (a) promoting investment, and specifically addressing the risk of an exit of capital from the sector if the cost of capital were set too low;
- (b) the asymmetry of risk in the package of ODIs;
- (c) the scale of parameter uncertainty in estimating the cost of equity, particularly in the context of a sharp decline in equity returns since PR14; and
- (d) cross-checks, including the need for the WACC to be sufficiently high to support financeability, which we concluded was a more appropriate mechanism than Ofwat's decision to increase bills by advancing cash-flows from future periods.

13.43 We also consider other cross-checks against market data, although we conclude that these were insufficiently robust to change the choice of point estimate which we assessed based on the factors above.<sup>3437</sup>

#### *Industry cost of debt*

13.44 We set an allowance for the total industry cost of debt at 2.18% in CPIH-real terms, marginally higher than Ofwat's 2.14%. We reach this figure by considering the costs of debt already incurred by the industry (embedded debt), the new debt costs that companies will face during the price control, the appropriate ratio of new and embedded debt and the costs of fees in relation to issuance and liquidity costs.<sup>3438</sup>

13.45 Evidence submitted by the Parties following Provisional Findings and our subsequent consultation on the costs of debt, as well as our own analysis, has allowed us to base our cost of embedded debt allowance on actual costs. We then cross check our estimates against the iBoxx A/BBB benchmark over 15- and 20-year trailing averages.<sup>3439</sup>

13.46 In relation to new debt costs, we set an allowance relative to an iBoxx A/BBB 10+ benchmark, measured over the first 6-months of the price control. Unlike Ofwat, we consider there to be insufficient evidence to apply an outperformance wedge in order to reduce this allowance. We agree with the

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<sup>3436</sup> See paragraphs 9.1226 to 9.1415

<sup>3437</sup> See paragraphs 9.1345 to 9.1401

<sup>3438</sup> See paragraphs 9.533 to 9.904

<sup>3439</sup> See paragraphs 9.538 to 9.795

use of a true-up mechanism for the cost of new debt in the next price control process and would expect this to be conducted on a like-for-like basis (with no performance wedge applied when calculating the true-up).<sup>3440</sup>

- 13.47 We apply a ratio of 17% new debt to 83% embedded debt in our calculations, slightly lower than the 20% of new debt used by Ofwat. We set the issuance and liquidity cost allowance at 0.1%, in line with Ofwat.<sup>3441</sup>

### *Company-specific adjustments*

- 13.48 We decide to award Bristol an uplift in its embedded debt allowance of 0.30% reflecting the higher historical financing costs of a small company relative to our cost of embedded debt allowance which is based on the actual costs of the larger companies in the sector.<sup>3442</sup>
- 13.49 We reject Bristol's request for an uplift to its cost of new debt, considering recent evidence to suggest that Bristol can now access debt markets in a flexible and competitive manner. However, we award a 0.05% increase to Bristol's issuance and liquidity cost allowance, reflecting that average fees may be larger as a result of smaller companies having less interactions with financial markets.<sup>3443</sup>
- 13.50 We reject Bristol's request for a cost of equity uplift, taking into account the latest evidence on the market pricing of debt and equity for small companies, as well as taking into consideration our overall cost of equity allowance and our assessment of Bristol's financeability.<sup>3444</sup>

### *Appointee WACC*

- 13.51 As part of this assessment, we decide on levels for related metrics, particularly inflation (CPIH of 2%, with a 0.9% RPI-CPI wedge)<sup>3445</sup> and notional gearing (60%).<sup>3446</sup>
- 13.52 The CMA point estimates for its WACC parameters are therefore shown in Table 13-5, alongside Ofwat's FD figures. Our final point estimate for Bristol's Appointee Vanilla WACC is 3.37% (in CPIH-Real terms).

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<sup>3440</sup> See paragraphs 9.796 to 9.828

<sup>3441</sup> See paragraphs 9.829 to 9.903

<sup>3442</sup> See paragraphs 9.905 to 9.1006

<sup>3443</sup> See paragraphs 9.1007 to 9.1035

<sup>3444</sup> See paragraphs 9.1052 to 9.1102

<sup>3445</sup> See paragraphs 9.15 to 9.36

<sup>3446</sup> See paragraphs 9.37 to 9.45

**Table 13-5: CMA point estimates of WACC components versus Ofwat PR19, Bristol-specific cost of debt, CPIH-Real**

	<i>Ofwat PR19</i>	<i>CMA Point Estimate</i>	<i>Delta</i>
TMR	6.50%	6.81%	<b>+0.31%</b>
RFR	-1.39%	-1.34%	<b>+0.05%</b>
ERP	7.89%	8.15%	<b>+0.26%</b>
Equity Beta	0.71	0.71	-
Cost of New Debt	0.53%	0.19%	<b>-0.34%</b>
Cost of Embedded Debt	2.42%	2.76%	<b>+0.34%</b>
Proportion of New Debt	20%	17%	<b>-3%</b>
Issuance and Liquidity Costs	0.10%	0.15%	<b>+0.05%</b>
Impact of picking a point estimate above the midpoint	-	0.25%	<b>+0.25%</b>
Pre-tax Cost of Debt	2.14%	2.47%	<b>+0.33%</b>
Post-tax Cost of Equity	4.19%	4.73%	<b>+0.54%</b>
Gearing	60%	60%	-
<b>Appointee-level Vanilla WACC*</b>	<b>2.96%</b>	<b>3.37%</b>	<b>+0.41%</b>

Source: CMA analysis and Ofwat PR19 FD

\* Footnote: 'Vanilla' here refers to a WACC set using a pre-tax cost of debt and a post-tax cost of equity.

13.53 We note that our WACC figure is around 67bps lower than Bristol proposed to us in its SoC, equivalent to us closing around 38% of the difference between Ofwat and the company.<sup>3447</sup>

### ***Retail margin adjustment***

13.54 Our view is that using the unadjusted Appointee WACC and a retail margin of 1% would result in water companies being overcompensated by receiving returns on their notional retail assets twice, as the retail margin includes compensation for risks which would be faced by an independent retail business but which are in practice mitigated for a vertically integrated appointee business.<sup>3448</sup>

13.55 We calculate the extent of this overcompensation as being equivalent to 8bps of RCV, and accordingly our decision is to reduce Bristol's allowed revenues by this amount as a retail margin adjustment.<sup>3449</sup>

### ***Gearing outperformance sharing mechanism***

13.56 Ofwat introduced a GOSM for the first time in PR19. Ofwat stated that equity investors benefit from higher equity returns that are associated with their increased risk, but there is no substantive benefit passed to customers. In addition, Ofwat stated where companies adopt high levels of gearing, they may reduce financial resilience and transfer some risk to customers and / or potentially taxpayers in the event that a company fails. To address this, Ofwat

<sup>3447</sup> See Table 9-1

<sup>3448</sup> See paragraphs 9.1104 to 9.1149

<sup>3449</sup> See paragraphs 9.1104 to 9.1149

introduced a mechanism that it said would share the benefits of higher gearing with customers.<sup>3450</sup>

13.57 We consider that the GOSM as designed was ineffective either as a benefit-sharing mechanism or as a tool to improve financial resilience. First, we consider that Ofwat had not adequately evidenced the existence of the benefits from high gearing that it said would be available to share. Second, to the extent that high gearing reduces financial resilience, the GOSM works only to encourage a reduction in gearing rather than to require a reduction in gearing. Moreover, we note that there are already multiple licence conditions which, together with a large and stable asset base, provide protection to consumers from excessive gearing. While we do not rule out that Ofwat may need to intervene at some time in the sector to reinforce its financial resilience and that this may or may not involve some constraint on gearing, for the purposes of this price control, we were not presented with evidence that an intervention on gearing is currently required in respect of the Disputing Companies or that the GOSM is the appropriate mechanism for such an intervention.<sup>3451</sup>

## **Financeability**

13.58 We are required to ensure that companies can continue to finance their functions. We therefore completed an in-the-round assessment of the financeability of the Disputing Companies, including a financial ratio analysis similar to that which would be undertaken by the credit rating agencies. The outputs of this ratio analysis for Bristol are shown in Table 13-6.<sup>3452</sup>

**Table 13-6: Credit ratio analysis for Bristol**

<i>Ref</i>	<i>Ratio</i>	<i>Gearing</i>	<i>Interest cover</i>	<i>AICR</i>	<i>FFO/net debt</i>	<i>Dividend cover</i>	<i>RCF/Net debt</i>
1	CMA FD	58.4%	5.1	1.6	14.3%	2.9	11.6%
2	CMA FD + 1% RoRe penalty	59.8%	4.7	1.3	13.1%	2.6	10.9%
3	CMA FD + 2% Totex overspend	59.2%	4.9	1.4	13.7%	2.7	11.4%
4	Ofwat	58.8%	5.4	1.5	13.5%	2.8	11.4%

Source: CMA analysis

Note: Ofwat ratios are consistent with its approach to the final determination. CMA FFO/Net Debt ratios were calculated in line with Ofwat's approach to IRE for the period.

13.59 Our analysis of Bristol's ratios suggests that, based on our determination and the assumption of a notional capital structure, Bristol would achieve financial ratios which are consistent with a strong investment-grade credit rating. In the

<sup>3450</sup> See paragraphs 9.1150 to 9.1155

<sup>3451</sup> See paragraphs 9.1156 to 9.1225

<sup>3452</sup> See Table 10-4 and paragraphs 10.88 to 10.101



downside scenarios, Bristol should still achieve ratios consistent with an investment grade credit rating of BBB/Baa2.<sup>3453</sup>

- 13.60 We have made an assessment of the WACC and wholesale totex requirements, in each case providing an increased allowance compared to Ofwat's FD. This represents a reasonable level of costs that each of the Disputing Companies could be expected to incur. We have also de-risked the determination, including moderating the cost-sharing rates to rebalance risk between customers and investors. Each of these factors improves financeability.
- 13.61 We find that Bristol should be able to achieve strong investment-grade credit ratings based on the notional capital structure, and this is consistent with our assumptions in the WACC for the cost of debt. We also find that under a reasonable downside scenario, Bristol's ratios are worse than the baseline model but still investment-grade. We consider that companies facing a financeability constraint, such as to address a downside scenario, may adopt a range of mitigating actions to address impact, such as absorbing headroom in credit ratios, or increasing the contribution of equity either by forgoing dividends or injecting fresh capital. We conclude that this supports the view that our determination for Bristol is financeable.<sup>3454</sup>

## **Implied calculations of revenue and implications for k and bills**

### ***Revenue adjustments***

- 13.62 The majority of a water company's wholesale revenue is derived from the totex and WACC figures discussed above. However, there are certain additional elements which affect Bristol's revenue allowance in AMP7.<sup>3455</sup>
- 13.63 For the majority of these revenue categories, Bristol has not raised any concerns and we have no evidence to support the use of alternative figures, and so we decide to use Ofwat's figures. In doing so, we note that certain figures have changed since Ofwat's FD. This is the result of 'blind year adjustments', in which Ofwat conducts a reconciliation for company performance in the final year of the last AMP – this uses data which was not available at the time of Ofwat's FD. We include these adjustments in our final

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<sup>3453</sup> See paragraphs 10.112 to 10.114

<sup>3454</sup> See paragraphs 10.112 to 10.114 and 10.123 to 10.134

<sup>3455</sup> Revenue adjustments for PR14 reconciliations; Tax; Grants & contributions after adjustment for income offset (price control); Non-price control income; Innovation competition; Revenue re-profiling; see Table 4.1 of Ofwat (2019), [PR19 final determinations: Bristol Water final determination](#).

determination, which results in a £2.1 million increase in Bristol's revenue for the period.<sup>3456</sup>

13.64 However, we have received submissions in one area, which we consider support a different approach. Ofwat's FD used a corporation tax rate of 17% on the expectation that the rate was going to drop from the current figure of 19%. However, the rate has remained at 19%, and we consider it appropriate to use the prevailing rate. Accordingly, we decide to use a corporation tax rate of 19%. This, along with other changes in our determination which impact tax allowances, results in an increase in Bristol's wholesale revenue compared to Ofwat's FD of around £4 million. We also adopt the same approach as Ofwat of including a reconciliation mechanism which reflects subsequent increases or decreases in the corporation tax rate.<sup>3457</sup>

13.65 We also allow Bristol to recover a proportion of its costs for the determination process, which includes an allocation of our own costs. This represents around £2.0 million (which is excluded from totex cost-sharing).<sup>3458</sup>

### ***Implied Bristol revenue in AMP7 and calculations of k***

13.66 In order to calculate Bristol's revenue figures, we need to include a PAYG rate to split totex into in-period recovery and RCV additions. To do this, we use the 'natural rates' included in Ofwat's FD.<sup>3459</sup>

13.67 Table 13-7 shows Bristol's resulting wholesale allowed revenue.

**Table 13-7: Calculation of Bristol's wholesale allowed revenue**

			£m
	<i>Water resources</i>	<i>Water network plus</i>	<i>Total</i>
PAYG	67	258	325
RCV Run-off	14	113	128
Return on Capital (incl RMA)	17	58	75
Reconciliation	0	-5	-5
Tax	0	14	15
Grants and contributions	0	16	16
Deduct non-Price control income	0	-10	-10
Innovation competition	0	2	2
Revenue reprofiling	0	1	1
<b>Wholesale revenue</b>	<b>100</b>	<b>448</b>	<b>547</b>

Source: CMA analysis.

<sup>3456</sup> See [https://www.ofwat.gov.uk/wp-content/uploads/2020/11/In-period-adjustment-model\\_BRL\\_BYRun2.xlsx](https://www.ofwat.gov.uk/wp-content/uploads/2020/11/In-period-adjustment-model_BRL_BYRun2.xlsx), 'abatements and deferrals' tab; we note that Ofwat has also made adjustments to the company's RCV but that these will occur at the end of AMP and so do not affect in-period revenues.

<sup>3457</sup> See paragraphs 11.2 to 11.11

<sup>3458</sup> See paragraphs 11.124 to 11.134. We note that this has been modelled as an increase in totex, with these costs being considered entirely opex (and so recovered in period). This results in a small change in the PAYG rates purely for the purpose of modelling this specific cost recovery.

<sup>3459</sup> See paragraphs 10.85 to 10.87.

13.68 This calculation results in Bristol's wholesale revenue over the AMP being around £45 million higher than Ofwat's FD.<sup>3460</sup>

13.69 In relation to the retail price control, neither Bristol nor any of the other Disputing Companies have raised any concerns that Ofwat's approach should be re-considered. Our decision is to align our approach with Ofwat's FD19. This includes the household retail expenditure allowance and the outcome measures relating to C-MeX and D-MeX.<sup>3461</sup> Therefore, we maintain Ofwat's approach of calculating retail allowances based on wholesale, which results in a small incremental allowance of £0.4 million for Bristol (£51.3 million in our determination compared to £50.9 million in Ofwat's FD).<sup>3462</sup>

13.70 The estimated effect of these changes on average annual customer bills is shown in Table 13-8, compared to Bristol's historical bills and Ofwat's FD.<sup>3463</sup>

**Table 13-8: Indicative impact of our determination on Bristol's annual customer bills**

	<i>Bristol historical bills (2019/20)</i>	<i>Bristol average bill in April business plan†</i>	<i>Bristol average bill under Ofwat FD</i>	<i>Bristol average bill under CMA decision</i>
Average annual bill (water only) *	182	174	160	172

Source: CMA calculations; Bristol business plan bills taken from of Ofwat (2019), [PR19 final determinations: Bristol Water final determination](#), Table 1.1.

\* Footnote: The numbers in this table reflect the average amount per customer charged, expressed at constant (inflation adjusted) prices (2017-18 CPIH deflated). Individual customer bills will vary depending on a number of factors such as the whether the property is metered or not and, for metered customers, the amount of water consumed.

† Footnote: The April business plan figure here is taken from Ofwat's published documents and may not align with all of the implications of the company's submissions in its SoC.

13.71 The bill in our determination is higher than Ofwat's FD by around £13 per year. Under our determination, Bristol's average bills are still £10 per year lower than they were in 2019/20 (and £2 per year lower than Bristol's April business plan), which should assist customers who were struggling with the affordability of this essential utility.

13.72 Having determined the revenue allowances over the whole AMP, we profile it between individual years in order to provide customers with a better view of the potential impact, and to allow for an annual calculation of K. In doing so, we choose to implement a consistent annual increase in nominal bills over the

<sup>3460</sup> Ofwat's FD included wholesale revenues for Bristol of £502 million; see Table 1.3 in of Ofwat (2019), [PR19 final determinations: Bristol Water final determination](#).

<sup>3461</sup> See paragraphs 11.115 to 11.120.

<sup>3462</sup> See paragraphs Table 11-2; Table 6.2 of Ofwat (2019), [PR19 final determinations: Bristol Water final determination](#).

<sup>3463</sup> The price control sets revenue allowances for the individual companies. This determines the average bill that the company can charge its customers. Individual bills will vary depending on the charging scheme adopted by the company, see Ofwat's [information on charging](#).

course of the remaining years in the AMP.<sup>3464</sup> This defers some of the bill increases until later years, which is likely to be particularly beneficial to customers affected by the COVID-19 pandemic, whilst also avoiding any specific ‘spike’ in customer bills in a single year.<sup>3465</sup>

13.73 The results of this profiling, as well as the impact on K and bills,<sup>3466</sup> is shown in Table 13-9 and Table 13-10.

**Table 13-9: Bristol’s Base Revenue and K factors by charging year**

	Base (£m)	2020-21	2021-22	2022-23	2023-24	2024-25
Water resources	17.6	0.00	+0.57%	+10.61%	+9.56%	+9.87%
Water network plus	84.0	0.00	+2.24%	+4.00%	+4.03%	+3.66%

Source: CMA calculations  
Note: 2017-18 CPIH deflated

**Table 13-10: Bristol’s indicative annual bills**

	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
Customer bills	182	164	166	171	177	183

Source: CMA calculations  
Note: 2017-18 CPIH deflated

13.74 Finally, we emphasise that while we have looked at individual components in detail, and necessarily made decisions on each of these, we have also considered any cross-cutting or interconnected issues when making such decisions. In particular, the inter-relationship between cost and service, as well as risk, return and financeability have influenced our decisions in each of the major areas of the determination (totex, outcomes and WACC). This is a determination of a whole package ‘in the round’, and we consider that this determination secures compliance with all our duties.

<sup>3464</sup> We note that due to the timing of the redetermination, Bristol will not be able to implement our final determination until the third year of the AMP, which will result in larger increases in the later years than would be the case otherwise.

<sup>3465</sup> Paragraph 3.5 of [The Consumer Council for Water’s response to the provisional findings](#) noted that ‘customers prefer a smooth profile to any bill increases rather than experiencing spikes in any one year’.

<sup>3466</sup> The price control sets revenue allowances for the individual companies. This determines the average bill that the company can charge its customers. Individual bills will vary depending on the charging scheme adopted by the company, see Ofwat’s [information on charging](#).

## 14. The final determination for Northumbrian

- 14.1 This section provides a summary of our individual final determination for Northumbrian. In this, we set out our final determination, but we do not fully restate the explanation or rationale for our decisions; many methodologies are common between the individual companies, and we cross-reference to the relevant earlier sections of our report to identify where we have explained these rationales.
- 14.2 In reaching our decisions we have taken account of the same statutory duties as applied to Ofwat, and we have had regard to the principles of best regulatory practice and the need to act in accordance with the SPS, but have exercised our own regulatory discretion in appropriately complying with these statutory duties.

### Introduction

- 14.3 Northumbrian is a large WASC providing services in the North East of England (trading as Northumbrian Water) and water-only services in Essex and Suffolk (trading as Essex & Suffolk Water). It serves more than 2.1 million connected properties in total and directly employed 2,911 full-time equivalent staff at 31 March 2020.<sup>3467</sup>

### *Approach to the determination*

- 14.4 As originally proposed in our approach to the determinations document,<sup>3468</sup> we are using the same regulatory building blocks as Ofwat used in its determinations. In particular, we have maintained:<sup>3469</sup>
- (a) Ofwat's approach of setting four wholesale price controls (water resources, water network plus, wastewater network plus, and bioresources);<sup>3470</sup>
  - (b) separating our assessment into its major component parts around costs, outcomes, and financial returns;<sup>3471</sup>
  - (c) managing bioresources as an average revenue control;<sup>3472</sup> and

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<sup>3467</sup> See paragraphs 2.53 to 2.59

<sup>3468</sup> [CMA approach to water redeterminations](#), paragraph 29; also see paragraphs 3.37 to 3.50 in this report.

<sup>3469</sup> See paragraph 3.5

<sup>3470</sup> See paragraph 11.114. We note that these separate controls are specified in Northumbrian's licence conditions.

<sup>3471</sup> See paragraphs 2.102 and 3.2 to 3.20

<sup>3472</sup> See paragraphs 3.43 and 11.121 to 11.123

(d) setting a separate retail control.<sup>3473</sup>

14.5 The rest of this section sets out the final decisions we have applied to Northumbrian, grouped into:

(a) totex allowances;

(b) outcomes;

(c) WACC and financeability; and

(d) calculations of revenue, with implications for k and bills in the period.

## **Totex allowances**

14.6 In setting Northumbrian's totex allowance in our final determination, we have considered four main cost areas:

(a) modelled base costs (including growth);

(b) unmodelled base costs;

(c) enhancement costs; and

(d) other costs.

## **Modelled base costs**

14.7 Water companies conduct many routine activities in order to run their businesses and provide a base level of service to customers. We adopt an econometric modelling approach to assess most of the costs of Northumbrian's base level of service, using data from across the sector. Comparative benchmarking allows us to estimate the efficient costs for these day-to-day operations, rather than relying on individual company data or forecasts. Our modelling approach is similar to Ofwat's, although we adjust the econometric models and expand the dataset by including data from 2019/20. This 2019/20 data was not available to Ofwat when it set the FD.<sup>3474</sup>

14.8 Our cost models estimate how much it would cost the averagely efficient water company to cover base operations. However, we want to set cost allowances for a water company that is more than merely averagely efficient, and so we apply a 'catch up' efficiency challenge. Our decision is to use the

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<sup>3473</sup> See paragraphs 3.41 and 11.115 to 11.120

<sup>3474</sup> See paragraphs 4.2 to 4.403

company at the upper quartile as the benchmark, which we consider sets a challenging benchmark whilst acknowledging the limitations of our econometric modelling (and the consequent risk that the company will have insufficient allowed revenue to ensure a base level of service).<sup>3475</sup>

14.9 Future costs are likely to differ from the historical benchmarks because of changes to productivity levels and input costs. We therefore:

- (a) Apply a 'frontier shift' which reduces the modelled allowance by 1% per year to reflect expected productivity gains from improvements in technology and new ways of working;<sup>3476</sup> and
- (b) Provide an RPE adjustment for labour costs. We also include a reconciliation mechanism for these labour costs to protect both customers and the company if there are differences between forecasts and actual wage inflation.<sup>3477</sup>

14.10 Serving new properties involves additional costs for water companies: both the costs of installing new connections, and from the demand increase, necessitating reinforced or additional infrastructure. We therefore:

- (a) decrease Northumbrian's allowance due to forecast growth being below industry average (using updated ONS forecast figures). Unlike Ofwat, we do not halve this adjustment;<sup>3478</sup> and
- (b) include a reconciliation mechanism to protect against differences between forecasts and actual growth. We use an expanded scope for this reconciliation mechanism, compared with Ofwat's FD, to better reflect the costs associated with growth.<sup>3479</sup>

14.11 Ofwat's historical data collection approach contained no distinction between base opex and enhancement opex. Therefore, Ofwat's modelled base costs could double-count Northumbrian's enhancement opex if an adjustment was not applied. We decide to use the same approach as Ofwat used in its FD, which is to estimate an implicit allowance for enhancement opex and adjust the companies' allowance accordingly.<sup>3480</sup>

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<sup>3475</sup> See paragraphs 4.404 to 4.495

<sup>3476</sup> We have also applied this adjustment to other elements of totex, not just base costs; See paragraphs 4.496 to 4.652.

<sup>3477</sup> We have also applied this adjustment to other elements of totex, not just base costs; See paragraphs 4.653 to 4.740.

<sup>3478</sup> See paragraphs 4.741 to 4.878

<sup>3479</sup> See paragraphs 4.805 to 4.859

<sup>3480</sup> See paragraphs 4.879 to 4.905

14.12 The overall effect of our modelling changes described above is to increase Northumbrian's base allowances by around £61 million compared to the allowances in Ofwat's FD.<sup>3481</sup>

### ***Unmodelled base costs***

14.13 In designing our base models discussed above, we exclude certain costs that are unsuitable for modelling where, for example, there is insufficient data for modelling or where exceptional circumstances apply to particular companies. We refer to these as unmodelled base costs. These include costs associated with abstraction, business rates, compliance with the IED and Traffic Management Act.<sup>3482</sup>

14.14 Ofwat made an allowance for Northumbrian's unmodelled base costs, and we decide that some of these are appropriate, but intervene in the following areas:<sup>3483</sup>

(a) **Abstraction charges (Kielder Transfer Scheme):** Northumbrian has atypical abstraction costs associated with the Kielder Transfer Scheme (which reflect the cost of building, maintaining, and operating the reservoir), that have increased following an Environment Agency consultation which finished after the Ofwat FD was published. We reflect this latest information by allowing Northumbrian an additional £61 million to cover these costs. This allowance is subject to a 100% pass-through rate, such that any difference to actual spend will be borne / passed back to customers.<sup>3484</sup>

(b) **Abstraction (Thames Bulk Supply):** Northumbrian's costs associated with its Thames Bulk Supply agreement for water also increased after the time of Ofwat's FD. We have considered the evidence provided and decide to reflect this latest information by allowing Northumbrian an additional £2.5 million to cover these costs. We apply a 75/25 (customer/company) sharing rate to reflect a limited degree of control management have over these costs.<sup>3485</sup>

(c) **Business rates:** Ofwat was not aware of, and did not reflect in its FD, a revision of Northumbrian's rateable values which took place in 2018. This resulted in an over allowance of around £59 million of totex for

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<sup>3481</sup> See Table 6-3

<sup>3482</sup> See paragraphs 4.971 to 4.1131

<sup>3483</sup> See paragraphs 4.1128 to 4.1131 and Table 6-4

<sup>3484</sup> See paragraphs 4.1026 to 4.1037

<sup>3485</sup> See paragraphs 4.1038 to 4.1046



Northumbrian's business rates, which we remove in our final determination.<sup>3486</sup>

- (d) **IED compliance costs:** Northumbrian has provided evidence and explanation (supported by views from the Environment Agency) that it is likely to incur some costs during AMP7 to ensure compliance with the IED due to changing interpretation of this legislation. We decide to allow £12 million of totex to address this. Given the degree of uncertainty around eventual compliance costs, any over or underspends will be subject to a 75/25 cost-sharing rate.<sup>3487</sup>

14.15 We do not apply a frontier shift to business rates or abstraction charges as we conclude that these costs were in the most part outside of company control. However, we apply a frontier shift to other unmodelled base costs of 1% together with a labour RPE. We consider that our approach does not give rise to any double-counting necessitating an adjustment. Our frontier shift is slightly below the level which Ofwat set in its FD and, combined with our decision not to apply this to unmodelled abstraction charges or business rates, results in an increase in Northumbrian's allowances of £10 million compared to Ofwat's FD.<sup>3488</sup>

14.16 The combined effect of the above changes is to increase Northumbrian's base allowances by around £26 million compared to Ofwat's FD.<sup>3489</sup>

14.17 Due to management having a more limited degree of control than over other costs, we apply a cost-sharing rate of 90/10 (customer/company) for business rates, rather than using the 75/25 sharing rate that Ofwat set in its FD.<sup>3490</sup>

### **Enhancement costs**

14.18 We provide additional allowances to Northumbrian where we have been persuaded that it is undertaking necessary investment for the purpose of enhancing the capacity or quality of service beyond a base level.<sup>3491</sup>

14.19 In our review of enhancement expenditure, we generally focus on areas where Ofwat and Northumbrian have provided conflicting views and where we need to resolve these in coming to our determination. To help us reach our own view, our assessment often involves considering additional evidence or

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<sup>3486</sup> See paragraph 4.1078

<sup>3487</sup> See paragraphs 4.1079 to 4.1118

<sup>3488</sup> See paragraphs 4.652 and 4.975, and Table 6-5

<sup>3489</sup> See Table 6-5

<sup>3490</sup> See paragraphs 4.1054 to 4.1077

<sup>3491</sup> See paragraphs 5.5 to 5.8 for a description of how enhancement allowances fit into the broader price review framework.

arguments, which were not available to Ofwat at the time that it made its FD. For other enhancement expenditure, including major schemes which met Ofwat's evidential threshold to receive additional enhancement funding, we adopt the same approach as Ofwat did in its FD.<sup>3492</sup>

- 14.20 We make use of comparative data (including econometric modelling, engineering comparisons and cost benchmarking comparisons) where available to develop our best estimate for efficient enhancement costs. In particular, for P-removal and WINEP allowances more generally, we have used benchmarking in our assessment to test the efficiency of companies' proposals for these large and broadly-comparable programmes of work. Our decision is to make adjustments to Ofwat's P-removal allowances using a broader range of model specifications but to adopt the same overall approach. This results in an increase in Northumbrian's allowances of around £4 million compared to Ofwat's FD.<sup>3493</sup>
- 14.21 We apply efficiency challenges and reduce allowances where we are concerned about the robustness of the evidence provided for enhancement schemes. In doing so we are seeking to ensure that customers do not overpay for inefficient service whilst also ensuring sufficient allowance is available to achieve the enhanced level of service/quality. While Northumbrian's shallow-dive efficiency challenge figures change very slightly, this makes very little difference compared to Ofwat's FD. Applying a 10% cost efficiency challenge to deep dives results in a reduction in Northumbrian's enhancement allowances of around £6.5 million.<sup>3494</sup>
- 14.22 Northumbrian raised two specific projects which we have assessed in greater detail. We make the following decisions:
- (a) **Essex Resilience Scheme:** Northumbrian proposed to build a new interconnector to allow the transfer of raw water between its reservoir in Abberton and its reservoir in Hanningfield, to mitigate the risk of substantial supply loss to the local area (in the context of ongoing climate change, population growth, and other risk factors). We consider that, in light of the nature of the risk, the cost of addressing the issue is relatively modest particularly given the number of households affected and the long-life nature of the solution, which would provide ongoing benefits for many years to come. We provide an allowance for this scheme. However, we have some concerns around the level of evidence provided on cost

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<sup>3492</sup> See paragraphs 5.4 and 5.16 to 5.17

<sup>3493</sup> See paragraphs 5.27 to 5.111, and 5.151 to 5.163

<sup>3494</sup> See paragraphs 5.164 to 5.203; Table 5-29

efficiency for the scheme, so apply a 10% challenge to Northumbrian's request;<sup>3495</sup> and

(b) **Sewer Flooding Resilience Scheme:** Northumbrian proposed to undertake a 'proactive' scheme to reduce the risk of sewer flooding in properties which have not previously been flooded. We do not include any increased allowance for this scheme as we have not seen robust evidence that the scheme proposed by Northumbrian represents incremental benefits for customers which should attract additional enhancement funding, rather than simply reflecting an alternative approach to carrying out its base activities (which are already funded).<sup>3496</sup>

14.23 This scheme allowance results in an increase of £18 million in Northumbrian's enhancement allowance compared with Ofwat's FD, before the application of frontier shift.<sup>3497</sup>

14.24 When providing companies with specific funding to undertake additional activities, there is a risk that the company does not subsequently choose to proceed with the scheme while customers nonetheless bear the cost. In order to ensure that the higher level of service being funded through the Essex Resilience Scheme is delivered, we adjust Northumbrian's water resilience enhancement PC and ODI to also cover this scheme, in order to protect customers from the risk of non-delivery.<sup>3498</sup>

14.25 Consistent with our decision on base costs above, we apply a frontier shift of 1% together with a labour RPE on all enhancement costs (not just to WINEP and metering as Ofwat did). We consider that our approach does not give rise to any double-counting which would necessitate an adjustment for Northumbrian. This frontier shift results in a decrease of around £5 million in Northumbrian's enhancement allowances.<sup>3499</sup>

14.26 The combination of enhancement changes results in an overall increase of £11 million for Northumbrian compared with Ofwat's FD.<sup>3500</sup>

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<sup>3495</sup> See paragraphs 5.316 to 5.375

<sup>3496</sup> See paragraphs 5.376 to 5.429

<sup>3497</sup> See Table 5-29

<sup>3498</sup> See paragraphs 5.373 to 5.375

<sup>3499</sup> See paragraphs 5.722 to 5.742; Table 5-29

<sup>3500</sup> See Table 5-29

## Other costs

14.27 As well as the three cost areas discussed above, there are a number of other cost categories which contribute to Northumbrian's totex allowance.<sup>3501</sup>

14.28 Northumbrian has not raised any concerns with any of these cost categories, and we have no evidence to support the use of alternative figures, and so we decide to use the figures in Ofwat's FD (updating Grants & Contribution figures to reflect consequential changes of our decisions).

## Overall totex

14.29 Our determination of Northumbrian's wholesale total totex allowance is shown in Table 14-1.

**Table 14-1: Totex cost allowances by wholesale price control**

	<i>Water resources</i>	<i>Water network plus</i>	<i>Wastewater network plus</i>	<i>Bioresources</i>	<i>Total</i>
Modelled base allowance (including CAC)	93	1,087	771	67	<b>2,016</b>
Unmodelled base allowance	218	133	33	17	<b>402</b>
Enhancement allowance	14	165	184	0	<b>363</b>
Other totex allowances*	26	-56	-10	1	<b>-40</b>
<b>Total totex</b>	<b>350</b>	<b>1,329</b>	<b>978</b>	<b>85</b>	<b>2,742</b>

Source: CMA analysis

\* Footnote: Other totex allowances include: Operating lease adjustments; strategic regional water resources solutions and other cash items; third party costs; non-section 185 diversions; ex-ante cost sharing adjustment; grants and contributions (after adjustment for income offset, updated for our determination); and pension deficit recovery costs; see Table 3.2 of Ofwat (2019), [PR19 final determinations: Northumbrian Water final determination](#).

Note: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

14.30 As shown in Table 14-2, our total totex allowance is around £112 million higher than Ofwat's FD.

**Table 14-2: Totex cost allowances compared with Ofwat's FD**

	<i>Ofwat FD</i>	<i>CMA final decision</i>	<i>£m</i> <b>Delta</b>
Modelled base allowance (including CAC)	1,955	2,016	<b>+61</b>
Unmodelled base allowance	376	402	<b>+26</b>
Enhancement allowance	352	363	<b>+11</b>
Other totex allowances	-54	-40	<b>+14</b>
<b>Total totex</b>	<b>2,630</b>	<b>2,742</b>	<b>+112</b>

Source: Table 3.2 of Ofwat (2019), [PR19 final determinations: Northumbrian Water final determination](#), CMA analysis

Note: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

<sup>3501</sup> Operating lease adjustments; strategic regional water resources solutions and other cash items; third party costs; non-section 185 diversions; ex-ante cost sharing adjustment; grants and contributions (after adjustment for income offset); and pension deficit recovery costs; see Table 3.2 of Ofwat (2019), [PR19 final determinations: Northumbrian Water final determination](#).

- 14.31 In order to mitigate the risk that we set a totex allowance that turns out to be either too low or too high, we include an overall totex cost-sharing mechanism which applies to the majority of totex. Under the cost-sharing mechanism, if a company underspends its allowance, customers share in the saving made. Conversely, if the company needs to overspend to deliver the necessary services, it can recover part of the costs from customers. Cost-sharing enables us to rely less on other mechanisms in the price control that provide some protection from uncertainty.<sup>3502</sup>
- 14.32 The totex cost-sharing rates we set for Northumbrian are 45% outperformance and 55% underperformance for both water and for wastewater.<sup>3503</sup>

## Outcomes

- 14.33 Overall, we decide that the package of performance commitments and delivery incentives imposed by Ofwat should largely remain in place, having found no evidence to suggest that those are inappropriate.<sup>3504</sup>
- 14.34 We focus our assessment on the Common PCs and the related ODIs and conclude that the PC levels for the three common performance measures set at the forecast upper quartile level are appropriate. We consider that it is normal regulatory practice to make assessments using comparative regulation, and that upper quartile is a common measure used when promoting improvements in efficiency.<sup>3505</sup>
- 14.35 However, we make the following determinations based on our investigation of specific PCs and ODIs:
- (a) **Adjustments to Common PCs and ODIs (other than leakage):** For a small number of Northumbrian's Common PCs and ODIs we alter the company's collars and deadbands in order to protect the company against small variations in performance beyond management's control, while maintaining strong incentives to invest.<sup>3506</sup> We also welcome the common PC linked to vulnerable customers that encourages companies to identify those customers most likely to need additional support. A thorough and up-to-date Priority Services Register may also prompt companies to

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<sup>3502</sup> See paragraphs 6.70 to 6.107

<sup>3503</sup> See paragraphs 6.70 to 6.107

<sup>3504</sup> See paragraphs 7.45 to 7.140 and 7.311 to 7.320

<sup>3505</sup> See paragraphs 7.141 to 7.194

<sup>3506</sup> See paragraphs 7.141 to 7.261

identify further innovations that will allow the sector better to help vulnerable customers.<sup>3507</sup>

- (b) **Bespoke PCs and ODIs:** We have reviewed Northumbrian's visible leak repair time PC and decide that its definition should be clarified to exclude customer-side leaks.<sup>3508</sup> Finally, we also welcome Northumbrian's Bespoke PCs to support the delivery of appropriate services to vulnerable customers.<sup>3509</sup>

- 14.36 In relation to leakage specifically, we decide to retain the leakage PC at the level set by Ofwat while removing the enhanced ODI. We have not made any adjustments for Northumbrian's leakage totex, as it is not a high performer on leakage in AMP6 and although it submitted a late request for enhancement totex (having previously not identified a need for enhancement funding to achieve leakage reductions in AMP7), we did not find that its submissions established a persuasive case for the expenditures it was planning to be considered as different to the package it had previously said could be funded through base funding.<sup>3510</sup>
- 14.37 For the purposes of this determination, we do not list every PC and/or ODI to which Northumbrian is subject. Instead, we provide a list of the changes we make to Ofwat's FD.<sup>3511</sup> If we do not reference a PC or ODI, our determination is that we have seen no evidence to support adopting a different approach to that used by Ofwat, and so we apply the same requirement that Ofwat included in its FD.
- 14.38 The summary of changes we make to PCs and ODIs in Ofwat's FD (excluding scheme-specific PCs) is set out in Table 14-3.<sup>3512</sup>

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<sup>3507</sup> See paragraphs 7.247 to 7.261

<sup>3508</sup> See paragraphs 7.299 to 7.304

<sup>3509</sup> See paragraph 7.253

<sup>3510</sup> See paragraphs 8.31 to 8.175 and 8.205

<sup>3511</sup> The list of PCs and ODIs which Ofwat included in its FD is available here: Ofwat (2019), [PR19 final determinations: Northumbrian Water – Outcomes performance appendix](#).

<sup>3512</sup> See Table 7-17 and paragraph 8.205

**Table 14-3: Summary changes on outcome requirements**

<i>Unique reference</i>	<i>Description of commitment</i>	<i>Description of intervention</i>
PR19NES_COM03	Water quality compliance (CRI)	Set an underperformance deadband at Ofwat's DD levels (For each year of AMP7: 2.0, 2.0, 1.5, 1.5, 1.5)
PR19NES_COM05	Leakage (NW)	Remove enhanced ODI
PR19NES_COM06	Leakage (ESW)	Remove enhanced ODI
PR19NES_COM12	Mains repairs	Set an underperformance deadband of 10 repairs per 1,000km above the PC (For each year of AMP7: 151.9, 147.1, 142.4, 137.9, 133.4)
PR19NES_COM13	Unplanned outage	Set an underperformance deadband of 1.2x PCL (For each year of AMP7: 7.64, 6.43, 5.23, 4.02, 2.81)
PR19NES_BES04	Visible leak repair time	Clarification of definition to exclude customer-side leaks

Source: CMA

Note: We expect the leakage PCs to be updated to reflect the updated definitions in Table 8-1 and 8-4.

14.39 We considered whether the overall reward cap on ODIs from Ofwat's FD was appropriate, and concluded that no change was necessary.<sup>3513</sup>

14.40 Finally, we have considered whether there are other scheme-specific PCs and ODIs which required recalibration as a result of broader changes in our determination (most notably the difference in cost-sharing rates compared with Ofwat's FD). For Northumbrian, these are shown in Table 14-4.<sup>3514</sup>

**Table 14-4: Updated ODI rates for scheme-specific PCs**

<i>Company</i>	<i>Unique ID</i>	<i>Description</i>	<i>ODI rate</i>
Northumbrian	PR19NES_BES25	Delivery of lead enhancement programme	-0.0462
Northumbrian	PR19NES_BES26	Delivery of smart water metering enhancement programme	-0.194
Northumbrian	PR19NES_BES27	Delivery of wastewater resilience enhancement programme	-0.127
Northumbrian	PR19NES_BES28	Delivery of cyber resilience enhancement programme [clawback]	-0.0417
Northumbrian	PR19NES_BES28	Delivery of cyber resilience enhancement programme [delay]	-0.0073
Northumbrian	PR19NES_BES29	Delivery of Howdon STW enhancement	-0.0274
Northumbrian	PR19NES_BES31	WINEP [delay]	-0.0183

Note: all ODI rates are expressed as £m per unit, where the measurement unit is described in the relevant company's respective outcomes performance commitment appendix from PR19 FD.

## WACC and financeability

### WACC

#### *Cost of equity*

14.41 We have used the CAPM to determine the cost of equity. The CAPM is an established methodology with well-understood theoretical foundations and which makes use of observable market data as far as possible. The CAPM is used by all UK regulators when calculating the cost of capital, and was the

<sup>3513</sup> See paragraphs 7.305 to 7.310

<sup>3514</sup> See Table 5-26

framework used in Ofwat's FD. We perform our own assessment of each of the parameters of this model, using up-to-date market data.<sup>3515</sup>

14.42 The main components of the cost of equity on which we decide are (in inflation adjusted CPIH-real terms):

- (a) **The TMR (6.2% to 7.5%):** To calculate the TMR, we place the most weight on historical ex post returns (from 1900 to the present day), as well as on the historic ex-ante approach when selecting our range. We place less weight on the forward-looking evidence,<sup>3516</sup>
- (b) **The RFR (-1.6% to -1.0%):** We calculate an RFR by placing weight on both long-tenor index-linked gilts and AAA-rated non-government bonds (the highest quality commercial debt) and taking into account up-to-date market data;<sup>3517</sup> and
- (c) **The equity beta (0.69 to 0.74):** We calculate an equity beta based on a range of approaches of analysing the observable market data of WASC comparators, including a potential debt beta.<sup>3518</sup>

14.43 Based on the above, we calculate a range for the cost of equity over the period of the price control of 3.76% to 5.21%. We pick a point estimate 0.25% above the mid-point of this range. Our judgement of the point estimate of the cost of equity is based on the following considerations:<sup>3519</sup>

- (a) promoting investment, and specifically addressing the risk of an exit of capital from the sector if the cost of capital were set too low;
- (b) the asymmetry of risk in the package of ODIs;
- (c) the scale of parameter uncertainty in estimating the cost of equity, particularly in the context of a sharp decline in equity returns since PR14; and
- (d) cross-checks, including the need for the WACC to be sufficiently high to support financeability, which we concluded was a more appropriate mechanism than Ofwat's decision to increase bills by advancing cash-flows from future periods.

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<sup>3515</sup> See paragraphs 9.5 to 9.14

<sup>3516</sup> See paragraphs 9.267 to 9.397

<sup>3517</sup> See paragraphs 9.46 to 9.266

<sup>3518</sup> See paragraphs 9.398 to 9.532

<sup>3519</sup> See paragraphs 9.1226 to 9.1415



14.44 We also consider other cross-checks against market data, although we conclude that these were insufficiently robust to change the choice of point estimate which we assessed based on the factors above.<sup>3520</sup>

#### *Cost of debt*

14.45 We set an allowance for the total industry cost of debt at 2.18% in CPIH-real terms, marginally higher than Ofwat's 2.14%. We reach this figure by considering the costs of debt already incurred by the industry (embedded debt), the new debt costs that companies will face during the price control, the appropriate ratio of new and embedded debt and the costs of fees in relation to issuance and liquidity costs.<sup>3521</sup>

14.46 Evidence submitted by the Parties following Provisional Findings and our subsequent consultation on the costs of debt, as well as our own analysis, has allowed us to base our cost of embedded debt allowance on actual costs. We then cross check our estimates against the iBoxx A/BBB benchmark over 15- and 20-year trailing averages.<sup>3522</sup>

14.47 In relation to new debt costs, we set an allowance relative to an iBoxx A/BBB 10+ benchmark, measured over the first 6-months of the price control. Unlike Ofwat, we consider there to be insufficient evidence to apply an outperformance wedge in order to reduce this allowance. We agree with the use of a true-up mechanism for the cost of new debt in the next price control process and would expect this to be conducted on a like-for-like basis (with no performance wedge applied when calculating the true-up).<sup>3523</sup>

14.48 We apply a ratio of 17% new debt to 83% embedded debt in our calculations, slightly lower than the 20% of new debt used by Ofwat. We set the issuance and liquidity cost allowance at 0.1%, in line with Ofwat.<sup>3524</sup>

#### *Appointee WACC*

14.49 As part of this assessment, we decide on levels for related metrics, particularly inflation (CPIH of 2%, with a 0.9% RPI-CPI wedge)<sup>3525</sup> and notional gearing (60%).<sup>3526</sup>

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<sup>3520</sup> See paragraphs 9.1345 to 9.1401

<sup>3521</sup> See paragraphs 9.533 to 9.904

<sup>3522</sup> See paragraphs 9.538 to 9.795

<sup>3523</sup> See paragraphs 9.796 to 9.828

<sup>3524</sup> See paragraphs 9.829 to 9.903

<sup>3525</sup> See paragraphs 9.15 to 9.36

<sup>3526</sup> See paragraphs 9.37 to 9.45

14.50 The CMA point estimates for its WACC parameters are therefore shown in Table 14-5, alongside Ofwat's FD figures. Our final point estimate for Northumbrian's Appointee Vanilla WACC is 3.20% (in CPIH-Real terms).

**Table 14-5: CMA point estimates of WACC components versus Ofwat PR19, CPIH-Real**

	<i>Ofwat PR19</i>	<i>CMA Point Estimate</i>	<i>Delta</i>
TMR	6.50%	6.81%	<b>+0.31%</b>
RFR	-1.39%	-1.34%	<b>+0.05%</b>
ERP	7.89%	8.15%	<b>+0.26%</b>
Equity Beta	0.71	0.71	-
Cost of New Debt	0.53%	0.19%	<b>-0.34%</b>
Cost of Embedded Debt	2.42%	2.47%	<b>+0.05%</b>
Proportion of New Debt	20%	17%	<b>-3%</b>
Issuance and Liquidity Costs	0.10%	0.10%	-
Impact of picking a point estimate above the midpoint	-	0.25%	<b>+0.25%</b>
Pre-tax Cost of Debt	2.14%	2.18%	<b>+0.04%</b>
Post-tax Cost of Equity	4.19%	4.73%	<b>+0.54%</b>
Gearing	60%	60%	-
<b>Appointee-level Vanilla WACC*</b>	<b>2.96%</b>	<b>3.20%</b>	<b>+0.24%</b>

Source: CMA analysis and Ofwat PR19 FD

\* Footnote: 'Vanilla' here refers to a WACC set using a pre-tax cost of debt and a post-tax cost of equity.

14.51 We note that our WACC figure is around 34bps lower than Northumbrian proposed to us in its SoC, equivalent to us closing around 41% of the difference between Ofwat and the company.<sup>3527</sup>

### ***Retail margin adjustment***

14.52 Our view is that using the unadjusted Appointee WACC and a retail margin of 1% would result in water companies being overcompensated by receiving returns on their notional retail assets twice, as the retail margin includes compensation for risks which would be faced by an independent retail business but which are in practice mitigated for a vertically integrated appointee business.<sup>3528</sup>

14.53 We calculate the extent of this overcompensation as being equivalent to 8bps of RCV, and accordingly our decision is to reduce Northumbrian's allowed revenues by this amount as a retail margin adjustment.<sup>3529</sup>

### ***Gearing outperformance sharing mechanism***

14.54 Ofwat introduced a GOSM for the first time in PR19. Ofwat stated that equity investors benefit from higher equity returns that are associated with their increased risk, but there is no substantive benefit passed to customers. In addition, Ofwat stated where companies adopt high levels of gearing, they

<sup>3527</sup> See Table 9-1

<sup>3528</sup> See paragraphs 9.1104 to 9.1149

<sup>3529</sup> See paragraphs 9.1104 to 9.1149

may reduce financial resilience and transfer some risk to customers and / or potentially taxpayers in the event that a company fails. To address this, Ofwat introduced a mechanism that it said would share the benefits of higher gearing with customers.<sup>3530</sup>

14.55 We consider that the GOSM as designed was ineffective either as a benefit-sharing mechanism or as a tool to improve financial resilience. First, we consider that Ofwat had not adequately evidenced the existence of the benefits from high gearing that it said would be available to share. Second, to the extent that high gearing reduces financial resilience, the GOSM works only to encourage a reduction in gearing rather than to require a reduction in gearing. Moreover, we note that there are already multiple licence conditions which, together with a large and stable asset base, provide protection to consumers from excessive gearing. While we do not rule out that Ofwat may need to intervene at some time in the sector to reinforce its financial resilience and that this may or may not involve some constraint on gearing, for the purposes of this price control, we were not presented with evidence that an intervention on gearing is currently required in respect of the Disputing Companies or that the GOSM is the appropriate mechanism for such an intervention.<sup>3531</sup>

## **Financeability**

14.56 We are required to ensure that companies can continue to finance their functions. We therefore completed an in-the-round assessment of the financeability of the Disputing Companies, including a financial ratio analysis similar to that which would be undertaken by the credit rating agencies. The outputs of this ratio analysis for Northumbrian are shown in Table 14-6.<sup>3532</sup>

**Table 14-6: Credit ratio analysis for Northumbrian**

<i>Ref</i>	<i>Ratio</i>	<i>Gearing</i>	<i>Interest cover</i>	<i>AICR</i>	<i>FFO/net debt</i>	<i>Dividend cover</i>	<i>RCF/Net debt</i>
1	CMA FD	59.5%	4.2	1.5	10.0%	2.3	7.8%
2	CMA FD + 1% RoRe penalty	62.0%	3.9	1.3	9.1%	1.6	7.1%
3	CMA FD + 2% Totex overspend	61.1%	4.0	1.4	9.3%	2.1	7.2%
4	Ofwat	59.5%	4.2	1.5*	10.0%	1.8	6.9%

Source: CMA analysis

Note: Ofwat ratios are consistent with its approach to the final determination and include a benefit of accelerating PAYG in the interest cover ratio.

<sup>3530</sup> See paragraphs 9.1150 to 9.1155

<sup>3531</sup> See paragraphs 9.1156 to 9.1225

<sup>3532</sup> See Table 10-5 and paragraphs 10.88 to 10.101

- 14.57 Our analysis of Northumbrian's ratios suggests that, based on our determination and the assumption of a notional capital structure, Northumbrian would achieve financial ratios which are consistent with a strong investment-grade credit rating. In the downside scenarios, Northumbrian should still achieve ratios consistent with an investment grade credit rating of BBB/Baa2.<sup>3533</sup>
- 14.58 We have made an assessment of the WACC and wholesale totex requirements, in each case providing an increased allowance compared to Ofwat's FD. This represents a reasonable level of costs that each of the Disputing Companies could be expected to incur. We have also de-risked the determination, including moderating the cost-sharing rates to rebalance risk between customers and investors. Each of these factors improves financeability.
- 14.59 In measuring credit ratios, we took account of the credit rating agencies' stance on whether or not advancing revenue by adjusting PAYG rates would affect a credit ratings assessment. We concluded that Ofwat's approach of increasing the PAYG rate risks increasing customer bills without leading to a practical improvement in the water companies' ability to secure a strong investment grade rating, and we did not make PAYG adjustments.<sup>3534</sup>
- 14.60 We find that Northumbrian should be able to achieve strong investment-grade credit ratings based on the notional capital structure, and this is consistent with our assumptions in the WACC for the cost of debt. We also find that under a reasonable downside scenario, Northumbrian's ratios are worse than the baseline model but still investment-grade. We consider that companies facing a financeability constraint, such as to address a downside scenario, may adopt a range of mitigating actions to address impact, such as absorbing headroom in credit ratios, or increasing the contribution of equity either by forgoing dividends or injecting fresh capital. We conclude that this supports the view that our determination for Northumbrian is financeable.<sup>3535</sup>

## **Implied calculations of revenue and implications for k and bills**

### ***Revenue adjustments***

- 14.61 The majority of a water company's wholesale revenue is derived from the totex and WACC figures discussed above. However, there are certain

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<sup>3533</sup> See paragraphs 10.115 to 10.118

<sup>3534</sup> See paragraphs 10.77 to 10.87

<sup>3535</sup> See paragraphs 10.115 to 10.118 and 10.123 to 10.134

additional elements which affect Northumbrian's revenue allowance in AMP7.<sup>3536</sup>

14.62 For the majority of these revenue categories, Northumbrian has not raised any concerns and we have no evidence to support the use of alternative figures, and so we decide to use Ofwat's figures.

14.63 However, we have received submissions in two areas, which we consider support a different approach:

- (a) Northumbrian raised concerns about an error in relation to Ofwat's treatment of its grants and contributions costs, arising from changes that Northumbrian made to the structure of its submitted business planning tables. We decide that this adjustment is an error which results in a double-count of revenues and should be remedied by decreasing Northumbrian's Water Network Plus Grants and Contributions revenue allowance by £11 million. We note that this decision also increases Northumbrian's Water Network Plus RCV by £12 million, which has an effect on AMP7 revenue through a slightly increased RCV run-off and return on capital.<sup>3537</sup>
- (b) Ofwat's FD used a corporation tax rate of 17% on the expectation that the rate was going to drop from the current figure of 19%. However, the rate has remained at 19%, and we consider it appropriate to use the prevailing rate. Accordingly, we decide to use a corporation tax rate of 19%. This, along with other changes in our determination which impact tax allowances, results in an increase in Northumbrian's wholesale revenue compared to Ofwat's FD of around £14 million. We also adopt the same approach as Ofwat of including a reconciliation mechanism which reflects subsequent increases or decreases in the corporation tax rate.<sup>3538</sup>

14.64 We also adjust Northumbrian's allowances to reflect its inclusion of certain redetermination costs in its 2019/20 figures (including a revenue and RCV adjustment). This will ensure that these costs are not recovered from customers twice.

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<sup>3536</sup> Revenue adjustments for PR14 reconciliations; Tax; Grants & contributions after adjustment for income offset (price control); Non-price control income; Innovation competition; Revenue re-profiling; see Table 4.1 of Ofwat (2019), [PR19 final determinations: Northumbrian Water final determination](#).

<sup>3537</sup> See paragraphs 11.81 to 11.113

<sup>3538</sup> See paragraphs 11.2 to 11.11

14.65 We also allow Northumbrian to recover a proportion of its costs for the determination process, which includes an allocation of our own costs. This represents around £1.8 million (which is excluded from totex cost-sharing).<sup>3539</sup>

### ***Implied Northumbrian revenue in AMP7 and calculations of k***

14.66 In order to calculate Northumbrian's revenue figures, we need to include a PAYG rate to split totex into in-period recovery and RCV additions. To do this, we use the 'natural rates' included in Ofwat's FD.<sup>3540</sup>

14.67 Table 14-7 shows Northumbrian's resulting wholesale allowed revenue.

**Table 14-7: Calculation of Northumbrian's wholesale allowed revenue**

	<i>Water resources</i>	<i>Water network plus</i>	<i>Wastewater network plus</i>	<i>Bioresources</i>	<i>£m</i> <b>Total</b>
PAYG	320	760	374	35	<b>1,490</b>
RCV Run-off	79	442	450	51	<b>1,022</b>
Return on Capital (Incl RMA)	38	246	258	19	<b>561</b>
Reconciliation	0	0	-1	0	<b>-1</b>
Tax	11	31	32	7	<b>81</b>
Grants and contributions	0	94	18	0	<b>112</b>
Deduct non-Price control income	-7	-35	-9	0	<b>-50</b>
Innovation competition	0	7	5	0	<b>12</b>
Revenue reprofiling	2	0	0	0	<b>3</b>
<b>Wholesale revenue</b>	<b>443</b>	<b>1,546</b>	<b>1,129</b>	<b>113</b>	<b>3,230</b>

Source: CMA analysis.

Note: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

14.68 This calculation results in Northumbrian's wholesale revenue over the AMP being around £115 million higher than Ofwat's FD.<sup>3541</sup>

14.69 In relation to the retail price control, neither Northumbrian nor any of the other Disputing Companies have raised any concerns that Ofwat's approach should be re-considered. Our decision is to align our approach with Ofwat's FD19. This includes the household retail expenditure allowance and the outcome measures relating to C-MeX and D-MeX.<sup>3542</sup> Therefore, we maintain Ofwat's approach of calculating retail allowances based on wholesale, which results in a small incremental allowance of £1.0 million for Northumbrian (£257.2 million in our determination compared to £256.2 million in Ofwat's FD).<sup>3543</sup>

<sup>3539</sup> See paragraphs 11.124 to 11.134. We note that this has been modelled as an increase in totex, with these costs being considered entirely opex (and so recovered in period). This results in a small change in the PAYG rates purely for the purpose of modelling this specific cost recovery.

<sup>3540</sup> See paragraphs 10.85 to 10.87

<sup>3541</sup> Ofwat's FD included wholesale revenues for Northumbrian of £3,115 million; see Table 1.3 in Ofwat (2019), [PR19 final determinations: Northumbrian Water final determination](#).

<sup>3542</sup> See paragraphs 11.115 to 11.120

<sup>3543</sup> See paragraphs Table 11-2; Table 6.2 of Ofwat (2019), [PR19 final determinations: Northumbrian Water final determination](#)

14.70 The estimated effect of these changes on average annual customer bills is shown in Table 14-8, compared to Northumbrian's historical bills and Ofwat's FD.<sup>3544</sup>

**Table 14-8: Indicative impact of our determination on Northumbrian's annual customer bills**

	£			
	<i>Northumbrian historical bills (2019/20)</i>	<i>Northumbrian average bill in April business plan†</i>	<i>Northumbrian average bill under Ofwat FD</i>	<i>Northumbrian average bill under CMA decision</i>
Average annual bill (water and sewerage)*	£429	£343	£323	£335

Source: CMA calculations; Northumbrian business plan bills taken from Ofwat (2019), [PR19 final determinations: Northumbrian Water final determination](#), Table 1.1.

\* Footnote: The numbers in this table reflect the average amount per customer charged, expressed at constant (inflation adjusted) prices (2017-18 CPIH deflated). Individual customer bills will vary depending on a number of factors such as the whether the property is metered or not and, for metered customers, the amount of water consumed.

† Footnote: The April business plan figure here is taken from Ofwat's published documents, and may not align with all of the implications of the company's submissions in its SoC.

14.71 The bill in our determination is higher than Ofwat's FD by around £12 per year. Under our determination, Northumbrian's average bills are still £94 per year lower than they were in 2019/20 (and £8 per year lower than Northumbrian's April business plan), which should assist customers who were struggling with the affordability of this essential utility.

14.72 Having determined the revenue allowances over the whole AMP, we profile it between individual years in order to provide customers with a better view of the potential impact, and to allow for an annual calculation of K. In doing so, we choose to implement a consistent annual increase in nominal bills over the course of the remaining years in the AMP.<sup>3545</sup> This defers some of the bill increases until later years, which is likely to be particularly beneficial to customers affected by the COVID-19 pandemic, whilst also avoiding any specific 'spike' in customer bills in a single year.<sup>3546</sup>

14.73 The results of this profiling, as well as the impact on K and bills,<sup>3547</sup> is shown in Table 14-9 and Table 14-10.

<sup>3544</sup> The price control sets revenue allowances for the individual companies. This determines the average bill that the company can charge its customers. Individual bills will vary depending on the charging scheme adopted by the company, see Ofwat's [information on charging](#).

<sup>3545</sup> We note that due to the timing of the redetermination, Northumbrian will not be able to implement our final determination until the third year of the AMP, which will result in larger increases in the later years than would be the case otherwise.

<sup>3546</sup> Paragraph 3.5 of [The Consumer Council for Water's response to the provisional findings](#) noted that 'customers prefer a smooth profile to any bill increases rather than experiencing spikes in any one year'.

<sup>3547</sup> The price control sets revenue allowances for the individual companies. This determines the average bill that the company can charge its customers. Individual bills will vary depending on the charging scheme adopted by the company, see Ofwat's [information on charging](#).

**Table 14-9: Northumbrian's Base Revenue and K factors by charging year**

	<i>Base (£m)</i>	<i>2020-21</i>	<i>2021-22</i>	<i>2022-23</i>	<i>2023-24</i>	<i>2024-25</i>
Water resources	77.7	0.00	-1.31%	+11.83%	+12.86%	+10.90%
Water network plus	306.2	0.00	+0.39%	+0.67%	+0.42%	+0.83%
Wastewater network plus	217.9	0.00	+0.41%	+3.38%	+2.02%	+2.56%

Source: CMA calculations

Footnote: 2017-18 CPIH deflated

**Table 14-10: Northumbrian's indicative annual bills**

	<i>2019-20</i>	<i>2020-21</i>	<i>2021-22</i>	<i>2022-23</i>	<i>2023-24</i>	<i>2024-25</i>
Customer bills	429	328	327	334	339	346

Source: CMA calculations

Footnote: 2017-18 CPIH deflated

14.74 In addition, we update Northumbrian's bioresources control such that its TDS revenue average is set to £317.9 in years 3 to 5 of the AMP. Applying the variable vs fixed split from Ofwat's FD (16%)<sup>3548</sup> results in a variable revenue of £52.4 / TDS.

14.75 Finally, we emphasise that while we have looked at individual components in detail, and necessarily made decisions on each of these, we have also considered any cross-cutting or interconnected issues when making such decisions. In particular, the inter-relationship between cost and service, as well as risk, return and financeability have influenced our decisions in each of the major areas of the determination (totex, outcomes and WACC). This is a determination of a whole package 'in the round', and we consider that this determination secures compliance with all our duties.

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<sup>3548</sup> [https://www.ofwat.gov.uk/wp-content/uploads/2019/12/Bioresources-Revenue\\_NES\\_FD.xlsx](https://www.ofwat.gov.uk/wp-content/uploads/2019/12/Bioresources-Revenue_NES_FD.xlsx)



## 15. The final determination for Yorkshire

- 15.1 This section provides a summary of our individual final determination for Yorkshire. In this, we set out our final determination, but we do not fully restate the explanation or rationale for our decisions; many methodologies are common between the individual companies, and we cross-reference to the relevant earlier sections of our report to identify where we have explained these rationales.
- 15.2 In reaching our decisions we have taken account of the same statutory duties as applied to Ofwat, and we have had regard to the principles of best regulatory practice and the need to act in accordance with the SPS, but have exercised our own regulatory discretion in appropriately complying with these statutory duties.

### Introduction

- 15.3 Yorkshire is a WASC providing services to around 2.5 million connected properties in the Yorkshire and Humberside region. It is one of the largest landowners in Yorkshire managing 28,000 hectares of land. At 31 March 2020, Yorkshire directly employed 3,525 full-time equivalent employees.<sup>3549</sup>

### *Approach to the determination*

- 15.4 As originally proposed in our approach to the determinations document,<sup>3550</sup> we are using the same regulatory building blocks as Ofwat used in its determinations. In particular, we have maintained:<sup>3551</sup>
- (a) Ofwat's approach of setting four wholesale price controls (water resources, water network plus, wastewater network plus, and bioresources);<sup>3552</sup>
  - (b) separating our assessment into its major component parts around costs, outcomes, and financial returns;<sup>3553</sup>
  - (c) managing bioresources as an average revenue control;<sup>3554</sup> and

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<sup>3549</sup> See paragraphs 2.60 to 2.64

<sup>3550</sup> [CMA approach to water redeterminations](#), paragraph 29; also see paragraphs 3.37 to 3.50 in this report.

<sup>3551</sup> See paragraph 3.5

<sup>3552</sup> See paragraph 11.114. We note that these separate controls are specified in Yorkshire's licence conditions.

<sup>3553</sup> See paragraphs 2.102 and 3.2 to 3.20

<sup>3554</sup> See paragraphs 3.43 and 11.121 to 11.123

(d) setting a separate retail control.<sup>3555</sup>

15.5 The rest of this section sets out the final decisions we have applied to Yorkshire, grouped into:

(a) totex allowances;

(b) outcomes;

(c) WACC and financeability; and

(d) calculations of revenue, with implications for k and bills in the period.

## **Totex allowances**

15.6 In setting Yorkshire's totex allowance in our final determination, we have considered four main cost areas:

(a) modelled base costs (including growth);

(b) unmodelled base costs;

(c) enhancement costs; and

(d) other costs.

## **Modelled base costs**

15.7 Water companies conduct many routine activities in order to run their businesses and provide a base level of service to customers. We adopt an econometric modelling approach to assess most of the costs of Yorkshire's base level of service, using data from across the sector. Comparative benchmarking allows us to estimate the efficient costs for these day-to-day operations, rather than relying on individual company data or forecasts. Our modelling approach is similar to Ofwat's, although we adjust the econometric models and expand the dataset by including data from 2019/20. This 2019/20 data was not available to Ofwat when it set the FD.<sup>3556</sup>

15.8 Our cost models estimate how much it would cost the averagely efficient water company to cover base operations. However, we want to set cost allowances for a water company that is more than merely averagely efficient, and so we apply a 'catch up' efficiency challenge. Our decision is to use the

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<sup>3555</sup> See paragraphs 3.41 and 11.94 to 11.98

<sup>3556</sup> See paragraphs 4.2 to 4.403

company at the upper quartile as the benchmark, which we consider sets a challenging benchmark whilst acknowledging the limitations of our econometric modelling (and the consequent risk that the company will have insufficient allowed revenue to ensure a base level of service).<sup>3557</sup>

15.9 Future costs are likely to differ from the historical benchmarks because of changes to productivity levels and input costs. We therefore:

- (a) Apply a 'frontier shift' which reduces the modelled allowance by 1% per year to reflect expected productivity gains from improvements in technology and new ways of working;<sup>3558</sup> and
- (b) Provide an RPE adjustment for labour costs. We also include a reconciliation mechanism for these labour costs to protect both customers and the company if there are differences between forecasts and actual wage inflation.<sup>3559</sup>

15.10 Serving new properties involves additional costs for water companies: both the costs of installing new connections, and from the demand increase, necessitating reinforced or additional infrastructure. We therefore:

- (a) decrease Yorkshire's allowance due to forecast growth being below industry average (using updated ONS forecast figures). Unlike Ofwat, we do not halve this adjustment;<sup>3560</sup> and
- (b) include a reconciliation mechanism to protect against differences between forecasts and actual growth. We use an expanded scope for this reconciliation mechanism, compared with Ofwat's FD, to better reflect the costs associated with growth.<sup>3561</sup>

15.11 Ofwat's historical data collection approach contained no distinction between base opex and enhancement opex. Therefore, Ofwat's modelled base costs could double-count Yorkshire's enhancement opex if an adjustment was not applied. We decide to use the same approach as Ofwat used in its FD, which is to estimate an implicit allowance for enhancement opex and adjust the companies' allowance accordingly.<sup>3562</sup>

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<sup>3557</sup> See paragraphs 4.404 to 4.495

<sup>3558</sup> We have also applied this adjustment to other elements of totex, not just base costs; See paragraphs 4.496 to 4.652.

<sup>3559</sup> We have also applied this adjustment to other elements of totex, not just base costs; See paragraphs 4.653 to 4.740.

<sup>3560</sup> See paragraphs 4.741 to 4.878

<sup>3561</sup> See paragraphs 4.805 to 4.859

<sup>3562</sup> See paragraphs 4.879 to 4.905

- 15.12 The overall effect of our modelling changes described above is to increase Yorkshire's base allowances by around £112 million compared to the allowances in Ofwat's FD.<sup>3563</sup>
- 15.13 Finally, we recognise that our approach is reliant on models which are based on a limited set of explanatory variables and, like any econometric model, are subject to some limitations and a degree of uncertainty in their final estimates. While we have reflected this already in earlier decisions (such as selection of the catch up benchmark), we have also reviewed a specific issue raised by Yorkshire as a base cost adjustment claim in relation to treatment complexity. However, we found that Yorkshire had not provided compelling evidence to support its claim, and make no allowance for this.<sup>3564</sup>

### ***Unmodelled base costs***

- 15.14 In designing our base models discussed above, we exclude certain costs that are unsuitable for modelling where, for example, there is insufficient data for modelling or where exceptional circumstances apply to particular companies. We refer to these as unmodelled base costs. These include costs associated with abstraction, business rates, compliance with the IED and Traffic Management Act.<sup>3565</sup>
- 15.15 Ofwat made an allowance for Yorkshire's unmodelled base costs, and we decide that these are largely appropriate. In particular, we apply the same cost challenge that Ofwat did to Yorkshire's proposed TMA costs (50%).<sup>3566</sup>
- 15.16 Although we do not provide any allowance for Yorkshire's IED compliance costs, we include a bespoke cost-sharing rate of 75/25 (customer/company).<sup>3567</sup>
- 15.17 We do not apply a frontier shift to business rates or abstraction charges as we conclude that these costs were in the most part outside of company control. However, we apply a frontier shift to other unmodelled base costs of 1% together with a labour RPE. We consider that our approach does not give rise to any double-counting necessitating an adjustment. Our frontier shift is slightly below the level which Ofwat set in its FD and, combined with our decision not to apply this to unmodelled abstraction charges or business

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<sup>3563</sup> See Table 6-3

<sup>3564</sup> See paragraphs 4.959 to 4.970

<sup>3565</sup> See paragraphs 4.971 to 4.1131

<sup>3566</sup> See paragraphs 4.1047 to 4.1053, 4.1128 to 4.1131, and Table 6-4

<sup>3567</sup> See paragraphs 4.1079 to 4.1118

rates, results in an increase in Yorkshire's allowances of around £8 million compared to Ofwat's FD.<sup>3568</sup>

- 15.18 Due to management having a more limited degree of control than over other costs, we apply a cost-sharing rate of 90/10 (customer/company) for business rates, rather than using the 75/25 sharing rate that Ofwat set in its FD.<sup>3569</sup>

### **Enhancement costs**

- 15.19 We provide additional allowances to Yorkshire where we have been persuaded that it is undertaking necessary investment for the purpose of enhancing the capacity or quality of service beyond a base level.<sup>3570</sup>
- 15.20 In our review of enhancement expenditure, we generally focus on areas where Ofwat and Yorkshire have provided conflicting views and where we need to resolve these in coming to our determination. To help us reach our own view, our assessment often involves considering additional evidence or arguments, which were not available to Ofwat at the time that it made its FD. For other enhancement expenditure, including major schemes which met Ofwat's evidential threshold to receive additional enhancement funding, we adopt the same approach as Ofwat did in its FD.<sup>3571</sup>
- 15.21 We make use of comparative data (including econometric modelling, engineering comparisons and cost benchmarking comparisons) where available to develop our best estimate for efficient enhancement costs. In particular, for P-removal and WINEP allowances more generally, we have used benchmarking in our assessment to test the efficiency of companies' proposals for these large and broadly-comparable programmes of work. Our decision is to make adjustments to Ofwat's P-removal allowances using a broader range of model specifications but to adopt the same overall approach. This results in an increase in Yorkshire's allowances of around £9 million compared to Ofwat's FD.<sup>3572</sup>
- 15.22 We apply efficiency challenges and reduce allowances where we are concerned about the robustness of the evidence provided for enhancement schemes. In doing so we are seeking to ensure that customers do not overpay for inefficient service whilst also ensuring sufficient allowance is available to achieve the enhanced level of service/quality. Reflecting our

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<sup>3568</sup> See paragraphs 4.652 and 4.975, and Table 6-5

<sup>3569</sup> See paragraphs 4.1054 to 4.1077

<sup>3570</sup> See paragraphs 5.5 to 5.8 for a description of how enhancement allowances fit into the broader price review framework.

<sup>3571</sup> See paragraphs 5.4 and 5.16 to 5.17

<sup>3572</sup> See paragraphs 5.27 to 5.111, and 5.151 to 5.163

shallow dive efficiency factors results in no change to Yorkshire's allowance compared to Ofwat's FD. However, applying a 10% cost efficiency challenge to deep dives results in a reduction in Yorkshire's enhancement allowances of around £5 million.<sup>3573</sup>

15.23 Yorkshire raised two specific projects, which we have assessed in greater detail. We make the following decisions:

- (a) **Living with Water Partnership in Hull and Haltemprice:** We provide additional enhancement funding to help address the unique circumstances in this area which result in an increased risk of flooding. However, we apply an efficiency challenge to the estimate included in Yorkshire's business plan. We also include a PC and ODI in order to protect customers from the risk of non-delivery on this scheme.<sup>3574</sup>
- (b) **Internal Sewer Flooding Scheme:** Yorkshire submitted that its region has a higher prevalence of cellars and back-to-back properties which result in a higher number of internal sewer flooding incidents, and requested funding to address this issue. We do not provide any increased allowance for this scheme as we have not seen robust evidence to support Yorkshire's claims that this is a material, unique factor which justifies additional funding.<sup>3575</sup>

15.24 This scheme allowance results in an increase of around £7 million in Yorkshire's enhancement allowance compared with Ofwat's FD, before the application of frontier shift.<sup>3576</sup>

15.25 As discussed in paragraph 15.37, we consider that Yorkshire requires an additional enhancement allowance in order to meet its leakage PC. We calculate this enhancement requirement as being £28.2 million, compared to Ofwat's FD which made no allowance for this purpose.<sup>3577</sup>

15.26 Consistent with our decision on base costs above, we apply a frontier shift of 1% together with a labour RPE on all enhancement costs (not just to WINEP and metering as Ofwat did). We consider that our approach does not give rise to any double-counting which would necessitate an adjustment for Yorkshire. This frontier shift results in a decrease of around £1.1 million in Yorkshire's enhancement allowances.<sup>3578</sup>

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<sup>3573</sup> See paragraphs 5.164 to 5.203; Table 5-29

<sup>3574</sup> See paragraphs 5.212 to 5.259

<sup>3575</sup> See paragraphs 5.260 to 5.315

<sup>3576</sup> See Table 5-29

<sup>3577</sup> See paragraphs 8.83 to 8.174

<sup>3578</sup> See paragraphs 5.722 to 5.742; Table 5-29

15.27 The combination of enhancement changes results in an overall increase of £38 million for Yorkshire compared with Ofwat's FD.<sup>3579</sup>

### **Other costs**

15.28 As well as the three cost areas discussed above, there are a number of other cost categories which contribute to Yorkshire's totex allowance.<sup>3580</sup>

15.29 Yorkshire has not raised any concerns with any of these cost categories, and we have no evidence to support the use of alternative figures, and so we decide to use the figures in Ofwat's FD (updating Grants & Contribution figures to reflect consequential changes of our decisions).

### **Overall totex**

15.30 Our determination of Yorkshire's wholesale total totex allowance is shown in Table 15-1.

**Table 15-1: Totex cost allowances by wholesale price control**

	£m				
	<i>Water resources</i>	<i>Water network plus</i>	<i>Wastewater network plus</i>	<i>Bioresources</i>	<b><i>Total</i></b>
Modelled base allowance (including CAC)	125	1,298	1,319	266	<b>3,008</b>
Unmodelled base allowance	65	171	86	6	<b>327</b>
Enhancement allowance	33	130	745	35	<b>943</b>
Other totex allowances*	0	-36	-33	1	<b>-67</b>
<b>Total totex</b>	<b>223</b>	<b>1,563</b>	<b>2,117</b>	<b>308</b>	<b>4,211</b>

Source: CMA analysis

Footnote: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

\* Other totex allowances include: Operating lease adjustments; strategic regional water resources solutions and other cash items; third party costs; non-section 185 diversions; ex-ante cost sharing adjustment; grants and contributions (after adjustment for income offset, updated for our determination); and pension deficit recovery costs; see Table 3.2 of Ofwat (2019), [PR19 final determinations: Yorkshire Water final determination](#).

15.31 As shown in Table 15-2, our total totex allowance is around £158 million higher than Ofwat's FD.

<sup>3579</sup> See Table 5-29

<sup>3580</sup> Operating lease adjustments; strategic regional water resources solutions and other cash items; third party costs; non-section 185 diversions; ex-ante cost sharing adjustment; grants and contributions (after adjustment for income offset); and pension deficit recovery costs; see Table 3.2 of Ofwat (2019), [PR19 final determinations: Yorkshire Water final determination](#).

**Table 15-2: Totex cost allowances compared with Ofwat's FD**

			£m
	<i>Ofwat FD</i>	<i>CMA final decision</i>	<b><i>Delta</i></b>
Modelled base allowance (including CAC)	2,896	3,008	<b>+112</b>
Unmodelled base allowance	319	327	<b>+8</b>
Enhancement allowance	906	943	<b>+38</b>
Other totex allowances	-67	-67	<b>-</b>
<b>Total totex</b>	<b>4,053</b>	<b>4,211</b>	<b>+158</b>

Source: Table 3.2 of Ofwat (2019), [PR19 final determinations: Yorkshire Water final determination](#), CMA analysis

Note: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

15.32 In order to mitigate the risk that we set a totex allowance that turns out to be either too low or too high, we include an overall totex cost-sharing mechanism which applies to the majority of totex. Under the cost-sharing mechanism, if a company underspends its allowance, customers share in the saving made. Conversely, if the company needs to overspend to deliver the necessary services, it can recover part of the costs from customers. Cost-sharing enables us to rely less on other mechanisms in the price control that provide some protection from uncertainty.<sup>3581</sup>

15.33 The totex cost-sharing rates we set for Yorkshire are 45% outperformance and 55% underperformance for both water and for wastewater.<sup>3582</sup>

## Outcomes

15.34 Overall, we decide that the package of performance commitments and delivery incentives imposed by Ofwat should largely remain in place, having found no evidence to suggest that those are inappropriate.<sup>3583</sup>

15.35 We focus our assessment on the Common PCs and the related ODIs and conclude that the PC levels for the three common performance measures set at the forecast upper quartile level are appropriate. We consider that it is normal regulatory practice to make assessments using comparative regulation, and that upper quartile is a common measure used when promoting improvements in efficiency.<sup>3584</sup>

15.36 However, we make the following determinations based on our investigation of specific PCs and ODIs:

- (a) **Adjustments to Common PCs and ODIs (other than leakage):** For a small number of Yorkshire's Common PCs and ODIs we alter the company's collars and deadbands in order to protect the company against

<sup>3581</sup> See paragraphs 6.70 to 6.107

<sup>3582</sup> See paragraphs 6.70 to 6.107

<sup>3583</sup> See paragraphs 7.45 to 7.140 and 7.311 to 7.320

<sup>3584</sup> See paragraphs 7.141 to 7.194



small variations in performance beyond management's control, while maintaining strong incentives to invest.<sup>3585</sup> We also welcome the common PC linked to vulnerable customers that encourages companies to identify those customers most likely to need additional support. A thorough and up-to-date Priority Services Register may also prompt companies to identify further innovations that will allow the sector better to help vulnerable customers.<sup>3586</sup>

- (b) **Bespoke PCs and ODIs:** We have reviewed Yorkshire's low pressure PC and decide that, under full consideration, the methodology and customer evidence used to support the rewards ODI was not robust, and so we remove the reward element.<sup>3587</sup> Finally, we also welcome Yorkshire's Bespoke PCs to support the delivery of appropriate services to vulnerable customers.<sup>3588</sup>

15.37 In relation to leakage specifically, we decide to retain the leakage PC at the level set by Ofwat, but in doing so conclude that Yorkshire requires additional allowance to achieve the required level of performance.<sup>3589</sup> In particular:

- (a) We conclude that there is a link between maintaining higher performance on leakage and costs such that the base cost model we use will not adequately compensate companies that are maintaining performance above the upper quartile. However, Yorkshire does not meet this criterion so does not receive any additional base allowance.<sup>3590</sup>
- (b) We conclude that Yorkshire requires enhancement cost funding for achieving the leakage reductions it committed to, and so should be allowed the efficient cost of doing so. We estimate the efficient costs using a top-down approach, and conclude on a figure of £28.2 million for Yorkshire's leakage enhancement totex.<sup>3591</sup>
- (c) We also consider the ODI rates relating to the leakage PC and in particular reject the use of enhanced ODI rates to reward substantial outperformance in this area. As explained above, we conclude that leakage improvements will require additional funding and so will impose costs on customers. In the circumstances, and in the absence of evidence for the cost-benefit trade off of further leakage reductions, we consider it would not be appropriate to use Enhanced ODIs to shift the frontier in this

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<sup>3585</sup> See paragraphs 7.141 to 7.261

<sup>3586</sup> See paragraphs 7.247 to 7.261

<sup>3587</sup> See paragraphs 7.290 to 7.298

<sup>3588</sup> See paragraph 7.253

<sup>3589</sup> See paragraphs 8.31 to 8.175 and 8.205

<sup>3590</sup> These figures are included in the totex allowances discussed earlier; see paragraphs 8.48 to 8.82.

<sup>3591</sup> These figures are included in the totex allowances discussed earlier; see paragraphs 8.83 to 8.174.

area. We also make adjustments to increase Yorkshire's penalty rates for underperformance ODIs, as we conclude that this would make the calibration of the ODIs more consistent with our determination on enhancement costs.<sup>3592</sup>

15.38 For the purposes of this determination, we do not list every PC and/or ODI to which Yorkshire is subject. Instead, we provide a list of the changes we make to Ofwat's FD.<sup>3593</sup> If we do not reference a PC or ODI, our determination is that we have seen no evidence to support adopting a different approach to that used by Ofwat, and so we apply the same requirement that Ofwat included in its FD.

15.39 The summary of changes we make to PCs and ODIs in Ofwat's FD (excluding scheme-specific PCs) is set out in Table 15-3.<sup>3594</sup>

**Table 15-3: Summary changes on outcome requirements**

<i>Unique reference</i>	<i>Description of commitment</i>	<i>Description of intervention</i>
PR19YKY_20	Water quality compliance (CRI)	Set an underperformance deadband at Ofwat's DD levels (For each year of AMP7: 2.0, 2.0, 1.5, 1.5, 1.5)
PR19YKY_22	Leakage	Remove enhanced ODI; provide additional totex; and amend Tier 1 penalties
PR19YKY_31	Internal sewer flooding	Increase collar to: For each year of AMP7: 2.7, 3.2, 3.8, 4.3, 4.9
PR19YKY_24	Mains repairs	Set an underperformance deadband of 10 repairs per 1,000km above the PC (For each year of AMP7: 196.1, 193.6, 191.0, 188.4, 185.8)
PR19YKY_23	Unplanned outage	Set an underperformance deadband of 1.2x PCL (For each year of AMP7: 6.14, 5.30, 4.48, 3.64, 2.81)
PR19YKY_28	Low pressure	Remove outperformance incentive

Source: CMA

15.40 We considered whether the overall reward cap on ODIs from Ofwat's FD was appropriate, and concluded that no change was necessary.<sup>3595</sup>

## WACC and financeability

### WACC

#### *Cost of equity*

15.41 We have used the CAPM to determine the cost of equity. The CAPM is an established methodology with well-understood theoretical foundations and which makes use of observable market data as far as possible. The CAPM is used by all UK regulators when calculating the cost of capital, and was the

<sup>3592</sup> See paragraphs 8.176 to 8.204

<sup>3593</sup> The list of PCs and ODIs which Ofwat included in its FD is available here: Ofwat (2019), [PR19 final determinations: Yorkshire Water – Outcomes performance appendix](#).

<sup>3594</sup> See Table 7-17 and paragraph 8.205

<sup>3595</sup> See paragraphs 7.305 to 7.310

framework used in Ofwat's FD. We perform our own assessment of each of the parameters of this model, using up-to-date market data.<sup>3596</sup>

15.42 The main components of the cost of equity on which we decide are (in inflation adjusted CPIH-real terms):

- (a) **The TMR (6.2% to 7.5%):** To calculate the TMR, we place the most weight on historical ex post returns (from 1900 to the present day), as well as on the historic ex-ante approach when selecting our range. We place less weight on the forward-looking evidence;<sup>3597</sup>
- (b) **The RFR (-1.6% to -1.0%):** We calculate an RFR by placing weight on both long-tenor index-linked gilts and AAA-rated non-government bonds (the highest quality commercial debt) and taking into account up-to-date market data;<sup>3598</sup> and
- (c) **The equity beta (0.69 to 0.74):** We calculate an equity beta based on a range of approaches of analysing the observable market data of WASC comparators, including a potential debt beta.<sup>3599</sup>

15.43 Based on the above, we calculate a range for the cost of equity over the period of the price control of 3.76% to 5.21%. We pick a point estimate 0.25% above the mid-point of this range. Our judgement of the point estimate of the cost of equity is based on the following considerations:<sup>3600</sup>

- (a) promoting investment, and specifically addressing the risk of an exit of capital from the sector if the cost of capital were set too low;
- (b) the asymmetry of risk in the package of ODIs;
- (c) the scale of parameter uncertainty in estimating the cost of equity, particularly in the context of a sharp decline in equity returns since PR14; and
- (d) cross-checks, including the need for the WACC to be sufficiently high to support financeability, which we concluded was a more appropriate mechanism than Ofwat's decision to increase bills by advancing cash-flows from future periods.

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<sup>3596</sup> See paragraphs 9.5 to 9.14

<sup>3597</sup> See paragraphs 9.267 to 9.397

<sup>3598</sup> See paragraphs 9.46 to 9.266

<sup>3599</sup> See paragraphs 9.398 to 9.532

<sup>3600</sup> See paragraphs 9.1226 to 9.1415

15.44 We also consider other cross-checks against market data, although we conclude that these were insufficiently robust to change the choice of point estimate which we assessed based on the factors above.<sup>3601</sup>

### *Cost of debt*

15.45 We set an allowance for the total industry cost of debt at 2.18% in CPIH-real terms, marginally higher than Ofwat's 2.14%. We reach this figure by considering the costs of debt already incurred by the industry (embedded debt), the new debt costs that companies will face during the price control, the appropriate ratio of new and embedded debt and the costs of fees in relation to issuance and liquidity costs.<sup>3602</sup>

15.46 Evidence submitted by the Parties following Provisional Findings and our subsequent consultation on the costs of debt, as well as our own analysis, has allowed us to base our cost of embedded debt allowance on actual costs. We then cross check our estimates against the iBoxx A/BBB benchmark over 15- and 20-year trailing averages.<sup>3603</sup>

15.47 In relation to new debt costs, we set an allowance relative to an iBoxx A/BBB 10+ benchmark, measured over the first 6-months of the price control. Unlike Ofwat, we consider there to be insufficient evidence to apply an outperformance wedge in order to reduce this allowance. We agree with the use of a true-up mechanism for the cost of new debt in the next price control process and would expect this to be conducted on a like-for-like basis (with no performance wedge applied when calculating the true-up).<sup>3604</sup>

15.48 We apply a ratio of 17% new debt to 83% embedded debt in our calculations, slightly lower than the 20% of new debt used by Ofwat. We set the issuance and liquidity cost allowance at 0.1%, in line with Ofwat.<sup>3605</sup>

### *Appointee WACC*

15.49 As part of this assessment, we decide on levels for related metrics, particularly inflation (CPIH of 2%, with a 0.9% RPI-CPI wedge)<sup>3606</sup> and notional gearing (60%).<sup>3607</sup>

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<sup>3601</sup> See paragraphs 9.1345 to 9.1401

<sup>3602</sup> See paragraphs 9.533 to 9.904

<sup>3603</sup> See paragraphs 9.538 to 9.795

<sup>3604</sup> See paragraphs 9.796 to 9.828

<sup>3605</sup> See paragraphs 9.829 to 9.903

<sup>3606</sup> See paragraphs 9.15 to 9.36

<sup>3607</sup> See paragraphs 9.37 to 9.45

15.50 The CMA point estimates for its WACC parameters are therefore shown in Table 15-4, alongside Ofwat's FD figures. Our final point estimate for Yorkshire's Appointee Vanilla WACC is 3.20% (in CPIH-Real terms).

**Table 15-4: CMA point estimates of WACC components versus Ofwat PR19, CPIH-Real**

	<i>Ofwat PR19</i>	<i>CMA Point Estimate</i>	<i>Delta</i>
TMR	6.50%	6.81%	<b>+0.31%</b>
RFR	-1.39%	-1.34%	<b>+0.05%</b>
ERP	7.89%	8.15%	<b>+0.26%</b>
Equity Beta	0.71	0.71	-
Cost of New Debt	0.53%	0.19%	<b>-0.34%</b>
Cost of Embedded Debt	2.42%	2.47%	<b>+0.05%</b>
Proportion of New Debt	20%	17%	<b>-3%</b>
Issuance and Liquidity Costs	0.10%	0.10%	-
Impact of picking a point estimate above the midpoint	-	0.25%	<b>+0.25%</b>
Pre-tax Cost of Debt	2.14%	2.18%	<b>+0.04%</b>
Post-tax Cost of Equity	4.19%	4.73%	<b>+0.54%</b>
Gearing	60%	60%	-
<b>Appointee-level Vanilla WACC*</b>	<b>2.96%</b>	<b>3.20%</b>	<b>+0.24%</b>

Source: CMA analysis and Ofwat PR19 FD

\* Footnote: 'Vanilla' here refers to a WACC set using a pre-tax cost of debt and a post-tax cost of equity.

15.51 We note that our WACC figure is around 58bps lower than Yorkshire proposed to us in its SoC, equivalent to us closing around 29% of the difference between Ofwat and the company.<sup>3608</sup>

### ***Retail margin adjustment***

15.52 Our view is that using the unadjusted appointee WACC and a retail margin of 1% would result in water companies being overcompensated by receiving returns on their notional retail assets twice, as the retail margin includes compensation for risks which would be faced by an independent retail business but which are in practice mitigated for a vertically integrated appointee business.<sup>3609</sup>

15.53 We calculate the extent of this overcompensation as being equivalent to 8bps of RCV, and accordingly our decision is to reduce Yorkshire's allowed revenues by this amount as a retail margin adjustment.<sup>3610</sup>

### ***Gearing outperformance sharing mechanism***

15.54 Ofwat introduced a GOSM for the first time in PR19. Ofwat stated that equity investors benefit from higher equity returns that are associated with their increased risk, but there is no substantive benefit passed to customers. In addition, Ofwat stated where companies adopt high levels of gearing, they

<sup>3608</sup> See Table 9-1

<sup>3609</sup> See paragraphs 9.1104 to 9.1149

<sup>3610</sup> See paragraphs 9.1104 to 9.1149

may reduce financial resilience and transfer some risk to customers and / or potentially taxpayers in the event that a company fails. To address this, Ofwat introduced a mechanism that it said would share the benefits of higher gearing with customers.<sup>3611</sup>

15.55 We consider that the GOSM as designed was ineffective either as a benefit-sharing mechanism or as a tool to improve financial resilience. First, we consider that Ofwat had not adequately evidenced the existence of the benefits from high gearing that it said would be available to share. Second, to the extent that high gearing reduces financial resilience, the GOSM works only to encourage a reduction in gearing rather than to require a reduction in gearing. Moreover, we note that there are already multiple licence conditions which, together with a large and stable asset base, provide protection to consumers from excessive gearing. While we do not rule out that Ofwat may need to intervene at some time in the sector to reinforce its financial resilience and that this may or may not involve some constraint on gearing, for the purposes of this price control, we were not presented with evidence that an intervention on gearing is currently required in respect of the Disputing Companies or that the GOSM is the appropriate mechanism for such an intervention.<sup>3612</sup>

## **Financeability**

15.56 We are required to ensure that companies can continue to finance their functions. We therefore completed an in-the-round assessment of the financeability of the Disputing Companies, including a financial ratio analysis similar to that which would be undertaken by the credit rating agencies. The outputs of this ratio analysis for Yorkshire are shown in Table 15-5.<sup>3613</sup>

**Table 15-5: Credit ratio analysis for Yorkshire**

<i>Ref</i>	<i>Ratio</i>	<i>Gearing</i>	<i>Interest cover</i>	<i>AICR</i>	<i>FFO/net debt</i>	<i>Dividend cover</i>	<i>RCF/Net debt</i>
1	CMA FD	60.6%	4.1	1.4	9.9%	1.9	7.9%
2	CMA FD + 1% RoRe penalty	62.0%	3.9	1.3	9.1%	1.6	7.1%
3	CMA FD + 2% Totex overspend	61.3%	4.1	1.4	9.7%	1.8	7.6%
4	Ofwat	60.5%	4.2	1.5*	10.1%	2.0	8.1%

Source: CMA analysis

Note: Ofwat ratios are consistent with its approach to the final determination and include a benefit of accelerating PAYG in the interest cover ratio. CMA FFO/Net Debt ratios were calculated in line with Ofwat's approach to IRE for the period.

<sup>3611</sup> See paragraphs 9.1150 to 9.1155

<sup>3612</sup> See paragraphs 9.1156 to 9.1225

<sup>3613</sup> See Table 10-6 and paragraphs 10.88 to 10.101

- 15.57 Our analysis of Yorkshire's ratios suggests that, based on our determination and the assumption of a notional capital structure, Yorkshire would achieve financial ratios which are consistent with a strong investment-grade credit rating. In the downside scenarios, Yorkshire should still achieve ratios consistent with an investment grade credit rating of BBB/Baa2.<sup>3614</sup>
- 15.58 We have made an assessment of the WACC and wholesale totex requirements, in each case providing an increased allowance compared to Ofwat's FD. This represents a reasonable level of costs that each of the Disputing Companies could be expected to incur. We have also de-risked the determination, including moderating the cost-sharing rates to rebalance risk between customers and investors. Each of these factors improves financeability.
- 15.59 In measuring credit ratios, we took account of the credit rating agencies' stance on whether or not advancing revenue by adjusting PAYG rates would affect a credit ratings assessment. We concluded that Ofwat's approach of increasing the PAYG rate risks increasing customer bills without leading to a practical improvement in the water companies' ability to secure a strong investment grade rating, and we did not make PAYG adjustments.<sup>3615</sup>
- 15.60 We find that Yorkshire should be able to achieve strong investment-grade credit ratings based on the notional capital structure, and this is consistent with our assumptions in the WACC for the cost of debt. We also find that under a reasonable downside scenario, Yorkshire's ratios are worse than the baseline model but still investment-grade. We consider that companies facing a financeability constraint, such as to address a downside scenario, may adopt a range of mitigating actions to address impact, such as absorbing headroom in credit ratios, or increasing the contribution of equity either by forgoing dividends or injecting fresh capital. We conclude that this supports the view that our determination for Yorkshire is financeable.<sup>3616</sup>

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<sup>3614</sup> See paragraphs 10.119 to 10.122

<sup>3615</sup> See paragraphs 10.77 to 10.87

<sup>3616</sup> See paragraphs 10.119 to 10.122 and 10.123 to 10.134

## Implied calculations of revenue and implications for k and bills

### *Revenue adjustments*

- 15.61 The majority of a water company's wholesale revenue is derived from the totex and WACC figures discussed above. However, there are certain additional elements which affect Yorkshire's revenue allowance in AMP7.<sup>3617</sup>
- 15.62 For the majority of these revenue categories, Yorkshire has not raised any concerns and we have no evidence to support the use of alternative figures, and so we decide to use Ofwat's figures. In doing so, we note that certain figures have changed since Ofwat's FD. This is the result of 'blind year adjustments', in which Ofwat conducts a reconciliation for company performance in the final year of the last AMP – this uses data which was not available at the time of Ofwat's FD. We include these adjustments in our final determination, which results in a £0.6 million increase in Yorkshire's revenue for the period.<sup>3618</sup>
- 15.63 However, we have received submissions in two areas, which we consider support a different approach:
- (a) Yorkshire raised concerns about the effects of an accidental data input error it made in PR14, and which it raised with Ofwat as soon as this error was identified in 2015-16. We decide that this is a clear and unambiguous error which should be remedied by increasing Yorkshire's Water Network Plus revenue allowance by around £34 million. We note that this decision also decreases Yorkshire's Water Network Plus RCV by around £11 million, which has an effect on AMP7 revenue through a slightly lower RCV run-off and return on capital.<sup>3619</sup>
  - (b) Ofwat's FD used a corporation tax rate of 17% on the expectation that the rate was going to drop from the current figure of 19%. However, the rate has remained at 19%, and we consider it appropriate to use the prevailing rate. Accordingly, we decide to use a corporation tax rate of 19%. This, along with other changes in our determination which impact tax allowances, results in no change in Yorkshire's wholesale revenue compared to Ofwat's FD. We also adopt the same approach as Ofwat of

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<sup>3617</sup> Revenue adjustments for PR14 reconciliations; Tax; Grants & contributions after adjustment for income offset (price control); Non-price control income; Innovation competition; Revenue re-profiling; see Table 4.1 of Ofwat (2019), *PR19 final determinations: Yorkshire Water final determination*.

<sup>3618</sup> See [https://www.ofwat.gov.uk/wp-content/uploads/2020/11/In-period-adjustment-model\\_YKY\\_BYRun2.xlsx](https://www.ofwat.gov.uk/wp-content/uploads/2020/11/In-period-adjustment-model_YKY_BYRun2.xlsx), 'abatements and deferrals' tab; we note that Ofwat has also made adjustments to the company's RCV but that these will occur at the end of AMP and so do not affect in-period revenues.

<sup>3619</sup> See paragraphs 11.12 to 11.80



including a reconciliation mechanism which reflects subsequent increases or decreases in the corporation tax rate.<sup>3620</sup>

15.64 We also allow Yorkshire to recover a proportion of its costs for the determination process, which includes an allocation of our own costs. This represents around £2.3 million (which is excluded from totex cost-sharing).<sup>3621</sup>

### ***Implied Yorkshire revenue in AMP7 and calculations of k***

15.65 In order to calculate Yorkshire's revenue figures, we need to include a PAYG rate to split totex into in-period recovery and RCV additions. To do this, we use the 'natural rates' included in Ofwat's FD.<sup>3622</sup>

15.66 Table 15-6 shows Yorkshire's resulting wholesale allowed revenue.

**Table 15-6: Calculation of Yorkshire's wholesale allowed revenue (£ million)**

	<i>Water resources</i>	<i>Water network plus</i>	<i>Wastewater network plus</i>	<i>Bioresources</i>	<i>Total</i>
PAYG	184	1,183	964	181	<b>2,511</b>
RCV Run-off	69	394	720	144	<b>1,327</b>
Return on Capital (Incl. RMA)	74	302	526	40	<b>943</b>
Reconciliation	1	42	41	0	<b>83</b>
Tax	0	4	4	3	<b>11</b>
Grants and contributions	0	53	39	0	<b>92</b>
Deduct non-Price control income	0	-13	-5	0	<b>-18</b>
Innovation competition	0	8	10	0	<b>18</b>
Revenue reprofiling	1	4	-1	0	<b>4</b>
<b>Wholesale revenue</b>	<b>328</b>	<b>1,978</b>	<b>2,298</b>	<b>367</b>	<b>4,971</b>

Source: CMA analysis.

Note: £ million over the whole 2020-25 price control in 2017-18 CPIH deflated prices

15.67 This calculation results in Yorkshire's wholesale revenue over the AMP being around £148 million higher than Ofwat's FD.<sup>3623</sup>

15.68 In relation to the retail price control, neither Yorkshire nor any of the other Disputing Companies have raised any concerns that Ofwat's approach should be re-considered. Our decision is to align our approach with Ofwat's FD19. This includes the household retail expenditure allowance and the outcome measures relating to C-MeX and D-MeX.<sup>3624</sup> Therefore, we maintain Ofwat's approach of calculating retail allowances based on wholesale, which results in

<sup>3620</sup> See paragraphs 11.2 to 11.11

<sup>3621</sup> See paragraphs 11.124 to 11.134. We note that this has been modelled as an increase in totex, with these costs being considered entirely opex (and so recovered in period). This results in a small change in the PAYG rates purely for the purpose of modelling this specific cost recovery.

<sup>3622</sup> See paragraphs 10.85 to 10.87

<sup>3623</sup> Ofwat's FD included wholesale revenues for Yorkshire of £4,823 million; see Table 1.3 in Ofwat (2019), [PR19 final determinations: Yorkshire Water final determination](#).

<sup>3624</sup> See paragraphs 11.115 to 11.120

a small incremental allowance of £1.2 million for Yorkshire (£321.2 million in our determination compared to £320.0 million in Ofwat's FD).<sup>3625</sup>

15.69 The estimated effect of these changes on average annual customer bills is shown in Table 15-7, compared to Yorkshire's historical bills and Ofwat's FD.<sup>3626</sup>

**Table 15-7: Indicative impact of our determination on Yorkshire's annual customer bills**

	Yorkshire historical bills (2019/20)	Yorkshire average bill in April business plan†	Yorkshire average bill under Ofwat FD	Yorkshire average bill under CMA decision	£
Average annual bill (water and sewerage)*	383	379	364	374	

Source: CMA calculations; Yorkshire business plan bills taken from Ofwat (2019), [PR19 final determinations: Yorkshire Water final determination](#), Table 1.1.

\* Footnote: The numbers in this table reflect the average amount per customer charged, expressed at constant (inflation adjusted) prices (2017-18 CPIH deflated) Individual customer bills will vary depending on a number of factors such as the whether the property is metered or not and, for metered customers, the amount of water consumed.

† Footnote: The April business plan figure here is taken from Ofwat's published documents, and may not align with all of the implications of the company's submissions in its SoC.

15.70 The bill in our determination is higher than Ofwat's FD by around £10 per year. Under our determination, Yorkshire's average bills are still £9 per year lower than they were in 2019/20 (and £5 per year lower than Yorkshire's April business plan), which should assist customers who were struggling with the affordability of this essential utility.

15.71 Having determined the revenue allowances over the whole AMP, we profile it between individual years in order to provide customers with a better view of the potential impact, and to allow for an annual calculation of K. In doing so, we choose to implement a consistent annual increase in nominal bills over the course of the remaining years in the AMP.<sup>3627</sup> This defers some of the bill increases until later years, which is likely to be particularly beneficial to customers affected by the COVID-19 pandemic, whilst also avoiding any specific 'spike' in customer bills in a single year.<sup>3628</sup>

<sup>3625</sup> See paragraphs Table 11-2; Table 6.2 of Ofwat (2019), [PR19 final determinations: Yorkshire Water final determination](#)

<sup>3626</sup> The price control sets revenue allowances for the individual companies. This determines the average bill that the company can charge its customers. Individual bills will vary depending on the charging scheme adopted by the company, see Ofwat's [information on charging](#).

<sup>3627</sup> We note that due to the timing of the redetermination, Yorkshire will not be able to implement our final determination until the third year of the AMP, which will result in larger increases in the later years than would be the case otherwise.

<sup>3628</sup> Paragraph 3.5 of [The Consumer Council for Water's response to the provisional findings](#) noted that 'customers prefer a smooth profile to any bill increases rather than experiencing spikes in any one year'.

15.72 The results of this profiling, as well as the impact on K and bills,<sup>3629</sup> is shown in Table 15-8 and Table 15-9.

**Table 15-8: Yorkshire's Base Revenue and K factors by charging year**

	Base (£m)	2020-21	2021-22	2022-23	2023-24	2024-25
Water resources	65.3	0.00	-1.94%	+1.82%	+1.75%	+1.83%
Water network plus	367.9	0.00	+2.50%	+4.58%	+4.26%	+4.97%
Wastewater network plus	478.1	0.00	-3.94%	-0.62%	-0.69%	-0.70%

Source: CMA calculations  
Note: 2017-18 CPIH deflated

**Table 15-9: Yorkshire's indicative annual bills**

	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
Customer bills	383	379	371	372	374	376

Source: CMA calculations  
Note: 2017-18 CPIH deflated

15.73 In addition, we update Yorkshire's bioresources control such that its TDS revenue average is set to £475.1 in years 3 to 5 of the AMP. Applying the variable vs fixed split from Ofwat's FD (38%)<sup>3630</sup> results in a variable revenue of £180.2 / TDS.

15.74 Finally, we emphasise that while we have looked at individual components in detail, and necessarily made decisions on each of these, we have also considered any cross-cutting or interconnected issues when making such decisions. In particular, the inter-relationship between cost and service, as well as risk, return and financeability have influenced our decisions in each of the major areas of the determination (totex, outcomes and WACC). This is a determination of a whole package 'in the round', and we consider that this determination secures compliance with all our duties.

<sup>3629</sup> The price control sets revenue allowances for the individual companies. This determines the average bill that the company can charge its customers. Individual bills will vary depending on the charging scheme adopted by the company, see Ofwat's [information on charging](#).

<sup>3630</sup> [https://www.ofwat.gov.uk/wp-content/uploads/2019/12/Bioresources-Revenue\\_YKY\\_FD.xlsx](https://www.ofwat.gov.uk/wp-content/uploads/2019/12/Bioresources-Revenue_YKY_FD.xlsx)