May 2025

PR24 redeterminations

Expenditure allowances – common issues

Ofwat

Executive summary

We set expenditure allowances based on company requests, cross company and historical benchmarking and detailed assessments of company justification for additional funding. Our final determination expenditure allowances were 7% less than company requests, and there was a 1% gap from company original business plan requests. For disputing companies' final determinations, cost gaps ranged from Wessex Water (17%), South East Water (13%), Southern Water (11%) to Anglian Water (2%) and Northumbrian Water (3%).

The disputing companies have increased their expenditure request by more than £1 billion since their response to the final determinations. In their statement of case, Anglian Water, Northumbrian Water, Southern Water and South East Water have all substantially increased their expenditure request. This itself was a substantial increase on the original business plan request for Anglian Water and Southern Water, and a smaller increase for Northumbrian Water and South East Water. While Wessex Water's request has reduced, it reserves the right to raise seven further issues. This increase in requests is at the same time as the disputing companies are committing to delivering less and asking for more protection against risks.

The disputing companies have raised around one hundred issues on cost allowances and related mechanisms. This document sets out Ofwat's response to the common issues – that is issues that are raised by more than one company and issues that while raised by only one company could have implications for other companies. It also covers issues where benchmarking was a significant part of the assessment. Issues that only impact one company are covered in the company specific documents.

We continue to consider that our base expenditure benchmarks are robust. Southern Water and South East Water proposes changes to our base expenditure benchmarks, for example in relation to network topography. Our PR24 base expenditure models build on the models used in PR19 and have been further developed over several years in consultation with the sectors. Other companies have not raised concerns with these cost drivers and changes in cost drivers will impact the allowances for all disputing companies and potentially all companies if reflected in benchmarks for PR29.

We made significant adjustments to our base expenditure benchmarks, totalling £3.9 billion, compared to £0.3 billion in PR19. All five disputing companies propose cost adjustment claims. We have made company specific adjustments to our base cost benchmarks where companies were able to provide compelling evidence of unique circumstances driving higher efficient costs claims. Where there was evidence of a sector wide issue or cost pressures, we introduced sector wide adjustments to provide additional allowances. Some of the disputing companies provide new evidence for cost adjustments or suggest new cost adjustments (such as Anglian Water on capital maintenance, Wessex water on bioresources and water disinfection, or Anglian Water on capital maintenance). We

continue to consider that there is insufficient evidence for the proposed adjustments and/or the adjustments reflect factors that are already reflected in cost benchmarks. Each of the disputing companies challenge our assessment of what base buys, in particular in regard to mains renewals. We have assumed that base buys the average historical rate of renewals from the period used for the cost models.

We have improved our understanding of asset health and made forward looking adjustments to allowances where required. Anglian Water, Northumbrian Water and Southern Water challenge our approach to maintaining asset health. We provided an increase in allowances for companies to increase mains renewals and where appropriate rising main renewals as part of final determinations. During the price review process, to address concerns over asset health, we collected asset condition data on water mains, sewers and bioresources assets. The asset condition data we collected covered around 70% of the network. This did not identify systematic asset health issues that needed to be addressed at final determinations. However, we acknowledge that we have not covered all assets and are progressing work at pace to collect sector wide condition data on priority assets with a view to making sector wide adjustments during the 2025-30 period, where appropriate.

We have improved our assessment of enhancement expenditure. We have significantly improved and extended our enhancement cost benchmarks, including the use of scheme level and historical data for significant expenditure areas. Our enhancement cost benchmarks cover around three quarters of enhancement expenditure. Where benchmarks are less robust such as for Industrial Emissions Directive costs, we have reflected this in our cost sharing rates.

We have adjusted our enhancement cost benchmarks to account for high cost or engineering outliers where there are scheme characteristics that drive higher costs such as very tight phosphorus permits. The disputing companies request additional adjustments where they consider their scheme costs are higher. Enhancement cost benchmarks are based on data from many projects with a range of circumstances. We have adjusted allowances where costs are impacted by exogenous factors that are not explicitly or implicitly reflected in the benchmarks, are supported by robust supporting evidence and are not inside a company's control, such as a company's own cost efficiency.

We have moderated the scale of our enhancement cost challenge. Each of the disputing companies raises concerns over our cost challenges on specific schemes. Compared to draft determinations we have reduced the scale of our deep and shallow dive efficiency challenges. We use median benchmarks and equal weights for historical and forecast data for enhancement expenditure. We are concerned where disputing companies suggest that weight placed on historical evidence should be removed or reduced (such as Southern Water on supply interconnectors and Wessex Water on phosphorus removal) or do not provide sufficient and convincing evidence why costs have increased compared to historical outturn

(such as South East Water on water efficiency and investigations). Historical costs can often be more reliable than forecasts as they reflect what has been spent and the impact of risk and uncertainty.

Each of the disputing companies provides new evidence for existing claims and submits entirely new claims in addition to those included in business plan. The companies will have highlighted where costs have increased rather than fallen, but not where costs have fallen. If updates are made for new information, then this should cover all areas rather than those the companies have suggested.

Some of the disputing companies also request additional allowances which duplicate previous allowances, implicitly asking for customers to pay twice. This can cover overlaps with the expectations of base allowances (such as South East Water's replacement of air fed water treatment process) or enhancement (such as Southern Water's request for transitional expenditure to fund improvements to treatment works it committed to make in PR19).

We continue to consider that a 1% per year frontier shift (or 'ongoing efficiency') assumption is reasonable. Each of the disputing companies suggests that frontier shift should be reduced in particular to reflect lower recent productivity growth. We consider that a 1% per year frontier shift is appropriate as this is in the middle of our consultants CEPA's range; is consistent with recent regulatory decisions, recent and longer term productivity growth and Office of Budget Responsibility forecasts; reflects embodied technical shift; and the step-change in investment over the 2025-30 period, which should facilitate a 'learning by doing' productivity effect.

We use price control deliverables to hold companies to account to deliver in full and on time the improvements that customers have funded. Anglian Water and Southern Water request greater flexibility and reduced reporting. We have built in flexibility into price control deliverables so that they can deliver programme outputs in the best way possible. Our time incentives encourage companies to deliver schemes on time, based on a fair bet calibrated on outturn PR19 data. We continue to consider our expectations on regular reporting, transparency and independent assurance on delivery will be critical to maintaining the trust and confidence in the sector during PR24. The administrative costs of our reporting and assurance requirements will be small compared to the significant step up in enhancement allowances.

We included a wide range of uncertainty mechanisms in PR24 to deal with delivery concerns or to manage cost and output uncertainty over the price review period such as cost sharing, the aggregate cost sharing mechanism, the delivery mechanism, the large scheme gated process and bespoke uncertainty mechanisms. Southern Water and Anglian Water request specific changes to these mechanisms to increase risk protection to companies, or in the case of storm overflows provide greater potential for water companies to outperform. We continue to consider that the overall suite of risk protections provides a balanced approach to

managing risks between companies and customers, and that companies should bear risks where it is most appropriate for them to manage these risks.

We have said that we will correct for errors that were flagged to Ofwat if they were unambiguous. Given the asymmetric nature of responses from companies, in that a company is only likely to flag errors that lead to higher allowances, we focused adjustments where errors were material.

Contents

1. Introduction to cost assessment

1.1 When setting expenditure allowances we consider several risks:

- Allowances are too high which means customers overpay and companies underspend which reduces confidence in the regulatory regime.
- Allowances are too low, either causing the company to overspend or to cut back on the enhancement scheme.
- The company does not invest in the right solutions. This will both result in poor value for money and unnecessary exposure of customers to risks to resilient services, poor performance and additional costs.

1.2 The starting point of our assessment is company business plans. However, companies may not forecast costs accurately. For example, there may be uncertainty over costs or scope, risk aversion or inaccuracies in forecasts.

1.3 Companies are more likely to put forward cases where their costs are higher than other companies than where they are lower. They are also likely to identify where costs have increased rather than fallen. This introduces asymmetry into our assessment.

1.4 We seek to manage these risks through our approach to cost assessment:

- We use benchmarking and where possible historical or external benchmarks to set expenditure allowances.
- We adjust costs for company and scheme specific factors, and where the future is likely to be different to the past.
- We use price control deliverables so that companies deliver the outputs and outcomes they have been funded for.
- We assess optioneering to test whether the company is likely to have identified the right option.
- We consider efficiency in the round – across a portfolio of work so that we do not expect companies to be efficient across all areas or all schemes.

1.5 Companies proposed around £112 billion of expenditure for PR24 in their representations to draft determinations. This was a significant increase in expenditure compared to previous price controls and a £7 billion increase on the requests in their business plans.

1.6 Our PR24 final determinations allowed total expenditure allowances of up to £104 billion, including contingent allowances. This represented a 71% increase in expenditure compared to PR19, and a 7% gap to revised company requests and a 1% gap from company original business plans. The final cost gap was comparable to PR19 (5% gap)

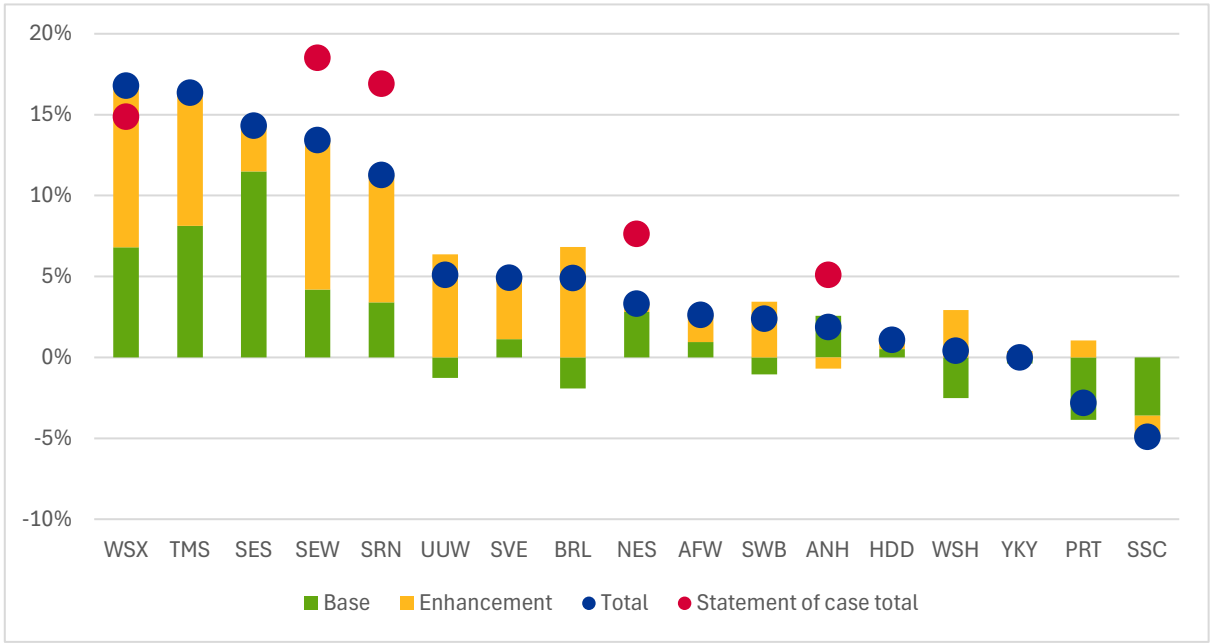
and lower than Ofgem RIIO2 (12%) despite the increase in enhancement expenditure where costs are more uncertain.

1.7 Our cost challenge reflects where requests for expenditure were higher than other companies for the same work without justification, where expenditure overlapped with the expectations from base expenditure or previous expenditure allowances and customers were effectively being asked to pay twice, or where additional expenditure had not been justified.

1.8 In total five companies had a cost gap of more than 5% at final determinations. This included Southern Water, Wessex Water and South East Water. Anglian Water had a cost gap of 2% and Northumbrian Water at 3%.

1.9 Four disputing companies: Anglian Water, Northumbrian Water, Southern Water and South East Water appear to have substantially increased their requests since final determinations. All four companies also increased their cost requests during the price review process between their original business plan and their response to draft determinations. Based on the information provided by the disputing companies we have estimated the increase in the cost gap compared to final determinations in the statement of case. This is shown together with the final determination cost gap below. The cost request could be larger than this. Wessex Water have asked to reserve the right to raise additional issues, which could substantially increase its cost gap. Other disputing companies have raised issues but have not quantified them or included them in their expenditure request. To allow a fair process, we consider that it is important that water companies are clear on the additional funding and adjustments that they are requesting at the start of the process.

Figure 1: Cost gap by company



Drivers of cost gaps

1.10 **Anglian Water** had a cost gap of 2% or £0.2 billion at our final determinations. In its statement of case Anglian Water is requesting an additional £0.4 billion to increase the cost gap to 5%.

1.11 Anglian Water substantially increased its cost request across the price review process. Its final determination cost request was 14% or £1.4 billion higher than its original business plan. Anglian Water's original business plan enhancement programme was efficient across a range of enhancement expenditure benchmarks. However, in response to our draft determinations, Anglian Water substantially increased its enhancement request often to reflect our industry benchmarks. This resulted in enhancement allowances that were 2% higher than the company's revised request and 20% and around £800 million more than its original business plan.

1.12 Our final determination base cost allowances are 11% higher than company spending over the last five years and 17% higher than PR19 but was 5% below Anglian Water's request due to our rejection of several cost adjustment claims.

1.13 Anglian Water's statement of case request covers additional claims on asset health improvements to storage points and gravity sewers (£150 million) and business rates (£76 million), together with a frontier shift adjustment of 0.8% per year, compared to using 1% in its final determination request.

1.14 **Northumbrian Water** had a cost gap of 3% or £0.2 billion at final determinations. This largely reflected the partial rejection of its wastewater power resilience claim and our decision to consider additional asset health claims (beyond those on mains renewals and rising mains) outside of the PR24 process. The company is now requesting additional costs of £0.5 billion compared to final determinations.

1.15 Our final determination allowance was 1% higher than the company's original business plan request. Our base expenditure allowances were 11% higher than PR19 allowances and 2% higher than company spending over the last five years. Northumbrian Water costs were generally in line with enhancement scheme level benchmarks.

1.16 Northumbrian Water's additional statement of case request is largely driven by new cost claims on phosphorus removal (£91 million), business rates (£37 million) and Industrial Emissions Directive (£25 million), and an increase in the asset health cost claim (up to £180 million). This is partially offset by the cost savings by pushing back the delivery of the Suffolk Water resources scheme (£77 million).

1.17 **Southern Water** had an 11% totex gap or £1.1 billion at final determinations. This was smaller than the company £1.7 billion (or 22%) increase the company made to its expenditure request from its original business plan.

1.18 Our final determination base expenditure allowances were 4% above its original business plan, but 8% or £0.3 billion below its final determination request.

1.19 A large part of the challenge at final determinations on enhancement expenditure was related to strategic water resource options (£109 million) and storm overflows (£121 million). On strategic resource options, we rejected upfront funding for risks which are covered through separate mechanisms. On storm overflows, Southern Water had much higher costs than our efficient benchmark, other companies and historical costs. Southern Water has not requested additional expenditure for either area as part of the statement of case. However, Southern Water has increased its additional cost request to £1.5 billion compared to its final determination allowance with new claims for costs on power (£47 million) and a £500 million asset health gated allowance claim.

1.20 **Wessex Water** had the largest cost gap at final determinations of 17% equivalent to £0.9 billion. In contrast to the other disputing companies, Wessex Water has reduced its cost request through the process. This partly reflects the high costs included in the company's original business plan. At final determinations the company's base expenditure request was 28% above its allowance at PR19 and 18% more than its actual spend in the last 5 years. Its enhancement expenditure requests were high compared to other companies across several benchmarked areas, most notably for phosphorus removal but also Industrial Emissions Directive and growth at sewage treatment works.

1.21 In its statement of case, Wessex Water requests additional expenditure allowances of £0.7 billion compared to the final determination. This is focused on base expenditure and phosphorus removal. Its base expenditure request has increased from £347 million at final determination to £485 million in its statement of case and its final determination capital maintenance claim has been refocused on specific claims on disinfection, bioresources and water base expenditure models.

1.22 **South East Water** is requesting additional expenditure allowances of £412 million in its statement of case, £129 million more than the cost gap at final determinations. Our final determinations base expenditure allowance was in line with the company's original business plan request but £88 million below South East Water's final determination request. The company is now seeking additional base allowances of £173 million.

1.23 On enhancement, our final determinations allowance was £194 million below the company's request, reflecting the company's high costs compared to other companies and the partial rejection of some of its large water resilience claim. South East Water now requests an additional enhancement allowance £239 million compared to the final

determinations. This largely reflects the company requesting its full final determination request in nearly all enhancement areas, but not taking into account the additional gated allowance of £50 million or the areas where it got more than requested, which would offset some of these additional requests.

2. Base expenditure allowances

Base costs are routine, year-on-year costs, which companies incur in the normal running of the business to provide a base level of good service to customers and the environment and maintain the long-term capability of assets. We engaged extensively with the sector to build on and improve our approach to assessing base expenditure at PR24.

Our suite of econometric cost benchmarking models are the starting point of our PR24 base cost assessment. They allow us to compare costs between companies on a like-for-like basis, overcome information asymmetry, and subsequently challenge companies' costs so customers do not overpay. The models are estimated using historical cost and cost driver information. We use forecast cost drivers to reflect future changes in population and the asset base in base expenditure allowances.

The cost adjustment claim process allowed companies to present evidence of unique operating circumstances which drive higher efficient costs for the company relative to its peers; or if the company did not consider that historical costs are a good reflection of future costs. We accepted eight company specific cost adjustments, and applied six sector wide cost adjustments where there was evidence of sector wide cost pressures not captured in the base cost models: mains renewals, meter replacements, network reinforcement, phosphorus removal, net-zero, and energy costs. We applied cost adjustments worth £3.9 billion at PR24 compared to only £287 million at PR19.

We assessed some costs outside of the econometric models, known as unmodelled base costs. These costs are assessed separately as they are largely outside of company control or are only incurred by a subset of water companies. At PR24, business rates accounted for approximately half of these costs.

PR24 base expenditure allowances totalled £60.1 billion, which is 19% higher than our base expenditure allowances at PR19 (£50.5 billion), and 7% more than what companies have spent in the past 5 years (£56.4 billion).

The disputing companies raise several cross cutting issues in relation to base expenditure allowances. These include:

- **The disputing companies challenge some aspects of the econometric benchmarking models.** This includes comments on model robustness, cost driver selection, and updating the models for the latest year of outturn data. We followed a robust model development process to arrive at our model selection, including extensive stakeholder engagement. Our models capture the key cost drivers; are consistent with engineering, economic and operational rationale; perform well against model robustness tests; and are broadly supported by the sector. We accept the models may not always capture company specific issues, and therefore allow companies to submit cost adjustment claims.

- **The disputing companies disagree with our approach to establishing what base buys in our sector wide cost adjustments.** Namely our decision to use the full historical modelling period to determine this, and not the last five years only. It is important to establish what base buys before applying any cost adjustments to ensure that customers do not pay twice. We set long-term base allowances using the historical modelling period (2011-12 to 2023-24). It is therefore appropriate to use this same period to establish what base buys. It also avoids perverse incentives for companies to reduce work in the lead up to a price review.

- **Northumbrian Water, Southern Water and South East Water disagree with our decision to hold companies to account for historical under-delivery.** The companies disagree with imposing delivery requirements based on previous price control periods to ensure that customers do not pay twice. Customers should not pay twice for companies failing to maintain their assets, or delivering the required renewals to keep pace with deterioration of the asset base. They should also not pay twice due to a company's decision to redivert expenditure to manage unforeseen cost pressures, at the expense of the health of other assets. There is cost sharing and other mechanisms in place to mitigate the risk of unexpected cost pressures.

- **The disputing companies disagree with the application of PCDs to base expenditure allowances**, stating this goes against the flexible nature of base allowances. The evidence suggests that companies have not delivered what was proposed in their PR19 business plans despite there being a sector cost gap of just 0.4% at final determination. At PR24, base allowances have increased by 19% relative to PR19. It is therefore important that there is a mechanism in place that incentivises delivery and also returns money to customers if companies fail to deliver the investment as set out in their business plans.

- **Anglian Water, Northumbrian Water and Southern Water state there is a lack of certainty regarding available funding through our enhancing asset health understanding workstream.** If data collected through this workstream indicates there are sector wide issues that need to be, and can be, addressed ahead of PR29, we will provide additional allowances to companies. As discussed with companies at our working groups, the right mechanism for providing additional allowances is unlikely to become clear until we have established and agreed priority assets, and the potential scope of required works.

- **Anglian Water, Northumbrian Water and Wessex Water state the assessment of business rates should be based on the updated Valuation Office Agency's (VOA) 2026 revaluation values.** We present an updated view of our business rates allowances that incorporates the values proposed by the companies.

Our final determination

2.1 Base costs are routine, year-on-year costs, which companies incur in the normal running of the business to provide a base level of good service to customers and the environment and maintain the long-term capability of assets. This covers both wholesale and retail activities.

2.2 There are three key elements to setting efficient base expenditure allowances:

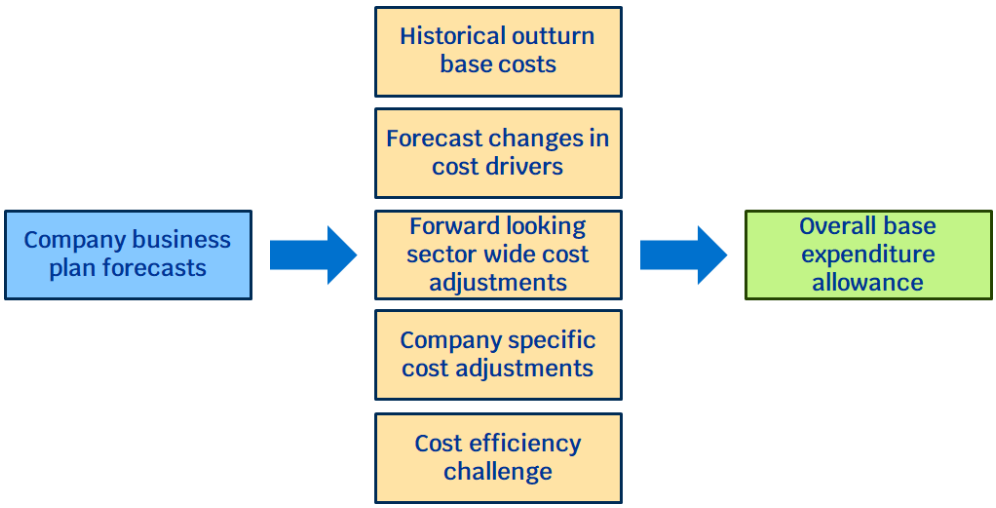
- Base cost econometric benchmarking models ('modelled base cost')
- Cost adjustment claims
- Assessment of unmodelled base cost

2.3 Our approach to assessing base expenditure builds on the approach used at PR19, which was mostly followed by the Competition and Markets Authority (CMA) in its PR19 redeterminations (eg only minor change to wastewater base cost models).

2.4 We engaged extensively with water companies and other stakeholders to identify areas of improvement, and how we can build more of a forward-look into our base cost assessment. Companies broadly supported our proposed approach to setting base expenditure allowances at PR24, with relatively minor comments received.[1]

2.5 We summarise our approach to assessing base expenditure at PR24 in the figure below.

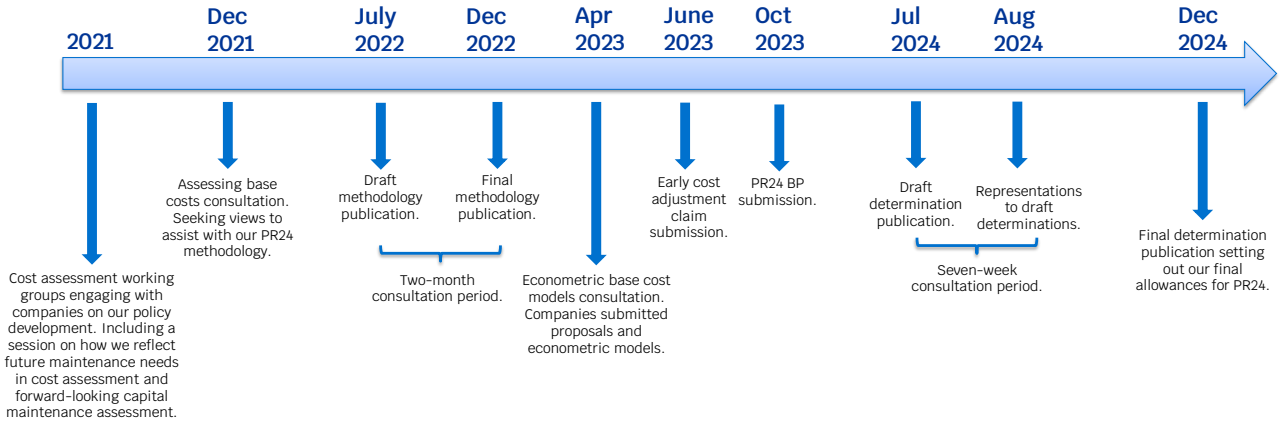
Figure 2: summarising our approach to setting base expenditure allowances at PR24



[1] [OF-CA-001] Ofwat, Creating tomorrow, together: Our final methodology for PR24: Appendix 9 Setting expenditure allowances, December 2022, p.6

2.6 We set out the PR24 timeline related to base expenditure allowances below, which demonstrates our extensive engagement with the sector.

Figure 3: Timeline for setting PR24 base expenditure allowances



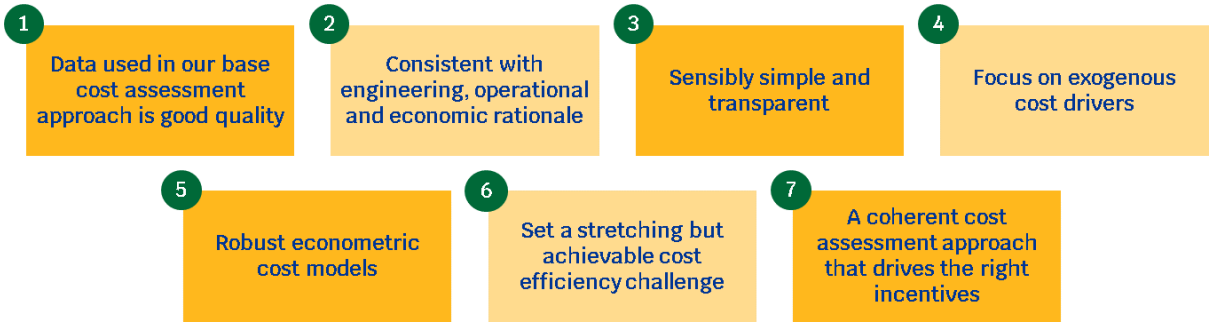
2.7 Key base cost publications and consultations prior to business plan submissions are:

- Cost Assessment Working Group (CAWG)[2]
- Assessing base costs at PR24 consultation – December 2021[3]
- Information notice 22/02 Cost assessment data requests, which reflected company feedback on additional data collection to support development of econometric benchmarking models and cost adjustment claims – April 2022.[4]
- Draft methodology – July 2022.[5]
- Final methodology – December 2022.[6]
- Econometric base cost models consultation – April 2023.[7]
- Early cost adjustment claim submission – June 2023.[8]

2.8 Through the Cost Assessment Working Group and 'Assessing base costs at PR24' consultation, we established principles of base cost assessment with water companies to help provide confidence that decisions we make at the price review are justified and well-evidenced. These are summarised in the figure below, and were supported by water companies.

Figure 4 4: Principles of PR24 base cost assessment

[2] [OF-CA-002] Ofwat, Cost Assessment Working Group
[3] [OF-CA-003] Ofwat, Assessing base costs at PR24, December 2021
[4] [OF-CA-004] Ofwat, IN 22/02 Cost assessment data requests, April 2022
[5] [OF-CA-005] Ofwat, Creating tomorrow, together: consulting on our methodology for PR24. Appendix 9 - Setting expenditure allowances, July 2022
[6][OF-CA-001] Ofwat, Creating tomorrow, together: Our final methodology for PR24: Appendix 9 Setting expenditure allowances, December 2022
[7] [OF-CA-006] Ofwat, Econometric base cost models for PR24, April 2023
[8] [OF-CA-007] Ofwat, Approach to assessing base expenditure – Cost adjustment claims, June 2023



Base cost econometric benchmarking models

2.9 Our base cost econometric benchmarking models are the starting point of our assessment of modelled base costs. They allow us to compare costs between companies on a like-for-like basis by taking into account multiple factors that drive differences in efficient base costs between companies and over time. For example, company size, treatment complexity and network topography. They help to overcome information asymmetry between Ofwat and water companies and allow us to challenge companies' costs so customers do not overpay.

2.10 We are in a unique position compared to other economic regulators as we can compare costs between 16 companies. Econometric benchmarking models are one of the most robust and transparent ways of benchmarking.

2.11 We have historically engaged with the sector on our model selection. First through the Cost Assessment Group following PR19.[9] And more recently through our April 2023 modelling consultation,[10] where we consulted on our proposed set of base cost models which built on those we used in PR19 and reflected the outcome of discussions with water companies in the Cost Assessment Working Group. We received consultation responses from all incumbent water and wastewater companies, which we considered to arrive at the proposed set of base cost models for draft determinations.

2.12 We received very limited comments and new information from water and wastewater companies on our selected base cost models in response to our draft determinations. After careful consideration we made no changes to our model selection.

2.13 Overall, our selected models produce robust results that align with engineering and economic rationale. Internal and external engineering experts played an integral role in model development so that the models have a clear engineering rationale and capture the key cost drivers that explain differences in efficient base expenditure between companies and over time. For example, engineers helped to identify the important cost

[9] [OF-CA-002] Ofwat, Cost Assessment Working Group
[10] [OF-CA-006] Ofwat, Econometric base cost models for PR24, April 2023

drivers from an engineering perspective, and how we can proxy these with explanatory variables. They also assisted us to ensure the model estimation results are intuitive and consistent with engineering logic.

2.14 We developed our models with input from Cambridge Economic Policy Associates (CEPA), a specialist regulatory economics consultancy, and our econometric academic advisor, Professor Andrew Smith.

2.15 Our models build on those used by Ofwat at PR19, and the CMA at PR19 redeterminations. We have made several improvements, which are set out in our final determination base cost modelling decision appendix.[11]

2.16 Following regulatory best practice, we triangulate across a range of models with different cost drivers and levels of cost aggregation. This reduces risk of error and bias in any one model. Disaggregated cost models enable a wider range of cost drivers to be captured. Whereas more aggregated models capture interactions between different services and mitigate potential cost allocation issues.

2.17 We summarise our base cost model selection below. Please see 'OF-OA-024, PR24 final determinations: Expenditure allowances – base cost modelling decision appendix' for more details on our base cost model selection and approach.

Table 1: summary of PR24 base cost models

	Cost drivers	High level of cost aggregation	Medium level of cost aggregation	Disaggregated cost models
Wholesale water[12]	• Scale • Treatment complexity • Network topography • Population density	Wholesale water (12 models)	Water resources plus (6 models)	Treated water distribution (6 models)
Wastewater network plus[13]	• Scale • Economies of scale at sewage treatment works • Treatment complexity • Network topography • Population density • Urban rainfall	N/A	Wastewater network plus (2 models)	• Sewage collection (3 models) • Sewage treatment (2 models)
Bioresources[14]	• Economies of scale in sludge treatment • Location of sewage treatment works relative	N/A	N/A	Bioresources (4 models)

[11] [OF-CA-008] Ofwat, Expenditure allowances – base cost modelling decision appendix, December 2024
[12]Wholesale water is made up of water resources + raw water distribution + water treatment + treated water distribution.
[13]Wastewater network plus is made up of sewage collection and sewage treatment.
[14]The dependent variable is defined as a unit cost: Bioresources base costs per volume of sludge produced.

	to sludge treatment centres			
Residential retail[15]	• Amount of revenue at risk if a customer does not pay its bill • A customer's propensity to default • Type of customer • Economies of scale	Residential retail (4 models)	N/A	• Bad debt (2 models) • Other retail costs (2 models)

Scope of modelled base costs

2.18 Modelled base costs include operating expenditure (opex), capital maintenance expenditure, and some enhancement. These are costs that are included in our econometric benchmarking models. Please see Table 1 in 'OF-OA-024 PR24 final determinations: Expenditure allowances – base cost modeling decision appendix' for more details.

2.19 The main differences in the scope of modelled base costs from PR19 are:

- Exclusion of site-specific developer services as these are almost entirely removed from the price control at PR24.
- Exclusion of growth at sewage treatment works enhancement as we have assessed these costs separately at PR24.
- Exclusion of Environment Agency water quality permit costs from the wastewater network plus and bioresources base cost models due to the step-change in costs expected in the 2025-26 period. We assessed these costs as part of unmodelled base costs at PR24.
- Added historical sludge growth and quality enhancement expenditure into the scope of bioresources modelled base costs to ensure the models provide an allowance for future bioresources growth and advanced anaerobic digestion (AAD) upgrades.

Sample period and incorporating a forward-look

2.20 We use a long time series of historical data from water companies going back to 2011-12 for wholesale water and wastewater, and 2013-14 for residential retail, to estimate our panel data base cost econometric cost models. We use the full historical data series to maximise model precision and accuracy, and to capture the cyclical nature of capital maintenance expenditure. As in PR19, we use random effects estimation to account for the panel structure of the data.

2.21 We consulted on the option of using business plan forecast base cost data to estimate the base cost models when developing our PR24 methodology as a way of incorporating

[15]The dependent variable is defined as a unit cost: Residential retail base costs per household.

more of a forward look into our base cost assessment.[16] However, several companies raised concerns that this would introduce endogeneity into our base cost assessment.[17]

2.22 Instead, we incorporated more of a forward-look into our base cost assessment through the cost driver forecasts (for example, future changes in scale)[18] and several forward-looking sector wide cost adjustments (energy; mains renewals; meter renewals; phosphorus removal; net zero; and network reinforcement)[19].

Catch-up efficiency challenge

2.23 We use the base cost benchmarking models to set a stretching but achievable catch-up efficiency challenge to encourage the lagging companies to catch-up with the leading companies in the sector.

2.24 The catch-up efficiency challenge applied depends on the benchmark (such as median, upper quartile, or leading company) and the time period used to set the benchmark:[20]

2.25 **We set the catch-up efficiency benchmark at the upper quartile**. This is consistent with wider regulatory practice, including the catchup efficiency benchmark applied by the CMA in the PR19 redeterminations. All water companies applied at least an upper quartile benchmark to develop their base cost proposals in PR24 business plans.

2.26 We set the catch-up efficiency challenge using the last five-years of outturn data for water, wastewater network plus, and residential retail (2019-24). This ensures the catch-up efficiency challenge is not based on a single atypical year by any one company, while also placing more weight on more recent efficiency levels and cost pressures. This is consistent with our approach at PR19 and by the CMA in the PR19 redeterminations.

2.27 **We set the bioresources catch-up efficiency challenge using the full-sample (2011-24).** Investment at sludge treatment centres to deal with the impact of population growth tends to be more lumpy than other expenditure. So, this approach takes this into account, and helps to provide a sufficient allowance for long-term bioresources growth including AAD upgrades. It leads to a less stretching bioresources catch-up efficiency challenge than if we used the last five-years of outturn data.

[16] [OF-CA-001] Ofwat, Creating tomorrow, together: Our final methodology for PR24: Appendix 9 Setting expenditure allowances, December 2022, pp.49-50
[17] [OF-CA-001] Ofwat, Creating tomorrow, together: Our final methodology for PR24: Appendix 9 Setting expenditure allowances, December 2022, p.50
[18] [OF-CA-008] Ofwat, Expenditure allowances – base cost modelling decision appendix, December 2024, pp.22-25
[19] [OF-CA-008] Ofwat, Expenditure allowances – base cost modelling decision appendix, December 2024, pp.7-63
[20] [OF-CA-008] Ofwat, Expenditure allowances – base cost modelling decision appendix, December 2024, pp.25-27

2.28 All of this results in catch-up efficiency challenges for water and wastewater network plus of 1.3% and 0.6% respectively. These are smaller than at PR19 and much smaller than at PR14.

2.29 Overall, our aim was to set a catch-up efficiency challenge that was stretching yet achievable, which we have achieved.

Cost adjustment claims

2.30 The cost adjustment claim process allowed companies to present evidence of unique operating circumstances, non-standard legal requirements or atypical expenditure which drive higher efficient costs for the company relative to its peers; or if the company did not consider that historical costs are a good reflection of future costs.

2.31 We expected companies to submit compelling evidence against the assessment criteria set out in our PR24 methodology to demonstrate the need for a cost adjustment.[21] Setting a high evidential bar is important as companies are likely to only submit cost adjustment claims that will increase its cost allowance. The CMA made the same point in its PR19 redeterminations.[22]

2.32 In our PR24 methodology, we set out the assessment criteria we would use to assess cost adjustment claims,[23] with the two key criteria being:

- **Need for adjustment** – we expected companies to provide compelling evidence to demonstrate why our econometric models do not adequately capture their unique circumstances.
- **Cost efficiency** – we expected companies to provide compelling evidence that the cost estimates are efficient, and clearly explain how it arrived at the cost estimate.

2.33 We described the evidence we expected companies to provide to justify a step change in efficient capital maintenance expenditure through the cost adjustment claim process. It is important we provide sufficient funding for companies to maintain good asset heath. But we must also make sure that customers do not pay twice for capital maintenance or pay for inefficiency. We expected companies to:

[21] [OF-CA-001] Ofwat, Creating tomorrow, together: Our final methodology for PR24: Appendix 9 Setting expenditure allowances, December 2022, p.28
[22] [OF-CA-013] Competition and Markets Authority, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations. Final report, 2021, paragraph 4.949
[23] [OF-CA-001] Ofwat, Creating tomorrow, together: Our final methodology for PR24: Appendix 9 Setting expenditure allowances, December 2022, p.31

- provide evidence of a clear link between the exogenous factors and capital maintenance expenditure requirements;
- provide evidence of how these exogenous factors are likely to change in the future;
- demonstrate good practice in asset maintenance; and
- demonstrate efficient use of base expenditure allowances in previous periods. We stressed that cost adjustment claims should not be used to make up for previous underinvestment or under delivery in maintenance.

2.34 We expected companies to demonstrate that each cost adjustment claim is material using the thresholds presented in our PR24 methodology.[24] These help to:

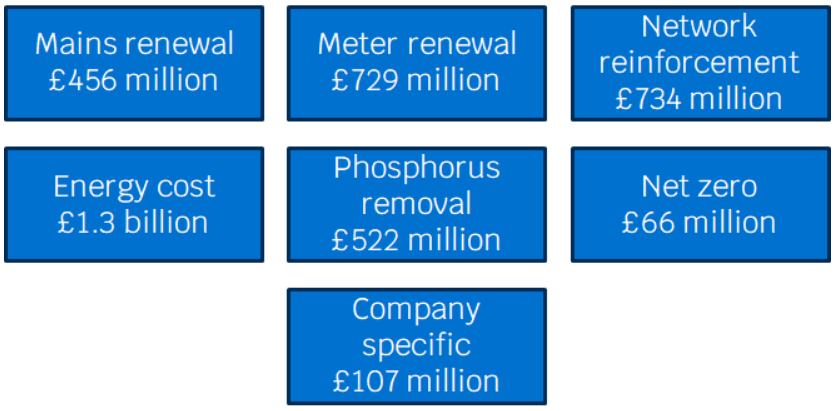
- mitigate the risks posed by asymmetry of information; and
- proportionately focus our assessment on the most significant cost adjustments.

2.35 We received 64 cost adjustments in PR24 business plans, totaling £5.4 billion.

2.36 For final determinations, we applied six sector wide cost adjustments to reflect that historical costs are not always a good reflection of the future: energy costs, mains renewals, meter renewals, phosphorus removal, net zero, and network reinforcement. We partially passed 10 claims in our final determination, and a further 29 cost adjustment claims were addressed through these sector wide adjustments.[25]

2.37 **We applied base cost adjustments worth £3.9 billion at final determinations.** We summarise these in the figure below.[26]

Figure 55: Summary of PR24 base cost adjustments



[24] [OF-CA-001] Ofwat, Creating tomorrow, together: Our final methodology for PR24: Appendix 9 Setting expenditure allowances', December 2022, pp. 156-159
[25] We reallocated 5 cost adjustment claims to enhancement cost assessment.
[26] Excluding condition allowance of up to £99.8 million for Thames Water's sludge powered generator replacement at Beckton, which is included in the large scheme gated process.

2.38 In contrast, at PR19 we only applied cost adjustments worth £287 million.

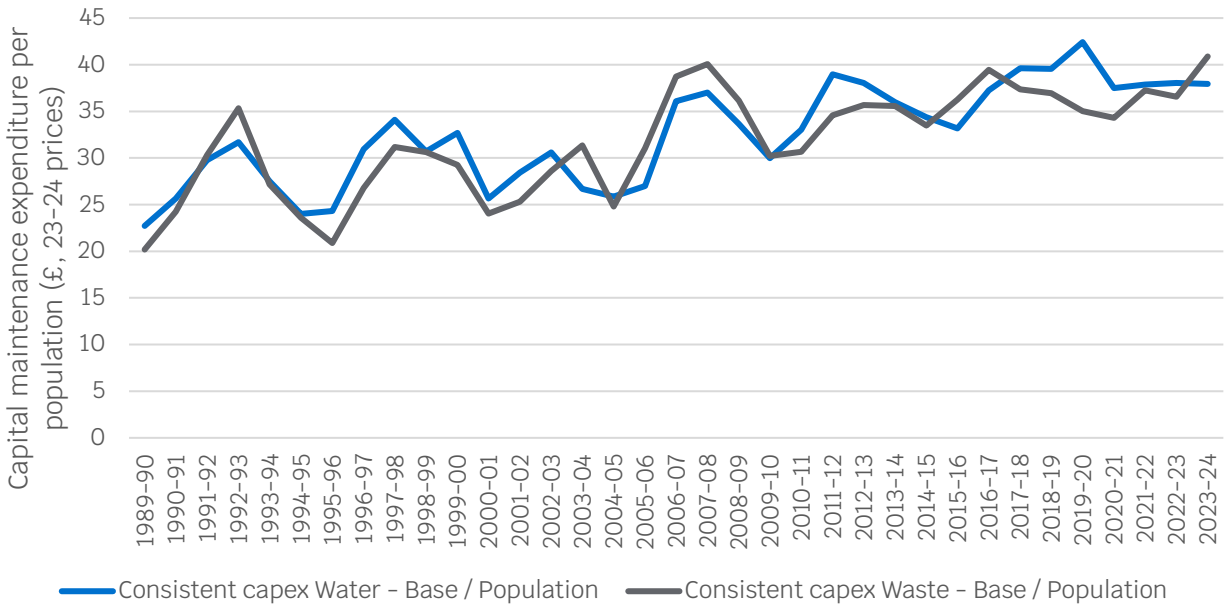
2.39 Details of our cost adjustment claim assessments are published,[27] [28] and please see our cost adjustment claim annex where we respond to issues raised on our assessment by the disputing companies.[29]

Enhancing asset health understanding

2.40 We would support the CMA deprioritizing redetermination of asset health allowances for reasons set out in the overarching document, but for completeness we have set out our position below.

2.41 We set base expenditure allowances that companies should invest to maintain good asset health. Capital maintenance within base expenditure allowances has increased materially since privatisation. And asset health metrics (eg mains repairs; unplanned outage; sewer collapses) show a stable or improving trend over time. We expect companies to continue to maintain and improve asset health from base expenditure allowances going forward.

Figure 66: Capital maintenance expenditure per population



2.42 Despite this, in our methodology and final determination, we raised our concerns that water companies have not delivered sufficient asset renewals to keep up with

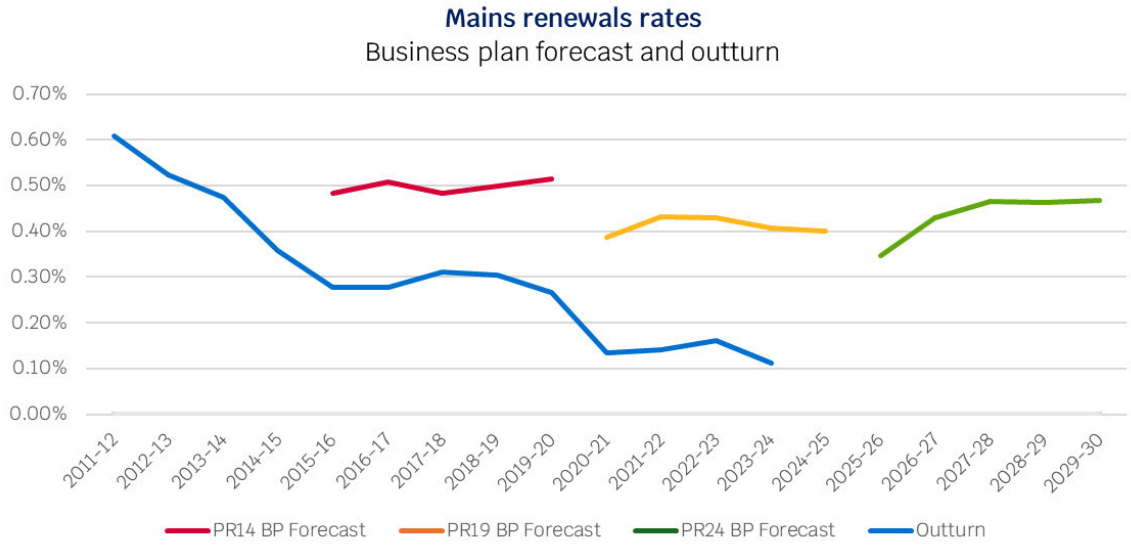
[27] [OF-CA-009] Ofwat, Base cost adjustment claims feeder models, December 2024.
[28] [OF-CA-010] Ofwat, Base cost sector-wide adjustment feeder models, December 2024
[29] [[OF-CA-001] Ofwat, Creating tomorrow, together: Our final methodology for PR24: Appendix 9 Setting expenditure allowances, December 2022, pp. 156-159

deterioration over the long-term.[30] For example, companies forecast to renew water mains at an average rate of 0.4% per year in their PR19 business plans. This was consistent with our view of what base buys at PR19, and therefore what companies were able to deliver with their base allowances. But during the period, renewals have been carried out at a rate of just 0.1%. This is shown in the figure below.

2.43 In advance of PR24, we worked with the sector to develop our approach to base costs. This included engaging with the sector on developing asset health metrics to inform our approach to setting allowances at PR24, establishing priority assets for consideration, and discussing additional data collection requirements to help support business plan proposals. At this time, the sector raised water mains and meters as a priority. We provided sector wide adjustments for both assets in the final determination.

2.44 We sought to better understand asset condition issues faced by the sector at PR24. We provided additional allowances where evidence suggested that companies need to deliver more asset renewals and refurbishment than they have delivered historically to maintain and improve asset condition. At the same time, we made sure that customers do not pay twice for capital maintenance that companies should have delivered with base expenditure allowances in the past. Our assessment was informed by collecting comparable and robust asset condition and renewals / refurbishment data from companies on water mains, sewers and bioresources assets, and evidence provided by companies in business plans and cost adjustment claims. Our analysis showed that asset condition has largely been maintained or improved since PR09.

Figure 7: Mains renewal rates over time



[30] [OF-CA-001] Ofwat, Creating tomorrow, together: Our final methodology for PR24: Appendix 9 Setting expenditure allowances, December 2022, p.80

2.45 We are implementing a plan to gain greater insight into the condition of a wider range of assets before PR29.[31] [32] This plan will be delivered collaboratively between Ofwat and the sector and seeks to move the entire sector towards a better understanding of asset health.

2.46 As part of this, we will assess if additional base expenditure allowances are needed to address any sector wide asset condition issues ahead of PR29. We intend to make decisions ahead of the 2027-28 financial year. Where appropriate, we will allow additional adjustments to companies' allowances to undertake additional capital maintenance work.

2.47 It is important that cost adjustments to address asset condition issues are underpinned by robust and comparable data, ensuring all companies are assessed equally. This approach avoids an adjustment to one single company that demonstrates a deterioration in asset condition, which may be caused by historical underinvestment and poor asset management and maturity and could lead to customers paying twice for asset renewals. We will collect and assess this data for a subset of priority assets during the 2025-27 period.

2.48 Disputing companies have expressed their concerns with the approach to assessing capital maintenance and asset health requirements at PR24. We present below the common points raised throughout the companies' statements of case, and an overview of our position on these concerns. We discuss these further alongside our forward looking plan in our supporting asset health appendix.

Table 2: Summary of key asset health related points

Area of concern	Overview of our position
There has been historical base underfunding as evidenced through base overspend in recent regulatory periods.	The sector is overspending its PR19 allowances. However, there was an average gap of 0.4% between allowances set at PR19 and business plan proposals. Overspend in the PR19 period was unforeseen by both water companies and Ofwat. For example, input price pressures, weather events, and investment to address water quality risks and compliance at treatment works. These were not reflected in business plans at the time of setting allowances. Water companies should not divert money away from capital maintenance to address unexpected cost pressures. There are mechanisms in place to mitigate this risk, such as cost sharing.
Growth in capital maintenance expenditure has not kept pace with growth of the asset base.	Our analysis indicates that capital maintenance expenditure over time has increased in absolute terms, but also when compared with population growth and growth in the size of the network.
The totex framework incentives companies to invest in short-term solutions to meet	The totex and outcomes framework provides financial incentives for companies to meet performance commitment levels, and

[31][OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, December 2024, pp.91-94
[32][OF-CA-011] Ofwat, Enhancing Asset Health Understanding Workstream, December 2024

performance commitments rather than investing in long-term asset health.	deliver improved outcomes for customers. But we do not expect a company with good asset management practices to focus its investment programme solely on achieving performance commitment levels. Particularly if at the expense of delivering its duty to maintain the capability of assets.
Disagreement with our approach to assessing what base buys at PR24 and applying this through our enhancing asset health understanding workstream.	We must assess what base buys to avoid customers paying twice. We provide companies with long-term allowances to balance peaks and troughs in capital maintenance, using a long time series of historical data from 2011-12 to 2023-24. We used this same period to calculate what base buys. We are working with the sector as part of our enhancing asset health workstream to develop our approach to determining what base buys for a more complex assets. For example, civil structures.
Disagreement with being held to account for asset deterioration over time or for under-delivery against PR19 business plans.	Companies have a duty to maintain the health of their assets. It is important that customers do not pay twice for companies not maintaining asset health with base expenditure allowances. It is also in customer interest to hold companies to account for asset renewals that the company promised in its PR19 business plans. Companies should not defer asset renewals in the event of unexpected cost pressures.
Ofwat has provided no certainty on whether there will be additional allowances available to companies through its enhancing asset health understanding workstream.	We are working with the sector to establish the priority assets for consideration in the 2025-27 period. Until we know what these are, and the potential scope of additional investment required, it is unclear which funding mechanism will be most suited.[33]

Unmodelled base cost assessment

2.49 Unmodelled base costs cover costs that are either outside of company control or are only incurred by a subset of water companies. These include:

- business rates;
- abstraction and discharge charges (water and wastewater);
- costs associated with the Traffic Management Act (TMA) and lane rental schemes;
- wastewater Industrial Emissions Directive operating costs;
- third-party services costs;
- developer services and diversions (excluding network reinforcement;
- non-household retail (Dŵr Cymru and Hafren Dyfrdwy);
- pension deficit recovery costs; and
- equity issuance costs.

2.50 Our unmodelled base expenditure allowance at final determinations was £8.8 billion, around 14% of total base expenditure allowances. This was only 1% below company proposals in companies' draft determination representations. Almost half the unmodelled base expenditure allowance is attributable to business rates.

[33] [OF-CA-012] Ofwat, Operational resilience discussion paper, April 2022

Overall PR24 base expenditure allowances

2.51 At PR24 final determinations, base expenditure allowances totaled £60.1 billion, which is 19% higher than our base expenditure allowances at PR19 final determinations (£50.5 billion), and 7% more than what companies have spent in the past 5 years (£56.4 billion). We expect companies to maintain and improve the long-term capability of assets, and meet existing permit and statutory obligations, with base allowances.

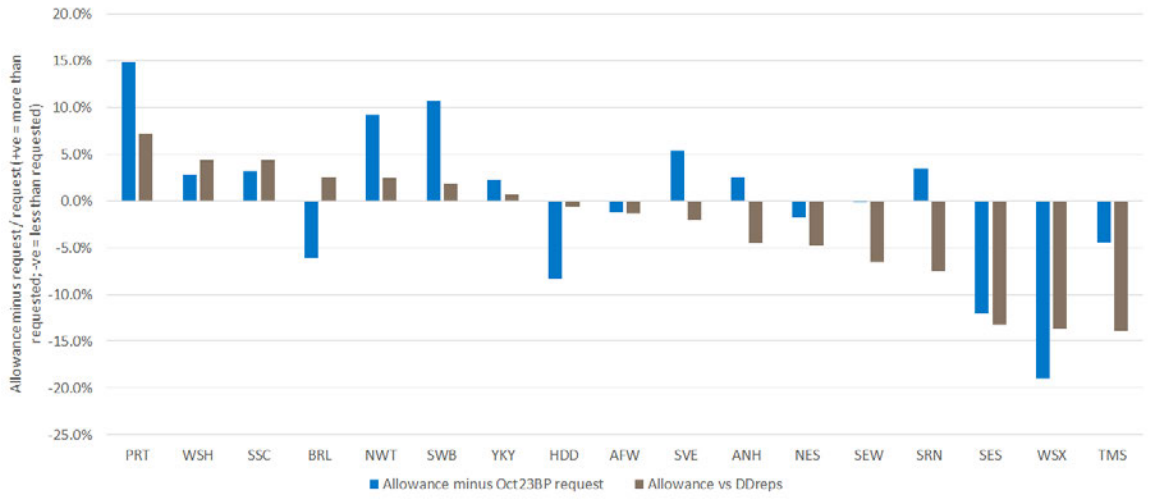
2.52 Compared to companies' business plan proposals, our base expenditure allowances at PR24 final determinations were:

- 5 percent below companies' requested base expenditure in draft determination representations of £63.1 billion.
- 1 percent more than companies' requested base expenditure in October business plans of £59.5 billion.

2.53 The figure below compares our base expenditure allowances to company requests:

- 7 out of 17 companies received a base expenditure allowance that was more than requested in draft determination representations.
- 9 out of 17 companies received a base expenditure allowance that was more than requested in October 2023 business plans, including disputing companies Anglian Water and Southern Water.

Figure 8: Base expenditure allowance versus company request



2.54 Section 5.2.2 of ' OF-OA-022, PR24 final determinations: Expenditure allowances' explains our base expenditure allowances for each company. We note that the disputing companies have increased their base expenditure requests in their statements of case. For example, Anglian Water has requested an additional £150 million for maintenance of

water storage assets and sewers. Southern Water has requested £500 million for an asset health gated allowance. And Northumbrian Water has requested a higher network reinforcement allowance, and increased the size of its capital maintenance request.

2.55 In the sections below, we focus on the areas of our base expenditure assessment that have been raised by the disputing companies.

Base cost econometric models

2.56 A relatively small number of issues have been raised in relation to our base cost models:

- Anglian Water asked the CMA to update base cost models with the most recent available data (ie 2024-25 outturn data).[34]
- Southern Water and South East Water raised issues relating to the cost drivers included in our wholesale water base cost models: scale; treatment complexity; network topography.
- Wessex Water raised issues relating to the robustness of our water base cost models.
- Southern Water raised an issue relating to how we capture economies of scale at sewage treatment works in our wastewater network plus base cost models.
- Southern Water and Anglian Water asked the CMA to use latest average bill forecasts to set residential retail base expenditure allowances.
- No disputing companies raised issues relating to our bioresources base cost models.

Use of 2024-25 outturn data in base cost models

2.57 Anglian Water asks the CMA to use the most recent data available to estimate the base cost econometric models in PR24 redeterminations.[35] For example, inclusion of 2024-25 outturn information when it is available. The CMA adopted this approach in the PR19 redeterminations.

2.58 We agree that using the most recent outturn data would help to reflect the most recent cost pressures and efficiencies in base expenditure allowances, and may improve the precision of estimated model parameters. But updating the models for an extra year of data is a significant task, which can take some time to deliver robustly.

2.59 It would be important to consider the following when deciding whether to use 2024-25 outturn information to set its determinations:

[34] [OF-OA-001], Anglian Water, Anglian Water PR24 CMA Redetermination Statement of Case, March 2025, p.53
[35][OF-OA-001] Anglian Water, 'Anglian Water PR24 CMA Redetermination Statement of Case', March 2025, p.14, para.41

- We receive 2024-25 outturn information in annual performance reports in July 2025. This will need to be **added to master data sets and quality assured for all water and wastewater companies**. This is likely to require queries to be raised with companies to address potential data issues. Updated datasets with quality assured data will not be available until the end of August 2025 at the earliest.

- **Selected enhancement cost benchmarking models also use historical data**: storm overflows (flow to full treatment and network storage), phosphorus removal, and supply interconnectors. Therefore updating these models with additional outturn information should also be considered.

- **There will need to be a reassessment of the performance and robustness of the econometric models with the additional year of data**. This may require changes to model specifications if the additional year of outturn data significantly reduces model robustness.

- **There will be need to be an assessment of whether the additional year of outturn data requires updates to cost driver forecasts out to 2029-30.** The disputing companies may propose updates to cost driver forecasts through the redeterminations process. These should be scrutinised to ensure that companies do not propose inflated forecasts that are not realistic, which would lead to customers overpaying.

- **Consideration should be given as to whether the catch-up efficiency adjustment needs updating** to reflect the latest outturn information.

- **Consideration should be given as to whether updates to the sector wide base cost adjustments are needed to maintain internal consistency between the base cost models and cost adjustments and to ensure that customers do not pay twice**. All sector wide adjustments apart from the net zero cost adjustments use historical data to help determine the adjustment. For example, the phosphorus removal base cost adjustment uses econometric modelling of historical and forecast data up to 2024-25. And the mains renewal, meter renewals, network reinforcement and energy adjustment use historical data to determine 'what base buys' so that customers do not pay twice – through the base cost models and the sector wide cost adjustment.

Wholesale water base cost models

Our final determinations

2.60 We used 6 water resources plus models (WRP), 6 treated water distribution models (TWD) and 12 wholesale water models (WW) to help set efficient wholesale water base expenditure allowances at PR24 final determinations. These capture the key drivers of

wholesale water activities: scale; treatment complexity; network topography and population density.

2.61 We made the following improvements to our PR19 wholesale water models:

- Included average pumping head in a subset of our treated water distribution and wholesale water models to capture network topography.
- Included three alternative population density measures. These are properties per length of mains, weighted average density – local authority districts (LAD) from Middle Super Output Area (MSOA) and weighted average density – MSOA. The last two measures are based on granular population density data from the Office for National Statistics.

Issues raised by disputing companies

2.62 **Scale**: South East Water states that total connected properties should be included as a scale variable in the treated water distribution models to capture population growth. [36]

2.63 **Water treatment complexity**: South East Water states that the weighted average treatment complexity variable in the wholesale water base cost models should be modelled in levels rather than taking logarithms.[37]

2.64 **Network topography**: Southern Water states that average pumping head should not be included in a subset of our treated water distribution and wholesale water models. [38] South East Water argues for the inclusion of both boosters per length of mains and average pumping head together in the models.[39]

2.65 **Wholesale water model robustness**: Wessex Water considers there are limitations to Ofwat's wholesale water base cost models, which results in costs that are unachievable.[40]

Scale

Our final determinations

[36] [OF-OA-005] South East Water, South East Water Limited Statement of Case, March 2025, pp.37-38, para. 4.19
[37] [OF-OA-005] South East Water, South East Water Limited Statement of Case, March 2025, pp.37-38, para. 4.19
[38] [OF-OA-003] Southern Water, Southern Water Limited Statement of Case', March 2025, pp.122-131, para.67
[39] [OF-OA-005] South East Water, South East Water Limited Statement of Case, March 2025, pp.37-38, para. 4.19-4.20
[40] [OF-OA-004] Wessex Water, Wessex Water PR24 CMA Redetermination Statement of Case', March 2025, pp.48-54, para. 8.30-8.36

2.66 Scale is a key driver of costs. Other things being equal, a company serving a larger customer base would be expected to incur higher costs.

2.67 We used number of properties as the measure of company scale in water resources plus (WRP) and wholesale water (WW) models. [41]

2.68 We used length of potable water mains as the scale driver in the treated water distribution (TWD) models because of its intuitive engineering rationale. The length of water mains directly correlates with the area covered by the distribution network, with longer mains indicating a more extensive network. [42]

Issues raised by disputing companies

2.69 South East Water states that the number of properties should be included as the scale variable in half of the TWD models. It considers the TWD models do not account sufficiently for costs associated with population growth, such as network reinforcement. [43]

Our assessment

Overlap with network reinforcement sector wide adjustment

2.70 We have allowed South East Water £32.2 million under our network reinforcement sector wide cost adjustment. Therefore, including number of properties as the scale variable in the treated water distribution models could lead to customers paying for growth twice, once through the base cost models and once through the network reinforcement adjustment which is driven by the increase in the population.

2.71 Based on analysis of the final determination models, South East Water's 2025-30 wholesale water allowance would have increased between £5.0 million to £6.9 million if connected properties had replaced length of mains in the TWD models. As shown in the files referenced in the footnote below,[44] this represents an increase of 0.62% to 0.86% to their wholesale water allowance. This is materially lower than the £32.2 million allowance under our network reinforcement sector wide cost adjustment. This additional increase in allowances would constitute a duplication of the network reinforcement adjustment if not netted off to avoid double counting.

Engineering rationale

[41] [OF-OA-024] Ofwat, Expenditure allowances - base cost modelling decision appendix, December 2024, p.19
[42] [OF-OA -024] Ofwat, Expenditure allowances - base cost modelling decision appendix', December 2024, p.19
[43] [OF-OA-005] South East Water, South East Water Limited Statement of Case, March 2025, pp.37-38, para. 4.19
[44] [OF-CA-018] Ofwat, PR24CA05 W3 FD Properties in TWD APH models and [OF-CA-017] Ofwat 'PR24CA05 W3 FD Properties in TWD boosters models', 'Final allowances' tab

2.72 Most companies did not object to the use of length of mains, and this is consistent with the approach used at PR19. South East Water and Yorkshire Water, both advised by Oxera, were the only companies to ask for the inclusion of connected properties in the treated water distribution models in response to the PR24 draft determinations.

2.73 Length of potable water mains is the most intuitive scale driver from an engineering perspective because treated water distribution base costs are associated with running a distribution network consisting mainly of water mains.

Small impact on allowances

2.74 Length of potable water mains is also highly correlated with length of mains (more than 90%), which means the inclusion of connected properties instead of length of mains in the treated water distribution models has an immaterial impact on the outcome as set out above in the table below.[45] [46]

Table 3: Impact of using connected properties as a scale driver in the treated water distribution models on wholesale water modelled base cost allowances

Company	Impact of including properties in treated water distribution models that include booster pumping stations	Impact of including properties in treated water distribution models that include average pumping head
Anglian Water	-0.28%	-0.20%
Dŵr Cymru	-0.45%	-0.99%
Hafren Dyfrdwy	-1.06%	-1.83%
Northumbrian Water	-0.15%	-0.27%
Severn Trent Water	0.28%	-0.26%
South West Water	-0.92%	-1.20%
Southern Water	0.29%	-0.33%
Thames Water	0.25%	0.21%
United Utilities	0.20%	-0.03%
Wessex Water	-0.23%	-0.91%
Yorkshire Water	0.44%	0.00%
Affinity Water	0.89%	0.20%
Bristol Water	-0.22%	-0.74%
Portsmouth Water	0.05%	-0.18%
South East Water	0.86%	0.62%
South Staffs Water	0.51%	0.27%

[45] In fact, the treated water distribution models that include properties per length of main as the density measure produce the same outcome if properties or length of mains are used as the scale driver due to rule of logs.
[46] We applied the same method used by Oxera on behalf of South East Water to estimate the impact.

Company	Impact of including properties in treated water distribution models that include booster pumping stations	Impact of including properties in treated water distribution models that include average pumping head
SES Water	-0.49%	-0.41%
Sector total	**0.14%**	**-0.15%**

Water treatment complexity

Our final determinations

2.75 Water treatment works complexity can reflect both the quality of the raw water source(s) supplying the works, and any requirements for the quality of the treated output. Where treatment complexity is higher, costs are expected to increase due to the challenge of maintaining and operating multiple stages of treatment that use more power and chemicals.

2.76 We used two variables to measure water treatment complexity in our PR24 final determination:

- **Proportion of water treated at complexity levels 3 to 6**. Levels 0, 1 and 2 include relatively simple works, such as those treating good quality groundwater sources, while level 3 will introduce works with multiple treatment stages treating lower quality raw water sources.
- **Weighted average treatment complexity measure (WAC)**, where each level of complexity, as defined in our annual reporting tables (ie levels 0 to 6), is weighted by the proportion of water treated at that level.[47]

Issues raised by disputing companies

2.77 South East Water considers the weighted average treatment complexity variable is operationally unintuitive and should be modelled in levels rather than in logarithms.[48]

2.78 An accompanying Oxera report elaborates this point, stating that a company that increases its WAC from 1 (all water treated at simple treatment works) to 2 (all water treated at complexity band 1) has the same increase in predicted costs as a company that increases its WAC from 3 (all water treated in complexity band 2) to 6 (all water treated in complexity band 5), which they consider unintuitive.[49]

[47] [OF-OA-024] Ofwat, Expenditure allowances - base cost modelling decision appendix, December 2024, p. 20
[48] [OF-OA-005] South East Water, 'PR24 Redetermination Statement of Case', March 2025, pp.38, para. 4.19
[49] [OF-CA-026] Oxera, 'Wholesale base expenditure modelling', March 2025, p.12, footnote 41

Our assessment

2.79 We consider our decision to model weighted average treatment complexity in logarithms continues to be appropriate. This is supported by the PR19 CMA redeterminations which state:

- "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."[50]

2.80 Including the variable in logs is appropriate given how the variable is defined. A company that treats 50% of water in complexity level 6 and 50% in complexity level 5 would receive a score of 6.5, rather than a percentage figure like in the other treatment complexity variable where we calculate the percentage of water treated in bands 3 to 6 over total water treated. Therefore, as acknowledged in the PR19 redeterminations, the interpretation of the estimated coefficient on weighted average treatment complexity represents an elasticity and is intuitive - a one percent increase in weighted average treatment complexity leads to a β% increase in costs.

2.81 We also note the example provided by Oxera on the relationship between weighted average complexity and costs is unrealistic as in 2023-24, the average weighted average complexity is 4.99, and the minimum WAC is 3.52. This shows that almost all water is treated in complexity bands 3 and above.

2.82 South East Water and Yorkshire Water are the only companies who raised this issue in response to our draft determinations with no other companies objecting to our approach. As per the table below, our analysis suggests South East Water's allowance would remain unchanged if we were to model weighted average complexity in levels, with their 2025-30 wholesale water allowance increasing by 0.001% only.

Table 4: Impact of modelling weighted average water treatment complexity in levels instead of logs on wholesale water modelled base expenditure allowances

Company	Impact of modelling weighted average water treatment complexity in levels [51]
Anglian Water	0.64%

[50][OF-CA-013] Competition and Markets Authority, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations: Final Report', March 2021, p.146

[51] Please see '[OF-CA-024] PR24CA05 - W3 - FD - Level WAC', 'Final allowances' tab for a full excel comparison.

Dŵr Cymru	0.50%
Hafren Dyfrdwy	0.53%
Northumbrian Water	0.60%
Severn Trent Water	-0.21%
South West Water	0.86%
Southern Water	0.03%
Thames Water	-0.10%
United Utilities	-0.26%
Wessex Water	-1.15%
Yorkshire Water	0.10%
Affinity Water	0.75%
Bristol Water	1.40%
Portsmouth Water	-1.32%
South East Water	0.00%
South Staffs Water	0.16%
SES Water	-0.06%
Sector total	**0.12%**

Network topography

Our final determinations

2.83 Network topography and the distribution of demand centres across the region can influence a company's treated water distribution costs through greater requirements to pump and transport water to customers.

2.84 We included network topography variables in our treated water distribution and wholesale water base cost models. 50 percent of the models included treated water distribution average pumping head, and 50 percent included booster pumping stations per length to proxy network topography.[52] Our decision aimed to balance the strengths and weaknesses of both measures: average pumping head has a stronger engineering rationale, and boosters per length of mains has better data quality.

Issues raised by disputing companies

2.85 Southern Water supports the removal of average pumping head as a network topography variable over data quality concerns. It does not consider the stronger engineering rationale of the variable is enough to address data quality concerns.[53]

[52] [OF-CA-008] Ofwat, Expenditure allowances - base cost modelling decision appendix, December 2024, p. 23
[53] [OF-OA-003] Southern Water, Southern Water Limited Statement of Case, March 2025, pp.122-131, para.67

2.86 South East Water, advised by consultancy firm Oxera,[54] considers that booster pumping stations per length of mains and treated water distribution average pumping head should be included in the same models as this would help to fully account for topography. The company considers that including the variables in separate models creates omitted variable bias.[55]

Our assessment

2.87 We consider our decision to triangulate between models that either contain boosters per length of mains or treated water distribution average pumping head as network topography explanatory variables continues to be appropriate for three main reasons:

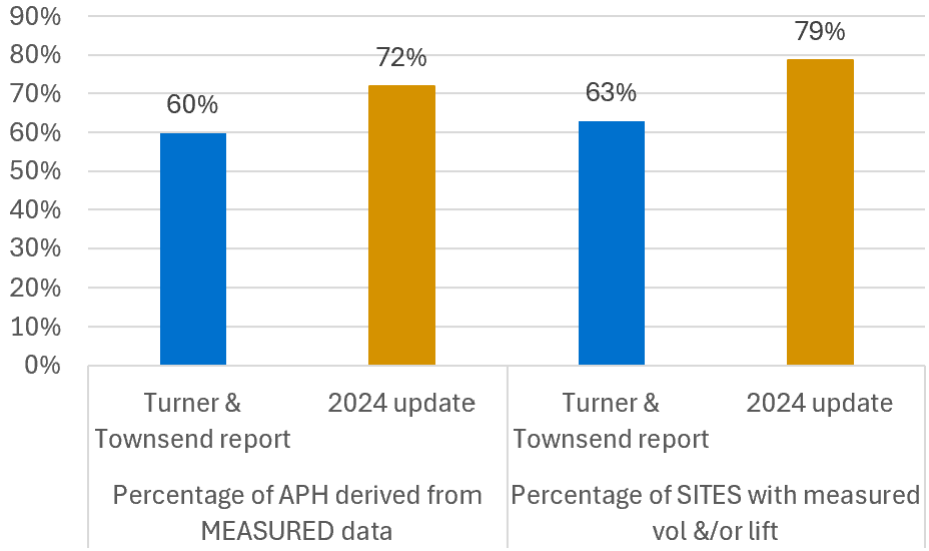
- Average pumping head data quality has improved since PR19.
- The inclusion of both network topography measures in our suite of wholesale water models balances the strengths and weaknesses of both measures.
- It reflects the mixed feedback received from companies throughout the PR24 process.

Average pumping head data quality has improved since PR19

2.88 Since the publication of the Turner & Townsend report,[56] which studied average pumping head data reporting across the sector, we have seen an improvement in data quality. But the sector has some way to go to reach the Turner and Townsend recommendation that 80% of inputs to average pumping head are measured. As per the figure below, the percentage of measured data for wholesale water average pumping head and the percentage of sites with measured volume and/or lift across the sector has increased from 60% to 72% and from 63% to 79% respectively.[57]

Figure 9: Average pumping head data improvements

[54] [OF-CA-026] Oxera, Wholesale base expenditure modelling, March 2025
[55] [OF-OA-005] South East Water, 'South East Water Limited Statement of Case', March 2025, pages 37-38, para. 4.19-4.20
[56] [OF-CA-014] Turner & Townsend and WRC, Average Pumping Head - Data Quality Improvement, March 2022
[57] Figures are sector averages. The full sample consisted of 68 data points (17 companies and 4 data points per each). Percentages are based on 79.41% of data points (54 over 68) as some companies were not able to determine baseline inputs and/or changes in measurement methodology rendered the data points incomparable.



Inclusion of average pumping head and boosters per network length balances the strength and weaknesses of both variables

2.89 Booster pumping stations has better data quality than APH as it uses 100 percent measured data, and consistently performs well in the econometric models. But it has weaker engineering rationale than APH as it only counts the number of boosters rather than taking account of the size of the pumps and the amount of lift provided.

2.90 APH on the other hand has strong engineering rationale as it is a more direct measure of pumping requirements as it captures the volume of water pumped and the pressure at which it is pumped.

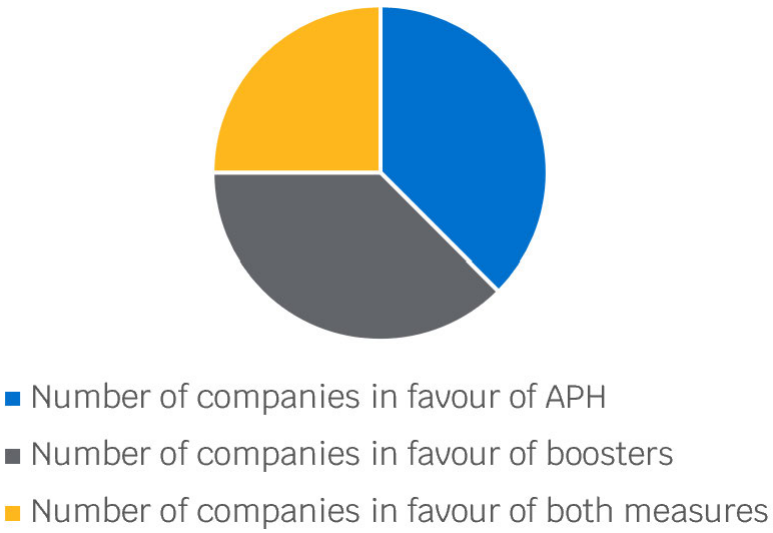
2.91 Based on the data quality improvements referenced above since the publication of the Turner & Townsend report, [58] we consider our decision to triangulate across a range of treated water distribution and wholesale water models – 50 percent that include treated water distribution average pumping head –and 50 percent that includes booster pumping stations per length of mains – balances the pros and cons of each measure.

Mixed company support for average pumping head and boosters per network length

2.92 Company support for either measure in response to our draft determinations was mixed, with Southern Water, United Utilities and Dŵr Cymru supporting the removal of APH, Thames Water, Anglian Water, and South West Water supporting the removal of boosters, and South East Water and Yorkshire Water considering both measures of topography should be included in the same models, as per the figure below. [59]

[58] [OF-CA-014] Turner & Townsend and WRC, Average Pumping Head - Data Quality Improvement, March 2022
[59] [OF-CA-008] 'Expenditure allowances - base cost modelling decision appendix', December 2024, pp. 22-23

Figure 10: Support for network topography drivers in response to our draft determination



2.93 To illustrate the effects of the choice of topography driver on allowances, we have prepared the allowances comparison file referenced in the footnote.[60] We note based on this file that the disputing companies support the topography measure that results in a higher wholesale water allowance for them.

2.94 For example, and as stated in its statement of case, Southern Water would see its 2025-30 wholesale water allowance increase in £53 million if APH was removed from the models in favour of boosters per length of mains.[61]

2.95 South East Water would also see its 2025-30 wholesale water allowance increase in £37 million if both boosters and APH were used together in the models.

Including both average pumping head and boosters in the same model

2.96 We disagree with the inclusion of booster pumping stations per length of mains and treated water distribution average pumping head in the same models, which was raised by South East Water.

2.97 Network configuration is complex, and focusing on the number of boosters in addition to treated water distribution average pumping head ignores other aspects of network complexity such as service reservoirs, water towers, and the degree of interconnectivity within a network. Incorporating every element of network configuration would make the models overly complex. The scale cost drivers likely capture some of these effects, for example, larger water distribution networks generally require more water towers.

[60] Please see file '[OF-CA-101] -Topography allowances'
[61] [OF-OA-003] Southern Water, Southern Water Limited Statement of Case, March 2025, p.130, para.56

2.98 Additionally, triangulating across models that include treated water distribution average pumping head and booster pumping stations per length of main separately helps to mitigate omitted variable bias; is consistent with our principle of using 'sensibly simply' models that include one variable for each cost driver; and leads to a more intuitive outcome than including both variables in the same model. For example, Severn Trent Water would have received a considerably higher allowance when both variables are included in the same model, but is around the sector average on both measures.[62]

2.99 As noted above, South East Water would see its 2025-30 wholesale water allowance increase by £37 million (4.66% over its final determination allowance) if both boosters and APH were used together in the models, as per the table below.

Table 5: Impact of including both boosters and average pumping head in the same water base cost models on wholesale water modelled base expenditure allowances

Company	Impact of including boosters and average pumping head in the same models[63]
Anglian Water	-2.73%
Dŵr Cymru	2.39%
Hafren Dyfrdwy	6.79%
Northumbrian Water	-1.34%
Severn Trent Water	4.60%
South West Water	0.97%
Southern Water	3.45%
Thames Water	0.08%
United Utilities	0.82%
Wessex Water	5.21%
Yorkshire Water	1.51%
Affinity Water	6.03%
Bristol Water	4.82%
Portsmouth Water	-3.37%
South East Water	4.66%
South Staffs Water	5.17%
SES Water	-0.46%
Sector total	**1.69%**

Wholesale water base cost model robustness

[62] £132 million increase in wholesale water allowances, representing a 4.6% increase over their baseline wholesale water allowances. Please see file 'Topography allowances'.
[63] Please see [OF-CA-101] Topography allowances' file.

Our final determinations

2.100 Our base cost models went through extensive robustness and sensitivity testing to make sure that they can accurately predict and forecast efficient base expenditure allowances. We arrived at a proportionate set of robustness and sensitivity tests in collaboration with the sector:[64]

- Are the estimated coefficients of the right sign and of plausible magnitude?
- Assess the ability of the models to explain variations in efficient base historical expenditure between companies and over time (eg adjusted R-squared and efficiency score ranges).
- How do the models perform across a range of statistical diagnostic tests (eg statistical significance of individual parameters, RESET test for omitted non-linearities, multicollinearity test, etc.)?
- Are the estimated model results stable / robust to changes in the underlying assumptions and data (eg different sample period; alternative model specification)?
- Cross-check efficient base allowances against business plan forecast costs, PR19 base allowances, and outturn spend over the past 5-years.

2.101 Each company also had the opportunity to submit cost adjustment claims if it considered it faced unique operating circumstances that are not captured in the base cost models.

Issues raised by disputing companies

2.102 Wessex Water suggests the cost drivers do not capture the full complexity of water company operations.[65] It highlights the rurality of its population, asset health and performance as omitted cost drivers.[66] It has also undertaken some additional sensitivity analysis.[67]

2.103 Wessex Water also provides additional analysis which aims to demonstrate that the wholesale water base cost models produce counterintuitive outcomes.[68] [69] It points to:

[64] [OF-CA-008] Ofwat, PR24 final determinations: Expenditure allowances - Base cost modelling decision appendix, December 2024, pp.15-16, section 2.5
[65] [OF-OA-004] Wessex Water, Wessex Water PR24 CMA Redetermination Statement of Case, March 2025, pp.50-51, para.8.31
[66] [OF-OA-004] Wessex Water, 'Wessex Water PR24 CMA Redetermination Statement of Case', March 2025, pp.50-51, para.8.35.
[67] [OF-OA-004] Wessex Water, Wessex Water PR24 CMA Redetermination Statement of Case, March 2025, 'A240 Wessex Water – March 2025 – Alternative approaches to the base cost models'
[68] [OF-OA-004] Wessex Water, Wessex Water PR24 CMA Redetermination Statement of Case, March 2025, pp.51-54, para.8.36
[69] [OF-OA-004] Wessex Water, Wessex Water PR24 CMA Redetermination Statement of Case, March 2025, A240 – Wessex Water – March 2025 – Alternative approaches to the base cost models'

- widening of the efficiency challenge since PR19;
- differences in efficiency across different models;
- sensitivity in allowances to changes in model specifications;
- the models predicting efficient expenditure for Wessex Water that is below its current outturn costs.

Our assessment

2.104 The analysis presented by Wessex Water is almost entirely new. Its response to our econometric modelling consultation highlighted some concerns with our proposed wholesale water base cost models.[70] However, Wessex Water did not propose alternative water treatment complexity or economies of scale in water treatment variables, and did not directly challenge our population density variables.

2.105 **It is unclear why Wessex Water does not consider rurality is not sufficiently captured in the models.** The company raises concerns around how we capture rurality and density in our base cost models. But comments received in its modelling consultation response were relatively light, with the only suggestion being around how we should decide which density measure is most suitable for different models. As noted above, we have made substantial improvements to our population density variables at PR24, which all companies are generally supportive of. All the water models include density and density squared to capture the so called "u-shape" relationship between density and costs. Companies in very densely populated areas face higher costs, and companies in very sparsely populated areas face higher costs.

2.106 Changes to Wessex Water's base expenditure allowances between PR19 and PR24 reflect improvements we made to our weighted average population density variables at PR24 and a data input error in PR19. Wessex Water did not acknowledge that it provided water services in Poole when completing a density data request. This meant **Wessex Water's PR19 wholesale water base cost allowance was around £60 million higher than it should have been** (in 2022-23 prices). We have not clawed this back but have ensured that this error has not persisted into PR24 through the development of our refined weighted average population density variables.

2.107 The company's response to our econometric modelling consultation in 2023 did not raise any points in relation to economies of scale in water treatment or alternative water treatment complexity variables, which are the basis for a large part of the company's sensitivity testing. It is unclear how the company has arrived at these alternative

[70] [OF-CA-015] Wessex Water, Econometric base cost models for PR24 – Wessex Water response', May 2023

variables, why it considers them superior, and provides no assessment of whether the resulting allowances are sensible.[71]

2.108 Wessex Water does not recognise that we already accounted for economies of scale in water treatment through the application of Southern Water's partially accepted cost claim to Wessex Water. We also found that the models that include weighted average treatment works size do not produce very robust results. This is why we used them to apply a cost adjustment instead of including in the model suite that is applied to all companies.[72] For example, the weighted average treatment works size variable was only statistically significant in 1 of the 6 water resources plus models at the 10% significance level. Our decision to apply a cost adjustment in relation to economies of scale at water treatment could be considered favourable to Wessex Water as it did not submit a cost adjustment claim. In addition the statistically insignificant econometric results may suggest that economies of scale at water treatment works are already explained by existing explanatory variables (eg population density).

2.109 Wessex Water considers an alternative approach to treatment complexity by controlling for the proportion of ground vs surface water, which it has not suggested before.[73] It is unclear why the company considers this is an appropriate measure of treatment complexity. CEPA explored the inclusion of separate surface water and ground water treatment complexity bands 3 to 6 variables in wholesale water base cost models. CEPA found the these variables do not produce robust and intuitive results, and do not lead to a clear improvement compared to our selected water treatment complexity variables.[74] We therefore did not include in our model selection, which was generally supported by companies.

2.110 **We do not include asset health or service indicators in our base cost models due to endogeneity**, which can drive perverse incentives. A key principle of our base cost assessment is to focus on drivers that are outside of company control. This was supported in the PR19 redeterminations.[75] For example, including leakage performance in the base cost models would increase allowances for poor leakage performers and could incentivize companies to worsen leakage performance to increase allowances. Also, including asset age as an indicator of asset health is likely to reward companies

[71] [OF-OA-004] Wessex Water, 'Wessex Water PR24 CMA Redetermination Statement of Case, March 2025, A240 – Wessex Water – March 2025 – Alternative approaches to the base cost models'
[72] [OF-CA-009] Ofwat, 'Base cost adjustment claim feeder model – Southern Water', December 2025, worksheet SRN_CAC7
[73] [OF-OA-004] Wessex Water, 'Wessex Water PR24 CMA Redetermination Statement of Case. A240 – Wessex Water – March 2025 – Alternative approaches to the base cost models', March 2025, p.5, para.1.26
[74] [OF-CA-016] Ofwat, 'PR24 Wholesale Base Cost Modelling', April 2023, pp. 55-56
[75] [OF-CA-013] Competition and Markets Authority, 'Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations. Final report', p.173, para.4.234. There are several other examples when endogeneity of variables is used by the CMA to help make decisions (eg leakage).

that have not proactively renewed assets over time with higher allowances, or incentivize companies not to renew older assets.

2.111 Wessex Water says it is negatively impacted by changes in the water base cost models between PR19 and PR24. This does not recognize that we have made improvements to our base cost models between PR19 and PR24. For example, we have used more robust and precise weighted average density measures and included average pumping head.

2.112 We triangulate across models with different cost drivers and levels of cost granularity to mitigate the risk of error in any one model. It is perfectly reasonable from an engineering perspective for a company to be more efficient in one element of the value chain than in another. The company should use these findings to explore why it is has higher costs in one element of the value chain than another and make improvements where necessary.

2.113 **We assessed the sensitivity of model results to changes in the underlying data as part of our model selection criteria**. For example, dropping years of data and most / least efficient company from the panel. The results of these sensitivity tests fed into our robust model selection process and are presented in our base cost modelling appendix.[76] As noted above, we consider alternative models used by Wessex Water to assess sensitivity of results are inferior to our models, and the company has not attempted to assess if these models are aligned with engineering and economic rationale or produce robust results.

2.114 **Wessex Water did not take up the opportunity to submit cost adjustment claims**. We recognize that our base cost models may not capture all factors that explain variations in costs between companies and over time. This is why companies can use the cost adjustment claim process to request additional allowances to account for unique operating circumstances or forward-looking cost drivers. It is unclear why Wessex Water did not submit cost adjustment claims to account for cost drivers it considers are not reflected in the models. To focus purely on the base cost models is misleading as they are only one component of our base cost assessment approach. We also note that its disinfection upgrade at water treatment works business case submitted as evidence to the CMA would increase the company's water base expenditure allowance if the CMA accept the need for adjustment.

2.115 **Wessex Water's base expenditure allowance is 10 percent higher than the company's PR19 base expenditure allowance**, and that is before taking into account that the company's water base allowance at PR19 was £60 million too high due to the company's population density input data error. After accounting for this error, Wessex Water's base expenditure allowance is 14 percent higher than the company's PR19 base expenditure allowance. The company's base allowance is also 2 percent higher than what the

[76] [OF-CA-008] Ofwat, Expenditure allowances - base cost modelling decision appendix, December 2024

company has spent over the past 5 years, or 5 percent higher after accounting for the unexpected increase in energy costs which we have addressed through the energy cost adjustment and accompanying reconciliation mechanism.

Wastewater network plus base cost models

Our final determinations

2.116 We used 3 sewage collection models, 2 sewage treatment models, and 2 wastewater network plus models to help set efficient wastewater network plus base expenditure allowances at PR24.[77]

2.117 The key drivers of wastewater network plus activities are scale; economies of scale at sewage treatment works; treatment complexity; network topography; population density; and urban rainfall. All of which are captured in our models.

2.118 We made the following improvements to our PR19 wastewater network plus models:

- Included an alternative economies of scale at sewage treatment works variable to better capture economies of scale at large sewage treatment works. Our weighted average sewage treatment works size variable is used alongside the PR19 economies of scale at sewage treatment works variable - percentage of load treated in sewage treatment works bands 1 to 3.
- Included improved weighted average population density variables in our sewage collection models based on Middle Super Output Area population density data from the Office for National Statistics.
- Included urban rainfall in our sewage collection and wastewater network plus models. This variable aims to reflect the volume of inflows into drainage and sewerage networks.
- Added top-down wastewater network plus models to the modelling suite, which allows us to triangulate between models of different levels of cost aggregation.

2.119 We made no changes to our set of wastewater network plus base cost models between draft and final determinations. This reflected the general support of the selected models, which was an outcome of the extensive consultation process we followed.

Issues raised by disputing companies

[77] Wastewater network plus = sewage collection + sewage treatment.

2.120 Anglian Water, Northumbrian Water and Wessex Water either accept our econometric benchmarking models used to help set wastewater network plus base expenditure allowances at PR24 final determinations or did not comment.

2.121 Southern Water is the only disputing company to raise an issue relating to our choice of explanatory variables that aim to capture economies of scale at sewage treatment works in our sewage treatment and wastewater network plus models.[78]

Economies of scale at sewage treatment works

Our final determinations

2.122 We expect large treatment works to have a lower unit cost of treatment than small treatment works due to economies of scale. The size of sewage treatment works is mostly outside of company control as it depends on where company customers are located. Companies serving sparsely populated areas tend to have smaller sewage treatment works.

2.123 We used two economies of scale at sewage treatment works explanatory variables:

- the percentage of load treated in sewage treatment works serving less than 2,000 people (bands 1 to 3) used in PR19. This variable models step-like changes in sewage treatment costs.
- a weighted average sewage treatment works size variable. This variable captures the weighted average sewage treatment works size for each company in kg of BOD5/day. This variable allows for a continuous relationship with sewage treatment costs.

Issues raised by disputing companies

2.124 Southern Water disputes the use of the PR19 economies of scale at sewage treatment works variable – percentage of load treated in sewage treatment works bands 1 to 3 in our sewage treatment models. This differs to its draft determination representation where Southern Water disputed the use of the variable in our sewage treatment and wastewater network plus models.

2.125 Southern Water is concerned with the relatively weaker statistical significance and engineering rationale of the PR19 bands 1-3 variable when compared to the weighted average treatment works size variable. It points to the statistical insignificance of the variable in our sewage treatment model and considers the weighted average treatment works size variable to produce a better range of efficiency scores. Southern Water considers the weighted average treatment works size variable to have a stronger

[78] [OF-OA-003] Southern Water, Southern Water Limited Statement of Case, March 2025, pp. 114-122

engineering rationale in that it captures a more continuous relationship with sewage treatment costs. It does not agree with the use of a variable that models step-like changes in sewage treatment costs.

Our assessment

2.126 We consider our decision to use percentage of load treated in bands 1 to 3 as a proxy for economies of scale at sewage treatment works alongside weighted average treatment works size is appropriate.

2.127 The percentage of load treated in bands 1-3 variable was used at PR19 and has a strong engineering and economic rationale. It helps account for economies of scale in sewage treatment by capturing a higher unit cost of treatment as a result of operating sewage treatment works of smaller size.

2.128 The bands 1-3 variable is not statistically significant at the 10 percent significance level in our sewage treatment models. But this single result is not sufficient to exclude this variable from the models. Setting such a high standard would not be in the interests of customers given the importance of econometric cost benchmarking models in reducing information asymmetry between Ofwat and water companies. This is particularly the case when the bands 1-3 variable:

- produced an estimated coefficient that has the right sign, is of a sensible magnitude, and is consistent across different model specifications;
- is more statistically significant in our wastewater network plus models than the weighted average treatment works size variable; and
- was supported by the majority of wastewater companies.

2.129 Only Anglian Water, Southern Water, United Utilities and Yorkshire Water disagreed with the bands 1-3 variable in responses to our base cost modelling consultation.[79]

2.130 Triangulating across cost models with different economies of scale at STWs variables helps to mitigate the risk of error in any one model. This recognises that one explanatory variable alone may not be a perfect proxy for the underlying cost driver (ie economies of scale at sewage treatment works). Triangulating across a range of models with different cost drivers and levels of cost aggregation was a key part of our base cost assessment principles and approach and is generally supported by companies. This approach is also consistent with regulatory best practice.

2.131 We also do not agree with the analysis presented by Southern Water[80] because:

[79] [OF-CA-008] Ofwat, Expenditure allowances - base cost modelling decision appendix, December 2024, pp. 33-34
[80] [OF-CA-098] Southern Water, SOC-2-0067_WATS_and_Load_1_to_3-Southern_Water_analysis

- **It has not appropriately quantified the impact of its issue.** Southern Water uses a different set of forecast cost drivers to those used in our final determinations. This impacts the calculated allowance change for all companies. For example, Southern Water quantifies the impact on Thames Water to be a £71 million reduction in its wastewater network plus allowance. Our analysis based on the published feeder model considers the impact to be a materially larger reduction of £104 million.[81]

- **The company's unit cost analysis relies on the company's internal data** that has not been quality assured through our Annual Performance Reporting process.

- **Southern Water appears to use Anglian Water's total load figures from the year 2011-12 and assumes these figures apply for all companies for all outturn years.**[82]

Residential retail base cost models

Our final determinations

2.132 We used two bad debt cost models, two other cost models, and four total retail cost models to help set efficient residential retail base expenditure allowances at PR24 final determinations. In each model, the dependent variable is specified as cost per household.[83]

2.133 The key drivers of residential retail costs are the amount of revenue at risk if a customer does not pay its water bill; a customer's propensity to default; type of customer; and economies of scale.

2.134 The robustness of PR19 residential retail base cost models was impacted by Covid-19, largely due to the increase in companies' bad debt provisions. We addressed these issues by including two Covid-19 dummy variables for 2019-20 and 2020-21, removing the transience variable and removing the proportion of metered households variable.

Issues raised by disputing companies

2.135 Northumbrian Water, Southern Water, Wessex Water and South East Water accepted our final determinations for the full residential retail price control.

[81] [OF-CA-099] Ofwat, PR24CA08 - WW3NP - FD EoS impact analysis
[82] [OF-CA-100] Ofwat, Analysis of Southern Water OF-CA-098-SOC-2-0067.
[83] [OF-CA-008] Ofwat, 'Expenditure allowances - base cost modelling decision appendix', December 2024, p.52

2.136 Only Anglian Water did not explicitly accept our final determinations of the residential retail price control. The company requests that the CMA include the updated average bill size calculation in its redeterminations.[84]

2.137 Despite accepting the retail control, Southern Water has listed this as an additional item for consideration in the CMA redetermination.[85]

Average bill size forecasts

Our final determinations

2.138 We include average bill size in bad debt and total retail cost models to capture the amount of revenue at risk if a customer defaults on its water bill; a key driver of bad debt and debt management costs. We applied the same approach at PR19, and it is supported by almost all companies.

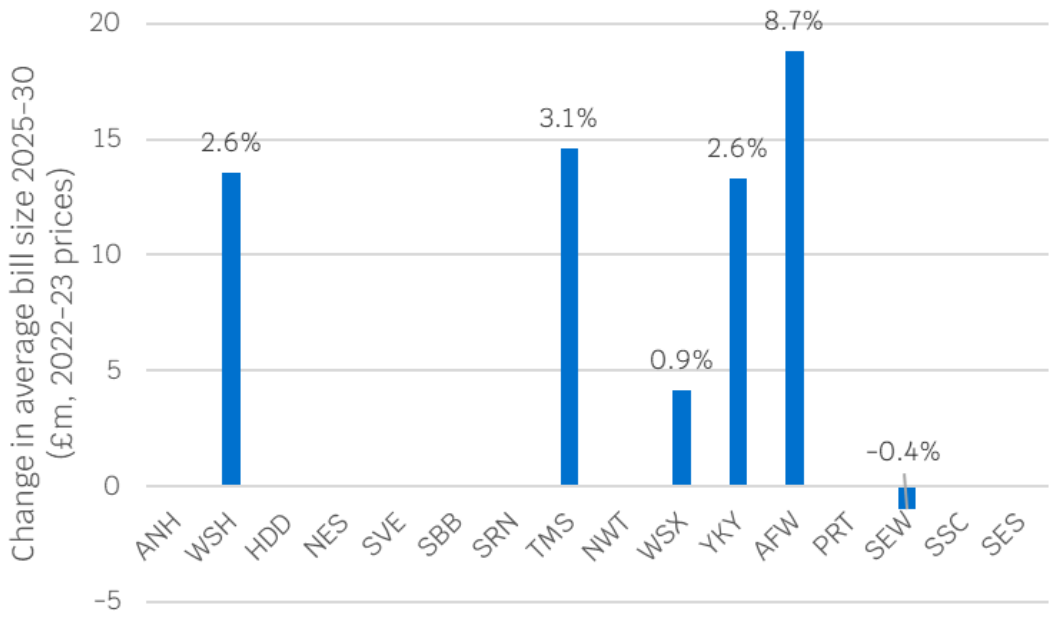
2.139 To produce a long-time series of the average bill variable for all companies, we calculate average bill as total revenue (wholesale plus retail) divided by the number of households.[86,] This is consistent with our PR19 approach.[87]

2.140 We need to forecast changes in average bill for each company over the 2025-30 period to set residential retail base expenditure allowances. This ensures that retail allowances reflect forecast changes in the amount of revenue at risk. We applied a conservative approach and used companies' business plan forecasts rather than the allowed revenue implied by our determinations.

2.141 In draft determination representations, most companies did not update forecast revenue and household numbers. So, the average bill size did not change at final determinations for most of the sector. This is highlighted in the figure below.

[84][OF-OA-001] Anglian Water, PR24 CMA Redetermination Statement of Case, March 2025, p.77
[85][OF-OA-003] Southern Water, PR24 Redetermination Statement of Case', March 2025, p.575
[86][OF-CA-019] Ofwat, PR24 Draft determinations expenditure allowance base cost modelling decision appendix, July 2024, p.64
[87][OF-CA-020] Ofwat, PR19 Final determinations securing cost efficiency technical appendix, December 2019, p. 127

Figure 11: Change in forecast average bill sizes between draft determination and final determination



2.142 Southern Water was one of the companies that did not update forecast revenue and household numbers in its draft determination representation. So, we used the same forecast average bill at draft and final determinations to set residential retail allowances for Southern Water. As part of the query process, it disputed our decision to not reflect updated figures in the retail allowances. The company stated that had the data and calculation used for the average size been communicated to the company, it would have restated this data in its representation.[88]

2.143 We did not consider this to be an unambiguous error as the company had the opportunity to restate its data and chose not to. Therefore, we made no corrections to the retail models and do not intend to make amendments for this in the 2024-25 blind year process. We used the latest data available to us at final determinations.

Issues raised by disputing companies

2.144 Southern Water and Anglian Water ask the CMA to use updated average bill size forecasts to set residential retail expenditure allowances in PR24 redeterminations.

Our assessment

2.145 We recommend the CMA excludes residential retail from the scope of its redeterminations. Providing additional allowances would not improve customer

[88] Series of three post final determination queries and responses: OFW-FD-SRN-002, OFW-FD-SRN-006, OFW-FD-SRN-013. Included with submission.

outcomes, and risks windfall gains given our residential expenditure allowances are somewhat favourable to companies.

2.146 Residential allowances are 14% more than PR19, and 3% more than what companies have spent over the past 5 years. Company reported expenditure on retail is impacted by large increases in bad debt provisions in response to Covid. However, debt written off (which more accurately reflects the actual costs to companies of bad debt) which did not increase in line with provisions because cash collection rates did not fall significantly. 10 out of 17 companies received a residential retail allowance that was more than they requested in their draft determination representations.[89]

2.147 We disagree with Southern Water and Anglian Water's request that the CMA updates residential retail allowances to reflect latest average bill forecasts. Companies had the opportunity to provide updated revenue and household forecasts as part of their representations but chose not to in most cases.

2.148 The average bill size variable used in the retail models is not the actual bill size that customers will face. Rather, it is a proxy based on the company's forecast revenue over the period. This revenue forecast is based off the company's proposed business plan request, and not the allowance it received at final determination. In the case of the disputing companies, a lower allowance than requested should lead to a lower average bill size.

2.149 We therefore recommend that, if the CMA chooses to update the average bill size, it uses the actual bill size to calculate allowances. This will ensure that customers do not overpay, which is particularly important in retail where there is no cost sharing. It will also reduce the risk of the disputing companies gaming their retail allowances through an updated average bill forecast.

2.150 Southern Water provided updated figures as part of the query process.[90] We did not reflect the updated figures in allowances because they were not stated in representations. But following further scrutiny, we find that Southern Water forecasts the biggest change in average bill size since PR24 business plans (11.7%) when compared to other companies that restated figures.[91] Acceptance of these figures without challenge would increase Southern Water's residential retail allowance by £24.4m (6.4%).[92] The company provided no commentary to justify the steep increase in revenue forecasts since its previous submission.

[89] [OF-CA-021] Ofwat, PR24 base costs aggregator model', December 2024
[90] [OF-CA-022] Ofwat, PR24 Inbound query, Southern Water, base costs - residential retail model, December 2024
[91] [OF-CA-023] Ofwat, Average bills vs Financial bill checks (Avg bill changes), March 2025
[92] [OF-CA-023] Ofwat, 'Average bill analysis', April 2025

2.151 Anglian Water has not provided updated bill forecasts in its statement of case, so we cannot assess the materiality or isolated impact to allowances of accepting the figures without challenge.

2.152 Should the CMA want to explore reflecting updated average bill forecasts in residential retail allowances, we recommend the following steps:

- Collect updated business plan tables from each company for updated revenue and household figures.[93]
- Cross-check changes in these figures since the PR24 business plan to ensure the forecasts are sensible, eg cross-check against the increase in requested expenditure, benchmark against the companies that already restated figures.
- Independently determine average bill forecasts for each disputing company that reflects the CMA's final determination rather than the companies' forecasts.
- Update residential retail base expenditure allowances to reflect the CMA's forecast of average bill size for each company.

Catch-up efficiency challenge

Our final determinations

2.153 We set the catch-up efficiency benchmark at the upper quartile for wholesale water, wastewater network plus, bioresources, and residential retail base costs. This is consistent with the benchmark used by the CMA in PR19 redeterminations.

Issues raised by disputing companies

2.154 Northumbrian Water states that the upper quartile catch-up efficiency challenge means that allowances provided before cost adjustments will be lower than the three quarters of the companies actual spend.[94]

2.155 Northumbrian Water considers the upper quartile catch-up efficiency is not sensible given limitations in econometric modelling and risks a downward spiral in allowances over time.[95]

2.156 South East Water states that we did not justify the upper quartile challenge, and states that the upper quartile challenge is most stringent that could be applied.[96]

[93] Specifically, table RR27 for the total residential retail revenue figures and table SUP1a for the number of households connected figures.
[94] [OF-OA-002] Northumbrian Water, Statement of case, p.67, para.210
[95] [OF-OA-002] Northumbrian Water, Statement of case, p.69, para.221
[96] [OF-OA-005] South East Water, Statement of case, p.36, para.4.14

Our assessment

It is incorrect to state that allowances provided before cost adjustments will be lower than the three quarters of the companies actual spend

2.157 Historical cost benchmarking helps to overcome information asymmetry by comparing companies on a like for like basis, and allows us to challenge lagging companies to catch-up with leading companies. The same process would happen in a competitive market. It helps to ensure that customers do not pay for inefficiency.

2.158 In a perfect world, we would set the benchmark at the leading company. But no benchmarking models can capture all cost drivers. So we reduce the stretch by moving the benchmark to the upper quartile company. At PR24, this leads to a catch-up efficiency challenge that is relatively small.

2.159 We then use cost driver forecasts so that base expenditure allowances reflect forecast changes in the cost drivers. For example, population and asset growth.

2.160 Northumbrian Water has not accurately represented what historical benchmarking aims to achieve, or acknowledged the use of cost driver forecasts to set base expenditure allowances. The company has also not acknowledged that high spend in recent years is partially caused by energy costs, which we have addressed through the energy cost adjustment and reconciliation.

The upper quartile catch-up efficiency challenge is not overly stretching

2.161 We set the catch-up efficiency benchmark at the upper quartile. This is consistent with wider regulatory practice. All water companies applied at least an upper quartile benchmark to develop their base cost proposed included in PR24 business plans.

2.162 In addition, the catch-up efficiency adjustment for water and wastewater network plus was small at 1.3% and 0.6% respectively. It is also smaller than at PR19, and much smaller than at PR14. This is shown in the table below, which compares the upper quartile efficiency adjustment factors at different price controls.

Table 6: Comparison of the upper quartile catch-up efficiency adjustment at different price controls

	PR24[97 98 99 100]	PR19[101 102]	PR14[103 104]
Wholesale water	1.3%	3.9%	6.5%
Wastewater network plus	0.6%	1.2%	10.4%
Bioresources	7.4%	1.2%	10.4%
Residential retail	8.3%	10.2%	0% (average cost to serve)

2.163 The table also shows that the retail catch-up efficiency challenge is smaller than at PR19. As in PR19, disputing companies have not challenged residential retail expenditure allowances.

2.164 The bioresources catch-up efficiency challenge is larger than at PR19 due to the decision to set separate efficiency challenges for wastewater network plus and bioresources, which was facilitated by improved cost allocation since PR19. Setting a separate bioresources cost efficiency challenge is more transparent and more likely to achieve a stretching, targeted efficiency challenge for bioresources activities.

2.165 The disputing companies have not acknowledged the partial overlap with the sector wide energy cost adjustment by calculating the water and wastewater network plus catch-up efficiency benchmark over the last 5-years of outturn data. This approach to determining the benchmark helps to ensure base expenditure allowances reflect recent evidence on efficiency and sector wide cost pressures. But it does lead to a smaller catch-up efficiency challenge than if we had used the full historical sample, and overlaps with the energy cost adjustment which also aims to capture the step-change in energy costs in recent years. As stated in our final determination, we consider this approach provides companies with headroom to deliver performance improvements with base expenditure allowances over the 2025-30 period.[105]

2.166 Overall, the catch-up efficiency challenge applied is relatively small and achievable. The CMA may want to consider applying a more stretching catch-up efficiency

[97] Water available here: [OF-CA-236] Ofwat, PR24-water-base-costs-feeder-model-3, December 2024, worksheet 'Efficiency'
[98] Wastewater network plus available here: [OF-CA-237] Ofwat, PR24-wastewater-network-plus-base-costs-feeder-model-3, December 2024, worksheet 'Efficiency'
[99] Bioresources available here: [OF-CA-238] Ofwat, PR24-bioresources-base-costs-feeder-model-3, December 2024, worksheet 'Efficiency'
[100] Residential retail available here: [OF-CA-239] Ofwat, PR24-residential-retail-base-costs-feeder-model-3, December 2024, worksheet 'Efficiency'
[101] Water and wastewater available here: [OF-CA-233] Ofwat, PR19-redeterminations-cost efficiency-response-to-common-issues, May 2020, p.71, Table 6.1
[102] Residential retail available here: [OF-CA-235] Ofwat, PR19-Feeder-model-2-Retail-Catch-up-adjustment, worksheet 'Catch up efficiency'
[103] Wastewater and wastewater available here: [OF-CA-233] Ofwat, PR19-redeterminations-cost efficiency-response-to-common-issues, May 2020, p.71, Table 6.1
[104] An average cost efficiency challenge was applied to residential retail expenditure allowances at PR14. Retail services were separated from wholesale services at PR14.
[105] [OF-OA-022] Ofwat, PR24 Final determinations expenditure allowances', February 2025, p.27

challenge, and/or removing the overlap with energy cost adjustment.ost adjustment claims

2.167 Disputing companies raise several issues relating to cost adjustment claims. We discuss the issues relating to mains renewal, meter renewal, network reinforcement and energy forward looking sector wide cost adjustments below. We cover company specific cost adjustments in a separate annex.[106]

Water mains renewal cost adjustment

2.168 In response to the draft methodology, six companies stated that there is a need for a step-change in the level of asset maintenance and replacement at PR24, focusing on a need to increase water mains renewal rates.[107]

2.169 Companies presented a similar range of reasons for this, which reference the Economic Insights report produced for Water UK.[108] This set out that historical expenditure has not been sufficient to maintain asset health, citing various reasons including a comparison to the mean European renewal rate of 1% per year, and the age of the asset base.

2.170 Previous renewal rates in England and Wales have been higher than recent rates, with 0.5% per year post 2008 and 1.4% per year pre 2008, resulting in 41% of mains which are less than 30 years old. At PR19 companies were funded on the basis of plans to renew an average of 0.4% of water mains per year. So far this period (2020-2024) the sector has delivered at an average rate of 0.15% per year. Some companies, through the 2021-22 annual performance report query process, have suggested that renewals had been deferred in favour of short-term interventions such as pressure management, which may be storing up long term issues.

Our final determinations

2.171 We applied an adjustment to nine companies' base expenditure allowances to increase the rate of water distribution mains renewals over the 2025-30 period.[109] The aim of the

[106] Ofwat, PR24 redeterminations – expenditure allowances - cost adjustment claims, April 2025
[107] [OF-CA-001] Ofwat, Creating tomorrow, together: Our final methodology for PR24. Appendix 9 – Setting expenditure allowances, p.48 ;The companies were Affinity Water, Anglian Water, Northumbrian Water, Thames Water, Wessex Water and Yorkshire Water.
[108] [OF-CA-049] Economic Insights, 'Options for a Sustainable Approach to Asset Maintenance and Replacement', June 2022
[109] Anglian Water, Dŵr Cymru, Northumbrian Water, Southern Water, Thames Water, Wessex Water, Yorkshire Water, South West Water (Bristol region) and South East Water.

adjustment was to move the sector towards a more sustainable renewal rate and to improve asset health over the 2025-30 period.[110]

2.172 Our assessment was based on robust and comparable asset condition data provided by companies in their PR24 business plans. We applied an adjustment to the companies that had the highest proportion of poor (grade four) and very poor (grade five) condition grade mains across the sector to improve asset condition and reduce burst rates over the 2025-30 period.[111]

2.173 We determined that our base models fund companies to deliver an average mains renewal rate of 0.3% per year, known as 'what base buys'. This was based on the long-term average renewal rate, and consistent with the time period used to estimate the base cost econometric models. We set the expectation that all companies should deliver mains renewals at this rate at a minimum across the 2025-30 period.

2.174 Through the cost adjustment, we required five of the nine companies that received the adjustment to allowances to increase their annual average renewal rate to 0.43% over the 2025-30 period.[112] For the remaining four companies, we accepted the company's proposed renewal rate based on evidence included in their business plans or draft determination representations.[113] This ranged from 0.34% to 0.66% per year.

2.175 We required all nine companies to focus on renewing worse condition mains (condition grade four and five mains) with the cost adjustment to improve the health of the asset base.[114]

2.176 To ensure that customers do not pay twice for historical under-delivery, we held Dŵr Cymru, Southern Water and Yorkshire Water to account for the deterioration in asset condition between PR09 and PR24. These companies have also historically renewed mains at a rate below the annual sector average. We adjusted our assessment of what base buys to reflect the lower than average renewal rates of these companies.[115]

2.177 We applied a price control deliverable to all companies for mains renewals to ensure that money is returned to customers if companies do not deliver the mains renewals as expected.

[110] [OF-OA-022] Ofwat, PR24 Final determinations expenditure allowances', February 2025, pp.31-39
[111] This does not include Anglian Water which have a lower proportion of condition grade four and five mains. For this company, we accepted a company specific cost adjustment claim that focused on climate change and improving asset health.
[112]Northumbrian Water, Southern Water, Wessex Water, South West Water (Bristol region) and South East Water.
[113] Anglian Water, Dŵr Cymru, Thames Water and Yorkshire Water.
[114]This requirement applies only to renewals above 'what base buys'. We did not impose any restrictions or conditions on what mains companies choose to renew through what base buys.
[115] [OF-OA-022] 'PR24 final determinations expenditure allowance', February 2025, p.35

Issues raised by disputing companies

2.178 The disputing companies raised the following issues, which we assess below:

- The five disputing companies disagree with our approach to calculating what base buys.
- Southern Water raises concerns with the quality of the asset condition data used to inform our assessment.
- Southern Water disagrees with holding the company to account for a deterioration in asset condition between PR09 and PR24.
- Southern Water and South East Water disagree with the median unit cost applied to the mains renewals adjustment at final determination.
- The five disputing companies disagree with holding the companies to account for delivering mains renewals through their base expenditure allowances. The companies state that the PCD mechanism reduces flexibility and may not lead to the best outcome for customers.

Issue 1: What base buys

Our final determinations

2.179 We stated that base buys mains renewals at an average rate of 0.3% per year.

2.180 This was determined based on historical rate of mains renewals delivered through base expenditure allowances. To determine our view, we used the average renewal rate across the historical period, 2011-12 to 2022-23. We did not include 2023-24 data in our calculation of what base buys at final determination as renewal rates in this year were not representative of a long-term renewals rate, and did not materially impact the rate used at draft determination (moving from 0.3% to 0.29%).[116]

2.181 Our base models determine allowances based on a long time-series of historical data. In doing so, they provide long-term allowances that enable companies to maintain the long-term capability of assets while managing peaks and troughs in capital maintenance over time. We consider our approach to determining what base buys is consistent with this.

Issues raised by disputing companies

2.182 The five disputing companies disagree with using the historical modelling period to determine what base buys. Four of the companies state that this should be calculated

[116] Over half of the sector delivered mains renewals at a rate that was at or below 0.1 percent. We did not consider this to be reflective of what base allowances deliver and therefore excluded this year from our calculation.

based on the last five years only.[117] Wessex Water does not state a preferred approach to recalculating what base buys. The disputing companies stated what base buys assumptions that ranged from 0.15% to 0.2% per year.

2.183 The companies state that using the last five years only will ensure alignment with the setting of our catch-up efficiency challenge.

2.184 Anglian Water states that using an unweighted mean leads to undue reliance on small, unrepresentative networks. It uses Portsmouth Water as an example of a company with a high rate of renewals, but an insignificant proportion of mains in England and Wales.

2.185 Anglian Water and Northumbrian Water disagree with the exclusion of 2023-24 data in our calculation of what base buys. Both state this is inconsistent with how we set modelled allowances at final determination.

Our assessment

There is a clear and strong rationale for using the full historical period to determine 'what base buys' for mains renewals.

2.186 Before any adjustment is applied to a company's allowance, it is important to first establish what it can deliver through its base allowance. In the case of mains renewals, this reduces the risk of customers paying twice by determining at what rate companies have delivered mains renewals through their base allowances in the past.

2.187 There are a range of approaches that can be used to determine a view of what base buys, and we acknowledge that there is no perfect view. Nor is it likely that there will be one view that all companies support. This was reflected in the range of assumptions of what base buys included in PR24 business plans.[118]

2.188 We therefore considered a range of approaches to determining what base buys in our final determination. As part of this, we also considered the rationale underpinning the approach and the potential for any unintended consequences. This included basing it on the last five years only as proposed by four of the disputing companies.

2.189 We consider there is a clear and strong rationale for using the full historical period to determine what base buys. This led to a what base buys mains renewal rate of 0.3% per year. In draft determinations representations, eight out of seventeen companies

[117] Anglian Water, Northumbrian Water, Southern Water and South East Water.
[118] [OF-CA-027] Ofwat, PR24 Cost Assessment Master Dataset, Mains replacement sector wide base costs adjustment, July 2024

forecast to deliver mains renewals at a rate of 0.3% per year or above.[119] And the companies that disagreed did not hold a unanimous view of what base buys.

2.190 Using the full historical period to determine what base buys aligns to our approach to modelling base expenditure costs to determine long-term allowances that enable companies to maintain the long-term capability of assets while managing peaks and troughs in capital maintenance over time.

2.191 We applied a consistent approach to determining what base buys between our sector wide cost adjustments.[120] Our energy costs and meter replacements use the full historical period and received broad support and acceptance from the sector in response to our draft determinations. This is also consistent with the approach used in the PR19 water redeterminations for the sector wide growth unit cost adjustment.[121]

It would be perverse to determine 'what base buys' using the last five years of outturn data

2.192 We disagree with disputing companies proposals to determine what base buys using the last five years of outturn data simply because the catch-up efficiency challenge is calculated over that period.

2.193 We do not set allowances based on the last five years. We calculate an efficiency challenge over this period as a way to incentivise companies to find efficiency, and "catch up" to the more cost efficient companies. We use the five year period to moderate the challenge applied to reflect most recent performance and cost pressures.

2.194 Our modelled allowances take account of historical expenditure and what companies have delivered over time. This helps us to understand what companies are able to deliver going forwards, and what expenditure will be required to do so. The same applies to mains renewals. A decision to reduce mains renewals in recent years does not mean that a higher rate of renewals cannot be undertaken in future years.

2.195 Choosing to focus solely on the last five years to determine what base buys risks creating perverse incentives to reduce renewal rates in advance of a price review in order to lower this assumption, and the requirements through base.

2.196 In addition, the sector has undertaken mains renewals at an average rate of 0.14% per year over the last five years. This is despite being funded to deliver a renewal rate of

[119] Hafren Dyfrdwy, SES Water, Severn Trent Water, South Staffs Water, Affinity Water, South West Water (Bristol region, 0.28%), Portsmouth Water and Dŵr Cymru.
[120] We still consider alignment between the approach to calculating what base buys to be important, and therefore hold the same view in response to the statement of cases with regard to meter replacements and energy costs.
[121] [OF-CA-013] Competition and Markets Authority, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, March 2021, pp.297-330

0.4% per year in PR19. While there were no PCDs attached to mains renewals at PR19, there was a sector wide cost gap of just 0.4%. This means that the sector was sufficiently funded to deliver what was set out in business plans.

2.197 Some companies, including Southern Water, stated the reduction in mains renewal rates in recent years can be explained by the incentives of the totex framework which is encouraging companies to divert expenditure away from low risk assets, such as water mains, to meet performance targets or to manage unforeseen cost pressures

2.198 Companies have a duty to maintain an efficient and economical system of water supply, including maintaining good asset health.[122] In accepting their final determinations, companies accept that they have sufficient funds to undertake their functions and meet their statutory obligations. In the event that companies need flexibility in their allowances to invest in their assets as required, there are cost sharing mechanisms in place to enable further investment.

2.199 Taking account of this, it seems perverse for companies to put forward mains renewals as a priority at PR24, despite not renewing mains in line with what they considered they needed to in their PR19 business plan submissions, and were subsequently funded to through PR19 allowances. We therefore do not consider it appropriate to determine what base buys on a period of time where companies have underdelivered on a previous determination.

2.200 From a perspective of ensuring that customers do not pay twice, other stakeholders may argue our approach of setting what base buys at 0.3% per year instead of the 0.4% per year companies were funded to deliver at PR19 is conservative.

We do not consider it is appropriate use 2023-24 outturn data to determine what base buys as this could encourage perverse company behaviour

2.201 In our final determinations, we chose not to update our what base buys analysis to include 2023-24 data. In this year, 12 companies renewed mains at a rate equivalent to or below 0.1% per year despite companies stressing the importance of increasing mains renewal rates when developing the PR24 methodology and in their PR24 business plan submissions.

2.202 We do not consider a mains renewal rate of 0.1% is reflective of what base buys, and therefore excluded this data. Including it in our calculation of 'what base buys' could encourage companies to adopt similar perverse behaviour in the future. For example, reduce renewal rates in the current regulatory period to obtain a higher cost adjustment in the future. This behaviour would lead to customers paying twice.

[122] [OF-CA-194] UK Government, Water Industry Act 1991, section 37

2.203 Including 2023-24 in the calculation leads to an immaterial change in the what base buys renewal rate, moving from 0.3% to 0.29% per year. However, this could have a material impact on company incentives at future price reviews in relation to asset renewals because of the reasons set out above, ie there is a high risk of incentivising companies to reduce renewal rates further to reduce the view of what base buys.

We do not use a weighted mean to avoid placing disproportionate weight on large water and sewage companies

2.204 Our benchmarking models include drivers that capture differences in company operating networks, including total length of mains and population served. This means that companies receive an allowance that reflects the specifics of their network, and their subsequent maintenance requirements.

2.205 We therefore do not consider it appropriate to use a weighted mean in our approach to determining rates. Conversely to the point raised by Anglian Water regarding small water companies, we consider that a weighted mean will result in placing disproportionate weight on large water and wastewater companies.[123]

2.206 Allowances are proportionate to the size of companies networks, and therefore no one company is advantaged or disadvantaged by their size. We therefore consider it appropriate to use an arithmetic mean to calculate what base buys. We applied the same approach in the PR19 growth symmetrical sector wide cost adjustment, which was also followed in the PR19 redeterminations.

Issue 2: Holding companies to account

Our final determinations

2.207 We held Dŵr Cymru, Southern Water and Yorkshire Water to account for a deterioration in mains asset condition between PR09 and PR24, and low renewal rates across the historical period.

2.208 For these companies, we increased our view of what base buys to reflect the level of deterioration between PR09 and PR24.[124] This means the companies are required to deliver a higher renewal rate through their modelled base allowance prior to any cost adjustment.

Issues raised by disputing companies

[123] [OF-OA-001] Anglian Water, Statement of Case, March 2025, p.57, paragraph 217(i)
[124] [OF-OA-022] Ofwat, PR24 final determinations expenditure allowance, February 2025, pp.35-36

2.209 Southern Water states our approach of using condition grade to assess changes in mains renewals condition is inconsistent with regulatory precedent and past guidance.[125]

2.210 Southern Water states that its base allowances have been invested flexibly, and where required. It states that, in some cases, this has reduced mains renewals rates but has not impacted service levels delivered to customers.[126]

Our assessment

2.211 Water companies have a duty to maintain an efficient and economical system of water supply, including maintaining asset health.[127] It is therefore important to consider what companies have delivered in the past, and ensure that customers are not paying twice for historical under delivery of asset renewals and refurbishment.

2.212 Companies will experience capital maintenance peaks and troughs over the long term. But companies should undertake renewals at a rate that at least keeps up with the rate of deterioration. The evidence assessed at PR24 indicated that this was not the case for some companies. We addressed by increasing the renewal rate we expect these companies to deliver through modelled base allowances before applying a cost adjustment. This ensured that customers do not pay twice for renewals.

2.213 In our final determination, we implemented a twin test that looked at (i) the change in asset condition over time; and (ii) renewal rates over the historical period. If a company had allowed its assets to deteriorate since PR09, and also renewed mains at a rate below the industry average renewal rate, we held the company to account for doing so. This resulted in holding three companies to account for asset deterioration over time: Dŵr Cymru, Southern Water and Yorkshire Water.

2.214 Based on the data provided by Southern Water, we found that at PR09, the company reported that 4.3% of its water distribution mains were in condition grade four (poor) and five (very poor). At PR24, this has increased to 7.3%. This compares to an overall decrease in condition grade four and five mains across the sector.[128]

2.215 In addition, Southern Water has renewed its mains at an average rate of 0.16% over the historical period, and at an average rate of 0.11% over the last five years. In both cases, the company has renewed mains at a rate below the sector average.

[125] [OF-OA-003] Southern Water, Statement of Case, March 2025, p.272, section 7.7.1
[126] [OF-OA-003] Southern Water, Statement of Case, March 2025, p.276, section 7.1.12
[127] [OF-CA-194] UK Government, Water Industry Act 1991, section 37
[128] [OF-CA-029] Ofwat, Mains renewal cost adjustment model, December 2024

2.216 While the company states that it has maintained its service to customers over time, the evidence suggests that it has done this at the expense of allowing its mains to deteriorate over time. This is likely to negatively impact customer and environmental outcomes in the future. For example, more bursts, higher leakage, more water supply interruptions.

2.217 We therefore held Southern Water to account for the rate of deterioration over time in our final determination. Our decision to hold companies to account was acknowledged and supported by the Consumer Council for Water (CCW).[129]

Issue 3: Unit cost

Our final determination

2.218 In our final determinations, we applied a unit cost of £300 per metre (pre-frontier shift) for mains renewals delivered through base and enhancement allowances.[130]

Issues raised by disputing companies

2.219 Southern Water states that the unit cost used in our assessment does not sufficiently fund the company to undertake the leakage driven renewals it has planned. The company states that its proposed unit cost includes replacement of both mains and communication pipes.

2.220 South East Water states that the median efficient unit cost is unlikely to account for the regional and operational factors that the company faces.[131] It states it faces congested roads, higher regional wages and a high density of regions categorised as environmentally sensitive areas. It associates these factors with a higher efficient cost of mains renewal.

Our assessment

2.221 Companies do not report mains renewals expenditure as a separate cost line in our annual performance reports. This means we were not able to rely on historical cost data to determine an efficient unit cost across the sector.

2.222 In absence of this data, our assessment of an efficient unit cost of mains replacement was based on information provided in companies' PR24 business plan submissions,

[129] [OF-CA-028] Consumer Council for Water, CCW's response to Ofwat's 2025-30 draft price determination, August 2024, p.10
[130] We allowed a unit cost of £1150 per metre to Thames Water for renewals in Central London (pre-frontier shift).
[131][[OF-CA-048] Oxera, Base cost adjustments and cost adjustment claims, March 2025, p.7

information gathered through the PR24 query process, and in representations to our draft determination.

2.223 At draft determination, we applied the median unit cost (£292 per metre, pre-frontier shift) based on data from 11 companies.[132] We also acknowledged the limited range of unit costs used in our assessment.[133]

2.224 In response to our draft determinations the sector did not provide an alternative approach to determining unit costs on a consistent basis. Most companies provided their view of an appropriate unit cost, either explicitly stating what they considered this cost to be, or incorporating our draft determination unit cost into their proposed costs.

2.225 We included all unit costs submitted in business plans and draft determinations in our unit cost calculation at final determination. This included a mix of works, eg materials and diameters, as well as outturn and forecast costs, which helped to improve the robustness of the unit cost. The range of costs is shown in our published model.[134] Once accounted for, the median unit cost increased to £298.36 per metre. For simplicity, we rounded this to £300 per metre and used this in our calculation of our mains renewal adjustment.[135]

2.226 We consider applying a single unit cost for mains renewals across all companies is appropriate. Across a programme of work, we expect that some works will be more or less complex than others, and subsequently more or less costly.

2.227 Overall, Southern Water or South East Water have not provided compelling evidence on why their efficient unit cost of mains renewals is higher than other companies. Southern Water has been unable to point to company specific factors that are driving these costs, but does state that its unit cost includes the cost to replace its communication pipes at the same time. This is the company's asset management decision to do both. Our unit cost and adjustment is for the replacement of the mains pipes only to reduce bursts. Nevertheless, the unit cost information we used includes a mix of work, some of which includes communication pipe renewal, and therefore provides an allowance to for companies to undertake some communication pipe renewal at the same time as replacing the water main.

2.228 Furthermore, in its draft determination representations, the company accepted that our unit cost may be appropriate for an asset health or mains bursts driven programme.[136]

[132] [OF-CA-030] Ofwat, PR24 DD Mains renewals adjustments, July 2024
[133] [OF-CA-025] Ofwat, PR24 Draft determinations expenditure allowances, July 2024, p.35
[134] [OF-CA-031] Ofwat, PR24 FD Mains renewal cost adjustment model, December 2024
[135] This unit rate was also applied to enhancement water quality and leakage mains renewals requests.
[136] [OF-CA-160] Southern Water, SRN-DDR-029- Water Resources – Demand (Leakage) Enhancement Cost Evidence Case, p.10

Through the sector wide adjustment the company is required to target mains to reduce bursts, we therefore consider this specified unit rate appropriate.

Issue 4: Asset condition data

Our final determination

2.229 Companies stated the need for a step-change in the level of asset maintenance and replacement at PR24, focused on mains renewal rates.[137] So, we asked companies to provide water distribution mains condition data in table CW20 of the PR24 business plan reporting requirements[138] to better understand whether the observed reduction in renewals has had an impact on asset health.[139]

2.230 In support of the mains condition data requested for the October 2023 business plan submission, we asked companies to provide a supporting excel file that included a full breakdown of their condition grade mains cohorts and relative burst rate information. We provided a template with additional guidance to support this ask.[140] We received a mixed quality of response to our request with some companies not using the template provided.

2.231 In January 2024 we issued a query to all companies with specific instructions to complete the detailed cohort table addressing the issues discovered with the initial submissions. The returned information was more robust and complete.

2.232 The template was developed in consultation with the sector and based on the guidance set out in the 2009 Price Review asset inventory reporting requirements and the underpinning 2005 UK Water Industry Research (UKWIR) report. [141] [142] [143]

Issues raised by disputing companies

2.233 Southern Water questions the use of condition data as the sole metric used to determine renewal rates and states there are alternative ways to reduce burst rates

[137] [OF-CA-049] Economic Insights, Options for a Sustainable Approach to Asset Maintenance and Replacement, June 2022
[138] [OF-CA-032] Ofwat, PR24 final methodology submission table guidance section 3 costs wholesale, August 2023
[139] [OF-CA-001] Ofwat, Creating tomorrow, together: Our final methodology for PR24: Appendix 9 Setting expenditure allowances, December 2022, p.50
[140] [OF-CA-033] Ofwat, CW20 Additional Cohort Table Guidance, May 2023
[141] [OF-CA-034] Ofwat, PR09 Final Business plan reporting requirements (Table C3 Asset Inventory), May 2010
[142] [OF-CA-035] UK Water Industry Research, Review of Water Mains Serviceability Indicators and Condition Grading Volume II Mains Condition Grading', 2008
[143] It should be noted that companies were not required to provide the detailed cohort table in the 2009 asset inventory. Companies were only required to provide the length of main in each condition grade and in the commentary provide the graph showing the cumulative annual average bursts versus cumulative mains length, which is used to better understand which companies are better at targeting mains renewals.

such as pressure management and mains relining. The company considers it an error to use asset condition as the single source of information to assess asset health.

2.234 Southern Water states this data should not be compared to the PR09 submission due to issues with data consistency and comparability. It also questions the quality of the data cohort supplied from other companies and states that "comparing relative proportions of condition grades across companies is meaningless".[144]

Our assessment

2.235 In response to our draft methodology Southern Water stated that "we do not underestimate the difficulty in estimating the 'sustainable level' of asset replacement as it is a function of multiple factors, including asset age, asset condition and replacement rates. Nevertheless, the evidence that the current rate of asset replacement is inadequate is overwhelming."[145] Given that the metrics that Southern highlights are the metrics that we used, and that were used at PR09, it is unclear as to why the company now disagrees with their use.

2.236 We acknowledge there are alternative approaches to renewing mains that can help to reduce mains bursts. For example, pressure management has been used historically by companies to help reduce mains bursts, leakage, and supply interruptions. However, this is a short-term solution and does not ensure the long-term asset health of the network. Whereas relining is normally used by companies to improve water quality for taste, odor or discoloration and not to reduce mains bursts. In the final determination, we stated that companies are able to use relining in place of full mains renewal during the 2025-30 period if the relining was structural and replicated the same conditions as new main.[146] [147]

2.237 The company refers to an UWKIR report from 2010 which recommended the discontinuation of condition reporting for distribution mains.[148] The report suggests that serviceability measures are sufficient for monitoring the performance of the distribution network. Although serviceability measures were discontinued in 2015 and have not been reported since, companies still report mains bursts, leakage and supply interruptions performance. Alongside new condition information, which is comparable with the 2009 asset inventory submission, this allows for a rounded view of a company's ability to manage its network and maintain long-term asset health.

[144] [OF-OA-003] Southern Water, Statement of Case, March 2025, p.275, para.293
[145] [OF-CA-163] Southern Water, Response to PR24 draft methodology, September 2022, p.8
[146] This means that there should be no loss of capacity, functionality (eg ability to operate under the same conditions or pressure) or ability of the relined/sleeved main to provide the same service of the old main (when it was new).
[147] [OF-OA-027] Ofwat, Price control deliverables appendix, March 2025, p.25
[148] [OF-CA-036] UK Water Industry Research, The Asset Inventory, a simplified alternative approach, 2011

2.238 The data provided in the 2009 asset inventory is fully comparable to the data provided for the 2024 price review. The guidance we provided to companies at PR24 matches the guidance provided in 2009, which includes specific guidance around sub-grade boundaries eg 'significant' and 'non-significant' mains.[149] The only notable difference is that at PR24, we requested the additional detailed cohort data which was not requested in the 2009 asset inventory.

2.239 The company highlights that the cohort data provided by companies may not be relied upon or be comparable because of differences in individual cohort sizes leading to significant variance in compliance of cohorts within the expected tolerances of +/-50 % from the nominal burst rates. The UKWIR report from 2005 found minimal sensitivity of cohort size to the overall allocation of mains lengths to condition grades and recommended an overall tolerance of +/- 10% from the nominal length for the average cohort size. As a result, both the 2009 asset inventory and 2024 price review guidance state that "Whilst the size of any individual cohort may fall within the above tolerance of +/- 50%, it is not acceptable for all cohorts to be at the high end or the low end. Averaged over all cohorts the expected number of bursts must be within a tolerance of +/- 10% of the nominal size shown".[150]

2.240 Our analysis shows that shows that 12 out of 17 companies have overall tolerance within or close to +/- 10% as the guidance requires. Three of the companies outside the 10% tolerance (United Utilities, Severn Trent and Hafren Dyfrdwy) provided either only pipe level data or a mix of cohort and pipe level data. South Staffs Water and Southwest Water explain in their October 2023 business plan commentaries that their cohort sizes are the best fit for their network configuration.

2.241 Secondary checks on the published asset cohort data from those companies shows no data anomalies in either the expected burst rate in each condition grade ('condition grade' tab) or in the comparison to PR09 ('PR09 vs PR24' tab).[151] Therefore, despite some expected differences in the approaches to determining cohort size between companies, there is low sensitivity (as the UKWIR report found) to the overall allocation to condition grade.

Issue 5: Price control deliverable

Our final determination

[149] [OF-CA-033] Ofwat, CW20 Additional cohort table guidance, May 2023
[150] [OF-CA-035] UK Water Industry Research, Review of Water Mains Serviceability Indicators and Condition Grading, 2005
[151] [OF-CA-031] Ofwat, PR24 FD mains renewals cost adjustment model, December 2024

2.242 We applied a price control deliverable (PCD) to all companies for mains renewals. This included holding companies to account for delivering what base buys. For companies that we applied an adjustment to, we required companies to use these additional allowances to remove condition grade four and five mains over the 2025-30 period. For Anglian Water, we set out additional requirements in line with our acceptance of the company's cost adjustment claim to target mains with poor asset health that are also susceptible to impacts of climate change.

2.243 We considered it appropriate to apply a PCD to incentivise delivery given:

- deterioration in mains renewals rates in recent years;
- evidence of companies underdelivering against their PR19 plans; and
- the sector acknowledging the need to increase renewal rates.

Issues raised by disputing companies

2.244 The disputing companies raise similar concerns that attaching a PCD to mains renewals for what base buys, as well as additional requirements to focus on condition grade 4 and 5 mains reduces the flexible nature of base allowances.[152] [153] [154] [155] [156] Some of the companies raise more specific concerns set out below.

2.245 Southern Water states that the final determination does not provide justification for why the mains repairs outcome delivery incentive is inadequate to maintain asset health, and therefore why a PCD is required.[157]

2.246 Anglian Water states that it is not in customers' interests to attach a PCD to mains renewals. It states that the PCD requires the company to focus its efforts on categories of mains that poorly correlate to burst history.[158] The company asks the CMA to remove its condition grade 4 and 5 mains renewals requirement stating that this would allow the company to target mains that are at higher risk of failing.[159]

2.247 Northumbrian Water states that focusing renewals on condition grade 4 and 5 mains is likely to be more expensive and less effective at reducing bursts and leakage than a less prescriptive approach.[160] The company presents its own risk modelling to demonstrate

[152] [OF-OA-001] Anglian Water, Statement of Case, March 2025, p.2, paragraph 6
[153] [OF-OA-004] Wessex Water, Statement of Case, March 2025, p. 54, paragraph 8.4
[154] [Of-OA-005] South East Water, Statement of Case, March 2025, p.8, paragraph 1.17
[155] [OF-OA-003] Southern Water, Statement of Case, March 2025, p.346, paragraph 83
[156] [OF-OA-002] Northumbrian Water, Statement of Case, March 2025, p. 132,135, paragraphs 507,516
[157] [OF-OA-003] Southern Water, Statement of Case, March 2025, p.347, paragraph 84
[158] [OF-OA-001] Anglian Water, Statement of Case, March 2025, p.59, paragraph 225
[159] [OF-OA-001] Anglian Water, Statement of Case, March 2025, p.164, paragraph 623
[160] [OF-OA-002] Northumbrian Water, Statement of Case, March 2025, p.133, paragraph 509

an alternative approach that it states could reduce mains bursts by an additional 28%.[161]

Our assessment

Applying a PCD should incentivise companies to move towards a sustainable rate of renewals and to invest in mains as an identified priority at PR24

2.248 Mains renewal rates have deteriorated significantly in recent years. If the sector was to continue renewing mains at its current rate, it would take over 700 years to replace the entire network.[162] This is not a sustainable rate of renewals. For some companies, including four of the disputing companies, this has led to a deterioration in asset condition over time.[163]

2.249 As discussed above, companies forecast to deliver mains renewals at an average rate of 0.4% per year in PR19 business plans. Despite receiving allowances broadly in line with what was requested, companies have not delivered these renewals. At PR19, there was no mechanism in place to return money to customers if companies do not deliver on their plans.

2.250 We therefore consider it appropriate to apply a PCD to mains renewals over the 2025-30 period to protect customers from further under-delivery of mains renewals, and to incentivise companies to undertake the required renewals to move towards a more sustainable renewal rate, to improve condition and reduce bursts.

2.251 Specific conditions apply only to the proportion of renewals for which we applied an adjustment. This means that companies can invest their modelled base allowance, ie what base buys, flexibly. We set the expectation that companies' mains renewals programmes should balance the need to be efficient whilst achieving the maximum benefits for customers.[164]

The purpose of the mains renewals sector wide adjustment is to improve asset condition and reduce bursts over the 2025-30 period

2.252 At final determination we stated that "Companies must deliver mains renewals that are primarily driven by the factors for which we have accepted the need for investment. For companies that have received an adjustment to their allowances through our base sector wide adjustment for mains renewals, these additional allowances should be used to target condition grade 4 and 5 mains only. This does not mean that companies

[161] [OF-OA-002] Northumbrian Water, Statement of Case, March 2025, p.134, paragraph 512
[162] [OF-CA-025] Ofwat, PR24 draft determinations expenditure allowances, July 2024, p.37
[163] Northumbrian Water, Southern Water, Wessex Water and South East Water.
[164] [OF-OA-027] Ofwat, PR24 final determinations: Price control deliverables appendix, March 2025, pp.20-21

cannot replace condition grade 3 mains at the same time if deemed beneficial."[165] For example, companies could choose to replace condition grade 3 mains through their modelled base allowance.

2.253 The table below sets out the mains renewals PCD components for the disputing companies. Each company has a total expected annual renewal rate for the 2025-30 period. This is further broken down into:

- **Renewals delivered through modelled base allowances, ie what base buys.** There are no set requirements for these renewals to target specific mains.
- **Renewals delivered through the adjustment to allowances to improve asset condition.** These renewals should focus solely on the mains in poor and very poor condition grades (ie, grade four and five).
- **Renewals delivered through enhancement leakage and/or water quality allowances.** These renewals should focus solely on mains where the need for investment has been accepted.

Table 7: Mains renewals PCD requirements for the disputing companies[166]

	Proportion of condition grade 4 and 5 mains (%)	Required renewal rate (per year, %)	Modelled base renewal rate to be invested flexibly (per year, %)	Renewal rate to target condition grade 4 & 5 mains (per year, %)	Renewals to be delivered through enhancement allowances (per year, %)
Anglian Water	0.5%	0.54%	0.30%	0.24%	-
Northumbrian Water	4.1%	0.43%	0.30%	0.13%	-
Southern Water	4.3%	0.50%	0.30%	0.13%	0.07%
Wessex Water	4.0%	0.43%	0.30%	0.13%	-
South East Water	4.2%	0.50%	0.30%	0.13%	0.07%

2.254 Condition grade four and five mains, by definition, are those with the highest burst rate.[167] This means that, through holding companies to renewing condition grade four and five mains, companies are able to invest in the lengths of mains that are at higher risk of failing due to burst history or that have the highest incidence of bursts.

2.255 Without a PCD for mains renewals, there is a risk that companies will choose to renew mains that are the cheapest to replace rather than those where there is the greatest need of replacement.

[165] [OF-OA-027] Ofwat, PR24 final determinations: Price control deliverables appendix, March 2025, pp.20-21
[166] [OF-CA-031] Ofwat, PR24 Final determinations mains renewals cost adjustment model, December 2024
[167] [OF-CA-033] Ofwat, CW20 Additional cohort table guidance, May 2023

2.256 Anglian Water states that this approach could lead to the company focusing its efforts on categories of mains that poorly correlate to burst history. We have discussed this issue with the company prior to it submitting its statement of case, and have agreed a way forward. We provide a summary of this below.

2.257 At final determination, we accepted Anglian Water's proposal to increase its mains renewals rate to an average of 0.54% per year to target its mains with poor asset health that are also vulnerable to climate change. We queried the company to specify the cohorts of mains that it proposed to replace through its proposed renewal rate. This was important as the company's proposal did not focus solely on condition grade, other factors such as soil type were relevant to the claim. Overall, the company has a relatively low proportion of condition grade four and five mains relative to the sector average, 0.5% versus 4.3%.

2.258 At final determination, we held the company to renew the mains identified in its own query response, as well as renewing its condition grade four and five mains.[168] We considered the latter appropriate as Anglian Water's case was accepted as part of our mains renewals sector wide adjustment, which is focused on improving asset health over the 2025-30 period. This ensured fair and consistent treatment between the companies that received the adjustment. We also considered this a reasonable condition given the relatively small proportion of these mains (0.5%). We considered the company could use its adjustment or its modelled base allowance to deliver these renewals. We still consider this to be appropriate.

2.259 In February 2025, we discussed the PCD with the company, where it informed Ofwat that it had identified issues in the cohort analysis used to inform its own query response. The company found that the identified mains cohorts poorly correlated with burst history and therefore asked for this condition to be reconsidered. We have since agreed with the company to remove the reference to its query response, and therefore the condition to renew specific cohorts.[169] This addresses the company's concern with its own analytical outputs regarding historical bursts and required renewals. It is therefore unclear why the company raises this in its statement of case.

2.260 Northumbrian Water states that its own risk modelling will lead to a renewal programme that more effectively reduces bursts and leakage. Given that the PCD requires the company to focus the additional renewals (0.13% per year) on the mains that have the highest burst rate, it is unclear how an alternative approach will deliver a greater reduction in bursts.

[168] [OF-OA-027] Ofwat, PR24 final determinations: Price control deliverables appendix, March 2025, p.20
[169] As agreed by the company, we will make the required updates to the PR24 PCD appendix once we receive the relevant information from the company on its updated view of its proposed renewal programme.

2.261 For clarity, the PCD does not hold companies to account for the mains cohorts identified in PR24 business plan submissions (CW20). We accept that these cohorts are based on the average burst rate over the last five years, and specific lengths of pipes can be expected to move in between condition grades. The PCD requires companies to provide assurance that the mains renewed through the adjustment to allowances were those with the highest burst rate. We expect this to lead to an improvement in mains asset condition across the sector by 2029-30. If this is unclear, we will provide an update to the wording in the price control deliverables appendix.

2.262 It is important that the price control deliverables are designed so that companies are not incentivized to deliver the cheapest mains renewals that deliver the least benefit to customers and the environment. We note the lessons learnt from the iron mains replacement programme at Ofgem's RIIO-GD1 price control, where gas distribution companies delivered much cheaper iron mains replacement than they were funded for, leading to a £1.4 billion underspend in 2016-17 prices that the regulator could not return to customers.[170] We also note that we did not capture the potential impact of higher mains renewals on mains bursts when setting performance commitment levels at PR24, which was favourable to the companies.

Meter replacement cost adjustment

Our final determinations

2.263 We applied a sector wide adjustment to companies' wholesale water base expenditure allowances to fund the additional meter replacement costs companies will face from their enhancement smart metering programme. The adjustment was applied to enable the sector to deliver close to eight million meter replacements over the 2025-30 period in a timely and efficient way.[171]

2.264 We determined that base buys replacements at the average renewal rate and the average meter penetration across the historical period.[172] We based our view on the 2011-12 to 2023-24 period.

2.265 To ensure that customers do not pay twice for historical under-delivery, we applied a PR19 under-delivery adjustment. This meant the PR24 implicit allowance reflected the quantity of undelivered meter replacements at during the 2020-25 period.

[170] [OF-CA-174] CEPA, 'Review of the RIIO framework and RIIO-1 performance. Ofgem', March 2018, p.25
[171] This includes meter replacements that companies are delivering through AMP7 transition and accelerated expenditure.
[172] [OF-CA-025] Ofwat, PR24 draft determinations: Expenditure allowances, July 2024, pp.38-39

2.266 We applied a PCD to hold companies to account for delivery of their meter replacement forecasts over the 2025-30 period.

Issues raised by disputing companies

2.267 Northumbrian Water and South East Water challenge the application of the past under-delivery adjustment within the meter renewals sector wide base cost adjustment:[173, 174]

2.268 Northumbrian Water states the past under-delivery adjustment is a departure from the totex and outcomes framework, where totex allowances under the price control are not ring-fenced to fund specific activities. It states the past under-delivery adjustment departs from this policy framework without consultation.[175]

2.269 Northumbrian Water states the number of meter replacements included in its PR19 business plan were not reflected in PR19 base expenditure allowances because the volume of meter replacements was not accounted for in the base cost models. [176]

2.270 South East Water states there was no price control deliverable at PR19 that required companies to undertake meter renewal activity.[177]

2.271 South East Water requests that the CMA allow a higher efficient unit cost of replacement (£166.66 per meter). In a report submitted by the company, it states "in the absence of robust evidence that [South East Water's] costs are inefficient, and given that SEW has provided bottom-up evidence to support its unit cost proposals, the unit costs should be allowed in full."[178]

Our assessment

2.272 The PR24 metering replacement under-delivery adjustment was a reasonable and proportionate intervention to protect the customers' interest. Our statutory duties include, among other things, the consumer objective to protect the interest of customers. This adjustment ensures that customers do not pay twice for outputs that companies have already been funded for in previous price controls. We do not need to ringfence allowances for specific activities to allow such adjustments to be made.

2.273 We do not consider the metering past under-delivery adjustment represents a retrospective change. We are not seeking to claw back funding in relation to previous regulatory periods. Instead, we are seeking to set a threshold for considering additional

[173] [OF-OA-002] Northumbrian Water, Statement of Case, March 2025, pp.151-121
[174] [OF-CA-048] Oxera, Base cost adjustments and cost adjustment claims, 2025, pp.20-23
[175] [OF-OA-002] Northumbrian Water, Statement of Case, March 2025, pp.118-119
[176] [OF-OA-002] Northumbrian Water, Statement of Case, March 2025, pp.118-119
[177] [OF-CA-048] Oxera, Base cost adjustments and cost adjustment claims,2025, pp.20-23
[178] [OF-CA-048] Oxera, Base cost adjustments and cost adjustment claims, 2025, p.21

expenditure allowances for the 2025-30 period by reference to what customers have already paid for in prior price control periods.

2.274 Only three companies challenged the metering past under-delivery adjustment in draft determination representations: Portsmouth Water, South East Water and Wessex Water.[179] And it is important to recognise that base expenditure allowances at PR19 were only 0.4% below company requested costs. So, it is reasonable to assume that companies should deliver the volume of meter replacements included in PR19 business plans so that customers do not pay twice for meter renewals.[180]

2.275 The total sector wide meter replacement cost adjustment of £729 million was introduced to facilitate timely delivery of the smart metering programme. The cost adjustment will fund 78% of meter replacements over the 2025-30 period, with the remaining 22% to be delivered from base expenditure allowances.

2.276 This decision was arguably favourable to water companies. At PR19, Ofwat and the CMA concluded there was a risk of double funding if a cost adjustment was allowed for accelerated meter replacement costs.[181] Once through the cost adjustment, and again through base expenditure allowances at future price reviews. Smart meter upgrades also help to improve leakage detection, leading to more proactive, effective and efficient network management, which should reduce opex costs. So, companies were expected to deliver meter replacements without a base cost adjustment.

2.277 We could have made the same decision at PR24, but decided a cost adjustment was appropriate to facilitate timely delivery of the smart meter programme.

2.278 Our assessment of an efficient unit cost of replacement was based on unit cost evidence provided by the sector in response to a PR24 query. This query asked companies to set out the disaggregated costs of the different components and activities associated with a new meter installs and upgrades as part of the enhancement smart metering programme. From this query, we were able to identify the costs associated with meter replacement activity versus the enhancement smart metering technology upgrade. Based on this information, we applied the median unit cost to companies' forecast replacements.

2.279 South East Water received an adjustment of £28.89 million to its wholesale water allowance to deliver its forecast meter replacement programme. This compares to the

[179] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p. 40
[180] [OF-CA-020] Ofwat, PR19 final determinations: Securing cost efficiency technical appendix, December 2019, p.167
[181] [OF-CA-013] Competition and Markets Authority, 'Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, final report', March 2021, pp. 534-536

company' requested adjustment of £18.15 million in its business plan submission.[182] It is therefore unclear why the company is requesting a higher unit cost of replacement, despite it receiving an adjustment that is in excess of its original request.

2.280 South East Water has not provided compelling evidence to justify why its costs are higher than other companies. It is unclear why South East Water consider the median sector unit cost, which reflects a mix of different types of meter replacement, is not sufficient. In fact, we had concerns that the median unit cost may be too high. But we ultimately decided to apply the sector median unit rate as this was broadly supported by companies in response to our draft determinations, who thought a more stretching benchmark may not be achievable, and stated that the median unit rate would allow them to undertake a more complex mix of work.[183]

Network reinforcement cost adjustment

Our final determinations

2.281 We applied a sector wide network reinforcement cost adjustment of £733.5 million to account for higher network reinforcement investment that companies are forecasting in the 2025-30 period to facilitate growth (household and non-household). [184]

2.282 We also applied a Price Control Deliverable (PCD) to protect customers from under-delivery. It will return money to customers if companies fail to use the allowance in full to reinforce the network.

Issues raised by disputing companies

2.283 South East Water challenged the approach we applied to determine the cost adjustment with regards to (i) what base buys / implicit allowance; and (ii) cost efficiency challenge.

2.284 Northumbrian Water raised the need for additional network reinforcement investment beyond what it included in its draft determination representations.

Approach to determining the network reinforcement cost adjustment

Our final determinations

[182] [OF-CA-172] South East Water, PR24 business plan data tables, SEW76, table CW18
[183] [OF-OA-022] Ofwat, 'PR24 final determinations: Expenditure allowances', February 2025, pp.40
[184] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, section 2.2.6

2.285 Our network reinforcement sector wide adjustment calculated network reinforcement expenditure over the 2025-30 period for each company based on their requested expenditure in draft determination representations. It then reduced this amount based on any PR19 under delivery and the implicit allowance for network reinforcement already included in our base cost assessment models (ie what base buys). We applied this approach to ensure that customers do not pay twice.

2.286 We applied a cost efficiency challenge based on each company's unit costs over the 2025-30 period compared to the industry median cost.[185]

Issues raised by disputing companies

2.287 South East Water considers our network reinforcement sector wide cost adjustment overestimates the extent to which network reinforcement is implicitly funded in the base cost models and underestimates the efficient unit costs required to deliver its network reinforcement program.[186]

2.288 South East Water considers our approach to determining what base buys overestimates the implicit allowance.[187] It considers the implicit allowances should instead be estimated by removing network reinforcement costs from the base wholesale water models.

2.289 South East Water also challenges our approach to determining the cost efficiency challenge applied to company requested costs and asks the CMA to remove the 20% cost efficiency challenge we applied:[188]

2.290 South East Water states its unit costs are higher than the median due to the company operating in the South East. It considers companies in this region have a lesser degree of excess capacity to accommodate new connections, leading to higher costs.

2.291 South East Water states we should have used the year-on-year difference in total properties served for South East Water as the measure of new properties instead of the direct figures provided by the company on new properties per year. It claims this would have led to a lower cost efficiency challenge being applied (10% as opposed to the 20% efficiency challenge we applied).

Our assessment

Approach to determining what base buys

[185] OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, December 2024, section 2.2.6
[186] [OF-OA-005] South East Water, South East Water Limited Statement of Case, March 2025, p.41, para. 4.33
[187] [OF-CA-048] Oxera, Base cost adjustments and cost adjustment claims, March 2025
[188] [OF-CA-048] Oxera, Base cost adjustments and cost adjustment claims, March 2025

2.292 South East Water disputes our approach to estimating the implicit allowance. We recognise there is no perfect way to estimate the implicit allowance. To calculate the implicit allowance we used two approaches used by Thames Water in the development of its network reinforcement cost adjustment claim, we consider these to be reasonable as they allow for triangulation of implicit allowances:

- Approach 1: calculate efficient network reinforcement spend over the past 5-years by applying the upper quartile catch-up efficiency challenge to outturn spend.
- Approach 2: calculate industry average historical network reinforcement spend as a percentage of total historical modelled base costs, and multiply this by wholesale water and wastewater network plus modelled base expenditure allowances.[189]

2.293 We considered the approach to estimating the implicit allowance suggested by South East Water, which involves removing network reinforcement costs from the base cost models. But this approach did not lead to sensible implicit allowance estimates. This was partly driven by the low spend on network reinforcement in the historical period. For example, some companies would have received a negative wastewater network reinforcement implicit allowance.

2.294 South East Water states our first approach overestimates the implicit allowance as it assumes South East Water was fully funded for network reinforcement expenditure over the historical period. This is incorrect. Our approach is rooted on historical network reinforcement actually incurred by the company rather on allowed network reinforcement expenditure. And the efficiency challenge applied is based on wholesale water efficient base expenditure, rather than network reinforcement allowances.

2.295 In addition, South East Water arrives at an implicit allowance of £16.8 million versus our implicit allowance of £19 million. This suggests the issue is not material.

Cost efficiency challenge

2.296 We consider our decision to apply a 20% cost efficiency challenge to South East Water's requested network reinforcement costs is appropriate. We applied a consistent methodology to all companies.

2.297 South East Water's network reinforcement unit costs per property were significantly higher than the median (£906 vs £410).

2.298 Overall, our approach to determining the cost efficiency challenge was favourable to companies. Rather than apply the median unit cost for every company and expecting companies to provide compelling evidence to justify a higher unit cost, we applied a less stretching cost efficiency challenge by capping the efficiency challenge at 10%

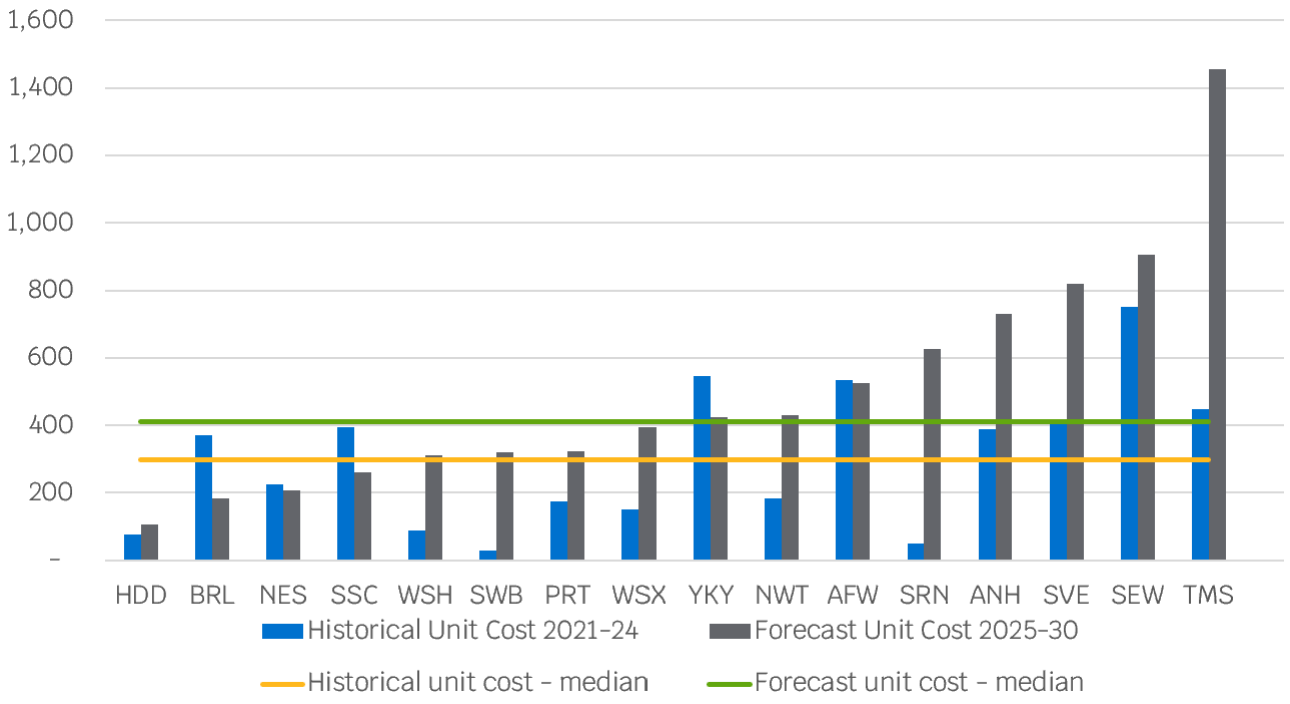
[189] Before cost adjustments.

when the gap to the median unit cost is less than 50%, and at 20% when the gap to median unit cost is more than 50%.

2.299 This approach recognised that network reinforcement requirements over the 2025-30 period are not solely driven by forecast growth over the 2025-30 period, and may reflect differences in headroom capacity between companies, which are not captured in simple unit cost analysis. Our approach therefore already accounts for the factors South East Water raises in its statement of case (for example, less excess capacity).

2.300 The figure below shows historical and forecast unit costs per company against the historical and forecast median unit cost for wholesale water. As displayed in the figure, forecast unit costs for the industry are much higher than historical unit costs.[190]

Figure 12: Network reinforcement unit costs (wholesale water)



2.301 To calculate the company's unit costs we used a direct measure of new properties served per year submitted by the company in business plans tables. This should reflect the company's best forecast of new properties, including properties served by the incumbent and properties served by new appointments and variations (NAVs). So, it is unclear to us why South East Water considers the implied number of new properties based on the year-on-year variation in total properties should be better.

[190] The median historical unit cost per property is £298, whereas the median forecast unit cost per property is £410. The graph compares historical unit costs over the 2021-24 period (the historically available data set) with unit costs over the 2025-30 period.

2.302 South East Water was unable to provide a breakdown of its proposed network reinforcement schemes despite several requests from us. In contrast, all other companies have been responsive to our request for more information on how the network reinforcement allowance will be spent to facilitate growth.[191]

Need for additional network reinforcement investment

Our final determinations

2.303 We applied a sector wide network reinforcement cost adjustment worth £733.5 million at final determinations to support growth and help to facilitate the Government's target to build 1.5 million new homes in England over the next five years. The basis of our cost adjustment was companies' requested network reinforcement costs.

Issues raised by disputing companies

2.304 Northumbrian Water raises the need for additional network reinforcement investment.

2.305 The company states its business plan tables did not reflect its full network reinforcement costs for the 2025-30 period (£52.5 million versus the £12.5 million submitted in its draft determinations representation). As a result, it states its network reinforcement cost adjustment (£0.12m) understates the amount it would have been awarded if the latest costs had been used (£40.1m). [192]

Our assessment

2.306 We would have incorporated these costs into our assessment of the network reinforcement sector wide cost adjustment if Northumbrian Water had put forward these costs in its draft determination representations.

2.307 If the CMA accept Northumbrian Water's updated forecast of network reinforcement expenditure, we recommend a PCD is applied in line with our final determination sector wide adjustment to protect customers from under-delivery and to prevent the allowance being used for other means (eg capital maintenance). We also suggest that the company provides a list of schemes that it will deliver with the additional allowance to allow us to monitor delivery. We have requested this from other companies.

[191] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, pp.58-59
[192] [OF-OA-002] Northumbrian Water, 'Northumbrian Water Limited Statement of Case', March 2025, p.128, para. 485

Energy cost adjustment

Our final determinations

2.308 We applied a positive energy cost adjustment of £1.3 billion across the sector to recognise energy price increases in recent years. This was based on actual and forecast changes in the seasonally adjusted DESNZ industrial energy price index up to 2029-30. In summary, we used the index to calculate an initial uplift to 2023-24 prices, and then assumed that this uplift would taper to zero by the end of the forecast period (2029-30).

2.309 To calculate the size of the adjustment, we applied the uplift factor based on the DESNZ index to company-specific measures of efficient energy costs. We calculated these efficient energy costs using company-specific average power expenditure over the most recent five years (2019-20 to 2023-24) as a percentage of actual base expenditure. This approach recognises that each company has different efficient energy consumption requirements, and that this may change over time. For further details, please see CEPA's report on the energy cost adjustment.[193]

2.310 We will apply a true-up of allowances at the end of the period based on the difference between forecast and outturn DESNZ index values.

Issues raised by disputing companies

2.311 Southern Water states that Ofwat should not have used a five-year window to calculate the average power cost shares used in the adjustment, but instead should have used the entire historical modelling period (2011-12 to 2023-24).[194] It states that using the five-year period underestimates their power cost share, as the company was 'well hedged' during the energy price crisis, so power costs did not increase by as much as other areas of base expenditure. It states that using the entire historical modelling period produces a power cost share that is more representative of its expected power cost share going forward.

2.312 Southern Water states the real price effect (RPE) applied in the energy cost adjustment is unrealistic and not grounded in available evidence on energy price forecasts.[195] It states that although the RPE will be subject to a true-up with outturn energy prices, Ofwat's approach to estimating the RPE creates an undue cashflow risk as Ofwat's ex-ante energy price forecast is lower than Southern Water's expectations. Instead, Southern Water states that Ofwat should base the energy RPE on energy price forecasts

[193] [OF-CA-073] CEPA, PR24 Final Determinations – Real Price Effects and the energy crisis cost adjustment mechanism, December 2024, pp. 23-26
[194] [OF-OA-003] Southern Water, Statement of Case, March 2025, p.194, para.333-334
[195] [OF-OA-003] Southern Water, Statement of Case, March 2025 p.197, para.343

provided in the HM Treasury Green Book. This contains forecasts for retail energy prices faced by a non-domestic industrial user.

Our assessment

Our decision to calculate average power cost shares over the last 5 years of outturn data was appropriate and supported by companies

2.313 In CEPA's report on the energy cost adjustment mechanism and real price effects, it discussed the trade-offs associated with the choice of historical period for calculating average power cost shares.[196] This was in response to an argument raise by United Utilities that using the 2019-20 to 2023-24 period would *overestimate* efficient power cost shares, as this period places greater weight on the energy price crisis period when companies' power cost shares generally increased.

2.314 There is a trade-off in the choice of averaging period – a longer averaging period would place less weight on the years affected by the energy price crisis, but would also include historical years which may be less reflective of the industry's current energy *consumption* requirements.

2.315 The question of which averaging period to use in calculating the historical power cost shares is not a new issue – it was considered carefully at both draft and final determinations. We decided that using a five-year period strikes the appropriate balance in placing weight on more recent years which reflect current company energy usage (for example, reflecting investments in energy efficiency measures) and not placing excessive weight on the energy price crisis which may have created unusual patterns in the data. Our base cost models explain differences in energy consumption between companies and over time through the network topography explanatory variables (eg average pumping head). If we had used the entire historical modelling period, most companies' calculated power cost shares would have decreased and the corresponding adjustment would have been lower.

2.316 We note that Southern Water did not raise this issue in response to our draft determinations.

Our approach to forecast changes in the DESNZ index to 2029-30 was reasonable and pragmatic

2.317 With regards to the ex-ante energy real price effect (RPE), we chose not to directly rely on energy price forecasts due to continuing uncertainty and volatility in forward wholesale energy markets and challenges in forecasting the 'third party charges'

[196] [OF-CA-073] CEPA, PR24 Final Determinations – Real Price Effects and the energy crisis cost adjustment mechanism, December 2024, p.24

component of delivered energy prices. These issues are discussed further in CEPA's final determinations report.[197]

2.318 We cross-checked our assumed RPE with available data on forward wholesale prices and third party charges to check that our approach would not expose companies to undue cashflow risk (based on available data). We continue to consider that our final determinations approach was reasonable and pragmatic.

2.319 We do not consider the Green Book forecasts suggested by Southern Water to be appropriate for use in an ex-ante forecast energy RPE. First, the forecasts appear to date from 2022. Therefore, the forecasts are at least two years out of date and do not incorporate the latest data or expectations on future movements in energy prices.

2.320 Second, the data provided in HMT Green Book supplementary tables appear to be scenario forecasts (based on high, central and low scenarios) that are intended to inform sensitivity analysis for the purposes of appraisal, rather than to be used as an explicit forecast of prices:

> *"We strongly advise the use of the full range of prices in all analysis due to the current uncertainty in energy prices, especially where the level of price has a material impact on your outcomes. This Is due to the significant uncertainties across all components of prices, as observed from historic and current volatility, and the transition to Net Zero."*[198]

2.321 Therefore, we do not agree that the forecasts suggested by Southern Water are preferable to the approach used in our final determinations.

Company specific cost adjustment claims

2.322 The disputing companies submitted several company specific cost adjustment claims:

- Anglian Water – Leakage
- Anglian Water – Boundary box replacements
- Anglian Water – Storage points and gravity sewers capital maintenance
- Northumbrian Water – Other capital maintenance (ie excluding mains renewals)
- Southern Water – Advanced anaerobic digestions upgrades
- Southern Water – Regional wage differentials
- Southern Water – Coastal population

[197] [OF-CA-073] CEPA, PR24 Final Determinations – Real Price Effects and the energy crisis cost adjustment mechanism, December 2024, pp. 25-26
[198] Department for Energy Security and Net Zero (2023), *Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal; Data tables 1 to 19: supporting the toolkit and the guidance (Table 4)*

- Southern Water – Gated capital maintenance allowance
- Wessex Water – Bioresources capital maintenance
- Wessex Water – Disinfection upgrades at water treatment works

2.323 Our detailed assessment of the issues raised by the disputing companies can be found in the cost adjustment claim annex.[199]

2.324 The CMA may also find it helpful to refer back to our assessment of cost adjustment claims at final determinations, which are available on our website.[200]

Unmodelled base costs

2.325 We assessed separately a small number of base cost items either because they are largely outside of company control or are only incurred by a subset of water companies.

2.326 We focus on business rates below, which account for around half of unmodelled base costs. We also discuss the issues raised relating to licence fees, which we assessed as part of modelled base costs at PR24. Northumbrian Water state these should be assessed separately as part of unmodelled base costs.

Business rates

Our final determinations

2.327 For final determinations we incorporated a reasonable forecast of how business rates will change following planned revaluations in 2026 and 2029 based on known and forecastable changes.[201] This reflected suggestions from companies in their draft determination representations.

2.328 The Valuation Office Agency (VOA) values water networks using the receipts and expenditure method of valuation based on the regulated accounts which are produced for individual water companies. The valuation method works by taking receipts and deducting working expenses to give the annual profit.

2.329 Therefore, two significant factors at revaluations are companies' Regulatory Capital Value (RCV) and the weighted average cost of capital (WACC). The WACC has fallen at the last three price reviews and increased at PR24. It is therefore reasonable to assume

[199] Ofwat, 'PR24 redeterminations – expenditure allowances - cost adjustment claims', April 2025
[200] [OF-CA-009] Ofwat, Base cost adjustment claim feeder models, December 2024
[201] [OF-OA-022] Ofwat, PR24 final determinations expenditure allowances, February 2025, pp. 64-67

that rateable values, and consequently business rates, will increase at the next revaluation in 2026.

2.330 The 2026 revaluation will be based on conditions that could reasonably have been expected at 1 April 2024. Therefore, we used our draft determinations RCV and wholesale WACC, and companies' own tenant's shares at the last revaluation to calculate a forecast rateable value for each company. For consistency, we also used this approach for the 2029 revaluation.

2.331 We continued to use the 2023-24 multiplier to calculate implied business rates liabilities since this is the multiplier set at the last revaluation, and we have no way to forecast the multiplier at the next revaluations.

2.332 In its budget in October 2024, the Government announced its intention to permanently lower the business rates multipliers for high-street retail, hospitality and leisure properties.[202] This will be funded through a higher multiplier for the most valuable properties. It is unclear how this will impact water companies.

Issues raised by disputing companies

2.333 Three disputing companies state they have received draft rateable values for the 2026 revaluation from the VOA since the final determinations.

2.334 Northumbrian Water states that forecast water business rates valuations were used in its business plan (£211 million) and our final determinations (£150 million).[203] Northumbrian Water says that the actual valuation was confirmed in February 2025 (£187 million). Applying this to the price control increases base allowances by £37m.

2.335 Anglian Water states that initial valuations data suggests that its business rates liability will be £76 million more than we allowed as a result of rate changes.[204] It expects to receive further information from the VOA in due course that will enable a more accurate forecast.

2.336 Wessex Water states that its draft valuation from the VOA set a rateable value of £39.6 million, £11m higher than it had assumed at PR24.[205] Using the published business rate model used to set cost allowances and updating the rateable value gives a revised business rates forecast of £95.1 million. It notes that negotiations will be ongoing in this area and it will provide updates with future valuations.

[202] [OF-CA-039] HM Treasury, 'Autumn Budget 2024', October 2024, p.46
[203] [OF-CA-055]-Northumbrian Water, 'Appendix 1: Supporting information', March 2025, p.77
[204] [OF-OA-001] Anglian Water, Statement of Case, March 2025, p.77
[205] [OF-OA-004] Wessex Water, Statement of Case, March 2025, p.199 (p 2.57(c))

Our assessment

2.337 All companies should have received draft rateable values for the 2026 revaluation in February 2025. Negotiations with the VOA are ongoing with rateable values expected to be confirmed in the summer.

2.338 The draft rateable values are in April 2024 prices and the rateable values we forecast at final determinations are in 2022-23 CPIH deflated prices. Therefore, companies' revised forecasts are overstated for inclusion in cost allowances and the rateable values should be deflated to 2022-23 prices. Since the VOA inflated our draft determinations revenues and costs using September 2022 and March 2024 CPIH values, we have used the same giving a deflation factor of 0.929.

2.339 We have updated our final determinations business rates model using the information provided by Anglian Water, Northumbrian Water and Wessex Water.[206] Revised allowances are shown in the table below.

Table 8: Revised business rates allowances for Anglian Water, Northumbrian Water and Wessex Water

Disputing company	Final determinations (£m)	Updated assessment for new information (£m)
Anglian Water	275.8	291.3
Northumbrian Water	150.1	175.3
Wessex Water	78.9	92.5

2.340 Anglian Water applied the 2026 draft rateable value to all five years of the 2025-30 period. But it will only apply from 1 April 2026. So, we have retained our final determination assessment for 2025-26.

2.341 Northumbrian Water provided a revised rateable value forecast for the 2029 revaluation, which we have also taken account of in our updated model.

2.342 Southern Water and South East Water have not included information on their draft rateable values in their statements of case. The revaluation will affect all companies therefore we consider that whatever approach the CMA applies, it should apply to all disputing companies.

2.343 The companies are still in negotiations with the VOA about the 2026 rateable values and the multiplier set by the Government is not due to be announced until the Autumn

[206] [OF-CA-040] Ofwat, PR24 FD CA24 Business rates updated, April 2025

Budget 2025 along with details of any Transitional Relief schemes.[207] Therefore, companies' business rates liabilities for 2026 to 2030 are still uncertain.

2.344 We also have enhanced cost sharing rates on business rates, with companies receiving 90% of any overspend on our allowances at the end of the period.

Licence fees

Our final determinations

2.345 Ofwat is mainly funded by licence fees paid by water companies and there is a cap on the levels of those fees in Condition N of water companies' licences.[208] The licence fee cap aligns with the decisions made by the Treasury, through the Comprehensive Spending Review, about how much Ofwat can spend.

2.346 At PR24, licence fee costs were included in modelled base costs.[209] Licence fees are a small proportion of total costs, and do not vary much year-on-year. They also largely vary based on company scale, which is a key driver in our base cost models. We therefore concluded it is appropriate to include licence fees in modelled base costs. We do not pass through 100% of any other costs to customers and so it would seem unjustifiable that the only costs we would pass through would be our licence fees. We applied the same approach at PR19.

Issues raised by disputing companies

2.347 Northumbrian Water states that we announced in January 2025 that our licence fees are increasing significantly for AMP8.[210] This means an estimated £9.1 million of additional costs that is not included in base cost allowances. It considers this should be a cost pass through as it is in other regulated sectors.

Our assessment

2.348 Ofwat licence fees remain a small proportion of total costs. The 2025-26 proposed licence fee represents 0.4% of 2025-26 total allowed costs at an industry level. So, it would not have reached the materiality threshold needed to demonstrate the need for a

[207] [OF-CA-041] HM Treasury, 'Business rates: forward look', February 2025
[208] Other regulated entities also pay licence fees but are only required to contribute towards specific Ofwat costs. Retailers in the business retail market (water supply and/or sewerage licensees) pay their share of our costs in relation to the water supply and sewerage licensing regime and the licensed infrastructure provider for the Thames Tideway Tunnel pays for our costs in relation the regulation, monitoring and enforcement of the infrastructure provider.
[209] [OF-CA-001] Ofwat, 'Creating tomorrow, together: Our final methodology for PR24. Appendix 9 – Setting expenditure allowance', December 2022, p.12
[210] [OF-OA-002] Northumbrian Water, Statement of Case, March 2025, p.124

cost adjustment. Table 2.2 of our PR24 setting expenditure allowances methodology document presents the materiality thresholds for cost adjustment claims at PR24, which companies generally did not dispute.[211]

2.349 The use of materiality thresholds for cost adjustment claims helps to (i) mitigate the risks posed by asymmetry of information; and (ii) proportionately focus our assessment on the most significant cost adjustments. For example, companies are likely to identify cost areas that are rising, but are unlikely to raise cost areas that are decreasing. Materiality thresholds therefore help to ensure that customers do not overpay.

2.350 Water companies can influence our costs through engagement on our regulatory approach and our forward programme consultations. It is important that companies are given the opportunity to change our costs. Allowing licence fees to be treated as pass-through would remove any incentive on companies to challenge potential increases to licence fees.

2.351 We consider that water companies can pay for licence fees through base expenditure allowances given the relative immateriality of the costs. Cost sharing also applies, allowing companies to recover around 50% of any overspend from customers.

[211] [OF-CA-001] Ofwat, 'Creating tomorrow, together: Our final methodology for PR24. Appendix 9 – Setting expenditure allowance', December 2022, p.31

3. Approach to enhancement expenditure

Overall approach

3.1 In PR24 (in common with PR19), to allow us to compare costs across companies, we generally assessed expenditure separately for different types of enhancement. For example, we assessed storm overflow expenditure separately to nutrient removal. This allowed us to compare like for like expenditure across companies. We defined different types of expenditure through the individual enhancement cost categories in the PR24 business plan data tables. Nevertheless, we assessed multiple lines together where there is potential for costs to be apportioned differently by companies and where there is some synergy in the costs between them.

3.2 We assessed enhancement costs in one of three ways:

- benchmarking;
- deep dives; and
- shallow dives.

3.3 Benchmarking is our preferred approach, as it allows us to compare historical and forecast costs across companies to estimate what an efficient cost for enhancement investment is. Where the investment area does not lend itself to benchmarking, we relied more on the assessment of evidence provided by companies in their business plans.

3.4 Whether we deep dive or shallow dive depends on the materiality of the costs and the level of uncertainty around the expenditure case, particularly in terms of the need for investment. For example, if we are not confident that the investment is required, then we will deep dive the investment.[212]

Benchmarking

3.5 Benchmarking is our preferred method of cost assessment as this reduces information asymmetry by comparing forecast costs across companies and with those incurred historically. For enhancement activities where most companies incur costs and we identify appropriate cost drivers we develop econometric or unit cost models. We used historical and forecast data depending on appropriateness and availability. We used

[212] [OF-OA-022] Ofwat, PR24 final determinations: expenditure allowances, February 2025, pp.95-108

benchmarking to assess about three quarters or £30 billion of enhancement expenditure.

3.6 We do not apply a common efficiency challenge to all enhancement costs.

3.7 For PR24, due to a significant increase in the scale of enhancement expenditure, we have undertaken scheme level cost benchmarking for the largest and most complex areas. This builds on the recommendations in the CMA redeterminations for scheme level reporting on the outturn costs for phosphorus removal schemes.

> *"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."*[213]

3.8 Scheme level models use data on cost and cost drivers at individual site level. These models alleviate some of the disadvantages of aggregate models, including size of the sample and transparency of allowances for each site. Further details of our scheme level enhancement approach are included in 'PR24 final determinations: Expenditure allowances - Enhancement cost modelling appendix'.

3.9 Outliers: We adjusted the cost allowance for individual schemes if scheme costs were significantly higher than the benchmark and there was compelling evidence to support the additional costs. We also adjusted scheme cost allowances if they were engineering outliers and had unique characteristics that could lead to higher costs above benchmark, for example if companies were using biological rather than conventional treatment for phosphorus removal. Where scheme costs were significantly below the benchmark, we allowed the requested costs.

Deep dives

3.10 Where the investment area did not lend itself to econometric modelling or unit cost benchmarking, we undertook either a deep or shallow dive. We undertook deep dive assessments where costs were material and the cost requested is greater than 0.5% of the water or wastewater wholesale totex, or greater than £10 million or where we were not confident if the entire additional allowance was required.

[213] [OF-CA-013] Competition and Markets Authority, Anglian Water, Bristol Water, Northumbrian Water and Yorkshire, March 2021, p.413, paragraph 5.65

3.11 In a deep dive, we assessed the quality of the evidence provided by the company against the following criteria. This provided further detail and refined the approach used in PR19. Further detail on the criteria is set out in the PR24 final methodology.[214]

Need for adjustment

3.12 There must be evidence that the proposed enhancement is required, including alignment with agreed strategic planning frameworks where relevant. The scale and timing must be justified and validated. Customers should not pay twice for resilient services – that is, they should not pay once through base allowances or previously funded enhancements, and then again through requests for further enhancement funding for the same improvement. We examined company evidence on the overlap with the expectations from base expenditure. For example, where funding requests overlap with the replacement of end-of-life assets, or maintenance activities. For non-statutory investment there must be customer support and evidence that the need for investment is driven by factors outside of company management control.

Best option for customers

3.13 An appropriate number of options must be considered, benefits quantified, and cost benefit analysis and best value assessment undertaken, accounting for customer views where appropriate.

Cost efficiency

3.14 Enhancement expenditure requests should be based on efficient costs with sufficient and convincing evidence to demonstrate efficiency. It must be clear how the company has arrived at its preferred option costs, including supporting evidence on calculations and assumptions, there must be evidence that the cost estimates are efficient, for example by benchmarking against similar scheme outturn data, industry costs or other external costs. The company must provide third-party assurance for the robustness of the cost estimates.

[214] [OF-OA-022] Ofwat, PR24 final determinations: expenditure allowances, February 2025, pp. 24-27 and appendix A1.

Customer protection

3.15 Customers should be protected if the investment is cancelled, delayed or reduced in scope and these protections must cover all the benefits that customers have funded to be delivered.

Shallow dive

3.16 In general, we carried out a shallow dive assessment where the expenditure was less than 0.5% of the water or wastewater wholesale totex or less than £10 million.

3.17 In a shallow dive we applied a company specific efficiency challenge rather than considering company evidence given the small scale of expenditure. We derived the company specific efficiency challenge by considering company efficiency in the main water and wastewater enhancement benchmarking models. Given the greater scale of enhancement expenditure and the greater scope and detail of enhancement cost benchmarking models in PR24 we consider that PR24 enhancement models provide a reasonable indication of a company's opportunity for efficiency in other enhancement areas.

3.18 We capped shallow dive cost efficiency challenges at 10% to avoid disproportionate interventions for companies where we have not examined costs in detail.

In the round assessment

3.19 When setting enhancement expenditure allowances, we have been conscious that we need to provide companies with sufficient allowances to deliver improvements, while protecting customers from overpaying. To facilitate this, we moderated our cost challenge in each of the areas of our expenditure assessment.

3.20 In our **cost benchmarking** models we generally did not apply a further challenge beyond the average predictions. That is, we set as an allowance the cost predicted by the model (for example, the regression line in econometric models) or adjusted to reflect the median company. This contrasts with the approach used in PR19 where we used an upper quartile adjustment for many models. For example, we provided an upper quartile adjustment to wastewater WINEP expenditure in PR19, which accounted for around 48% of overall enhancement expenditure.[215]

[215] [OF-CA-020] Ofwat, PR19 final determinations: Securing cost efficiency technical appendix, December 2019, p. 90

3.21 We placed equal weight on historical and forecast cost benchmarks across our network storm overflows, flow to full treatment (FFT) models, phosphorus removal, and supply interconnectors scheme level models. Historical data is an important tool to validate company forecasts and help impose a well-justified efficiency challenge, compared to relying on forecast models alone. Historical data provides evidence of companies' track record of delivering schemes in recent periods. It provides a robust and defensible benchmark that helps address the information asymmetry between Ofwat and water companies.

3.22 Overall, sector allowances were lower when we used the historical models. This suggested that on average historical schemes were delivered at a lower cost compared to companies' forecast in their draft determinations representations:

- storm overflows network schemes were 15% more expensive than historical costs;
- FFT schemes were 36% more expensive than historical costs; and
- phosphorus removal schemes were 49% more expensive than historical costs.

3.23 In this context, we considered applying weights of 100% to our historical models since they are based on companies' historical track record of outturn delivery, we present these allowances below.

Table 9: Change in final determinations allowances when we place 100% weight on our historical models for storm overflows, phosphorus removal and supply interconnectors.[216]

Company	Storm overflows: Change in allowance, £m[217]	P removal: Change in allowance, £m[218]	Supply IC: Change in allowance, £m[219]	Total change in allowance, £m
Affinity Water	0.00	0.00	-3.06	-3.06
Anglian Water	-156.19	-146.37	-81.95	-384.51
Dŵr Cymru	-128.12	-14.95	1.57	-141.49
Hafren Dyfrdwy	0.00	-0.23	0.00	-0.23
Northumbrian Water	-49.51	-1.59	-21.85	-72.95
Severn Trent Water	-241.34	-82.86	-40.38	-364.59
South West Water	-83.51	-14.38	-0.61	-98.51

[216] For the gathering file that includes allowances for the three areas, see [OF-CA-110]-Tabulated allowances - scheme level with full historical.
[217] For individual storm overflow derivations, see [OF-CA-111]-PR24-FD-CA55-FD-Storm-overflows-model_redacted-v2 and [OF-CA-112]-PR24-FD-CA55-FD-Storm-overflows-model_redacted-v2-full-hist
[218] For individual phosphorus removal derivations, see [OF-CA-113]-PR24-FD-CA60-FD-p-removal-enh-model-v2 and [OF-CA-114]-PR24-FD-CA60-FD-p-removal-enh-model-v2-full-hist
[219] For individual supply interconnectors derivations, see [OF-CA-115]-PR24-FD-CA92-FD-water-supply-interconnectors-model-v2 and [OF-CA-116]-PR24-FD-CA92-FD-water-supply-interconnectors-model-v2-full-hist

Company	Storm overflows: Change in allowance, £m[217]	P removal: Change in allowance, £m[218]	Supply IC: Change in allowance, £m[219]	Total change in allowance, £m
Southern Water	-85.42	-65.19	-10.86	-161.47
Thames Water	-64.69	-72.94	0.00	-137.63
United Utilities	-146.36	-58.63	0.00	-204.98
Wessex Water	-78.35	-104.39	0.00	-182.74
Yorkshire Water	-134.94	-52.13	0.00	-187.07
Total	**-1168.42**	**-613.66**	**-157.14**	**-1939.22**

3.24 We sent a sector wide query to companies requesting evidence of why the cost of their PR24 storm overflows and phosphorus removal enhancement programmes were materially higher compared to the level of efficiency companies were able to achieve in their PR19 enhancement programmes:

- On storm overflows company reasons included **increased regulatory requirements, more complex solutions and external market pressures**; and
- On phosphorus removal company reasons included **the prevalence of stricter permit limits, the prevalence of smaller sites requiring upgrades and additional regulatory requirements**.

3.25 We considered other potential reasons behind the difference in historical and forecast cost efficiency could include:

- **Companies may have different risk appetites** of how much ambition to show in business plans based on their prior enhancement programme experiences;
- **Companies have submitted higher business plan cost forecasts**, which may be due to cost uncertainty, expected cost increases, or an attempt to obtain a higher allowance under the assumption we will use these costs to set efficient cost allowances; and
- **PR24 WINEP / NEP programme is much larger than at PR19**. That might come with more deliverability challenges and lead to a stretched supply chain, resulting in higher efficient costs.

3.26 Some of the company reasons reflect factors accounted for in our assessment, for example, our phosphorus removal allowances reflect exogenous factors such as the size of sewage treatment works and their associated tightness of permits. We also include an adjustment for changes in materials, plant and equipment and labour costs (for example, if costs increase due to supply chain constraints). However, in the round, we considered that both forecast and historical models contain important information on

efficient costs for the relevant PR24 enhancement programmes with an equal 50% weight on each. We consider our position strikes the right balance between providing companies with a sufficient allowance, while making sure that customers do not pay for company inefficiency. If the factors identified by companies were not important, we would have set a higher weight on historical data than 50%.

3.27 On **deep dive** expenditure we have moderated our efficiency challenge where a company does not provide sufficient supporting evidence. In the draft determinations we applied optioneering and cost challenges of up to 30% if companies did not provide sufficient evidence. This was based on evidence on the impact of optioneering in company plans and the differences in cost efficiency between companies for common repeatable enhancement activities. [220,221,222,223]

3.28 We significantly moderated this challenge at the final determinations. We capped the optioneering challenge to 10% or 20% informed by overall company efficiency unless we had evidence to suggest otherwise. We capped the cost efficiency challenge at 10% unless we had other information, such as benchmarking or cross company comparisons, to support setting a specific efficiency challenge. We did not apply a cost efficiency challenge in addition to an optioneering challenge unless we had evidence to suggest that an additional challenge was required.[224]

3.29 On **shallow dives** for final determinations, we moderated the maximum shallow dive efficiency challenge from 20% to 10%. This avoided potentially disproportionate interventions for companies where we have not examined costs in detail. However, the potential efficiency challenges for several companies (Thames Water, United Utilities and Wessex Water) were significantly larger than this.[225]

Table 10: PR24 final determinations uncapped and capped shallow dive efficiency challenges – wastewater[226]

[220] [OF-CA-025] Ofwat, PR24 draft determinations: expenditure allowances, July 2024, p.61
[221] On optioneering this was based on 33% and 37% differences at P10 (for water and wastewater respectively) between companies presented costs to deliver their business plans (considered best value) and least cost business plans, and 50% differences between WRMP preferred and feasible unit cost.
[222] [OF-CA-025] Ofwat, PR24 draft determinations: expenditure allowances, July 2024, p.61
[223] On cost efficiency, for common repeatable enhancement activities we identified between a 32% (meters) 86% (new interconnectors) and 100% (lead pipe replacements) difference between the P25 and P75 unit costs of companies.
[224] [OF-OA-022] Ofwat, PR24 final determinations: expenditure allowances, February 2025, pp.103-104
[225] [OF-CA-078] Ofwat, PR24 FD CA110 Enhancement company efficiency challenge, December 2024
[226] [OF-CA-078] Ofwat, PR24 FD CA110 Enhancement company efficiency challenge, December 2024, Wastewater enhancement tab

Company	Shallow Dive Efficiency Challenge (Uncapped)	Shallow Dive Efficiency Challenge (Capped)
Anglian Water	-9%	0%
Dŵr Cymru	-10%	0%
Hafren Dyfrdwy	-4%	0%
Northumbrian Water	8%	8%
Severn Trent Water	5%	5%
South West Water	1%	1%
Southern Water	8%	8%
Thames Water	26%	10%
United Utilities	14%	10%
Wessex Water	26%	10%
Yorkshire Water	5%	5%

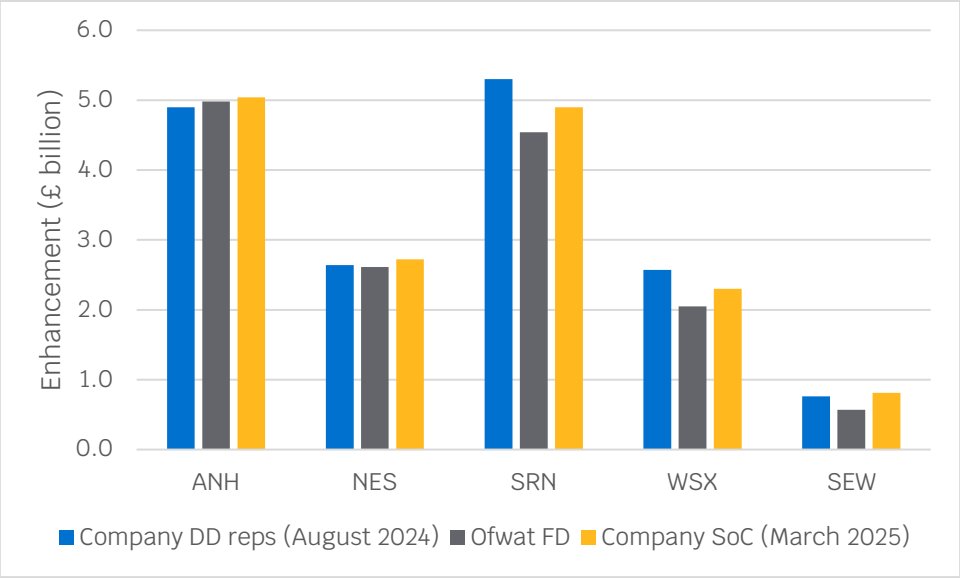
Overall PR24 enhancement expenditure allowances

3.30 At PR24 final determinations, our enhancement expenditure allowances at final determinations are £44 billion. This is £10 billion higher than at PR24 draft determinations, £5 billion lower than what companies requested in their representations, and is more than three times higher than the PR19 final determinations.

3.31 Compared to companies' business plan proposals, our enhancement expenditure allowances at PR24 final determinations were 11 percent below companies' requested enhancement expenditure of £49.0 billion following draft determinations. Our final determination allowance was 3 percent below companies' requested enhancement expenditure in company original business plans of £46.0 billion (on a pre frontier shift basis).

3.32 The increase in cost requests between business plans reflects a combination of increased requirements, increased scope and increases in cost requests. Anglian Water, Northumbrian Water and South East Water increase their enhancement expenditure request compared to draft determination response.

Figure 13: PR24 enhancement requested costs by company



Anglian Water

3.33 Our enhancement expenditure allowance in Anglian Water's final determination was £5.0 billion. This was 2% more than it requested in its draft determination response as the company's proposals were more efficient than our cost benchmarks. This was around £800 million more than Anglian Water's original business plan, after the company increased requests in several areas to move closer to our cost benchmarks. In its statement of case, Anglian Water requests a further increase in its enhancement allowance of £63 million to address leakage and adjust for its lower proposed frontier shift efficiency.

Northumbrian Water

3.34 Our enhancement expenditure allowance in Northumbrian Water's final determination was £2.6 billion. This was 1% less than the company requested in its draft determination response.

3.35 In its statement of case, Northumbrian Water overall enhancement expenditure request has increased by £110 million. This masks several underlying changes. On wastewater Northumbrian Water submits new requests for compliance with the industrial emissions directive at Howdon sewage treatment works and phosphorus removal. It also restates requests for fixed power generation and removal of the non-delivery adjustment for growth at sewage treatment works. These requests are partially offset by the company requesting to push back the delivery and expenditure on the Suffolk water supply scheme.

Southern Water

3.36 Our enhancement expenditure allowance in Southern Water's final determination was £4.5 billion. This was 14% less than the company requested in its draft determination response. In its statement of case, Southern Water does not include requests for several areas of our final determination where we challenged costs such as storm overflows, growth at sewage treatment works and the removal of the risk pot for Havant Thicket and the management costs of the competitively appointed provider (both of which are dealt with through separate mechanisms). The statement of case continues to challenge other areas of enhancement costs including mains renewals, water treatment works resilience, water supply and supply interconnectors and WINEP.

Wessex Water

3.37 Our enhancement expenditure allowance in Wessex Water's final determination was £2.0 billion. This was 20% less than the company requested in the company's draft determination response. In its statement of case Wessex Water requests an additional £254 million for phosphorus removal but does not challenge our cost adjustments on growth at sewage treatment works or industrial emissions directive (although it asks for the ability to raise these later in the process).

South East Water

3.38 Our enhancement expenditure allowance in South East Water's final determination was £566 million. This was 26% less than the company requested. While South East Water only submits one new cost request (on PFAS), it repeats its requests for full funding for areas where we adjusted allowances in our final determinations. This increases its overall enhancement request as this does not take account of our £50 million contingent allowance or areas where we provided the company with more than requested (for example nitrate removal for smaller schemes). South East Water's largest additional enhancement expenditure requests (compared to the final determination) are resilience (£118 million), water quality (£29 million), leakage (£36 million and water efficiency (£16 million).

4. Water enhancement expenditure allowances

Our water benchmarking models provide companies with an efficient expenditure allowance based on cross company comparisons of forecast costs and, where possible, historical costs. We have adjusted benchmarks where companies can provide evidence that scheme costs are higher than benchmarks due to exogenous factors. The disputing companies raise several cross cutting issues in relation to water enhancement costs.

Southern Water states that its **supply interconnector** allowance should be increased to reflect forecast costs only and reflects scheme specific factors. We continue to consider that historical costs are a valid determinant of future costs. Southern Water's does not provide evidence that its scheme specific costs are materially different to other companies' supply interconnection costs.

South East Water states that its **leakage costs** should be increased to reflect its forecast costs above our benchmark for better performing companies. We continue to consider our approach to funding leakage reductions appropriate making allowances for reductions already based on a higher unit rate due to South East Water's good performance and high meter penetration.

South East Water states that its **water efficiency costs** are higher than our benchmark for water efficiency visits or audits. South East Water does not justify why its forecast water efficiency costs are nearly ten times its outturn costs, and why it requires a higher allowance than other companies undertaking similar activities.

South East Water states that its **Water WINEP investigations** allowance does not reflect the complexity of its proposed schemes. We continue to consider that our benchmark approach with deep dives on cost outliers is appropriate. We have reflected the additional complexity of South East Water's actions in our allowance. However, the company has not provided supporting benchmarking or sufficient and convincing evidence of exogenous factors to fully justify why its costs are so much higher than other companies.

South East Water states that its Cookhams WTW **raw water deterioration nitrates** scheme is efficient if the costs of high costs schemes are included in our cost benchmark. We continue to consider that we should deep dive the costs of schemes which are greater than £10 million given the large variation in costs. South East Water provides insufficient evidence of cost breakdown or third party benchmarking to fully justify its proposed costs.

South East Water states that we should have provided an enhancement allowance for its **net zero** water process emissions and electric vehicle schemes. South East Water's water process emissions schemes will provide overall cost savings to the company and so are covered by base expenditure allowances. We continue to consider that the move to electric vehicles is funded by base allowances, as some companies have already funded the transition through base expenditure allowances, and at PR24 we have provided a sector wide net zero uplift for base transition.

Other statements of case issues raised by companies are covered in the company specific documents. For water enhancement these are:

- Northumbrian Water
    - Supply enhancement – Bacton desalination bulk supply pipeline and Suffolk strategic network
- Southern Water
    - Resilience enhancement – water treatment works
    - Supply enhancement - Smock alley
- South East Water
    - Resilience enhancement
    - Resilience interconnector enhancement
    - Cyber enhancement
    - Raw water deterioration - PFAS enhancement
    - Lead enhancement
    - SEMD - alternative water supply enhancement

Supply interconnectors

Our final determinations

4.1 Supply interconnectors are schemes which transfer water between companies' water resource zones and which provide a measurable zonal water available for use (WAFU) benefit to companies' supply demand balance. Interconnectors and their benefits are set out and justified in the company water resources management plans (WRMPs).

4.2 For the final determination we benchmarked the cost efficiency of these schemes consistently across the industry and used scheme level econometric modelling to set allowances using WAFU benefit and connection length as model variables. We determined that benefit and length are independent variables that give the best indication of efficiency. WAFU benefit is also an appropriate variable to assess efficient costs on, as it is this WAFU benefit to the company and zonal supply demand balances which provides customers with the resilience benefit that they have funded.

4.3 We used both outturn, from company Annual Performance Report (APR) submissions, and forecast scheme costs and benefits to determine unit costs. We placed equal weight on historical and forecast costs. The cost of activities underpinning the interconnectors being built over 2020-25 are similar to those underpinning the proposed interconnectors for PR24). These costs are recent and therefore provided a good indication as to the costs of interconnectors in PR24.

4.4 For the final determination we included the latest year of available historic data (from the 2023-24 Annual Performance Review submissions to Ofwat, and included in sheet '6f Input Data' of our supply interconnector model[227]) and the updated forecast costs (submitted as part of companies' representations, and included in sheet 'CW8 Input Data' of our supply interconnector model[228]).

4.5 Companies requested in their representations £1.37 billion against WRMP supply interconnector schemes. Our final determination allowance was £1.31 billion, representing a cost gap of -4.09%. This is an increase from PR19 final determination which allowed companies almost £0.4 billion for this area of enhancement.

4.6 We applied an uplift to benchmark allowances to four companies to account for the length of crossings (for example, where interconnectors cross rivers or roads). This resulted in a £6.78 million increase in Affinity Water's allowance, a £20.81 million increase in Northumbrian Water's allowance, a £4.36 million increase in Southern Water's allowance and a £1.58 million increase in Dŵr Cymru's allowance. We did not apply a downwards adjustment to companies with lower than average crossing lengths.

4.7 We also applied an uplift to Anglian Water's Grafham scheme. This was to take account of the use of more costly steel pipe material and the mid-transfer chlorination treatment element, resulting in uplifts of £76.499 million and £22.519 million respectively. We did not further adjust allowances to reflect other differences in pipeline material as the model dataset already included a range of different pipe materials.

Issues raised by disputing companies

4.8 Southern Water raised the following issues with our top-down modelling approach to set an allowance for supply interconnectors:

[227][OF-CA-083] Ofwat, PR24-FD-CA92 Water Supply interconnectors enhancement expenditure model, February 2025
[228][OF-CA-083] Ofwat, PR24-FD-CA92 Water Supply interconnectors enhancement expenditure model, February 2025

- Historical cost models are not a good predictor of future supply interconnectors costs[229].

- Our models do not account for all the scheme-specific factors that influence supply interconnector costs[230].

- We did not deep dive their supply interconnector schemes, instead applying simpler benchmark model approaches[231].

- Our models are not sufficiently robust for cost estimation and setting allowances[232].

4.9 Northumbrian Water raised changes to delivery timelines for its Suffolk Strategic Network interconnectors, which will result in these schemes being delayed. The company has asked for its 2025-2030 totex allowance to be reduced from £118.030 million to £41.270 million, with the remaining allowance assumed for 2025-2030, and for the PCD to be adjusted to reflect the changes to the anticipated delivery date. Our response to this issue is covered in the Northumbrian Water statement of case response document[233]. Northumbrian Water makes no reference to the model itself nor the allowances from it.

Our assessment

Use of historical and forecast data

4.10 Southern Water states that modelling historical and forecast costs gave a wide range in cost estimates, with historical cost models underestimating what costs are required when compared to companies' plans.

4.11 Southern Water states that for all companies in WRMP24 the deficit between water demand and supply is over three times higher than in previous plans. The company states that this increased requirement increases the average unit cost of future schemes compared to historical delivery. Therefore, Southern Water states that historical benchmarking models are unlikely to reflect the forward-looking efficient costs of companies' supply interconnector schemes.

4.12 We consider our decision to assign equal weights to historical and forecast models is appropriate and conservative, striking the right balance between providing companies with a sufficient allowance, while making sure that customers do not pay for company

[229][OF-OA-003] Southern Water, Statement of Case, March 2025, Section 5.1
[230][OF-OA-003] Southern Water, Statement of Case, March 2025, Section 5.1
[231][OF-OA-003] Southern Water, Statement of Case, March 2025, Section 5.1
[232][OF-OA-003] Southern Water, Statement of Case, March 2025, Section 5.1
[233] PR24 redeterminations – response to Northumbrian Water's statement of case

inefficiency. We consider that historical costs reflect the outturn costs for companies to deliver schemes, particularly when:

- The selected cost drivers, WAFU and length, have clear economic and engineering rationale; and
- The estimated coefficients of drivers in both the historical and forecast models have the correct sign consistent with economic and engineering rationale, are of a reasonable magnitude, and are statistically significant.

4.13 We consider using historical supply interconnector cost and cost drivers data has advantages as it:

- helps us understand the actual relationship between cost and cost drivers;
- provides insights on the actual cost of supply interconnector in PR19, which is a good indication of what it will be in PR24; and
- helps us to identify inefficient forecast costs by comparing historical and forecast efficiency scores for each company.

4.14 We recognise our historical models predict lower allowances than the forecast models. However, this single result is not sufficient to dismiss the important role historical cost benchmarking plays in identifying what companies have achieved in the past to challenge PR24 business plan forecasts. Utilising only forecast data would not be in the customer's interest given the importance of econometric cost benchmarking models in reducing information asymmetry between Ofwat and water companies. Forecast costs can be higher than historical costs for a range of reasons including risk aversion and uncertainty. This uncertainty is evidenced by Southern Water stating that its WRMP24 schemes costs are not well developed. The company also increased its AMP8 interconnector cost requests by 38.2% to £201.891 million in its draft determination representation from its draft business plan with little scoped evidence, and a small loss of 4.21 Ml/d in overall benefit. We also note that Anglian Water's forecast cost increase (submitted in its draft determination representation) was larger than its APR interconnector outturn cost by around 25%, and little specific scheme by scheme justification was provided for the increase in forecast costs.

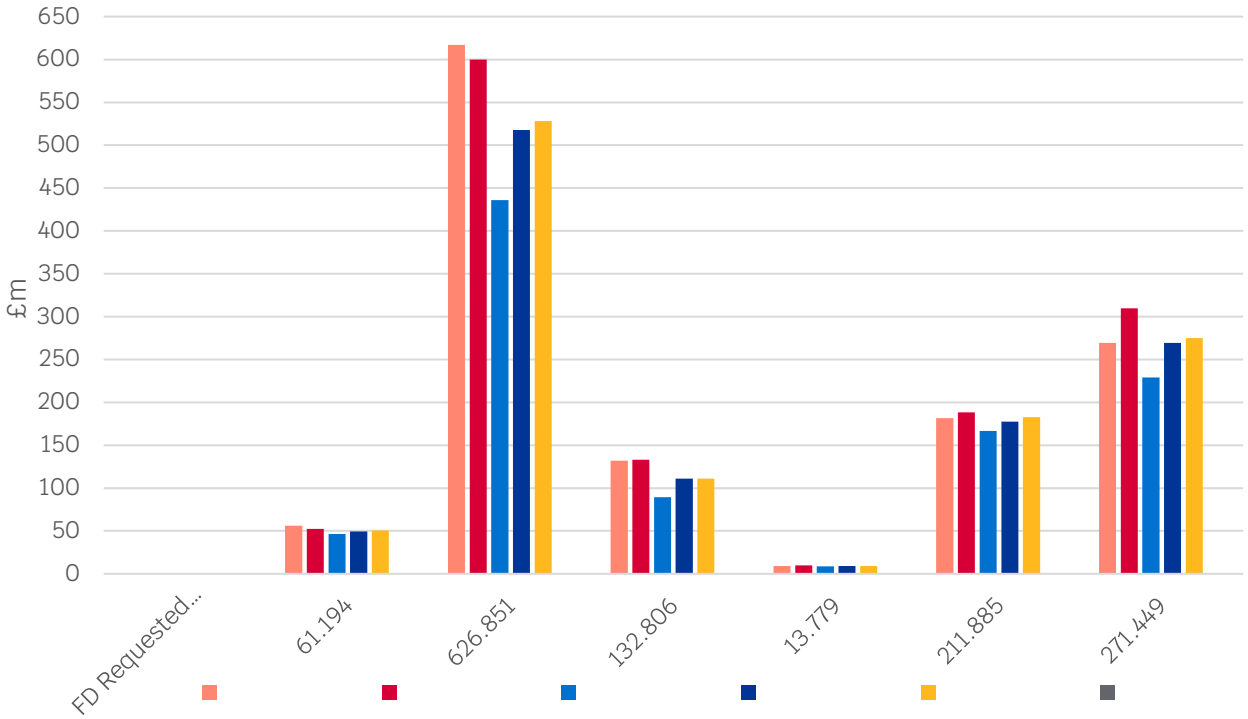
4.15 Further, many large interconnector schemes are multi-AMP schemes, spanning both the 2020-2025 and 2025-2030 periods for their delivery. This means that many of the historical schemes also include some years of forecast delivery as they are still due to be completed in the 2025-2030 period and therefore still represent some present pressures on cost.

4.16 We have undertaken post-PR24 final determination analysis to further compare historical and forecast data, and modelling approaches[234]. Figure 14 shows the

[234][OF-CA-065] Ofwat, Supply Interconnectors – post FD modelling, July 2024

difference between using outturn (historical) and forecast interconnector models is not consistent across the companies, and notably the difference for Southern Water is relatively small. The final determination allowances are set using an equal weighted between the outturn and forecast models. We have tested a pooled (historical and forecast data) model with an indicator variable for data type (forecast vs outturn), and this term was not statistically significant, suggesting that the two data sets are not statistically different. Figure 14 therefore shows the use of a pooled model as opposed to separated outturn and forecast models does not create a significant difference in outcome in allowance.

Figure 14: AMP8 supply interconnector model comparison by company



Consideration of cost drivers

4.17 Southern Water states that our models do not consider other cost drivers that influence supply interconnectors costs, such as diameter of pipeline, scope of additional assets, ground/soil conditions, pipeline material, local labour costs, whether the pipeline carries treated or untreated water, the number of crossings and/or the status of the land.

4.18 Our model specification is guided by engineering rationale of the cost drivers. The WAFU and length cost drivers explain a substantial proportion of the variation in scheme costs. The R-squared value is 0.93 for our forecast model and 0.81 for our historical model. While additional predictors could further improve the model, the

current specification already demonstrates strong explanatory power and performs reasonably well given the data limitations. We tested the inclusion of additional variables such as diameter of pipe and pumping capacity. The availability and quality of data for these variables was more limited, and showed high correlation with our preferred cost drivers. For example we would expect a higher WAFU requirement is likely to require larger pipes and more pumping. We did not find these additional variables to be statistically significant once we take account of length and WAFU. We prefer WAFU to pipe diameter and pumping capacity as it is exogenous and is a more direct measure of scheme requirements, as explained in our PR24 final determinations expenditure allowances document[235]. Using WAFU is therefore the best indication of efficiency and benefit to the customer that they have funded.

4.19 Companies did not submit, nor did we request, data on labour costs. This was not considered a major predictor to scheme cost variance, and companies did not raise this in draft determination representations. We also consider as most schemes are situated in the south east of England (Northumbrian Water's schemes are also situated in its Essex and Suffolk region, as opposed to its Northumbrian region), that the model would already be representative of higher labour costs.

4.20 In response to our draft determinations companies raised concerns that our models were not accounting for crossings and pipe material. We tested different cost drivers based on the data available. We addressed these concerns in our final determinations through post-modelling adjustments and deep dives.

4.21 In our final determination, we presented assessment of crossings as a separate deep-dive uplift to accommodate more complex schemes. We requested[236] data on a variety of crossing types, including road, rail, waterways and valleys, and asked companies to provide any further information on these crossing types that added complexity to their schemes. Companies provided information on these areas and also on other categories that they considered added crossing complexity to their schemes, including utilities and environmentally protected areas. We applied post-modelling uplifts to company allowances where the data showed that the crossing length per total length of interconnector exceeded the average across the industry, and therefore would have otherwise not been under-represented in the modelled allowance. Southern Water provided details on crossings for its Southampton and Andover link main schemes, including 1373m of crossings across environmentally protected areas on the Southampton link main scheme which have been incorporated into the crossing uplift model. For Southern Water, the provision of the additional crossing data resulted in a post-modelling uplift of £4.3 million to account for additional complexities in crossings for the company's interconnector schemes. We did not apply a negative uplift to companies that had crossing lengths that were below average per interconnector

[235][OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.181 (s.3.6.2)
[236] OFW-REP-SRN-019 - response

length across the industry. We consider we have been open to incorporating all types of crossing that add complexity to schemes.

4.22 We have undertaken further analysis on adding material as a cost driver[237]. This did not result in a significant effect after length and benefit had already been controlled. This is because schemes with both polyethelene and ductile iron material are included across the benchmarking data already. Steel is a more expensive material than polyethelene and ductile iron which are closer in cost. We have separately considered steel as a more expensive material outlier which required a separate and specific uplift.

4.23 We considered post-modelling uplifts to schemes where companies notified and evidenced where treatment requirements formed a major cost driver to their scheme. Anglian Water evidenced a specific case for the Grafham to Bury interconnector, that required a mid transfer treatment which is required for water chemistry (chlorination) to enable blending into the receiving zone. We removed the costs for the treatment element from the interconnector model and considered this separately. The scheme received a £22.519 million post-modelling uplift (90.0% of AMP8 requested cost). We note additional data provided by Southern Water in its statement of case[238] does not highlight significant treatment components on its interconnector schemes beyond disinfector upgrades on the 'Hampshire Grid ALM' scheme.

Data available for deep dive analysis

4.24 Southern Water states that each of its supply interconnector schemes has been developed to a detailed design stage and that the scope of each scheme includes scheme-specific elements and complexities that the Ofwat econometric model did not account for. Southern Water states that as it provided bottom-up evidence for these schemes, including scheme specific scope details and market data on costs of delivery, that individual deep dives should have been completed that took these factors into account. Southern Water requests that the CMA provides it the full allowance of £201.891 million for water supply interconnectors by referencing this bottom-up evidence, rather than applying an allowance through scheme level econometric modelling.[239]

4.25 Southern Water's final determination allowance for supply interconnectors was £181.743m million against a £201.891 million request. Southern Water's interconnector programme included the 'Southampton Link Main' and 'Andover Link Main' schemes.

4.26 In Southern Water's representation on the draft determination, the company did not provide detailed enough cost breakdowns or any evidence of benchmarking for its

[237][OF-CA-065] Ofwat, Supply Interconnectors – post FD modelling, July 2024
[238][OF-OA-003] Southern Water, Statement of Case, March 2025, page 240, (section 5.1.4)
[239][OF-OA-003] Southern Water, Statement of Case, March 2025, section 5.1

'Andover Link Main' and 'Southampton Link Main' schemes. The company also did not provide sufficient detailed cost breakdown and justification for the proposed increases in cost between the draft determination and draft determination representation to the level that we would require to deep dive the changes. As sufficiently detailed evidence was not provided, we were unable to complete an additional deep dive that could better determine the efficiency of costs and if a bespoke model adjustment was necessary. We consider our decision to benchmark the cost efficiency of Southern Water's schemes across the industry as appropriate given the inherent uncertainties in the company's proposed costs, and the lack of detailed evidence provided on these schemes as part of the company's representation.

4.27 Southern Water has provided detail in its statement of case[240] for factors which affect the costs of the Southampton link main and Hampshire link main interconnector schemes, including brief description of assets, crossings of environmentally protected areas, associated installation approaches required, and some high level cost statements for the installation approaches. Environmentally protected areas were accounted for as part of crossing length, although only Anglian Water provided a detailed cost breakdown for this as part of its query response. We do not consider the additional cost information provided in Southern Water's statement of case a sufficiently detailed breakdown of cost that would have enabled us to have undertaken further deep dive on its schemes.

Robustness of models

4.28 Southern Water stated that our models are not sufficiently robust for estimation[241] because they do not pass the normality of model residuals test, and the historical and forecast models also contain a small sample size. The company compares the sample size to other Ofwat benchmarking models, and states the sample size weakens the ability of the model to detect the true relationship between variables, poses a risk of overfitting the model and increases the chances of the model violating Ordinary Least Squares (OLS) assumptions.

4.29 We note that Anglian Water's historical interconnector schemes also represented 93% of the total cost of the historical scheme dataset. This is reflective of the size of Anglian Water's interconnector programme at PR19, where the £304.92 million allowance represented 78.5% of the total allowance awarded for supply interconnectors across the industry[242].

[240][OF-OA-003] Southern Water, Statement of Case, March 2025, p.240, section 5.1.4
[241] [Of-OA-003] Southern Water, Statement of Case, March 2025, section 5.1
[242][OF-CA-084] Ofwat, PR19 Supply Demand Balance enhancement expenditure model, December 2019, sheet 'Deep dive ANH'

4.30 We recognise that our models do not pass the normality of model residuals test. However, this result does not distort the estimated coefficients of our cost drivers. Our estimated coefficients are statistically significant and are well outside typical statistical thresholds. We consider that the lack of normality is not a sufficient result to dismiss our models. Setting such a high standard would not be in customers' interest given the importance of econometric cost benchmarking models in reducing information asymmetry between Ofwat and water companies.

4.31 We have done further analysis post final determinations[243] and have estimated our models using cluster-robust stand errors (clustered at the company error). This method addresses the issue of correlation within companies, without altering the coefficient estimates. After applying this, the results remain stable, and the key coefficients are still significant at any reasonable level.

4.32 We consider that the small sample size is a practical limitation rather than a modelling flaw; it reflects the available data rather than a methodological oversight. Importantly, despite this limitation, the estimated coefficients are relatively stable, and the robust standard errors are tight in the forecast model. These small standard errors suggest a strong relationship that is unlikely to be purely due to sampling noise, even if formal hypothesis testing is not strictly reliable in small samples. This is also demonstrated when increasing the sample size to 39 in the pooled model (Figure 14 above), and the outcome allowances did not notably change.

Leakage

Our final determinations

4.33 Leakage in this section refers to leakage enhancement, i.e. proposed investment by companies which result in a reduction in total leakage within the period 2025 to 2030. Base leakage allowances are discussed in Section 2 Base expenditure allowances.

4.34 In our final determinations[244] we assessed company proposals of £925.188 million and allowed £722.825 million sector wide enhancement allowance to reduce leakage. Since the publication, we updated the allowance for Anglian Water due to new information and removed its allowance of £41.424 million without an impact on any other company. This change resulted in the total allowance of £681.401 million across the sector to reduce leakage by 457.3 Ml/d (16.6%).

[243][OF-CA-065] Ofwat, supply Interconnectors – post FD modelling, July 2024
[244][OF-OA-022] Ofwat, PR24 final determination: Expenditure allowances, February 2025, pp.191-198

4.35 To assess companies proposed leakage investment we assessed the different types of leakage activity they were undertaking. This resulted in us dividing leakage activity into three categories:

- mains renewals;
- customer supply pipe leakage (CSPL); and
- other leakage activities.

4.36 The other leakage activities category includes all activities that result in a reduction in total leakage that do not fit in the first two categories, such as pressure management or find and fix activities.

4.37 We used a combination of unit cost benchmarking, and deep dive assessments to assess proposed investment. Any company requests for allowances relating to leakage reduction through CSPL activity were included within the metering enhancement category as leakage reduction volumes will be proportional to the delivery of smart meters. These costs were subsequently included in the metering model inputs and therefore included in metering model allowances.

4.38 Before setting leakage enhancement allowances we first ensured that volume reductions being requested reflected the leakage reduction targets in each company's 2024 water resources management plan (WRMP).

4.39 We requested that companies provide details identifying if they were proposing to deliver leakage reductions through base or enhancement expenditure allowances. Our view for PR24 was that leakage reductions should be funded through enhancement. This is a shift from PR19 final determinations where we expected all companies, apart from upper quartile performers, to deliver all leakage reductions through base. This was in part due to stagnating performance on leakage for the preceding 15 years[245].

4.40 There were two exceptions to funding all leakage reduction through enhancement at PR24 final determinations. The first related to mains renewal[246] where we considered there was a base allowance of mains renewal of 0.3% per year of a company's network length. Where the company planned to deliver less than this length, we first removed any remaining base mains renewal length from leakage driven mains renewal. Any remaining length leakage driven mains renewal after base allowance was accounted for was given a leakage enhancement allowance. Mains renewals for leakage, above the base funded length, were funded separately at unit cost per metre. The second exception was Dŵr Cymru[247] where we accepted the company's proposal to deliver the

[245] [OF-CA-020] Ofwat, PR19 final determinations: Securing cost efficiency technical appendix, December 2019, p.63, section 4.2.4
[246][OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, section 2.2.1
[247] [Of-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.195 (s.3.6.4)

reduction from base expenditure to recover its poor performance in the 2020-25 period.[248]

4.41 The leakage savings from CSPL and mains renewal activities are both funded through enhancement and so were deducted from the overall reductions proposed by South East Water over the AMP. The remaining leakage reduction was deemed to require enhancement funding from the other leakage activities.

4.42 In response to company concerns regarding the leakage unit rate for 'other leakage activities' we undertook further analysis for our final determinations. We included additional outturn years within our analysis to produce the unit rate and tested the impact of meter penetration and leakage performance on the leakage reduction unit costs. While this did not identify a robust relationship, several companies with higher meter penetration rates, pressure management coverage and leakage performance levels did have higher leakage reduction unit costs.

4.43 As a result, we increased the standard unit rate to determine leakage enhancement to £1.406 million per Ml/d of leakage reduction. For higher performing companies (leakage performance levels) and those that may find it harder to reduce leakage (high meter penetration): Anglian Water; Wessex Water; Bristol Water; South East Water; and SES Water), we allowed a higher unit rate of £2.057 million per Ml/d of leakage reduction (£m/Ml/d). This rate was then applied to the leakage reduction to be delivered through 'other leakage activities' which resulted in an increase in allowances in this category.

Issues raised by disputing companies

4.44 South East Water raises concerns regarding the unit cost used to provide allowances for 'other leakage activities'[249]. The company raises two principal concerns:

- The choice to use SES Water's unit costs as the high performer company benchmark is insufficiently justified; and
- The final determination documentation states the unit rate is based on SES Water's historical costs when it is actually based on forecast costs.

4.45 South East Water proposes the use of its own costs as requested in its business plan which it states is efficient and that it is in South East Water's customers' interests for the full £43.1 million to be funded[250].

[248] We do not consider this decision to be relevant to the points raised by the disputing companies but further detail is available in Ofwat, 'PR24 final determinations: Dŵr Cymru - Outcomes appendix', December 2024, pp. 3-4
[249] [OF-CA-195] South East Water, Annex G – Enhancement costs, March 2025, section 2.1
[250] [OF-CA-195] South East Water, Annex G – Enhancement costs, p.44, section 2.1

4.46 Anglian Water does not propose any changes to the approach to assessing leakage costs. However, the company considers its leakage cost allowance should be revised by applying the approach used at PR24 to its revised performance commitment level.[251]

Our assessment

4.47 We respond to Anglian Water's proposal to revise its leakage performance commitment levels in section 4.2 of our company-specific response document.[252] We consider this is likely to result in an amended PCL and that under such circumstances the company's enhancement allowance should be adjusted accordingly following the approach we applied at PR24.

4.48 In its business plan, South East Water requested a leakage enhancement allowance of £84.100 million to reduce leakage by 10.5 Ml/d. At PR24 we assessed 1.35 Ml/d reduction from mains renewals and 9.15 Ml/d reduction in our 'other leakage activities' category applying the higher unit rate of £2.057 million per Ml/d to provide an overall allowance of £18.823 million. We do not consider that the unit rate or allowance for South East Water requires adjustment and provide further detail of our reasoning below.

4.49 South East Water is correct that the final determination document incorrectly states the unit rate for 'other leakage activities' is based on SES Water's historical costs rather than its forecast unit rate. The text should read "forecast" rather than "historical". Within our published leakage model the calculation of the unit rate is shown as being derived from forecast data.[253]

4.50 In our PR24 final determination, we separated mains renewals from other leakage activities for the purpose of allowing expenditure. This is because mains renewal activity is typically a higher unit cost option (£ per Ml/d of leakage reduced) in comparison with other leakage interventions which are operational in nature; our analysis of leakage activity query responses[254] results in median unit costs of £17.4 million per Ml/d for mains renewal and £1.9 million per Ml/d for other leakage activities. We considered this to be particularly pertinent to better performers who, having achieved leakage reductions with more cost effective interventions, tend to shift to more mains renewal focused leakage strategies.

[251] [OF-OA-001] Anglian Water, PR24 CMA Redetermination Statement of Case, March 2025, p.125
[252] Ofwat, PR24 redeterminations - response to Anglian Water's statement of case, April 2025, pp.38-42
[253][OF-CA-085] Ofwat, PR24 FD CA34 Water leakage enhancement expenditure model, December 2024, worksheet 'Outlier Analysis'
[254] [OF-CA-085] Ofwat, PR24 FD CA34 Water Leakage enhancement expenditure model v3-1, December 2024, tab 'Leakage Activity'. Query_FD. Options with non-zero cost and benefit data used in the analysis. CSL options are excluded from this analysis.

4.51 On balance we therefore decided to allow the higher performers, including South East Water, a higher 'other leakage activity' unit rate. While this is in line with our PR19 final determination approach, however, as a whole the industry did not provide sufficient and convincing evidence in their PR24 business plans to support this. In PR19 our higher allowances for better performers in part reflected the inclusion of renewals in the unit rate.

4.52 However, determining an appropriate efficient unit rate for other leakage activity for higher performing companies is not a straightforward process. South East Water focus on why Ofwat's approach to identifying the higher unit rate is incorrect, rather than why the higher unit rate (£2.057m per Ml/d) is insufficient or importantly why its requested unit rate (£5.288m per Ml/d) is efficient. We do not consider simply selecting the median of a subset of five companies to be appropriate due to the very small sample size. Selecting an upper quartile value of all companies is equally unsatisfactory as it would result in application of unit rate from a company that is not high performing.

4.53 In our PR19 final determination, as one of four high performing companies, we allowed South East Water the average unit rate of £2.348 million per Ml/d (2017-18 prices). The average unit rate for all four high performing companies, was £2.808 million (2017-18 prices). Our analysis of outturn data for the period of six years between 2019 and 2024 resulted in the median unit cost of £3.555 million per Ml/d for the five companies classed as high performers at PR24, ranging between £0.644 million and £5.848 million per Ml/d. Whilst these values appear higher than our PR24 final determination of £2.057 million, PR19 costs represented a hybrid unit rate covering both mains renewals and other leakage reduction activities. As such it is not directly comparable to the PR24 other leakage activities' forecasts and given the high unit rate of mains renewals it would be considerably lower.

4.54 Within its statement of case South East Water states "when considering active leakage control, it is important to examine the unit costs per repair and per detected leak". The company then goes on to show its calculation of this compared with other companies and that on a per repair basis its costs are efficient.[255] While we do not disagree with this statement and acknowledge there are many useful leakage key performance indicators, it is more important that the overall cost for reducing leakage is efficient. If the cost per repair and per detected leak is efficient but the cost per Ml/d reduction in leakage is not efficient it would indicate that the saving per repair is lower than other companies. The company does not present evidence to explain why its overall cost per Ml/d reduction is efficient. Nor does it present comparative costs for alternative methods of leakage reduction to demonstrate that, despite its costs being high in comparison with other companies, its costs represent best value for customers.

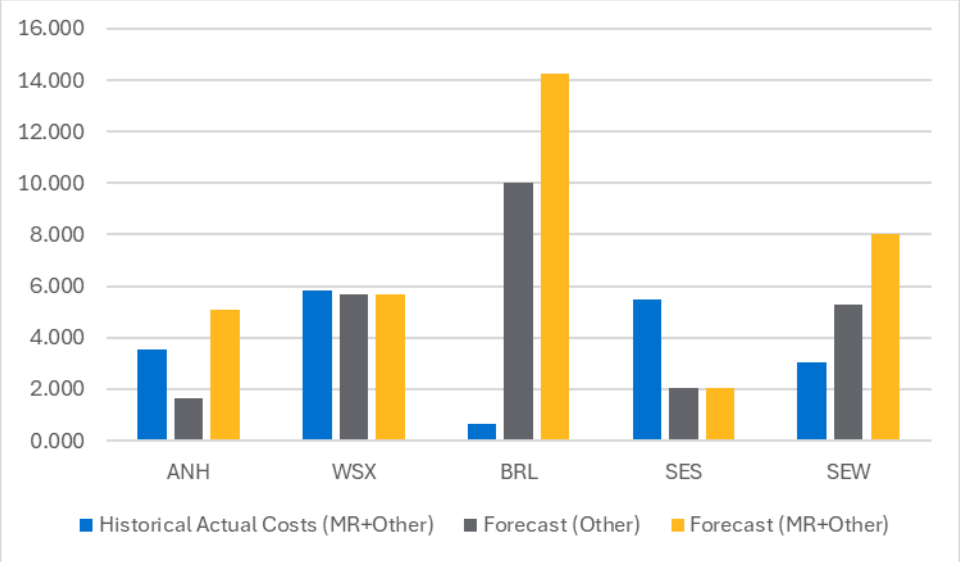
[255] [OF-CA-195] South East Water, Annex G Enhancement Costs, March 2025, paragraph 160

4.55 Water companies can use a range of methods of reducing leakage and they should present evidence to demonstrate that they have chosen an appropriate mix of activities. South East Water only proposes to reduce leakage through mains renewal and find and fix methods. The company does not propose any reduction through addressing customer supply pipe leakage or through pressure management. The company does not provide evidence or explain why its approach represents an optimised mix of activities.

4.56 It is up to each water company to determine the appropriate mix of activities as part of their leakage reduction strategies and we provide an overall efficient allowance to enable companies to reduce leakage. This allows companies to innovate and adapt to optimise their strategies within the 2025-30 period whilst being incentivized to achieve their overall leakage performance commitment levels through the Outcome Delivery Incentive mechanism.

4.57 South East Water does not provide sufficient and convincing evidence that its leakage costs are efficient or explain why there is an increase between its outturn costs within the 2019-24 period and the costs that it forecasts in 2025-30. Our analysis shows that its forecast unit rate for 'other leakage activities' represents a 75% increase in unit costs (£m/Ml/d) over its reported outturn costs for the 2019-2024 period (adjusted to 2022-23 prices), as shown in Figure 15. The forecast values represent 'other leakage activities' only (grey shaded bars) and combined mains renewal and 'other leakage activities (purple shaded bars), historical values (blue shaded bars) are a hybrid rate including more costly mains renewals in the basket of options used. We therefore do not consider that the unit rate for 'other leakage activities' the company proposes is a credible alternative rate.

Figure 15: Comparison of outturn and forecast leakage reduction unit rates for high performing companies



4.58 As highlighted above we used a range of sources to develop appropriate benchmarks and, as noted by South East Water, we identified a group of five companies (Anglian Water, Wessex Water, Bristol Water, South East Water and SES Water) classed as good performers. We allowed a higher unit rate of £2.057 million per Ml/d of leakage reduction and we consider this rate is fair and reasonable.

4.59 We therefore consider that our PR24 unit rate of £2.057 million per Ml/d represents a reasonable level of funding considering that it covers non-mains renewal activity only and that additionally South East Water receives mains renewals funding to support its leakage reduction strategy. Further information on the mains renewal assessment can be found in the 'Water mains renewal cost assessment' section of this document.

Demand (water efficiency)

Our final determinations

4.60 Water efficiency investments include funding for activities which reduce customer water consumption such as property visits and water efficiency audits, distribution of water saving devices, education and awareness campaigns, behaviour change initiatives, partnership projects with housing associations / local authorities, and innovative tariffs. This covers both households and non-households (businesses). This funding is in addition to metering allowances which support these activities and can help customers reduce consumption. We allowed £24.094 million of enhancement funding for South East Water's water efficiency investment. This represented a 55.1% reduction from the company's request where it submitted £53.661 million of funding in the 2025-30 period.

4.61 At final determination we calculated the unit cost normalised by megalitre per day (Ml/d) of cumulative water saved volume by 2029-30 for each company. [256] We also tested other relevant cost drivers (such as meter penetration) which did not improve the explanation of company forecast costs better than the simple unit cost being used (£ million per Ml/d benefit).

4.62 From the comparative analysis we identified that South East Water had a significantly higher unit cost of £4.51 million per Ml/d compared to our benchmark median value of £1.17 million. Because South East Water's unit cost was an outlier we further benchmarked its costs through a deep dive assessment against our model adjustment

[256] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, section 3.6.6

enhancement criteria (need for enhancement investment, best option for customers, and cost efficiency). [257]

4.63 Based on this deep dive, we had concerns that South East Water did not provide evidence of cost efficiency for its specific programme of activities planned for the 2025-30 period, or an explanation or breakdown of how its costs were derived. With a lack of company specific evidence we used the outturn costs from a range of similar water efficiency programmes across the industry to generate an average unit rate for the type of water efficiency activities South East Water proposed. These included programmes for companies with high meter penetration (therefore analogous to South East Water's situation), and we calculated an efficient average unit cost of £2.251 million per Ml/d.

4.64 We applied an additional efficiency challenge of 10% to the cost benchmark of £2.251 million per Ml/d. This was because the company had not provided detailed cost breakdowns or sufficiently demonstrated the need for high cost options. We therefore allowed a unit cost of £2.025 million per Ml/d for South East Water as there was no evidence to support use of the company's requested unit costs. This unit cost represented a 73% higher cost than benchmark median value of £1.170 million and we considered that it took into account programme specific circumstances.

Issues raised by disputing company

4.65 In its statement of case, South East Water reduces its expenditure request to £40.172 million[258].

4.66 The company raises five issues with our assessment, namely that:

- evidence shows that costs of water efficiency activities and programmes are highly variable;
- its strategic position requires South East Water to adopt higher unit cost approaches;
- its assumed unit costs are efficient when compared to external evidence on unit costs;
- our approach to setting South East Water's unit cost is based on an arbitrary sample; and
- our additional 10% reduction to the allowed costs is not evidenced.

[257] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, section 3.1
[258] [OF-CA-195] South East Water, Annex G – Enhancement costs, March 2025, Section 2.6

Our assessment

4.67 We continue to consider that our approach to benchmark the unit cost for water efficiency activities, with a deep dive due to cost outliers, as appropriate.

4.68 Water efficiency activities are not new to the industry, nor are they particularly novel or bespoke. All companies have been undertaking this work for several investment periods. South East Water has not incurred higher costs than most of its peers so far in the 2020-24 period. It provides insufficient evidence for its forecast costs that are significantly than other companies, and its own outturn.

4.69 We welcome the reduction in the overall funding request from the company and the resulting reduction in the unit cost from £4.511 million to £3.377 million per Ml/d. However, the requested costs continue to be significant the size of company, its customer base and the savings it achieves.

4.70 We welcome that our challenge during PR24 has enabled the company to identify £13.5 million of savings (25% of the programme costs) by optimising its proposed programme. However, such a sudden change raises concerns over the extent and quality of supporting evidence for the original business plan submission.

4.71 The revised funding request represents an approximate spend of over £41 per property. This is a substantial amount to spend on water efficiency on a per property basis. This raises concerns about the scale of investment for South East Water's customers without sufficient evidence from the company that its proposals are fully justified, effective and efficient. Comparatively, South East Water is planning for a materially bigger water efficiency expenditure programme than any other water company, in both absolute and normalised terms as illustrated in the charts shown. We further present our reasoning in the following points while addressing the company's arguments.

Figure 16: PR24 final determination water efficiency allowances

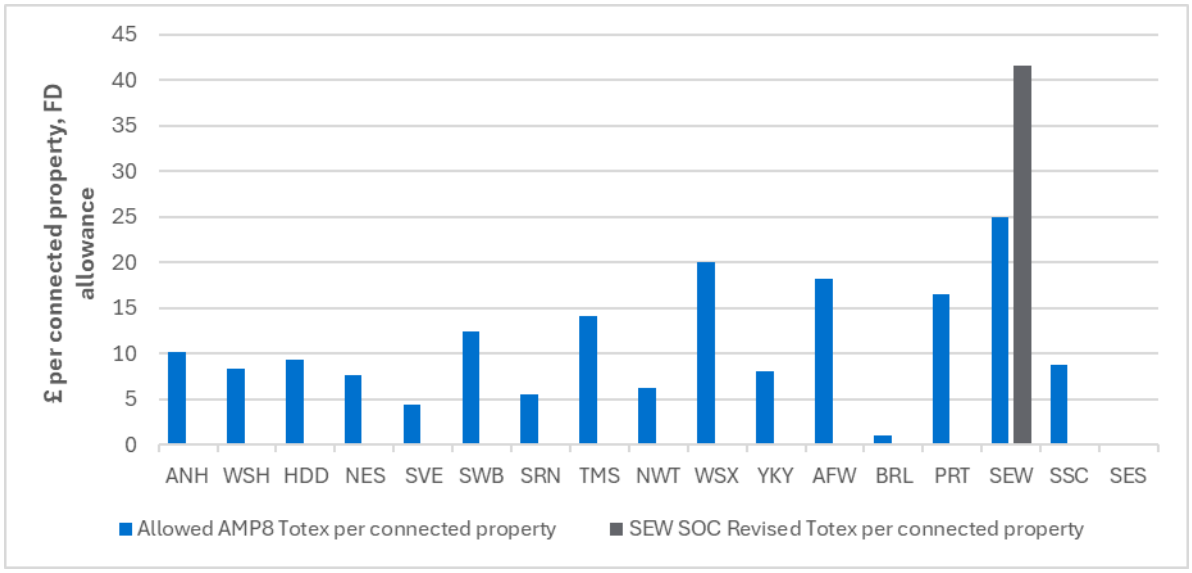
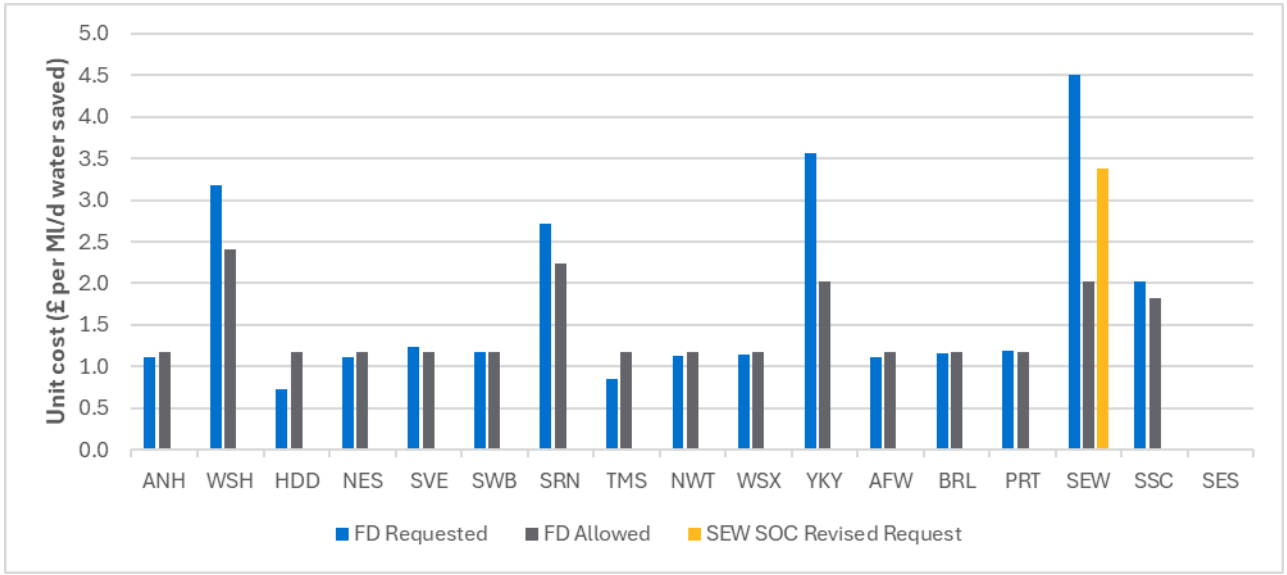


Figure 17 17: Water efficiency unit costs from PR24 Final Determination



Issue 1: Evidence shows that costs of water efficiency activities and programmes are highly variable

4.72 We agree that costs of water efficiency activities and programmes will depend on activities included within them. We understand that there also are company-specific factors which affect the life cycles of the programmes, and in turn their costs and benefits.

4.73 During the final determination we tested additional and alternative cost drivers for water efficiency, including meter penetration. We expected all companies to develop their water efficiency programmes in a way that takes account of their specific circumstances, technological limitations, operational practices and customer base. We also expected that these programmes and all interventions within, were tailored to these specific circumstances. This is particularly pertinent to the costs of the proposed interventions, and we expected that South East Water would have developed its costs from the bottom-up analysis and based on its and others outturn data where possible.

4.74 Although we expect a degree of variation in unit costs, notably at activity level, we see from company requests that variation is generally limited. This is illustrated by Figure 17 with most company unit rates close to £1 million per Ml/d. This is also supported by a median unit rate of £1.167 million per Ml/d, mean of £1.745 million per Ml/d and standard deviation of £1.090 million per Ml/d.

Issue 2: Its strategic position requires South East Water to adopt higher unit cost approaches

4.75 South East Water states in its statement of case[259] that its strategic position requires it to adopt higher unit cost approaches. However, it continues to only provide the total cost per option together with assumed savings in Ml/d with unit costs showing a range between £2.34 million and £4.60 million per Ml/d, with the average of £3.37 million per Ml/d.

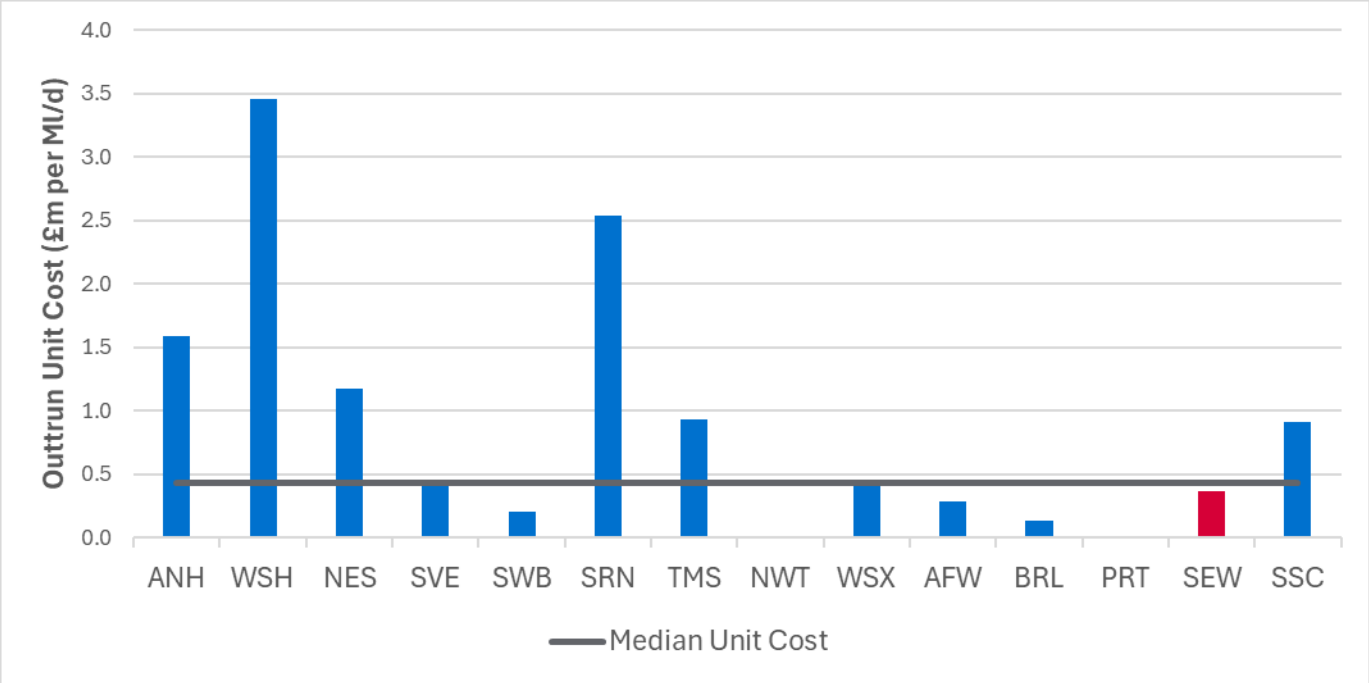
4.76 When we examine the total cost per option provided and derive spend per every connected household (as a normalisation measure), two options in particular indicate significant costs of nearly £29 for household audits including 'Leaky Loo Find and Fix' and £8 for non-household customer water audits. In comparison, the industry's second highest cost from Wessex Water results in £20 for its entire water efficiency programme, and the industry median allowance for water efficiency programmes is £9 per connected property. We therefore consider that funding requests, particularly of this materiality, should be underpinned by evidenced cost build-ups to increase the level of certainty. The company states it used the latest cost data available but does not provide any further detail.

4.77 There has been significant underspending of PR19 water efficiency enhancement allowances with only £97.630 million spent to date (2020-24) across the industry,

[259] [OF-CA-195] South East Water, Annex G – Enhancement costs, March 2025, Section 2.6

excluding United Utilities[260], compared to £193.264 million allowed. The industry has a median outturn unit cost of £0.425 million, generally with limited variation across companies illustrated in the chart.

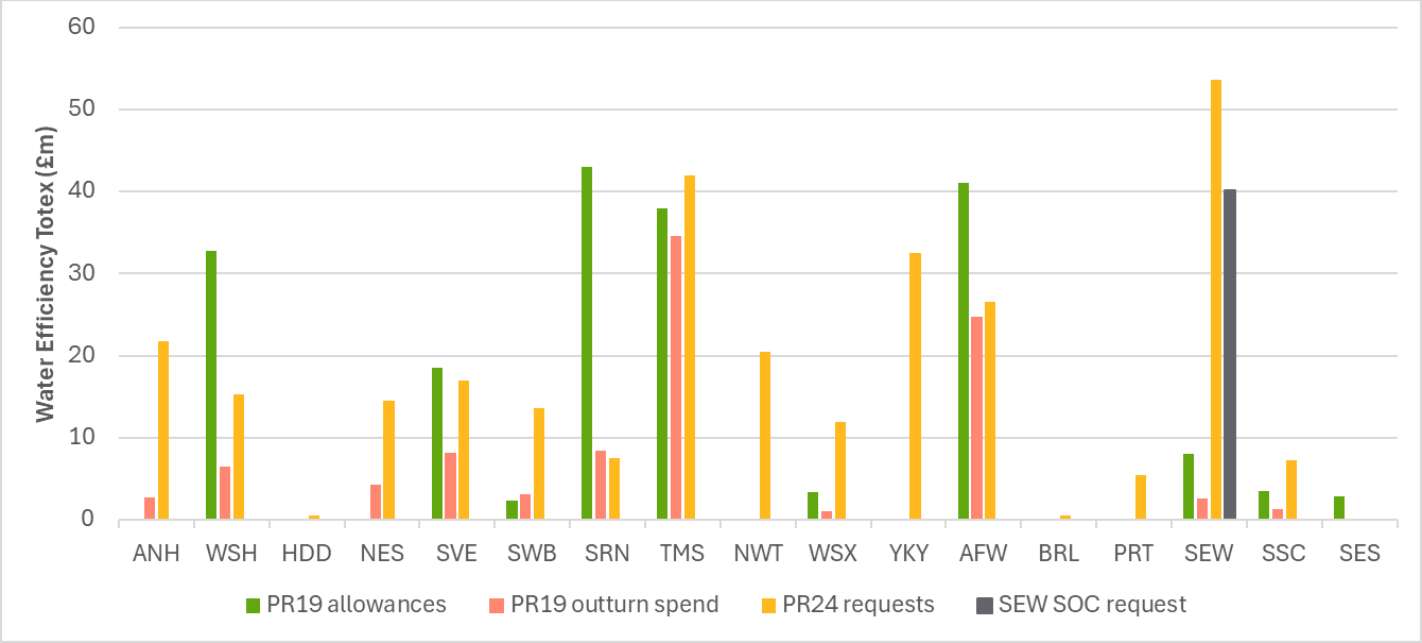
Figure 1818: Water efficiency outturn unit costs (2020-24)



4.78 Specifically, South East Water has so far spent £2.642 million in the 2020-24 period delivering a cumulative benefit of 7.15 Ml/d. This results in an outturn unit cost of £0.370 million per Ml/d. There is insufficient evidence that South East Water requires a large increase in its overall spend compared to PR19 nor a step change in resultant unit cost of £3.377 million per Ml/d.

[260] United Utilities received no allowance for water efficiency investment in PR19. However, the company presents incorrect data on costs and benefits outturn for the 2020-24 period and we exclude the company from analysis.

Figure 1919: Water efficiency PR19 allowances and PR24 requested costs



4.79 The descriptions for the proposed interventions indicate that the company focusses on installation and repair type activities. We would expect these types of options to have higher unit costs but South East Water does not support its case with evidence from own trials, pilot studies or any other validated evidence.

4.80 South East Water states it must address peak as well as average demand, which requires it to engage effectively with affluent households who place high value on water used in their large gardens, and – as part of another intervention – target more complex and bespoke solutions for medium to large business customers, stating some will cost more than £10,000 each with for example, storage and pumped solutions. We do not agree with this point for the following reasons:

- It is not clear which customers South East Water will target to deliver the benefits. This results in high cost solutions where it might expect a contribution from private companies and households given the savings.
- South East Water does not provide cost breakdowns or cost-benefit analysis to evidence that these are the best solutions.
- Even if the high intervention costs are correct – if this targets high water usage households and businesses – the benefits should also be larger resulting in a reasonable unit cost.
- South East Water states that it needs to address peak demand to reduce water supply interruptions but does not provide an impact on water supply interruptions.

4.81 We are concerned that these interventions add a significant cost for customers to fund whilst having limited benefits and no evidence that these are the right customer cohorts to target. South East Water should evidence its proposals with details relating to the delivery of these interventions, for example what categories of businesses it will target and how household customers will benefit from these proposals.

Issue 3: South East Water's assumed unit costs are efficient when compared to external evidence on unit costs

4.82 South East Water states that its assumed unit costs are efficient when compared to external evidence on unit costs[261]. However, the company refers to examples which were originally published in a 2019 report. This report is itself is based on limited data points, often from many years prior and from other companies or even other countries. While South East Water asked a consultant to undertake a cost benchmarking exercise, no attempt had been made to update or expand the dataset by including recent and/or more data points.

4.83 South East Water states that its consultant undertook a cost benchmarking exercise using the available industry standard values for activities and savings, resulting in costed scenarios at different levels of programme optimisation. It claims South East Water's programme is 3.6% cheaper than a partially optimised scenario, and that the fully optimised programme has a lower cost than South East Water programme by around 22%.

4.84 South East Water comments that it is more expensive than the fully optimised scenario because it has limited ability to optimise its approach as it does not have smart meter data to use. The company does not provide further detail what parameters were included in the optimisation modelling or input used in it (eg costs and benefits and how these are efficient or reliable). Cost optimisation of a programme in itself does not mean that it is efficient. We consider this limits the validity of the company's high level observations, as well as the fact that the scenarios were not South East Water-specific. Therefore, there is limited certainty regarding the cost range developed and its comparability with South East Water's programme.

Issue 4: Ofwat's approach to setting South East Water's unit cost is based on an arbitrary sample

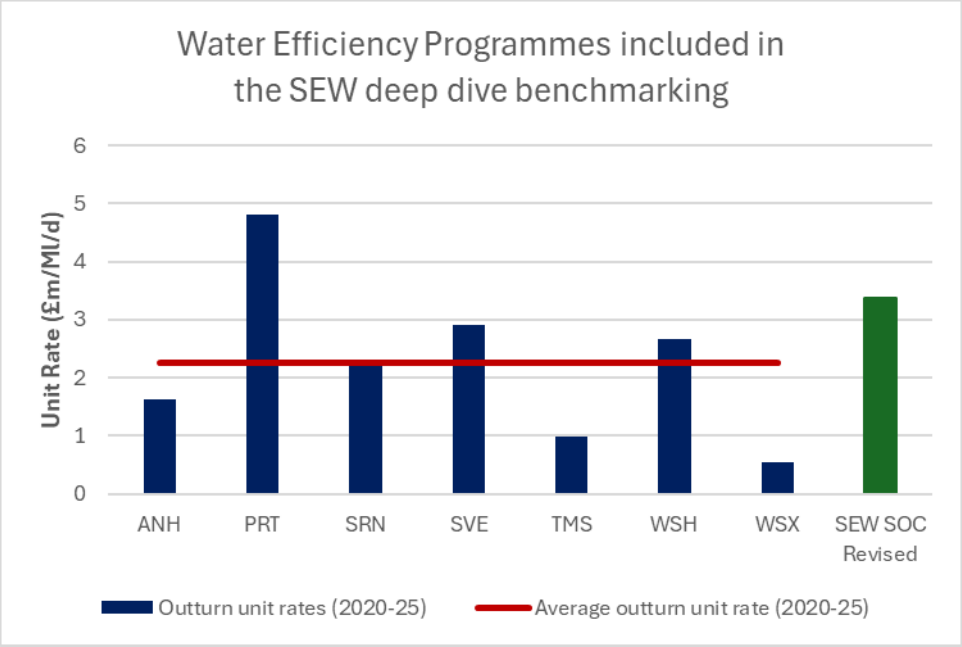
4.85 South East Water states that our approach to setting its unit cost is based on an arbitrary sample. The company further states that the sample appears to be loosely based on historical company programmes that have included home visits, and that this does not adequately represent the mix of approaches, including leaky loo – find and fix

[261] [OF-CA-195] South East Water, Annex G – Enhancement costs, March 2025, p.66, section 2.6

plan, media campaigns and individual incentive approaches. South East Water also states that we did not include a potential comparator in its sample i.e. Thames Water's Green Redeem programme that offers individual incentives – at £3.786 million per Ml/day – which if included would have resulted in a higher unit cost allowance. Taking the seven programmes, South East Water provided a tabulated comparison of five non-financial factors that impact on the comparability of our sample with its own proposed programme.[262] It shows that South East Water does not consider any of the examples fully mirror its circumstances, for example none of the seven comparator companies suffered material supply interruptions caused primarily by peak summer demand requiring a focus on peak summer demand reductions. We do not agree with these points for the following reasons:

4.86 Our sample of seven water efficiency programmes from across the English and Welsh water companies used reported outturn costs and benefits from the annual performance reporting process. The total sample of all 27 schemes from across the industry, for which the calculation of units costs was feasible, was narrowed down to specifically select schemes which include water efficiency visits or audits for households and non-households. This was based on the fact that over 90% of South East Water's requested funding (based on the revised cost of £40.172 million) is to carry out water audits. We therefore consider this to be a sensible selection of activities, both to match the company's proposal and are outturn to increase confidence in costs and delivered benefits. The outturn unit costs for the sample against the SOC revised unit cost in shown on the chart.

Figure 2020: Water efficiency programmes included in the South East Water deep dive benchmarking



[262] [OF-CA-195] South East Water, Annex G – Enhancement costs, March 2025, Section 2.6, Table ANG22

4.87 The mix of interventions from companies with similarities is valid in the absence of sufficient costing evidence from South East Water. It included both household and non-household programmes and therefore was not limited to home visits only.

4.88 South East Water states that we did not include a potential comparator in our sample i.e. Thames Water's Green Redeem programme. We did however include another Thames Water's Smarter Home Visits programme. We consider that the Smarter Home Visits better reflects South East Water's proposals; this is because:

4.89 Thames Water's Smarter Home Visits programme covers newly smart metered customers and offers a free home visit to install water saving devices, personalised advice, and wastage fixes if they are found to have a leaking toilet or tap. Digital engagement will allow these customers to access their data via a portal, offering assessments and advice, from being able to track their water consumption and cost throughout each day. We consider this that this option is a valid comparator because South East Water is planning to rollout its smart metering programme starting in 2025 and to achieve full smart meter penetration by 2035. It also plans to offer the same type of in-home water efficiency audits and leaky loo campaign, including installation of water savings devices and fixing of any leaks identified during a visit.

4.90 In contrast, Thames Water's Green Redeem programme is a scheme whereby customers are incentivised through non-financial offers to be more efficient with their water consumption. It aims to achieve consumption reduction through behavioural change element only, and the forecast savings were conservative at 0.21 Ml/d in total, leading to high unit costs. We therefore continue to consider that this programme is not a valid comparator for inclusion in our benchmark.

4.91 South East Water did not demonstrate that its proposed solutions for reducing peak summer demand are appropriate and best value. For example, South East Water stated that it is required, amongst other activities, to target non-household customers through leaky loos for smaller business customers but did not evidence that fixing leaky loos addresses peak demand issues, rather than average demand. South East Water also proposes rainwater storage solutions for larger rural household properties but did not demonstrate that these interventions are the right solutions nor demonstrate its cost-benefit analysis.

4.92 We consider that South East Water's supply interruption issues are primarily not caused by extreme weather conditions or a lack of operational headroom levels but rather past investment decisions relating to supply interruptions and a lack of root cause analysis to account for its poor performance. We discuss this in more detail in the Outcomes section of the PR24 redeterminations – response to South East Water's statement of

case. We also note that the company did not propose specific peak demand reducing solutions in its previous plans, and did not provide compelling evidence that its water supply interruptions issues are due to changes in its customers behaviours with regard to using water during peak periods.

Issue 5: Additional 10% reduction to the allowed costs is not evidenced

4.93 Finally, South East Water states that our justification for the 10% allowance reduction is the uncertainty in optioneering and cost efficiency. South East Water states[263] this overlaps with the purpose of cost sharing rates (including lower rates for enhancement expenditure including water efficiency). The company states we have therefore no need to apply an additional uncertainty adjustment through the cost allowances. In the PR24 final methodology we stated that cost sharing refers to the treatment of over- or underspend against efficient cost allowances we set for water companies[264]. It is therefore not intended to address uncertainty due to lack of credible evidence of the company's original cost estimates.

4.94 We continue to consider that our 10% challenge was appropriate due to South East Water not providing sufficient and convincing evidence to demonstrate that the investment is efficient by providing detailed cost breakdowns.[265]

4.95 Overall, we consider that our final determination allowance of £24.094 million is reasonable for South East Water to deliver its water efficiency activities in the 2025-30 period. The company does not provide sufficient and convincing evidence to include detailed cost breakdowns to justify the step change in water efficiency costs it proposes between the PR19 period and 2025-30.

4.96 In addition to funding allowances set through the price review, the industry will benefit from a water efficiency fund of £100 million to drive innovation, fund the development of new technologies and processes for water efficiency and campaigns to promote behaviour change[266]. In our final determination, we have not taken into account the impact of the fund on water demand, however, together with smart metering programmes, it will provide companies with additional benefits, reducing their costs of meeting demand reductions.

[263] [OF-CA-195] South East Water, Annex G – Enhancement costs, March 2025, p.69, Section 2.6
[264] [OF-CA-001] Ofwat, Creating tomorrow, together: Our final methodology for PR24: Appendix 9 Setting expenditure allowances, December 2022, p.39, section 2.4.5
[265] [OF-CA-196] Ofwat, PR24 FD CA38 Water Demand enhancement expenditure model, December 2024,Tab: SEW
[266] [OF-CA-197] Ofwat, Water Efficiency Fund – final decision document, February 2025.

WINEP water investigations

Our final determinations

4.97 WINEP water investigations includes funding for enhancement activities listed in the WINEP/ NEP to deliver investigations and/or options appraisals. Investigations aim to identify actions or determine impacts, costs and/or technical feasibility of meeting targets. Investigations' costs have been separated out into three separate categories to capture those that are desk-based, those that require a survey, some monitoring or simple modelling, or those requiring multiple surveys, monitoring, and/or complex modelling.

4.98 We allowed £47.195 million of enhancement funding for South East Water's water investigations investment programme of thirty-six investigations. This represented a 19.9% reduction from the company's request where it submitted £58.943 million of funding in the 2025-30 period.[267]

4.99 In the final determination[268] we adjusted our approach to allowing funding for water WINEP investigations to address the concerns raised by companies, regulators and stakeholders. We updated our assessment to take account of investigation complexity by investigations category, geographical scale (by WINEP scale grouping) and investigation driver type (by WINEP group). It was agreed that all these factors could influence the cost of an investigation. Allowances were determined for each investigation through triangulated unit-cost benchmarking across these three drivers.

4.100 As we had significant concerns around the widespread non-delivery and overall underspend on WINEP investigations across the 2020-25 period, we capped allowances at requested levels if costs were deemed efficient. We completed outlier deep dives where companies received a benchmark challenge greater than 10% and uplifted allowances where companies provided compelling evidence for additional costs.

4.101 We were unable to utilise outturn costs as an indicator of cost-efficiency for South East Water as it had presented £0.00 million in enhancement spend against its allowance of £21.494 million for Water Investigations (APR line 4L.18) in its 2023-24 Annual Performance Review (APR).

4.102 From the comparative analysis we identified that South East Water had a significantly higher unit cost across multiple metrics. This included a unit-cost of £1.637 million per investigation compared to our benchmark median value of £0.408 million. South East

[267] [OF-CA-086] Ofwat, PR24-FD-CA40-Water investigations enhancement expenditure model, December 2024, "SEW" sheet
[268] [OF-CA-022] Ofwat, PR24 final determinations – Expenditure allowances, December 2024

Water's programme was deemed inefficient by the modelled approach and a 76% adjustment was applied. To be consistent with our approach to benchmark outliers we therefore carried out a further deep dive assessment and applied our model adjustment enhancement criteria (need for enhancement investment, best option for customers, and cost efficiency).

4.1 As a result of a deep dive, we still had concerns that South East Water did not provide evidence of cost efficiency for its programme of activities planned for the 2025-30 period or an explanation or evidence as to how its costs were derived. As we had some concerns about the cost efficiency of the programme, a 19.9% adjustment was applied to South East Water's water investigations request. This consisted of an overall 20% adjustment that did not include WINEP action '08SE100182', which received its request in full.[269] This uplift from the modelled allowance represented an allowance that was 228% higher than the benchmarked median value and we consider that it appropriately accounted for programme specific circumstances.

Issues raised by disputing company

4.103 In its statement of case, South East Water raises four main issues with our assessment, namely that:

- the deep-dive approach seems to be primarily driven by a reliance on benchmarking results, which it states that Ofwat deemed not to be credible;
- there is an inconsistency in approach between WINEP wastewater and WINEP water investigations;
- its programme includes highly complex actions which are not comparable to standardised categories of investigations of other water companies, and that the deep dive fails to account for the fact that the company has a higher proportion of groundwater sources;
- the approach discourages companies from collecting investigative activities across related water sources into a single investigation, including schemes with secondary drivers.

4.104 South East Water requests that the CMA provides it the full allowance of £58.943 million for its WINEP water investigations programme, by referencing the bottom-up evidence provided.[270]

[269] [OF-CA-086] Ofwat, PR24-FD-CA40-Water investigations enhancement expenditure model, December 2024, "SEW" sheet
[270][OF-CA-195] South East Water, PR24 Redetermination: Annex G – Enhancement costs, March 2025, Section 2.9, paragraph 380

Our assessment

4.105 We continue to consider that our approach to benchmark the unit cost for the water investigations programme, with an additional deep dive on cost outliers, is both credible and appropriate. We consider that we have provided South East Water with a sufficient expenditure allowance to deliver all statutory WINEP obligations.

4.106 Water WINEP investigations are not new to the industry, nor are they particularly novel or bespoke. Companies will have been undertaking this work for several AMP cycles. While requesting the highest expenditure, South East Water does not have a larger or more complex investigations programme than any other water company. We further present our reasoning in the following points while addressing the company's raised issues.

Issue 1: Water investigations approach (modelling and deep dive)

4.107 South East Water does not agree with our deep-dive approach, stating that an arbitrary cost challenge of 19.9% has been applied, which is higher than the challenge for any other company. The company further states that this conclusion is primarily driven by a reliance on non-credible benchmarking results and does not account for site specific risks that disproportionately disadvantage South East Water.[271]

4.108 South East Water states in its statement of case that its strategic position and site-specific circumstances requires it to adopt higher unit cost approaches.[272] We consider that funding requests, particularly of this materiality, should be underpinned by evidenced and benchmarked cost build-ups to increase the level of certainty. While detailed cost breakdowns were provided in October 2024[273], South East Water has provided no evidence of how it has reached these costs, including any evidence of benchmarking. Additionally, the company has not been able to demonstrate that it has incurred higher costs than is standard for water investigations in the 2020-24 period. There is insufficient evidence to show that South East Water requires such a large increase in its overall spend compared to PR19.

4.109 During the final determination we tested additional and alternative cost drivers for water investigations, including triangulating outturn and forecast data. There has been significant underspending of PR19 water investigations enhancement allowances, with only £31.608 million spent to date (2020-24) across the industry compared to the £70.286 million allowed (Figure 21), representing an outturn median unit cost per investigation of £0.042 million for the 2020-24 period (Figure 22). Ultimately, we decided not to incorporate outturn data as part of our modelled approach due to

[271] [OF-OA-005] South East Water, PR24 Redetermination Statement of Case, March 2025, paragraph 4.76 (e)
[272] [OF-CA-195] South East Water, PR24 Redetermination: Annex G – Enhancement costs, Section 2.9
[273] [OF-CA-268]Ofwat, South East Water, OFW-REP-SEW-060, 22 October 2024

concerns about the accuracy of the data presented. South East Water, for example, has stated that it is currently unable to accurately report the expenditure associated with investigations in the 2020-24 period and has presented £0.00 million in enhancement expenditure.

Figure 2121: PR19 allowed expenditure for water investigations versus actual expenditure for water investigations.

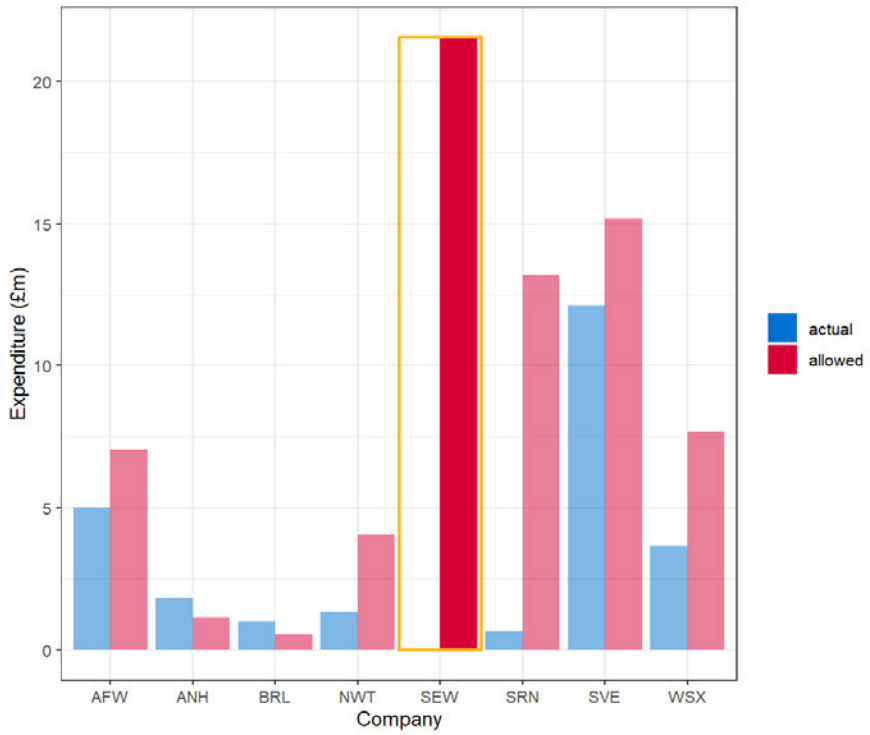
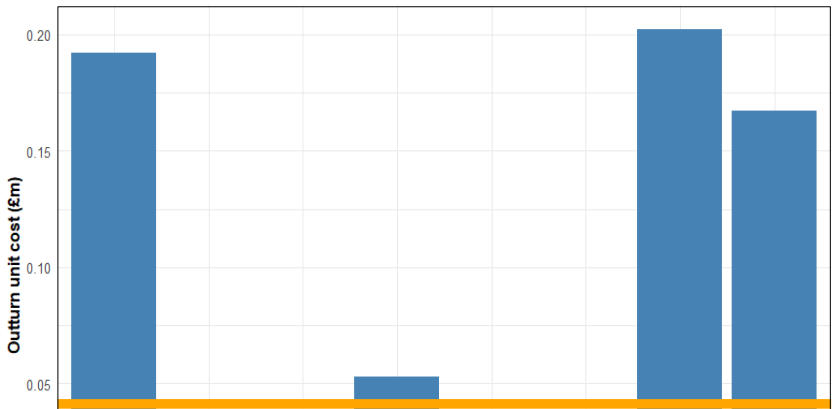


Figure 2222: PR19 outturn unit cost based on investigations delivered to date (2020-24). Orange line denotes industry wide unit cost median (£0.042 million per delivered investigation). Data based on Annual Performance Review (APR) Data 2020-24.



4.110 In the final determination, South East Water presented a high unit cost of £1.417 million per investigation in comparison with the industry wide median benchmark value of £0.255 million per investigation for CW3.31-CW3.33 (simple surveys, monitoring or modelling) (Figure 23) and £1.734 million per investigation in comparison with the industry wide median benchmark value of £0.554 million per investigation for CW3.34-CW3.36 (complex surveys, monitoring or modelling), (Figure 24).[274]

4.111 South East Water did not present any investigations under CW2.28-CW3.30 (desk-based investigations), claiming that all its investigations were more complex in nature. However, descriptions of desk-based studies were included in the scheme-scope of several of its investigations.[275]

Figure 2323: Cost benchmark for lines CW3.31 – CW3.33 (simple surveys, monitoring or modelling). Orange line denotes industry wide unit cost median (£0.255 million per investigation).

[274] [OF-CA-086] Ofwat, PR24-FD-CA40-Water investigations enhancement expenditure model, December 2024, "Unit_Cost_Analysis" sheet
[275] [OF-CA-268] Ofwat, South East Water, OFW-REP-SEW-060, 22 October 2024.

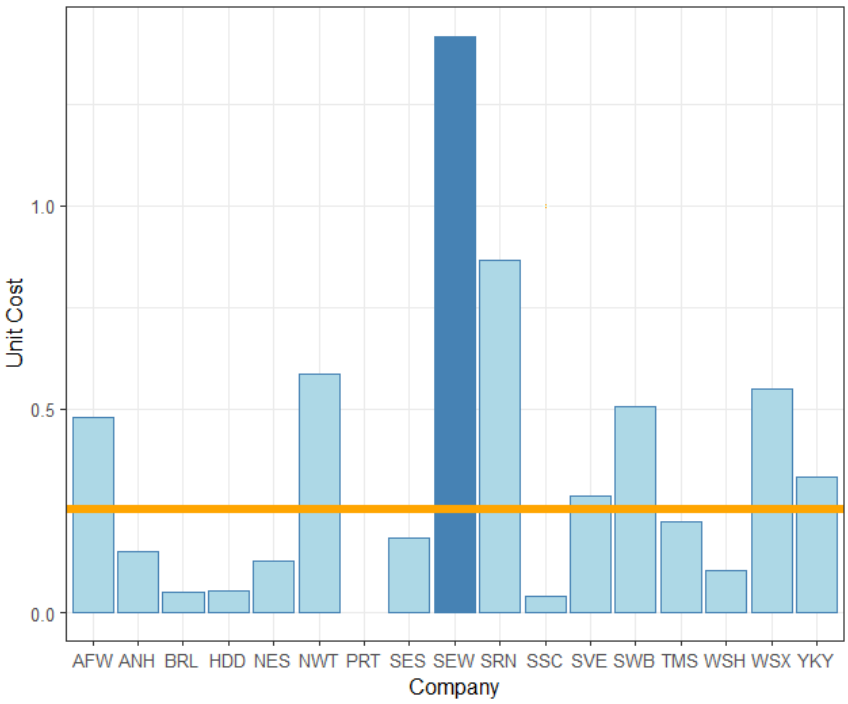
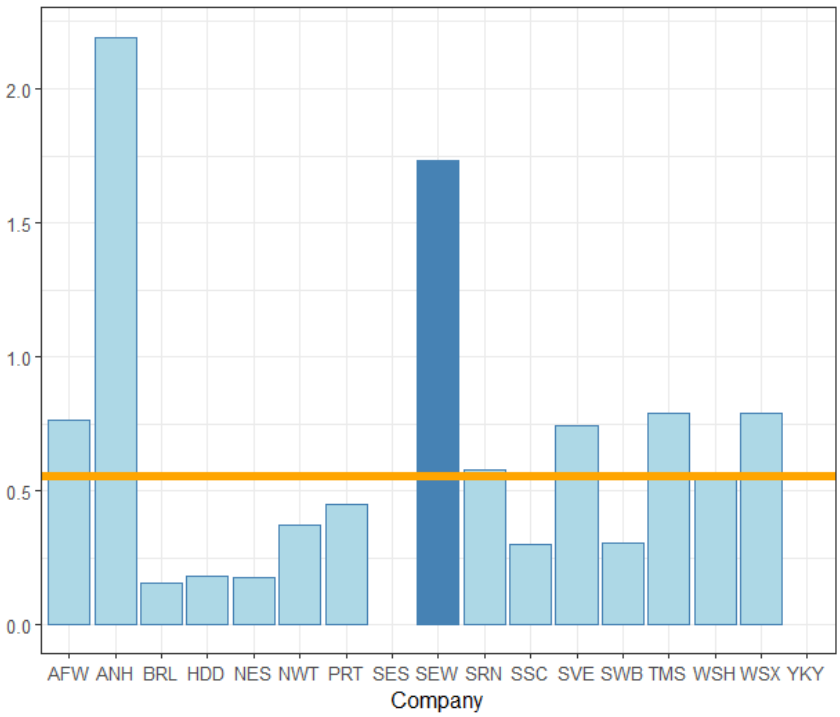


Figure 2424: Cost benchmark for lines CW3.34 – CW3.36 (complex surveys, monitoring or modelling). Orange line denotes industry wide unit cost median (£0.554 million per investigation).



4.112 Based on feedback on the draft determination, we updated the modelled approach to also account for geographical scale (by WINEP scale grouping). Despite this, South East Water's programme was still deemed inefficient by the modelled approach and a 76% adjustment was applied. Rather than just allow the company the efficient unit rate we carried out a further outlier deep dive assessment to determine whether there were any additional factors which might be driving South East Water's high unit-costs.

4.113 As part of our deep dive analysis, we reviewed the additional scope presented by South East Water, and in some cases found that sufficient and convincing evidence was provided to demonstrate that parts of its programme exceeded the scope of what could be considered a standard investigation. We provided an uplift based on site-specific circumstances, accounting for where enhanced hydrological, hydrogeological and ecological assessments were required across multiple sites. We also determined that WINEP action '08SE100182', a cross-industry investigation into Raw Water Transfer biosecurity, would be awarded the full requested allowance in line with other companies. However, in some cases the company did not provide compelling evidence to justify an increase in the modelled allowance.

4.114 For the reasons set out above, we do not agree with the points raised by South East Water. We conducted an outlier deep dive assessment, and an uplift of 53% was applied from the modelled allowance based on the company's site-specific circumstances, despite the company not submitting compelling evidence in some cases. This additional outlier deep dive was an attempt to explain the companies' significantly high unit costs compared to the benchmark and the industry's recent outturn. We remain concerned that the company has not sufficiently justified the step increase in costs between PR19 and PR24.

Issue 2: Inconsistency in approach between water and wastewater investigations

4.115 South East Water state that there is an inconsistency in approach between WINEP wastewater and WINEP water investigations. The company highlights that Ofwat has allowed all wastewater investigations in full and without challenge and introduced a specific cost sharing rate to deal with ex post over/underspend but has failed to apply the same approach for water investigations[276].

4.116 In the final determination, we considered applying the same approach to both wastewater and water investigations. However, the decision to fully fund all wastewater investigations was a result of continued uncertainty in the accuracy of the wastewater programme drivers.[277] For example, some companies made reasonable estimates of the

[276][OF-OA-005] South East Water, PR24 Redetermination Statement of Case, March 2025, paragraph 4.76 (e)
[277][OF-OA-023] Ofwat, PR24 final determinations: Expenditure allowances – Enhancement cost modelling appendix, December 2024, pp.199-200, section A1.1.19

percentage of investigations likely to be within lower complexity categories, while others maintained that all investigations would be complex[278]. Higher certainty in the water related drivers and complexity categorisations meant that cost efficiencies could be modelled for water investigations. The water WINEP drivers are fairly stable and well known and the 2025-2030 WINEP programme mainly builds on schemes delivered in previous cycles.

Issue 3: Deep dive fails to account for high proportion of complex actions, including groundwater investigations.

4.117 South East Water states that its programme includes highly complex actions which are not comparable to the standardised categories of investigations of other water companies, and highlights that its programme includes complex groundwater modelling[279]. The company also raises that the deep dive fails to account for the fact that local geology and topography means that 73% of the water supplied by South East Water comes from groundwater resources, which is a higher proportion than other water companies.

4.118 While South East Water does have a high proportion of its water supplied by groundwater resources, the data presented as part of companies Annual Performance Report (APR) in 2023-24 indicates that the company is not an outlier in this respect when compared directly to other water companies (Figure 25). There is also no evidence to show that a higher proportion of groundwater sources correlates with higher unit-costs for WINEP investigations. We have undertaken regression analysis (Figure 25), which instead demonstrates that the higher the proportion of groundwater resources, the lower the unit-cost per investigation.

4.119 As part of our deep dive analysis, we took into account some of the more significant costs presented by South East Water that related to groundwater investigations, including the installation of observation boreholes or building of groundwater models. The scope and scale of these schemes was factored into the 53% uplift provided to the company from the modelled allowance.

4.120 As shown by the chart, South East Water is not the only company with a significant number of groundwater sources from which they source their water. Therefore, it could be considered that the benchmark already accounts for this. It should also be noted that the WINEP process is not new, and has been in operation for several AMP cycles, so the requirement to build new groundwater models is surprising. It would be expected that these would already exist from a company perspective from previous WINEP cycles,

[278] [OF-OA-022] Ofwat, PR24 final determinations Expenditure allowances, February 2025, page 139 (Section 3.3.4)
[279] [OF-CA-195] South East Water, PR24 Redetermination: Annex G – Enhancement costs, March 2025, section 2.9, paragraph 352

or just by a company that owns and maintains many boreholes and therefore needs to understand groundwater levels.

Figure 2525: Proportion of groundwater (GW) sources for each company. SEW highlighted in dark blue. Companies with higher proportion of GW source highlighted in Red.

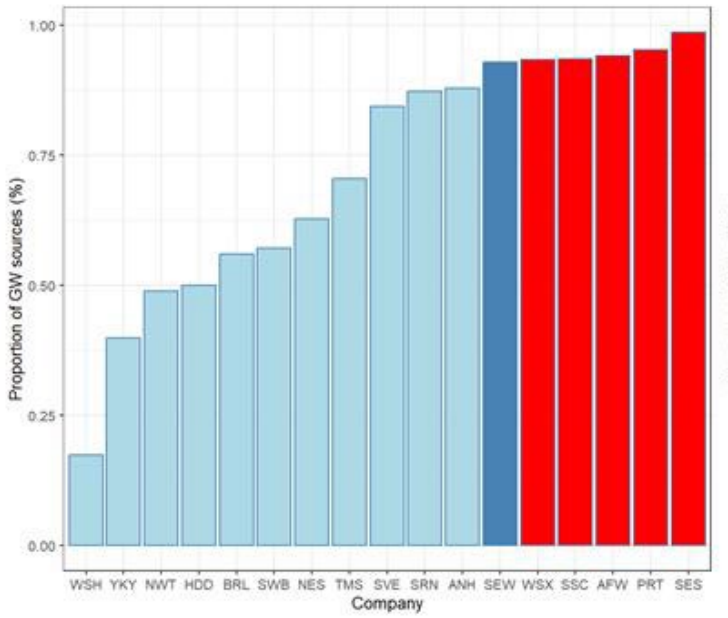
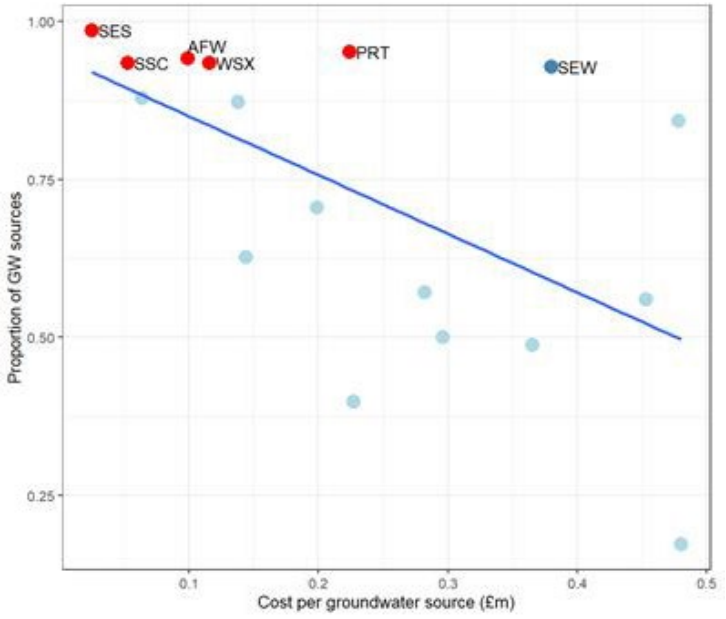


Figure 26 26: Relationship between proportion of groundwater (GW) sources and allowance requested per groundwater source.



Issue 4: Grouping of investigations and secondary implementation drivers

4.121 South East Water states that Ofwat's approach discourages companies from collecting investigative activities across related water sources into a single investigation, including schemes with secondary drivers aimed at assessing the effectiveness of interventions or schemes with greater site-specific risks, despite there being clear operational efficiencies to conducting these activities jointly.[280]

4.122 In their representations on the draft determination, multiple companies provided feedback on the water investigations modelled approach. Companies stated that, in some cases, individual 'actions' presented in the WINEP were in fact representative of multiple investigations. These 'grouped' investigations were, as a consequence, receiving higher than average adjustments.

4.123 In response to this feedback, we requested that each company re-present its investigation programme, confirming the exact number of investigations due to be completed for the funding requested.[281] We requested that if this resulted in any changes to the number of investigations included in the WINEP, that this was confirmed with either the Environment Agency or Natural Resources Wales.

4.124 Anglian Water and Thames Water both presented an updated version of the WINEP, where grouped investigations were separated into individual investigations. This resulted in a more accurate representation of the programmes in the modelled approach. South East Water did not provide this updated information when requested[282] and maintained there was no change from the number of investigations presented in the draft determination.

4.125 Late in the final determination process, South East Water provided further cost breakdowns and descriptions of scheme scope for its programme,[283] which included new information on the number of investigations included under each WINEP action. While we factored this information into the uplift provided to South East Water from the modelled allowance, we were unable to model this directly against other companies, as South East Water had not updated its WINEP to reflect this. Since the final determination, South East Water has still not updated its WINEP and continues to maintain that thirty-six investigations are included in its programme in its Statement of Case.

4.126 Twelve of South East Water's thirty-six schemes included more than one component in the WINEP. For these schemes, the core investigation is presented as an 'a' component, where associated actions for delivery are presented as 'b' components, notably under implementation driver codes. For elements of these schemes, scope and cost profiles

[280] [OF-CA-195] South East Water, PR24 Redetermination: Annex G – Enhancement costs, March 2025, Section 2.9, paragraph 378
[281][OF-CA-269] Ofwat, OFW-REP-SEW-026
[282] [OF-CA-269] South East Water, OFW-REP-SEW-026
[283] [OF-CA-268] South East Water, OFW-REP-SEW-060, 22 October 2024

are more reflective of implementation actions, rather than investigative ones. As per our guidance,[284] only '_INV' driver codes should be included under lines CW3.28-CW3.39, as implementation ('_IMP') drivers are, on average, associated with higher costs as they include the actual delivery of schemes. We recognised that the implementation actions South East Water presented could be considered necessary tools to deliver the requirements of the proposed investigations and therefore provided an appropriate uplift as part of the deep dive. However, it was also not feasible to benchmark these costs accurately against the purely investigative schemes presented by other companies.

Raw Water Deterioration – Nitrate

Our final determinations

4.127 In our final determinations, we allowed £40.636 million for five nitrate treatment schemes following a £39.110 million enhancement request from South East Water[285].

4.128 We provided an allowance of £1.526 million greater than requested. This allowance was developed using a unit cost model for four schemes and a deep dive for the remaining scheme.

4.129 The four schemes which were unit cost modelled were found to be efficient with respect to other company submissions for nitrate treatment, therefore allowances were provided which exceeded the company request[286].

4.130 For the remaining deep dived scheme (Cookham Dean WTW), we applied a 10% efficiency challenge under cost efficiency as there was insufficient detail on costing methodology and third-party benchmarking[287].

Issues raised by disputing company

4.131 In its statement of case, South East Water states that our approach to cost efficiency when reviewing schemes is "internally inconsistent", as smaller schemes were found to

[284][OF-CA-032] Ofwat, PR24 Final Methodology submission table guidance – section 3: Costs (wholesale), August 2023
[285][OF-CA-198] Ofwat, PR24CA33 - W - Raw Water Quality Deterioration (RWD), Worksheet: 'SEW (NO3)'& 'Nitrate Modelling Cost (New)', March 2025
[286][OF-CA-198] Ofwat, PR24CA33 - W - Raw Water Quality Deterioration (RWD), Worksheet: 'Nitrate Modelling Cost (New), March 2025
[287][OF-CA-198] Ofwat, PR24CA33 - W - Raw Water Quality Deterioration (RWD), Worksheet: 'SEW (NO3), March 2025

be efficient with one approach (unit cost) and using a different approach (deep dive) a larger scheme was found to be slightly inefficient.[288]

4.132 The company states that equivalent costing methodology and third-party benchmarking was used to develop costs for all submitted nitrate schemes, therefore the inconsistency in allowance outcomes is inappropriate[288].

Our assessment

4.133 South East Water states that the difference in allowance outcomes is inappropriate as the schemes were developed using the same costing methodology and third-party benchmarking.

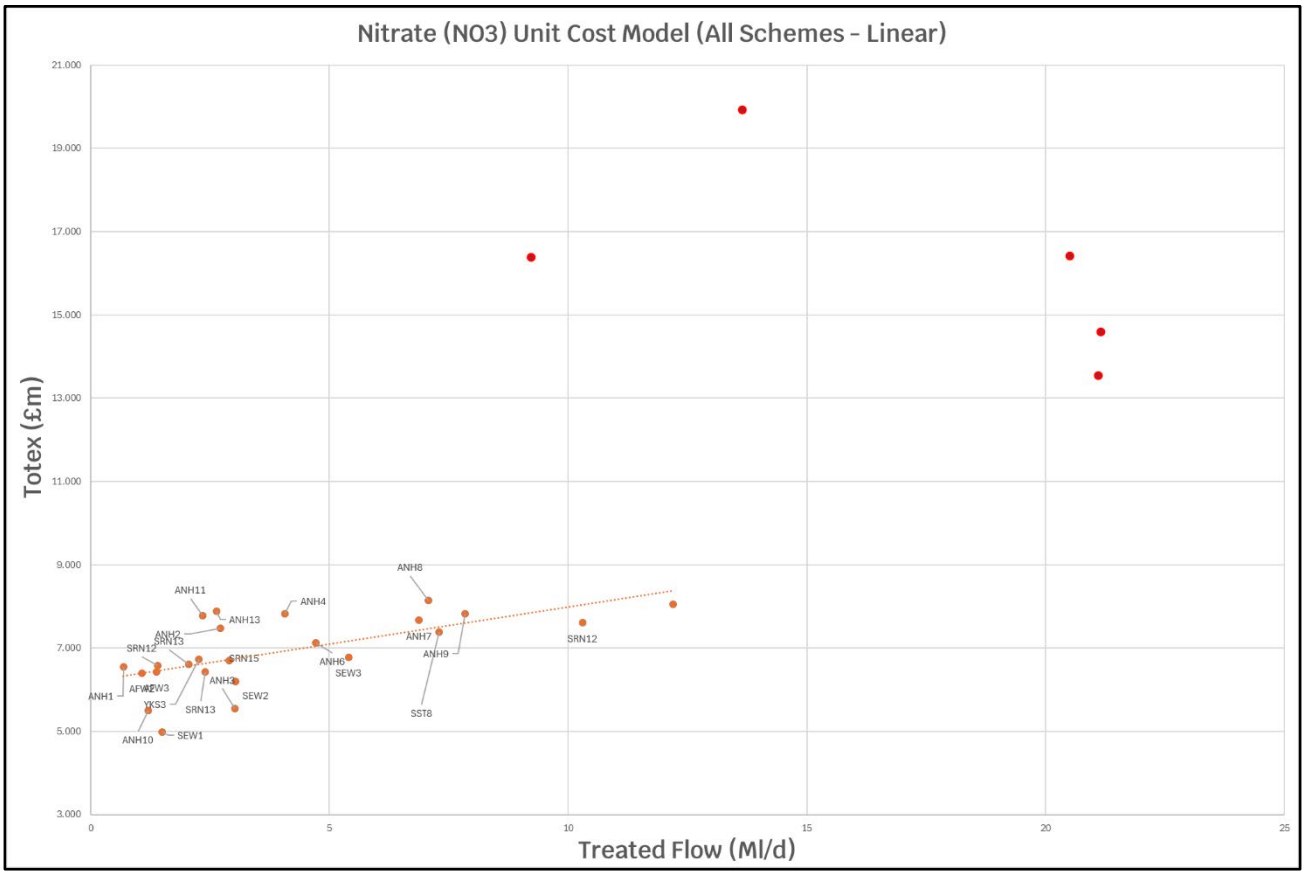
4.134 We continue to consider that a unit cost benchmark should be used for smaller sites (less than £10 million) as the models work well for lower cost and smaller scale schemes where there are more data points and where there are likely to be less complex and/or bespoke installations and so more suitable to benchmarking[289]. There are only five nitrate schemes with costs greater than £10 million (see figure below) and it is clear from the data point position that costs are more bespoke and it is inappropriate to include schemes of this scale in the unit cost model.

4.135 South East Water submit costs for four smaller nitrate treatment schemes in its request with treated water flows of 2, 3, 5 and 10 Ml/d – these treated water values are an order of magnitude smaller than that of Cookham Dean WTW at 21 Ml/d. We continue to consider that benchmarking is appropriate for the smaller schemes and a deep dive approach is suitable for the larger schemes given the range of costs involved. Given the scale of the Cookham Dean WTW scheme at £13.550 million, we consider that examining supporting evidence for the scheme is appropriate.

4.136 We continue to consider that a 10% challenge to the costs for Cookham Dean WTW scheme for cost efficiency is appropriate due to insufficient evidence of the costing methodology and third party benchmarking.

[288] [OF-CA-195] South East Water, Annex G - Enhancement costs, March 2025, p.33, paragraph 141
[289] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.206

Figure 2727: Nitrate treatment unit costs. The red data points indicate schemes >£10 million, orange indicates schemes <£10 million[290]



Net Zero

Our final determinations

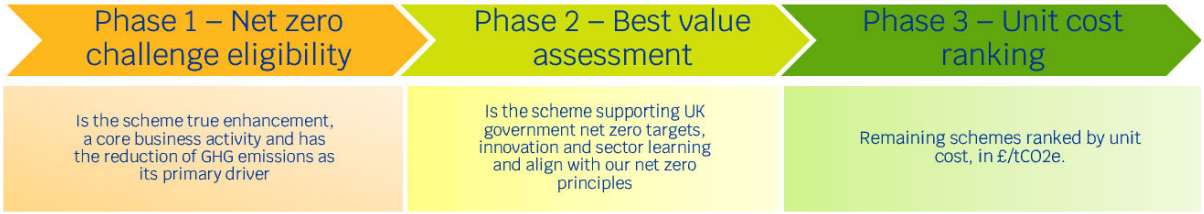
4.137 We introduced the net zero challenge in the PR24 methodology to encourage the delivery of net zero in the water sector, drive the innovation needed to achieve this and help reveal more reliable emission abatement unit costs.[291] We adopted this approach to encourage the most efficient companies to reduce emissions faster in the short term, while not requiring the same of all companies who might not be able to achieve reductions at the same low cost.

4.138 In the PR24 methodology we made it clear that net zero enhancement funding was to be focused on those companies that stretched themselves from base expenditure and had more mature and efficient approaches to emission reductions. We stated that eligibility for net zero funding would be limited to schemes that were primarily focused

[290] New Nitrate Unit Cost Model (All NO3 Schemes)
[291] [OF-CA-01] Ofwat, Creating tomorrow, together: Our final methodology for PR24 Appendix 9 – Setting expenditure allowances, December 2022, pp. 88-93

on reducing emissions and were supported by robust monitoring so the impact of schemes could be clearly demonstrated.[292] In our draft determinations we outlined our process; a three-phase methodology, and which we maintained for our assessment for the final determinations.[293] Phase 1 considered schemes eligible if driven by net zero and were not related to other cost drivers. Phase 2 focused on assessing the ability of schemes to support sector innovation and learning, with impact needing to be demonstrated through a programme of monitoring and reporting. Phase 3 focused on comparing unit rates of emission abatement.

Figure 2828: Net zero challenge fund assessment phases



4.139 Based on our assessment, we allowed expenditure for 33 schemes across seven companies, totalling £501.408 million. This funding allowance included £34.195 million for peatland restoration schemes and £1.016 million for one nature-based catchment project. The majority of the net zero challenge funding related to wastewater enhancement schemes, totalling £467.213 million.

4.140 South East Water proposed three schemes for net zero enhancement worth a total of £12.596 million. None of these schemes were approved at final determination as they did not pass the eligibility criteria set out in our PR24 methodology.

Issues raised by disputing companies

4.141 South East Water is the only company to challenge our net zero challenge funding decisions. This relates to its submission of three schemes, two ozone upgrade schemes and one for the electrification of its vehicle fleet. South East Water raises the following issues:

- Ofwat has applied the bespoke three phase deep dive assessment criteria inconsistently between water and wastewater schemes that are focused on process emissions.
- Ofwat has misunderstood the need for the two schemes submitted to upgrade ozone treatment at Arlington WTW and Barcombe WTW, contending that these two schemes are not solely driven by net zero.

[292] [OF-CA-001] Ofwat, Creating tomorrow, together: Our final methodology for PR24 Appendix 9 – Setting expenditure allowances, December 2022, p.93
[293] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025

- Ofwat has insufficiently funded the electrification of its fleet. It further stated that our decision was inconsistent with our guidance[294] and the Water (Special Measures) Act 2025.[295]

Our response

Application of deep dive assessment criteria for process emission schemes

4.142 We do not agree with South East Water that we applied the bespoke three phase deep dive assessment criteria inconsistently between water and wastewater schemes. Most approved schemes were wastewater schemes. We applied the same criteria, using our bespoke three phase assessment, for water and wastewater schemes submitted by eleven companies.[296] Each scheme was assessed on its own merit based on the information provided by companies. [297]Our process included engineering support to assess technological aspects of the submissions and a peer review process to ensure consistency and transparency. The details of our decisions for each scheme have been published alongside our final determination in the net zero challenge enhancement models.[298]

4.143 We received in total 81 schemes, 22 water, 59 wastewater schemes. Companies grouped their schemes in different ways, some submitted a scheme per site, others submitted a scheme that covered several sites. In total, we received submissions for process emissions covering 316 sites and we approved 293. At draft determinations we proposed funding for 17 wastewater schemes relating to process emissions, across 72 sites. We proposed not to allow any water schemes. Based on the representations made by companies to our draft determinations, and using the additional information provided by companies. This resulted in us approving an additional £183 million of funding in our final determinations. This encompassed funding for an additional 17 wastewater process emission schemes. We maintained our decision of not allowing net zero enhancement funding for three water schemes for process emissions, as no

[294] [OF-CA-001] Ofwat, Creating tomorrow, together: Our final methodology for PR24 Appendix 9 – Setting expenditure allowances, December 2022, pp 88-93; [OF-CA-097] Ofwat, Net zero principles position paper, January 2022
[295] We assume although it is not clear that the company is referring to section 10 of that Act which we note in this context has not yet been brought into force.
[296] Affinity Water, Anglian Water, Hafren Dyfrdwy, Severn Trent Water, South East Water, South Staffs Water, Thames Water, United Utilities, Welsh Water, Wessex Water, Yorkshire Water
[297] [OF-CA-043] Ofwat, PR24, Final determinations: Wastewater net zero enhancement expenditure model, December 2024; [OF-CA-044] Ofwat, PR24, Final determinations: Water net zero enhancement expenditure model, December 2024.
[298][OF-CA-043] Ofwat, PR24, Final determinations: Wastewater net zero enhancement expenditure model, December 2024; [OF-CA-044] Ofwat, PR24, Final determinations: Water net zero enhancement expenditure model, December 2024

further evidence was provided by companies to support a change in our assessment decision.[299]

Ozone treatment schemes

4.144 The ozone schemes were not allowed under net zero challenge enhancement as they did not meet our criteria to demonstrate innovation or net zero as the primary driver. In the draft and final determinations,[300] these schemes did not demonstrate that net zero was the primary driver since there are opex savings for each scheme. The totex saving accrued to South East Water through upgrades to ozonation at these two sites would be around £1.2m to 2050[301], making it the primary driver and a spend to save scenario.

4.145 Our assessment took into account that Arlington WTW was not in use and was in need of repair or replacement.[302] South East Water said it could not upgrade the site using base allowance as this usually requires like for like replacement. However, South East Water stated using a liquid oxygen feed rather than replacing the air fed system would result in reduced opex costs and entails a smaller capex cost. This should not inhibit repairing, or upgrading, the asset using base allowance.[303]

4.146 For the Barcombe WTW scheme, its statement of case is the first reference by South East Water to the remaining nine years of asset life of the air-fed system proposed for replacement. This reference was not made in any previous representation.[304] South East Water stated there are no operational issues with this part of the asset and the only reason to upgrade now is to avoid emissions[305]. The net zero challenge funding was conceived to support companies to go beyond what might be optimal for its specific decarbonisation glidepath where net zero is the primary driver[306]. The net zero challenge criteria is not designed to support the early retirement of assets to support a company's glidepath where this can be done using base allowance, this was referenced in our PR24 Methodology which allows for net zero drivers in scheme proposals for both base allowance and standard enhancement[307]. Furthermore, South East Water has not referenced the loss of value and associated carbon cost of early replacement in its calculations.

[299] Two of these schemes were submitted by South East Water and the third by Welsh Water.
[300] [OF-CA-043] Ofwat, PR24, Final determinations: Wastewater net zero enhancement expenditure model, December 2024; [OF-CA-044] Ofwat, PR24, Final determinations: Water net zero enhancement expenditure model, December 2024
[301][OF-CA-045] South East Water, Business Plan PR24: SEW08, October 2023, p.352, p3
[302] [OF-CA-045] South East Water, Business Plan PR24: SEW08, October 2023, p371 (PDF)
[303] [OF-CA-045] South East Water, Business Plan PR24: SEW08, October 2023, pp.365-366 (PDF)
[304] [OF-OA-005] South East Water, PR24 Redetermination Statement of Case, March 2025, p.56
[305] [OF-OA-005] South East Water, PR24 Redetermination Statement of Case, March 2025, p.56
[306][OF-CA-001] Ofwat, Creating tomorrow, together: Our final methodology for PR24: Appendix 9 Setting expenditure allowances, December 2022, p.93p93
[307] [OF-CA-001] Ofwat, Creating tomorrow, together: Our final methodology for PR24: Appendix 9 Setting expenditure allowances, December 2022, p.92., p92

4.147 In reviewing the benefits of the scheme, the estimated carbon benefits of the schemes are incomplete as they do not include the production and transportation of liquid oxygen to the Barcombe WTW and Arlington WTW sites, which would diminish the emissions reduction benefit of the schemes.[308]

4.148 We acknowledge that wastewater companies have received support for schemes which reduce nitrous oxide. However, in this instance, the spend to save element of the South East Water schemes supersedes the driver for net zero in the assessment. The schemes proposed by wastewater companies clearly showed the primary driver is to reduce nitrous oxide emissions from wastewater treatment, usually with an increase in capex and no impact or an increase in opex. Net zero challenge allowance offers a source of funding where schemes are driven primarily by emissions reductions and do not meet the criteria for base allowance or enhancement allowance – for which greenhouse gas emissions are also considered.

4.149 When reviewed in the context of asset maintenance and renewal, these schemes do not meet the criteria of delivering innovation or emissions reductions beyond options South East Water can already undertake through its base allowance.

Funding for fleet electrification

4.150 Transport and fuel costs are funded from base expenditure as these are recurring costs incurred by companies historically. We recognised in our draft determinations that adopting low-carbon technologies, such as electric vehicles, requires supporting infrastructure. Consequently, we introduced a sector-wide base cost adjustment for net zero at draft determinations to enable companies to invest in this supporting infrastructure to reduce emissions from the use of vehicles and heating.

4.151 We benchmarked relevant schemes benefits (using the reduction in tonnes of C02e (tCO2e)) and costs (£ / tCO2e) for water and wastewater submitted by companies. We used the median unit cost of carbon to apply an uplift in the base cost allowance for all companies to deliver a 2.5% reduction in their water and a 2.5% reduction in their wastewater emissions (the median benefit reduction across schemes).

4.152 Seven companies provided draft determination representations related to the marginal costs of electric vehicles.[309] They stated that transitioning their fleets to electric vehicles is an enhancement activity because electric vehicles involve additional costs above like for like replacement with petrol or diesel vehicles and changes in operational processes.

[308] [OF-CA-045] South East Water, Business Plan PR24: SEW08, October 2023, pp.363-366 (PDF)
[309] Affinity Water, Hafren Dyfrdwy, Severn Trent Water, South East Water, Thames Water, United Utilities and Wessex Water.

4.153 We did not specifically provide additional allowances for the marginal costs of electric vehicles at final determination. We expected companies to replace and upgrade transport assets with base expenditure allowances. We recognised that costs will initially be higher for replacing petrol or diesel vehicles with electric vehicles. But the incremental costs are immaterial when considered alongside future opex and capital maintenance savings[310], and the scale of base expenditure allowances at PR24. Base expenditure allowance already reflect the costs of companies transitioning to electric vehicles during AMP7.[311, 312]

4.154 In response to representations, we retained our approach at final determination to determining how the value of the cost adjustment is calculated, as we had minimal feedback from stakeholders in this regard. This resulted at final determination in a sector-wide base cost adjustment for net zero of £26 million adjustment for water, and a £40 million adjustment for wastewater to enable companies to invest in this supporting infrastructure to reduce emissions from the use of vehicles and heating. For South East Water this net zero cost base uplift was £1 million.[313]

4.155 We remain of the view that the net zero challenge fund is not suited to fund transport and fuel costs for several reasons. Transport and fuel have historically been funded from base cost allowance, several companies began the electrification of their fleet before the introduction of the net zero challenge fund, using their base cost allowance. Our guidance in this regard, included our PR24 methodology which set out the eligibility criteria for the net zero challenge fund, this made it clear that schemes for this fund should not be already funded elsewhere in the price review, such as through base allowance or standard enhancement. Finally, we recognised in our draft determinations that adopting low-carbon technologies, such as electric vehicles, requires supporting infrastructure. Consequently, we introduced a sector-wide base cost adjustment for net zero to enable companies to invest in this supporting infrastructure to reduce emissions from the use of vehicles and heating.

[310] [OF-CA-046] Department for Transport, Zero Emission Vehicle Mandate and CO2 Regulations: Joint Government Response Cost Benefit Analysis, October 2023
[311] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, pp.47-49
[312] Several companies have begun the electrification of their fleet from their base allowance, including Affinity Water, Anglian Water, Northumbrian Water, Severn Trent Water, SES Water, South East Water, South Staffs Water, South West Water, Thames Water, United Utilities, Wessex Water and Yorkshire Water.
[313] [OF-CA-050] Ofwat, PR24, PR24 final determinations: Net zero cost adjustment model, December 2024

5. Wastewater enhancement expenditure allowances

Our wastewater benchmarking models provide companies with an efficient expenditure allowance based on cross company comparisons of forecast costs and, where possible, historical costs. We have adjusted benchmarks where companies can provide evidence that scheme costs are higher than benchmarks due to exogenous factors.

The disputing companies raise several cross cutting issues in relation to wastewater enhancement costs.

Wessex Water and Northumbrian Water raise issues with the **phosphorus removal** benchmarking model including specification, robustness and capture of all relevant factors. We are confident that the models capture the key cost drivers and the models are robust. They also suggest that less weight is placed on historical expenditure. We continue to consider that our phosphorus removal models are robust and reflect the most important engineering cost drivers. We continue to consider that at least equal weight should be placed on historical expenditure as forecasts can be impacted by risk aversion and the pricing in of uncertainty.

Southern Water raises issues with the **Industrial Emissions Directive** model, stating that our top-down modelling approach is not robust and should not be used. While we acknowledge that the R-squared values are low, we consider the models to be appropriate as they cover the main cost drivers, have clear engineering and economic rationale, the coefficients have the correct sign, are of reasonable magnitude and are statistically significant. We apply enhanced cost sharing to cover residual uncertainty. Northumbrian Water request additional allowances (above those funded in PR19) for IED compliance work at Howdon. The scheme was funded in the PR19 CMA re-determination. Northumbrian Water was aware of the additional cost at the time of PR24 and did not request additional funding, as it considered it had previously been funded. Given the previous funding, full compliance at Howdon should have been achieved by December 2024 (now further extended by the Environment Agency to March 2025).

Northumbrian Water requests that we replace our **catchment nutrient balancing** uncertainty mechanism with direct funding for end of pipe solutions. We consider this to be appropriate given that the Environment Agency has now confirmed it will no longer support catchment nutrient balancing schemes, but suggest that the CMA considers potential overlaps between the cost request and existing allowances.

Southern Water states that we applied arbitrary top-down challenges without sufficiently engaging with bottom-up costs for both **Flow Monitoring at Sewage Treatment Works** and **MCerts monitoring** at pumping station emergency overflows. We disagree in both cases, Southern Water was a significant outlier on costs in almost all subcategories of investment and did not provide sufficient and convincing evidence to justify its higher costs.

Phosphorus removal

Our final determinations

5.1 The PR24 WINEP / NEP contains statutory requirements for water companies to undertake a programme of works that remove nutrients before discharging to waterbodies. These upgrades help to reduce the level of nutrients and improve the ecological status of relevant waterbodies. In particular, the WINEP / NEP phosphorus removal programme for the sector is extensive, covering a large number of sewage treatment work (STW) upgrades across all companies.

5.2 Companies requested £5.8 billion to enhance phosphorus removal, based on requirements set out in WINEP / NEP. We allowed £4.9 billion in total phosphorus removal enhancement allowances – an overall industry cost challenge of 15%. Phosphorus removal enhancement is the second largest area of enhancement after storm overflows and is much larger than in PR19 when we allowed companies £3.3 billion to enhance phosphorus removal.

5.3 Our scheme level models focused on providing an allowance for conventional phosphorus removal schemes. We assessed other schemes, including nature-based solutions, catchment nutrient balancing and catchment permitting separately.

5.4 We assessed the efficient costs of conventional phosphorus removal schemes using scheme level cross-sectional econometric models. We used two forecast models and two historical scheme level models to set efficient phosphorus removal enhancement allowances at PR24.

5.5 Our models captured the key cost drivers of phosphorus removal enhancement activities that are population equivalent (PE) served; enhanced phosphorus permit; historical phosphorus permit; enhanced permit squared; and technically achievable limit (TAL) dummy (permit <= 0.25mg/l).

Issues raised by disputing companies

5.6 Anglian Water and Southern Water either accepted their PR24 phosphorus removal final determinations allowances or did not comment.

5.7 Northumbrian Water's statement of case focuses on its request for additional allowances for catchment nutrient balancing (CNB) schemes that could be replaced

with more conventional solutions subject to a potential change in policy by the Environment Agency.[314] It raises some issues regarding:

- Model specification and the degree to which our models account for forward-looking costs.

5.8 Wessex Water raise several interrelated issues regarding:

- Model specification, model robustness, the degree to which they capture scheme level idiosyncrasies, and the costs of what companies are required to deliver over the PR24 period.

5.9 Wessex Water present a variety of options to the CMA including:

- carrying out deep dive reviews of bottom-up cost evidence;
- applying shallow dive efficiency challenges; and
- applying company specific cost adjustments.

Model robustness and weights applied to historical models

Our final determinations

5.10 We assessed the efficient costs of conventional phosphorus removal schemes using scheme level cross-sectional econometric models at PR24. This represented a material improvement from PR19, where we used company level models with one observation per wastewater company, as it allowed us to capture scheme level cost drivers. For example, historical and enhanced consent levels of each scheme.

5.11 Our models capture the **key exogenous drivers** of efficient phosphorus removal enhancement costs **from an engineering and economic perspective**:

- **Population Equivalent (PE) served**: we used PE served as a key scale / volume cost driver. PE served captures the size of the STWs receiving upgrades for phosphorus removal. All else being equal, STWs that serve a higher PE require higher efficient costs. We used average PE served over the modelling period given the focus on cross-sectional econometric models.
- **Enhanced phosphorus permit**: is the key exogenous treatment complexity driver. The permit level provides the best indication of the nature of upgrades that companies need to undertake. Engineering rationale suggests it has a negative impact on costs – the higher (less tight) the permit, the lower the efficient costs required to achieve it. The enhanced phosphorus permit level driver enabled us to capture differences in treatment

[314][OF-OA-002] Northumbrian Water, Statement of Case, March 2025, pp. 158, para.595

processes and provide higher efficient cost for STWs which are subject to more stringent phosphorus permits.

- **Historical phosphorus permit**: captures the extent of pre-existing phosphorus removal processes at each STW prior to implementation of enhanced phosphorus permits. Engineering rationale suggests that sites with a pre-existing permit should generally incur a lower cost to upgrade to a new enhanced permit level. That is because companies may be able to optimise and / or improve the pre-existing phosphorus removal processes to achieve the new permit level.

5.12 We used two approaches to capture the potential non-linear relationship between enhanced permit level and efficient cost at more stringent phosphorus permit levels:

- **Enhanced permit squared**: as the enhanced phosphorus permit becomes more stringent, the marginal cost increase gets higher (the slope of the relationship gets steeper). Therefore, this modelling option aims to capture a continuous non-linear relationship between enhanced phosphorus permit and the costs of the upgrade that recognises the higher costs associated with more stringent permits.
- **Technically achievable limit (TAL) dummy**: this adds a dummy variable indicating schemes where the permit is <= 0.25mg/l (a TAL dummy). It aims to capture a discrete step change in costs at the TAL permit level (<= 0.25mg/l), which is different than the continuous relationship modelled with enhanced permit squared. The sign of the estimated coefficient on this term should therefore be positive.

Issues raised by disputing companies

5.13 Northumbrian Water state our models do not capture all the relevant factors that drive scheme level costs as there is a wide variation in modelled costs versus requested costs across its schemes.[315]

5.14 Wessex Water consider the adjusted R-squared of our models that range from 30% to 53% possibly indicate the presence of omitted variables.[316]

5.15 Wessex Water consider our models do not appropriately capture the full relationship between costs and cost drivers:[317]

- **the relationship between scheme size and costs**: Wessex Water claims to have identified a systematic pattern of our models applying a higher cost challenge on "larger sized schemes". It considers this to be an indication of potential omitted variables correlated

[315][OF-CA-089] Northumbrian Water, Appendix 1: Supporting Information NWL SoC Appendix 1 Supporting Information, March 2025, pp. 89, para.261
[316][OF-OA-004] Wessex Water, Statement of Case, March 2025, p.75, para.9.46
[317][OF-OA-004] Wessex Water, Statement of Case, March 2025, pp.76-79

with the size of the scheme or the population equivalent variable itself being mis specified;
- **the relationship between permit levels and costs**: Wessex Water present evidence that suggest the possibility of extra discontinuities in addition to the <=0.25mg/l threshold included in our models. It also states that companies with a high number of schemes just above these thresholds are disadvantaged; and
- **the relationship between regulatory drivers and costs**: Wessex Water claim our models allow less costs for schemes driven by Habitats Regulations – nutrient neutrality; Sites of Special Scientific Interest (SSSI); and The Urban Wastewater Treatment Regulations 1994 (UWWTR). It explores this across the sector and finds mixed evidence of whether cost challenges are systematically different for individual companies that face regulations. It considers this reflects the possibility that our models are mis specified.

5.16 Wessex Water present analysis for a subset of its PR19 schemes and shows outturn costs for these schemes to be close to its bottom-up engineering cost estimates. It views this to mitigate concerns surrounding information asymmetry and incentives to overstate requested costs stating, in its case at least, this did not occur at PR19.[318]

Our assessment

Why we used scheme level data at PR24

5.17 Benchmarking is an important tool as it allows us to compare costs between companies on a like-for-like basis by taking into account multiple factors that drive differences in efficient costs between companies. For example, scheme size and permit levels. Companies are more likely to put forward cases where their costs are higher than other companies than where they are lower. Therefore, benchmarking helps to overcome the information asymmetry between Ofwat and water companies, and allow us to challenge companies' costs so customers do not overpay.

5.18 Scheme level models use data on cost and cost drivers for individual sewage treatment works, water treatment works and other water company assets. They help to alleviate disadvantages of company level models, including sample size and transparency of allowances for each enhancement scheme. They also better reflect the mix of schemes being taken forward by companies.

5.19 Scheme level benchmarking also allows us to set an allowance more clearly for each upgrade at a sewage treatment works. This is important in the context of Price Control Deliverables (PCDs) that will return money to customers if the company does not deliver the upgrade included in its allowance.

[318][OF-OA-004] Wessex Water, Statement of Case, March 2025, pp. 85-86, para.9.82-9.85

5.20 We note that in the PR19 redeterminations, the Competition and Markets Authority (CMA) suggested the development of scheme level enhancement models that use historical information:

"*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.*" [319]

5.21 In our Final Determinations we used the following data sources to assess phosphorus removal enhancement costs:

- **APR Table 7F dataset**, which contains historical scheme level data on cost and cost drivers of the PR19 WINEP / NEP phosphorus removal programme for a seven-year period from the first year before the price control period to an "After 2024-25" (labelled as 2025-26 in the dataset). The dataset contains company forecasts for the years 2024-25 to 2025-26.
- **BPT Table CWW19 dataset**, which contains forecast scheme level data on cost and cost drivers of the PR24 WINEP / NEP phosphorus removal programme for a seven-year period from the first year before the price control period to an "After 2029-30" (labelled as 2030-31 in the dataset).

5.22 We reviewed the data in Table 7F extensively following the 2023-24 Annual Performance Report (APR) publication. We raised queries with companies where they needed to improve data quality. We shared an aggregated scheme level dataset from Table 7F with each company to validate their data. We followed an equally extensive process on scheme level data on cost and cost drivers from BPT Table CWW19. We shared an aggregated scheme level dataset from BPT Table CWW19 with each company to validate their data.

5.23 Benchmarking at the scheme level helps us to capture scheme-specific cost drivers such as permit levels. But this does not mean they can set accurate allowances for every scheme as the models capture the key cost drivers but not every cost driver. And by definition, the average efficient cost of a scheme will be above or below a company's request. This could be due to inaccuracy or risk aversion in cost forecasts, cost efficiency or omitted cost drivers. For these reasons, we assess relative efficiency at the company level by aggregating model predicted costs and company requested costs across schemes. Wessex Water's evidence of costs being equal to its request at a

[319] [OF-CA-013] Competition and Markets Authority, Anglian Water, Bristol Water, Northumbrian Water and Yorkshire Water: Water price determinations: final report, March 2021, pp. 413, para.5.65

company level for a subset of its PR19 schemes is not enough to demonstrate efficiency if other companies are incurring lower costs to deliver similar levels of outputs.

5.24 We are confident that the models capture the key cost drivers. Given the relatively large sample of schemes to support robust modelling, any other factors that drive differences in scheme costs should be balanced out at the company level. We allowed companies to put forward evidence if they considered their schemes to have unique characteristics that warrant higher costs. For example, we adjusted the modelled allowance of schemes we assessed as engineering outliers to recognise unique characteristics of schemes. This includes schemes that upgrade to tight phosphorus permits <0.25mg/l and schemes that have a biological treatment component.

5.25 Factors such as land availability and existing infrastructure are not unique to Northumbrian Water and Wessex Water but common across wastewater companies. Neither of these companies have provided sufficient and convincing evidence that they are an outlier on these factors. It is important to hold a high evidential bar for allowing adjustments to modelled allowances due to information asymmetry. Companies are more likely to raise cost drivers that lead to high scheme level costs than lower scheme level costs. We consider these factors balance out across the individual schemes when assessing a company's entire phosphorus removal programme in the round.

Cost driver selection

Scheme size

5.26 We do not agree with Wessex Water's view that there is a systematic pattern of our models applying a higher cost challenge on larger sized schemes. It categorises 'large' schemes as those with PE served greater than 5,000. This grouping is inconsistent with our Annual Performance Reporting (APR) requirements that classify large sewage treatment works as those having PE served greater than 25,000 (ie size band 6 and above). Our analysis that compares scheme allowances to scheme requests based on groupings consistent with our APRs do not indicate a systematic pattern.

Table 11: Comparison of cost gaps of sewage treatment works in bands 1 to 5 (0 to 25,000 PE) against 'large' sewage treatment works in size band 6 and above (>25,000 PE) for modelled schemes excluding outliers.[320]

[320] Cost gaps are calculated as the scheme level allowance minus request as a percentage of the scheme level request. Hafren Dyfrdwy and South West Water do not have large sewage treatment works and therefore have 0% cost gaps for the band 6 and above category. Analysis: [OF-CA-119]-PR24-FD-CA60-FD-p-removal-enh-model-v2-cost-gap-analysis.

Company	Bands 1 to 5 average cost gaps	Band 6 and above average cost gaps
Anglian Water	102%	49%
Dŵr Cymru	178%	-26%
Hafren Dyfrdwy	21%	0%
Northumbrian Water	16%	-13%
Severn Trent Water	-7%	-10%
South West Water	3%	0%
Southern Water	222%	42%
Thames Water	-23%	-49%
United Utilities	43%	3%
Wessex Water	823%	-16%
Yorkshire Water	23%	80%

5.27 As stated in our final determinations, we found modelled costs for larger schemes tend to be significantly lower under a log specification compared to levels. That might suggest that log models systematically overestimate the economies of scale that could be achieved by larger schemes due to the application of a uniform log bias adjustment.[321] Although the assumption of constant marginal impact of the volume driver in levels models can be argued to be at the other extreme of not fully correcting for economies of scale, we found it results in a better fit to larger schemes. Therefore, of the simple and transparent model specifications available, we view our levels models to be most appropriate.

5.28 Additionally, we capture an economies of scale effect in our levels models. That is driven by the constant term in our models, which is fixed and the same for sewage treatment works of any size. All else being equal, smaller STWs get a higher allowance per PE due to the fixed constant being spread over a lower PE served. This acknowledges the sectors view, as well as that pointed out by Wessex Water in their statements of case, that the PR24 programme of works is characterised by a higher number of smaller sites achieving tighter P permits.

Discontinuity in the P permit

5.29 Our models include a dummy variable indicating schemes where the permit is <= 0.25mg/l (a TAL dummy). The use of this variable is consistent with economic and

[321][OF-OA-023] Ofwat, PR24 final determinations: Expenditure allowances – Enhancement cost modelling appendix, December 2024, pp. 25, section 2.4

engineering rationale and acknowledges the prevalence of more stringent permits in PR24, and the potential increased costs associated with these. We do not agree with Wessex Water's suggestion of the possibility of extra discontinuities in addition to the <=0.25mg/l threshold identified in our models. This is because:

- we considered a dummy variable indicating schemes where the permit is <= 0.5mg/l (the PR19 threshold) but the TAL dummy variable had a clearer engineering rationale and produced more robust model estimation results. For example, the size of the coefficient associated with a <= 0.5mg/l dummy variable appeared to indicate phosphorus removal schemes with a phosphorus permit below 0.5 mg/l leads to higher costs than phosphorus removal schemes with a phosphorus permit below 0.25 mg/l. This result was inconsistent with our own engineering rationale as well as that identified by companies. Schemes that approach the TAL of 0.25mg/l are more likely to require more advanced tertiary treatment processes and / or the use of a combination of processes resulting in higher costs than schemes with more lax permits. We have since retested the <= 0.5mg/l dummy variable and it is statistically insignificant beyond the 10 percent level of significance. For similar reasons, we did not consider the 0.7mg/l threshold for the tight consents dummy variable proposed by Wessex Water to be appropriate due to its weaker engineering and economic rationale and statistical insignificance;
- we improved the robustness of our approach by considering potential engineering outlier schemes in relation to enhanced permits. The models provide efficient allowances for an average scheme. However, we recognised that complex schemes with very tight phosphorus permits are likely to require higher efficient costs. We assessed schemes with phosphorus permits <0.25mg/l as engineering outliers;
- we do not agree with the economic and engineering rationale of modelling multiple breakpoints. Our models that include enhanced permit squared capture a more appropriate continuous non-linear relationship between enhanced phosphorus permit and the costs of the upgrade that recognises the higher costs associated with more stringent permits; and
- Wessex Water iteratively "*test for discontinuities in additional to the TAL in increments of 0.1mg/l between 0.5mg/l and 1.0mg/l.*" to evidence the presence of multiple discontinuities.[322] We do not agree with this approach. Statistical significance alone does not necessarily imply economic and engineering significance. The variables included in our models are backed by strong prior views of economic and engineering rationale that are supported by statistical performance. Additionally, Wessex Water appear to iteratively test permit thresholds in addition to the TAL dummy variable in one model. We do not agree with this approach because it risks masking the insignificant individual impact of different threshold variables. As above, we retested the <= 0.5mg/l dummy variable in its own right, as well as the 0.7mg/l threshold supported by Wessex Water, and it is statistically insignificant beyond the 10 percent level of significance.

[322] [OF-OA-004] Wessex Water, Statement of Case, March 2025, pp. 301, Table A15-4

Regulatory drivers

5.30 We do not agree with Wessex Water's suggestion that regulatory drivers, such as the Urban Wastewater Treatment Regulations 1994, can impact efficient phosphorus removal costs. In the PR19 redeterminations, the CMA noted a key driver of differences in unit costs was likely to be the tighter consent levels that are typically required by Water Framework Directive (WFD) driven consents. It considered the stringency of consents to be captured in the models.[323] We are of a similar view that our models appropriately capture the potential linear and non-linear relationship between enhanced permit levels and efficient cost. Therefore, our models implicitly control for the impact of regulatory drivers on efficient phosphorus removal costs.

Outliers

Our final determinations

5.31 We identified outliers using the Cook's distance statistic. These schemes were subject to engineering deep dive assessments and we added allowances on top of the modelled allowances as set out in section 2.3 of our final determinations.[324]

5.32 At final determinations, we also assessed separately schemes with phosphorus permits <0.25mg/l and / or schemes with a biological treatment component. We referred to these as engineering outliers. These schemes are likely to require higher efficient costs. We issued queries for all inefficient schemes that met this criteria to better understand the additional costs incurred. After undertaking our assessment, we applied a 75% cost gap adjustment between requested and allowed costs to all schemes in scope. This reflected that engineering differences are unlikely to be the full driver for the entire difference in costs but we conservatively assumed that they account for the majority of the cost difference.

5.33 There was a high bar to us treating schemes as engineering outliers. We focused on the most material factors that companies identified in their draft determinations representations as additional cost factors. This was essential to maintain the integrity of our scheme level modelled benchmarks as they already capture the key cost drivers.

Issues raised by disputing companies

[323] [OF-CA-013] Competition and Markets Authority, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations: final report, March 2021, p.419, para.5.81
[324] [OF-OA-023] Ofwat, PR24 final determinations: Expenditure allowances – Enhancement cost modelling appendix, December 2024, pp.19-24 (section 2.3)

5.34 Wessex Water points to our deep dive assessments of some of its phosphorus schemes, where a lower cost challenge was applied than for the schemes assessed through the scheme-level cost models. It considers this is internally inconsistent and therefore using the models to assess efficiency is not appropriate.[325]

Our assessment

5.35 In their draft determination representations, Wessex Water stated the Cook's distance statistic does not guarantee that an observation that requires closer scrutiny will be identified. We recognised this as part of our final determinations by considering whether there were any additional schemes that should be considered as outliers. To do this, we:

- examined the unique characteristics of schemes that could lead to an increase in efficient costs compared to the average scheme based on economic and engineering rationale;
- considered the factors that companies identified in their draft determinations representations as well as their responses to our sector wide query requesting evidence of why modelled costs using the forecast PR24 phosphorus removal enhancement programme are materially higher; and
- engaged with the Environment Agency to identify additional factors that could lead to an increase in efficient costs compared to the average scheme.

5.36 We identified schemes with phosphorus permits <0.25mg/l and / or schemes with a biological treatment component as appropriate for treatment as engineering outliers.

5.37 Following our final determinations, Wessex Water queried Ofwat to consider five of its schemes to have sufficiently strong engineering rationale and unique characteristics to be considered as engineering outliers. These five schemes are part of the eleven schemes Wessex Water has identified as having the largest cost gaps in its statements of case.[326]

5.38 We assessed the evidence presented in Wessex Water's statements of case for each of these schemes. Consistent with our response to their query[327], we consider Wessex Water has not demonstrated unique circumstances relating to these schemes. We note that these schemes all have enhanced phosphorus permits >=0.25mg/l and are identified as schemes that have "Chemical Treatment Only" solution types. We do not consider these schemes are appropriate for treatment as engineering outliers. We recognise that ten out of eleven of the schemes identified have enhanced phosphorus

[325] [OF-OA-004] Wessex Water, Statement of Case, March 2025, pp. 63-64, para.9.5
[326] [OF-OA-004] Wessex Water, Statement of Case, March 2025, pp.267-271, (Table A13-1)
[327][OF-CA-090] Ofwat, Query response: OFW-FD-WSX-022_Ofwat response

permits equal to 0.25mg/l. We consider our modelling approaches appropriately account for the higher costs associated with more stringent permits.

5.39 We considered companies draft determination representations on our cost drivers.[328] We allowed companies to put forward evidence if it considered their schemes to have unique characteristics that warrant higher costs as well as proposing cost drivers it considered were missing in our models. We assessed whether our models capture the relevant cost drivers of efficient phosphorus removal costs from an engineering and economic perspective. We also adjusted the modelled allowance of schemes we assessed as engineering outliers to recognise unique characteristics of schemes. Consistent with its draft determination representations, Wessex Water identify various site specific factors that can lead to differences in scheme level costs such as groundwater flows, site topography, geology, land availability and planning and environmental constraints. Wessex Water has not provided sufficient and convincing evidence that it is an outlier on these factors relative to other companies. It has not provided sufficient and convincing evidence of its internal benchmarks by comparing costs of its schemes that do not have these factors. Based on the insufficient evidence provided, we did not include additional cost drivers in our models nor did we consider these factors as engineering outliers. We consider the factors identified by Wessex Water balance out across the individual schemes when assessing a company's entire phosphorus removal programme in the round.

5.40 Our final determination models include the five key exogenous drivers of efficient phosphorus removal enhancement costs from an engineering and economic perspective. We note that in percentage terms the size of the cost gaps are not exclusive to the identified eleven schemes but are generally consistent with other identified modelled schemes that have similar cost gaps for Wessex Water. In addition, Wessex Water's high costs are not exclusive to phosphorus removal alone. Our assessments show Wessex Water has higher forecasts costs than our benchmarks across many other areas of its wastewater enhancement programme including growth at sewage treatment works, sanitary parameters and bioresources Industrial Emissions Directive (IED).Overall, we consider our framework of identifying Cook's distance outliers and considering additional engineering outliers is appropriate in identifying groups of schemes that require engineering deep dive assessments. It is important to set a reasonably high bar for engineering deep dives due to information asymmetry. Companies are more likely to raise factors that drive higher costs than lower costs. Additionally, the efficiency challenge we applied to Wessex Water's outliers was conservative. The CMA may want to consider applying the same modelled schemes efficiency challenge to the outlier schemes.

[328][OF-OA-023] Ofwat, PR24 final determinations: Expenditure allowances – Enhancement cost modelling appendix, December 2024, pp. 69-79 (section 4.2.1)

Efficiency benchmark

Our final determinations

5.41 We used four scheme level models to set efficient phosphorus removal enhancement allowances at PR24. Two estimated using historical information, and two estimated using forecast information. We assigned equal weights each model.

5.42 We set the efficiency benchmark at the average efficient scheme by fitting the PR24 phosphorus removal programme cost drivers to the estimated coefficients for both sets of models. We decided not to apply a more stretching efficiency benchmark as the use of historical and forecast cost information to set allowances was sufficient.

Issues raised by disputing companies

5.43 Wessex Water consider it would be more appropriate to place a lower weight on the outputs of the two models estimated using historical data for the following reasons:

- it is not appropriate to draw parallels to our base cost assessment approach where we place 100% weight on historical data viewing the nature of the spend to be more novel than capital maintenance work;
- the historical models are unlikely to capture the forward-looking costs of companies' phosphorus removal schemes due to an increase in the number of schemes with tighter permits;
- the decision to fully rely on forecast data is consistent with the CMA's PR19 redeterminations; and
- it views it more appropriate to rely on forecast data given the higher adjusted R-squared of the models.

5.44 Northumbrian Water consider forward-looking costs are more likely to reflect the cost of delivering these schemes over the AMP8 period.

Our assessment

5.45 We consider our decision to assign equal weights to historical and forecast models remains appropriate and conservative given the higher forecast costs is potentially favourable to companies.

5.46 Wessex Water considers only using forecast costs to estimate the phosphorus removal models would be consistent with the CMA's PR19 redeterminations. The CMA's approach in the PR19 redeterminations was constrained by the data available at the time. Indeed, in its redetermination, the CMA highlighted the future potential to use historical data to

challenge forward looking costs, which we have conservatively reflected in our final determinations:

5.47 "*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.*"[329]We recognise our historical models have a lower adjusted R squared compared to our forecast models. This result is consistent with prior expectations as we estimate the historical models based on the actual costs of delivering phosphorus removal schemes. Actual costs are likely to vary more than forecast costs which are the result of company forecasts and benchmarks. Notwithstanding, this single result is not sufficient to dismiss the important role historical cost benchmarking plays in identifying what companies have achieved in the past to challenge PR24 business plan forecasts. Setting such a high standard would not be in the customer's interest given the importance of econometric cost benchmarking models in reducing information asymmetry between Ofwat and water companies. Particularly when:

- the estimated coefficients of all drivers in both the historical and forecast models have the correct sign consistent with economic and engineering rationale, are of a reasonable magnitude, and are statistically significant;
- companies such as Anglian Water consider our models strike an appropriate balance between historical evidence of actual costs and forecast costs which are higher with more complex schemes at smaller sites; and
- the majority of companies have more experience with phosphorus removal upgrades compared to other enhancement areas due to the relatively large nature of the PR19 phosphorus removal enhancement programme.

5.48 We consider using historical phosphorus removal cost and cost drivers data is a distinct advantage because it:

- helps us understand the actual relationship between cost and cost drivers;
- provides insights on the actual cost of phosphorus removal in PR19, which is a good indication of what it will be in PR24; and
- helps us to identify inefficient forecast costs by comparing historical and forecast efficiency scores for each company.

5.49 Prior to our final determinations, we sent a sector wide query to companies requesting evidence of why modelled costs using the forecast PR24 phosphorus removal

[329][OF-CA-013] Competition and Markets Authority, 'Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations: final report', March 2021, p.413, para. 5.65

enhancement programme are materially higher than modelled costs using the PR19 enhancement programme. Companies put forward several reasons that we had already fully explored in our draft determinations, including:

- the prevalence of stricter permit limits;
- the prevalence of smaller sites requiring upgrades; and
- additional regulatory requirements.

5.50 We recognise that costs could be higher in the 2025-30 period compared to the past when comparing the costs of like-for-like schemes because of the reasons set out above. As such, we consider placing equal weight on historical and forecast models strikes the right balance between providing companies with a sufficient allowance, while making sure that customers do not pay for company inefficiency.

5.51 We could have justifiably placed more weight on the historical cost models to set allowances given this information is based on actual costs of delivering phosphorus removal schemes. The CMA may want to reconsider this in its redeterminations. For example, placing 100 percent weight on the historical cost models would have reduced phosphorus removal enhancement expenditure allowances by 13%.

5.52 Whilst the historical dataset contains valuable information on the actual costs of delivering phosphorus removal schemes, the dataset contains company forecasts for the years 2024-25 to 2025-26. The CMA may decide to use 2024-25 outturn information when it is available. Using the most recent outturn data could help to reflect the most recent cost pressures and efficiencies in phosphorus removal allowances. However, there is a risk that companies could face incentives to submit higher outturn costs in an attempt to obtain a higher allowance under the assumption we will use these costs to set efficient cost allowances and / or generate greater variability in outturn costs to undermine the robustness of the historical models. This is particularly relevant for phosphorus removal as companies typically deliver the majority of their PR19 phosphorus removal schemes in the years 2024-25 to 2025-26. But updating the models for an extra year of data is a significant undertaking, which can take some time to deliver robustly as we look to quality assure the data through our extensive query process.

Catchment nutrient balancing uncertainty mechanism

Our final determinations

5.53 Catchment nutrient balancing addresses the requirement for nutrient reduction by considering the entire catchment in terms of nutrient sources. In addition to

discharges from STW there may be agricultural and other sources of nutrients. These may be reduced by changing land management practices and this may be less expensive and have greater wider environmental outcomes, resulting in a best value solution. For water companies to propose this as a solution they may request funding in part to fund working with landowners, either in supporting them or via grant funds, or employing catchment staff. They may combine this approach with on-site solutions to meet overall outcomes.

5.54 We assessed expenditure through a combination of technical deep dives and shallow dives depending on materiality. Econometric modelling was not feasible due to a low number of companies submitting expenditure requests under the specific cost lines. Northumbrian Water's proposed enhancement expenditure for this cost line was assessed through a deep dive approach due to materiality.

5.55 We allowed Northumbrian Water the full amount of its proposed expenditure of £83.6 million for catchment nutrient balancing as it provided sufficient and convincing evidence[330].

5.56 At the time the Environment Agency had been considering whether to withdraw support for catchment nutrient balancing due to concerns over its effectiveness as a regulatory mechanism and its ability to achieve the nutrient standards required by legislation.

5.57 In our final determinations we stated:

> "Should catchment nutrient balancing no longer be supported by the Environment Agency, we will allow the previously funded catchment nutrient balancing schemes to be replaced with phosphorus removal schemes. The allowances for the new schemes will be determined based on the phosphorus model, and any costs over and above existing catchment nutrient balancing allowances will be trued up at the end of the period subject to companies having spent in full their allowances for both catchment nutrient balancing and phosphorus removal."[331]

5.58 Our final determination policy was put in place to provide companies with additional protection should there be future changes in policies set by the Environment Agency.

5.59 We also provided Northumbrian Water with £25.15 million for end of pipe phosphorus reduction solutions, and £18.57 million for catchment permitting solutions for phosphorus reduction.

5.60 In its business plan submission Northumbrian Water set out that its catchment permitting approach, whereby flexible permit limits are applied to all sewage treatment

[330] [OF-CA-047] Ofwat, Wastewater – Nutrient balancing; enhancement expenditure model, December 2024
[331] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.133

works discharging to a river, plays a key role in its overall catchment solutions, which combined both catchment nutrient balancing and in-river catchment permitting to address 'fair share', as an alternative to, or complimentary to, end-of-pipe investment.[332]

5.61 We previously responded to Northumbrian Water in query OFW-FD-NES-007, to state that we would ensure that the £10.5 million of transition spend on catchment nutrient balancing schemes, if incurred, would remain in the totex allowance given that the Environment Agency had not concluded its decision towards the end of the transition year.

Issues raised by disputing companies

5.62 Northumbrian Water set out a request to reflect new and updated requirements in the determination.[333] This covers an allowance uplift to reflect the Environment Agency's changed policy position with respect to catchment nutrient balancing schemes. Northumbrian Water raises two concerns with our final determination position:

5.63 Certainty of change and more appropriate funding: Northumbrian Water states that the Environment Agency indicated a change in policy in December 2024. It expects this policy change to be confirmed imminently. It considers making the change in the context of the redetermination will provide greater certainty and more appropriate funding in AMP8. It also requests retention of £14 million of the original £28 million for nutrient balancing, £10.5 million of which we allowed as transitional expenditure of which only £2 million was spend by December 2024.

5.64 Loss of efficiency gains: Northumbrian Water has concerns surrounding our final determination position of requiring companies to have spent their allowances for both catchment nutrient balancing and phosphorus removal in full, prior to triggering the uncertainty mechanism. It considers that this will result in a potential loss of cost sharing on efficiencies associated with the conventional phosphorus removal programme.

Our assessment

5.65 The Environment Agency has now confirmed its decision outlined in paragraph 5.56, to withdraw support for catchment nutrient balancing for all companies as it has found that this approach is not sufficiently effective in delivering the nutrient reductions

[332][OF-CA-091] Northumbrian Water Business Plan Submission, NES13 A3-24 NES13 A3-24 Wastewater WINEP – Phosphorus, September 2023, p.5, p.38
[333][OF-CA-002] Northumbrian Water, Statement of Case, March 2025, p.158, figure 54

required to meet statutory water quality standards.[334] In light of this decision, proposed catchment nutrient balancing schemes cannot be taken forward. We therefore consider it reasonable to adjust Northumbrian Water's enhancement expenditure allowance to reflect this change as part of the redetermination.

5.66 We consider there to be significant potential for overlap between the £104.7 million requested funding for new end of pipe solutions, and the existing allowances, including the £14 million proposed spend on transition and ongoing catchment nutrient balancing, the £18.57 million catchment permitting allowances and the residual nutrient balancing expenditure (£55.6 million), and recommend that the CMA undertakes a full deep dive of all of this expenditure against the deep dive criteria to determine any adjustments that need to be made to allowances.

Loss of efficiency gains

5.67 We agree with the proposed redetermination of allowances given the Environment Agency has confirmed that it no longer supports catchment nutrient balancing. We suggest that there is a need to consider the impact of overlaps in funding, which the uncertainty mechanism addressed through the requirement for companies to have spent their allowances for both catchment nutrient balancing and phosphorus removal in full prior to triggering (£25.15 million for phosphorus removal and £83.6 million for nutrient balancing). This provided some level of protection for customers for overlapping costs, as if there were significant efficiencies during delivery as a result of these overlaps, it would lead to the mechanism not triggering.

5.68 Northumbrian Water had previously stated that "Our best value plan for improvements includes 7 catchment solutions to avoid investment at 19 STWs (avoiding Capex investment of £40 million for customers)"[335], which it repeated in its statement of case.[336] In its statement of case the company then changes its position and states that moving away from nutrient balancing to end-of-pipe solutions "will cost £96m more than the £28m allowed."[337] It also indicates that using the Ofwat phosphorus model the costs increase from £28 million to £104.7 million for additional end of pipe solutions, which is an increase of £76.70 million, and it is unclear how this differs from the £96 million stated elsewhere. It does not mention what will happen to the remaining £55.6 million of combined catchment nutrient balancing and end of pipe solutions that make up the remainder of its £83.6 million nutrient balancing allowance, or whether there are any cost reductions from non-delivery of the catchment elements. As shown in Table 12, when combining the existing allowances (£83.6 million and £25.15 million) with the

[334] [OF-CA-106] Environment Agency, Catchment Nutrient Balancing Review, Final Decision Document, 2025
[335][OF-CA-094] Ofwat, OFW-REP-NES-005 - Response from NES
[336][OF-CA-089] Northumbrian Water Statement of Case Appendix 1, March 2025, p. 248, p86
[337][OF-CA-089] Northumbrian Water, Statement of Case Appendix 1, March 2025, p.85

increase from £28 million to £104.7 million this indicates that Northumbrian Water is forecasting an overall programme increase from £108.75 million to £199.45 million.

Table 12: Northumbrian Water Phosphorus reduction breakdown

Cost assessment line	Final Determination (£m)	Statement of case (view of FD) (£m)	Statement of case (request) (£m)
Nutrient balancing	£83.6 (including £10.4m transition spend)	£28 (including £10.4m transition spend, avoids £96m end of pipe cost)	£14 (includes £10.4m of transition spend, no impact on wider programme)
		£55.6	£55.6
Phosphorus	£25.15	£25.15	£25.15 + £104.7
Sub total considered for uncertainty mechanism	**£108.75**	**£108.75**	**£199.45**
Catchment permitting	£18.57	£18.57	£18.57
Total	**£127.32**	**£127.32**	**£218.02**
Additional cost from end of pipe solutions	£40m (avoided by nutrient balancing so not in total)	£96m (avoided by £28m so not in total)	£76.7m (no longer avoided - in total), based on £104.7m - £28m)

5.69 Of the £28 million it indicates was solely for nutrient balancing, which it states would have offset £96 million of end-of-pipe solutions based on its revised cost estimate, Northumbrian Water is stating that it is looking to continue to invest 50% of the allowance for catchment nutrient balancing schemes, but with no corresponding impact on the cost of the end-of pipe-solutions. As an example of the potential overlap/efficiency, it highlights that "we are already outperforming the current permits (such as Chester-le-street, Belmont, Tudhoe Hill, and Kelloe). This means that meeting the new permits here could be “no build” solutions (if this performance could be sustained)."[338] It goes onto request £13 million for end of pipe solutions[339] at these sites. However, we consider there to be potential for the £14 million nutrient balancing spend to contribute to the outperformance of these and other current permits, removing the requirement for the end of pipe solutions.

5.70 It is also unclear how the additional £18.57 million allowance Northumbrian Water was provided for catchment permitting[340] relates to the increased P-removal cost. As five of the six catchment permitting catchments overlap with the nutrient balancing

[338][OF-CA-055] Northumbrian Water, 'Appendix 1: Supporting information', March 2025, page 90 (para. 263)
[339] [OF-CA-089] Northumbrian Water, Statement of Case Appendix 1, March 2025, p.89 (sum of schemes from Figure 32)
[340][OF-CA-107] Ofwat, PR24-CA65 – Catchment Permitting, December 2024

catchments, as shown in Table we would expect some interrelation between these costs.

Table 13: Catchments covered by nutrient balancing and catchment permitting

Catchment Nutrient Balancing catchments	Catchment Permitting catchments
• Clow Beck (CNB Solution)	• Clow Beck CP
• River Leven (CNB Solution)	• River Leven CP
• River Skerne (CNB Solution)	• River Skerne CP
• River Wear (CNB Solution)	• River Wear CP
• South Low (CNB Solution)	• South Low CP
• *Belford Burn (CNB Solution)*	• *River Team CP*
• *Embleton Burn (CNB Solution)*	

5.71 We agree with the proposal that enhancement expenditure allowances should be redetermined now that it is clear catchment nutrient balancing solutions can no longer be taken forward as part of PR24, but consider there to be significant potential for overlap between the £91 million requested additional funding, and the existing allowances, including the £14 million proposed spend on transition and ongoing catchment nutrient balancing, the £18.57 million catchment permitting allowances and the residual nutrient balancing expenditure (£55.6 million). We recommend that the CMA undertakes a full deep dive of all of this expenditure against the deep dive criteria to determine any adjustments that need to be made to allowances.

Industrial Emissions Directive (IED)

Our final determinations

5.72 Wastewater companies are required to obtain installation permits for biological sludge treatment sites up to the standard required by Industrial Emissions Directive (IED) and the Best Available Techniques (BAT) reference document for Waste Treatment (the BREF)[341].

[341][OF-CA-108] European Commission, Best Available Techniques (BAT) Reference Document for Waste Treatment Industrial Emissions Directive 2010/75/EU, 2018

5.73 As set out in our letter to Companies on IED in August 2023,[342] the original deadline for full compliance with the requirements of the IED was 22 August 2022 [343]and funding requirements should have been raised by companies in PR19. However, due to the level of uncertainty in both scope and cost prior to agreeing permits for the implementation of IED, we considered on an exceptional basis to provide funding to allow companies to recover implementation costs as part of PR24.

5.74 We expected companies to make every effort to have permits in place and to deliver the required improvement works by the (extended from 2022) December 2024[344] deadline (now extended by the Environment Agency to March 2025).

5.75 At PR24 final determinations we applied a **hybrid approach**[345] to model the efficient allowance for IED compliance, comprising:

- scheme level econometric modelling for secondary containment and tank covering costs; and
- applying the company level modelled efficiency of secondary containment and tank covering to other IED costs.

5.76 We set the efficient bioresources IED enhancement allowances at final determinations as follows:

- Secondary containment costs: we applied an upper-quartile catch-up efficiency challenge.
- Tank covering costs: we applied a median catch-up efficiency challenge; and
- Other IED costs: we applied the company level modelled efficiency of secondary containment and tank covering to other IED costs.

5.77 We provided cost sharing[346] of 25:25 to recognise the higher cost uncertainty compared to other costs.

Issues raised by companies

5.78 Companies raise the following two issues:

[342][OF-CA-109] Ofwat, Industrial Emissions Directive Letter from Ofwat to companies, August 2023, pp.1-5
[343][OF-CA-013] Competition and Markets Authority, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations: March 2021, p 380, (para 4.1085)
[344] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.153
[345] [OF-OA-023] Ofwat, PR24 final determinations: Expenditure allowances – Enhancement Cost Modelling appendix, December 2024, pp.113-127 (s6)
[346] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p. 305

- Northumbrian Water states that it has new information with regards to the permit requirements at Howdon STW and that the requirement could not have been considered at PR24 final determinations[347] . The company requests additional expenditure to reflect this additional information and to comply with the IED requirements.
- Southern Water states that our top-down modelling approach for secondary containment, tank covering and other IED costs is not robust and should not be used for setting IED cost allowances[348].

Issue 1- Additional expenditure request due to new information (Northumbrian Water)

Issues raised by the company

5.79 In its statement of case,[349] Northumbrian Water states that there is new information with regards to the compliance requirements under the Industrial Emissions Directive, and that the requirement could not have been considered for PR24 final determinations. The new expenditure request is specifically for the delivery of a Flow Attenuation and Separation Tank at Howdon STW. The company states that this item is now listed under a Schedule 5 Notice by the Environment Agency and has an associated cost of £24.52 million.

5.80 Northumbrian Water notes that its business plan did not include any IED expenditure as at the time the scope had not changed from the activity funded by the CMA at PR19 as the company expected the original scope to be delivered through the cost sharing mechanism at PR19 and PR24.

5.81 Northumbrian Water states that it is now seeking funding [350] through the CMA process as the full scope and associated costs were only confirmed after the PR24 submission. The company also states that "it is confident that its claim is material and evidenced cost".

Our assessment

5.82 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)

[347] [OF-CA-118] Northumbrian Water, Appendix 6: Enhancement Case-Industrial emissions Directive, March 2025, pp.1-21
[348][OF-OA-03] Southern Water, Statement of Case, March 2025, pp. 243-252 (s5.20)
[349] [OF-OA-002] Northumbrian Water, Statement of Case Non-Confidential March 2025, pp.16 (Item 52)
[350] [OF-CA-118] Northumbrian Water, Appendix 6: Enhancement Case- Industrial emissions Directive, March 2025, pp.5 (Item 9)

Regulations 2016[351],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).

5.83 In relation to the Howdon specific request as part it the company's Statement of Case, we note that:

- The scheme was funded in the PR19 CMA re-determination. The IED scheme at Howdon received a total upfront allowance of £12m[352] and 25:25 cost-sharing.
- Northumbrian Water was aware of the additional cost[353] at the time of PR24 and did not request additional funding, as it considered it had previously been funded. It requested, and received an extension of its 25:25 cost sharing rates into AMP8 through the PR24 final determination.
- Given the previous funding and the compliance deadline, we would expect full IED site compliance at Howdon to be achieved at the present date. Had Northumbrian Water delivered the funded IED improvements on time it would not have been able to ask for additional costs.

The scheme was funded in the PR19 CMA

5.84 In 2020, as part of the CMA PR19 redetermination process, Northumbrian Water (and Yorkshire Water) asked for and received a specific mechanism for the recovery of IED compliance costs. Northumbrian Water received a £12 million allowance (£14.16 million in 2022-23 CPIH FYA prices) and a 25:25 cost sharing for IED compliance. No company asked for funding for IED related activities during the PR19 process for setting determinations.

5.85 The original deadline for full compliance with the requirements of the IED was August 2022, with a further extension of two years allowed to achieve compliance so that all aspects of the IED must be complied with by December 2024.[354] The Environment Agency expressed its concerns around the lack of companies' progress on permit applications and on-site delivery across the sector. Note that the deadline has now been further extended to March 2025).

The company was aware of the cost and recognised it had been funded

[351][OF-CA-013] Competition and Markets Authority, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, final report, March 2021, pp.378, (item 4.1079)
[352] [OF-CA-013] Competition and Markets Authority, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, final report, March 2021, pp.585, (para 6.31, d, I.)
[353] [OF-CA-133] Northumbrian Water, Northumbrian Water Response, OFW-REP-NES-034, 2024
[354] [OF-CA-109] Ofwat, Industrial Emissions Directive Letter from Ofwat to Companies, August 2023, pp.1-5

5.86 In August 2023, we published our 'Industrial Emissions Directive Letter from Ofwat to Companies'[355] (IED letter). We asked companies to complete a cost information data request by 23 August 2023, providing details for all sites where IED applied, with a breakdown of cost. We stated that companies should indicate whether they were intending to request additional funding as part of PR24, and if so, which costs this applied to.

5.87 In response to our IED letter, Northumbrian Water stated that:

"We have recently received a Schedule 5 Notice for Howdon (2 August 2023), so we now have a clearer view of expected improvements. Unfortunately, this latest feedback, has significantly increased the scope for Howdon; … It is also likely that the returned liquors improvement will extend into AMP8. This implies a significant increase in expected costs to c.£45m and a potential delay to the timelines".[356]

5.88 In relation to the additional £24.523 million [357] (Capex, 22-23 price base) cost, in its August 2023 response, Northumbrian Water stated, that:

"the CMA is clear that for AMP7 the expectation was that not only the allowed costs would cover the compliance cost but also that the enhanced cost sharing rate should address the risk. We therefore will not request additional enhancement funding for PR24 and will instead seek to meet the requirement during the current period as far as possible. Should the work to meet the IED requirement extend into AMP 8 then we would simply request that the cost sharing rate applied by the CMA is likewise extended reflecting the continued uncertainty up to this point around the requirements."

5.89 In October 2023, we confirmed that to enable companies to take account of latest liaisons and steers from regulators, we would allow companies to re-submit their data by 20 December 2023.

5.90 In December 2023, companies submitted their revised costs. Northumbrian Water included the outline cost breakdown for storm tanks and diversion of return liquors, cess and septic imports. The company also included a breakdown of costs arising from the Schedule 5 Notice with the cost of £26.157 million[358]. We understand that these are the requirements for which the company is now seeking funding from the CMA.

[355] [OF-CA-109] Ofwat, Industrial Emissions Directive Letter from Ofwat to Companies, August 2023, pp.1-5
[356] [OF-CA-131] Northumbrian Water, Ofwat IED response 22.08.23NES - Letter from Northumbrian Water to Ofwat RE: Industrial Emissions Directive (IED) (England) 22 August 2023, p.2
[357] [OF-CA-118] Northumbrian Water, SoC Appendix 6 Enhancement Case – Industrial Emissions Directive, March 2025, p. 24
[358] [OF-CA-132] Northumbrian Water, OFW-OBQ-NES-096, December 2023

5.91 In response to our draft determinations (September 2024) Northumbrian Water did not submit the ADD14[359] table or request additional IED enhancement funding. The company said that it was not requesting any further IED expenditure provided the policy of 25:25 cost sharing for IED expenditure that it got through the PR19 CMA redetermination is retained for PR24.[360] As part of the final determination, we provided a cost sharing rate of 25:25 for IED enhancement expenditure.

5.92 We subsequently queried Northumbrian Water in September 2024[361] to confirm if its data on costs and cost drivers related to IED compliance had changed since its 2023 submission and asked whether the company would wish to resubmit its ADD14 table. Northumbrian Waster responses that: " We did not propose any IED investments at PR24, so there is no new information to present in ADD14. Our data on costs and drivers has not changed since the December 2023 submission".[361]

The scheme was due for completion by December 2024

5.93 In the PR19 redeterminations Northumbrian Water received a £12 million (£14.16 million in 2022-23 CPIH FYA prices) allowance and 25:25 cost sharing for IED compliance. The company should have delivered all improvement works associated with IED by December 2024 to be compliant at its two sites falling under IED (Howdon and Bran Sands).

5.94 Northumbrian Water has not delivered the PR19 outcomes for which it was funded as part of the CMA PR19 redetermination and is subject to the same cost sharing rate of 25:25 for PR24. We are unclear as to why Northumbrian Water is now changing its long-held position as part of its PR24 redetermination request. Northumbrian Water was fully aware of the conditions relating to the PR19 determination, and the company appeared to know the scope and cost of the additional requirements prior to our final determination.

Issue 2 - Robustness of top down modelling approach (Southern Water)

Issues raised by disputing companies

5.95 Southern Water has raised two issues with our IED models[362]:

[359] [OF-CA-135] Ofwat, PR24 Additional Business Plan Tables for submission, June 2024, tab ADD14
[360] [OF-OA-023] Ofwat, PR24 final determinations: Expenditure allowances – Enhancement Cost Modelling appendix, December 2024, p.115, (s6.1)
[361] [OF-CA-133] Northumbrian Water, Northumbrian Water Response- OFW-REP-NES-034, 2024
[362] [OF-OA-003] Southern Water, Southern Water PR24 CMA Redetermination Statement of Case, March 2025, pp. 243-252 (s5.2)

- Top down modelling of secondary containment and tank covering costs relating to all 16 sites; and

- Top down modelling of 'other IED' costs relating to all 16 sites.

5.96 Southern Water claims that the secondary containment and tank covering cost models are not robust and appropriate for deriving IED cost allowances. It states that there might be factors outside management control and unexplained by our models that drive cost variation for secondary containment and tank covering. This is because of:

- the low adjusted R-squared values for these models; and

- the significant differences between scheme level and company level efficiency scores for secondary containment and tank covering.

5.97 Southern Water states that poor model performance results in a wide range in efficiency scores. The company therefore does not support the use of upper efficiency challenge for secondary containment costs and the median efficiency challenge for tank covering costs.

5.98 Southern Water also states that we should not use the company level-modelled efficiency of secondary containment and tank covering to other IED costs because it is derived from poor performance models. It also states that it is not possible to assume the same level of efficiency for all different IED cost categories. This is because activities and costs with other IED costs category are varied and different from the secondary containment and tank covering costs.

Our assessment

5.99 In our final determinations we provided Southern Water with an expenditure allowance of £135 million out of a request of £172 million for compliance with IED[363].

Top down modelling of secondary containment and tank covering costs

Model robustness

[363] [OF-OA-023] Ofwat, PR24 final determinations: Expenditure allowances – Enhancement Cost Modelling appendix, December 2024, p.127, (s6.5)

5.100 We disagree with Southern Water that the secondary containment and tank covering cost models are not robust. While the R-squared values are low, we consider that our models are reliable and appropriate for setting efficient IED allowances because:

- The selected cost drivers have clear engineering and economic rationale.
- The models cover the main drivers of costs.
- We have tested other cost drivers and those selected are the best of those we tested.
- The estimated coefficients of the drivers in the models have the correct sign, are of a reasonable magnitude, and are statistically significant.
- We acknowledge uncertainty over the cost estimates and therefore included cost sharing rates of 25:25.

5.101 Southern Water also states that the significant differences between scheme level and company level efficiency scores for secondary containment and tank covering is another reason for the models being unreliable and inappropriate for assessing costs. The company states that this difference suggests there might be factors unexplained by the models that drive cost variation. We disagree with Southern Water's statement. We tested a large number of models with several cost drivers. Our benchmarking models use key cost drivers backed by engineering and economic rationale. We discuss these points in more detail below.

5.102 Moreover, we note that we do not set allowances at a scheme level for enhancement expenditure related to IED. We set an efficient allowance at a company level. We acknowledge that there is still a level of uncertainty in the companies' scope, as not all permits have been issued and specific requirements and the final details of the solution implemented on-site may vary. On this basis, we also provide a 25:25 cost sharing in the event the company incurs additional costs under the IED permit.

5.103 In final determinations we used two key cost drivers for secondary containment cost models and one key cost driver for tank covering cost models. We triangulated across a set of secondary containment cost models with different cost drivers to mitigate the risk of error and bias in any one model. We used one model to set tank covering allowances.

5.104 We used bund wall surface area, the product of wall length and height as a more holistic measure of the level of bunding activity required to explain differences in the scale of secondary containment costs between companies. Some companies proposed

this cost driver at PR24 draft determinations representations[364]. We consider that larger wall surface area results in higher secondary containment costs[365].

5.105 We also used volume of bund to explain differences in the scale of secondary containment costs between companies. The higher the design volumes of the enclosed area needing containment, the higher secondary containment costs[366].

5.106 We use the surface area of tank covers provided to explain differences in the scale of tank covering costs between companies. The higher the area of open sludge tanks that require coverage the higher tank covering costs[367].

5.107 At final determinations we also explored other cost drivers for our secondary containment and tank covering cost models. For secondary containment cost models, we considered using other secondary containment scale drivers including:

- sludge produced – as a weak proxy for the volume of tanks;
- volume of tanks (m3) – broadly defines the total secondary containment requirement as per CIRIA 736 standard;
- impermeable surface area upgraded (m2) – measures the surface area dimension of the works; and
- bund wall weighted average height (m) – measures the height of the bund wall.

5.108 For tank covering cost models, we considered using other tank covering scale drivers including:

- sludge produced - as a weak proxy for the number and diameter of tanks;
- number of tanks – to directly capture the number of tanks covered; and
- volume of tanks – as a proxy for the diameter of tanks.

5.109 Out of all the potential scale variables, bund wall surface area and volume of bund explained the highest variation in secondary containment costs between companies. Surface area explained the highest variation in efficient tank covering costs between

[364] [OF-OA-023] Ofwat, PR24 final determinations: Expenditure allowances – Enhancement Cost Modelling appendix, December 2024, p.118, (s 6.2.1)
[365] Larger wall surface area that prevents spillage issues from site such as digesters, sludge holding tanks or other additional assets.
[366] The volume captures the aggregate bunding activity required in terms of impermeable surface area and bund wall surface area.
[367] Tank surface area is driven by the number and diameter of open tanks that need covering.

companies. Our models perform well using these cost drivers. In all models the cost drivers had a statistically significant impact on explaining cost variations across companies. We therefore retain the view that our final determination models are robust and appropriate for assessing IED costs.

Efficiency challenges

5.110 We disagree with Southern Water that an upper quartile efficiency challenge for secondary containment costs and a median efficiency challenge for tank covering costs are not appropriate.

5.111 At draft determinations we set an upper quartile efficiency challenge for secondary containment and other IED costs and a median efficiency challenge for tank covering. There has been significant debate about the potential scale of IED costs and the speed of compliance between water companies and the Environment Agency. We therefore set the benchmark based on the companies that were most progressed on IED implementation. When setting the benchmark, we recognised the uncertainty in our benchmarking by providing 25:25 cost sharing rates.

5.112 Following draft determinations, efficient companies significantly increased their proposed costs, while inefficient companies reduced costs or scope. Therefore, while the overall industry cost request did not increase significantly, there was a significant increase in the efficient cost funded by our models.

5.113 That has led to a reduction in the upper quartile challenge for modelled costs as the efficient companies no longer set an overly stretching benchmark. At final determinations the efficiency challenge for secondary containment costs is 5.6%[368] compared to 34% at draft determinations[369]. For secondary containment the efficiency challenge reduced from 63.4% in draft determinations[370] to 27% in final determinations[371]. This has led to a narrower distribution of cost gaps across companies with the overall sector cost gap being 16%[372].

5.114 Our analysis on company level efficiency scores shown in the table below suggests that the range in efficiency scores is smaller in final determinations compared to draft determinations. Companies generally perform well for secondary containment and tank covering models in final determinations. However, Southern Water is an outlier in both cost categories in draft and final determinations. We note that South West Water

[368][OF-CA-128] Ofwat, PR24-FD-CA89-Wastewater-Industrial-emissions-directive-enhancement-expenditure-model_redacted, 'Efficiency' sheet, December 2024
[369][OF-CA-127] Ofwat, PR24-DD-WW-IED-enhancement, 'Efficiency' sheet, June 2024
[370] [OF-CA-127] Ofwat, PR24-DD-WW-IED-enhancement, 'Efficiency' sheet, June 2024
[371] [OF-CA-128] Ofwat, PR24-FD-CA89-Wastewater-Industrial-emissions-directive-enhancement-expenditure-model_redacted, 'Efficiency' sheet, December 2024.
[372] [OF-OA-023] Ofwat, PR24 final determinations: Expenditure allowances – Enhancement Cost Modelling appendix, December 2024, p.125 (s6.4)

appears to be an outlier in these categories as well. However, South West Water has two sites only to comply with IED, whereas Southern Water has 16 sites.

Table 14: Efficiency scores and catch-up efficiency challenges

	PR24 Draft Determinations[373]		PR24 Final Determinations[374]	
Company	Secondary containment	Tank covering	Secondary containment	Tank covering
Anglian Water	0.43	0.19	1.00	0.86
Dŵr Cymru[375]				
Northumbrian Water	1.05			
Severn Trent Water	0.66	0.35	0.76	0.34
South West Water	3.99	0.1	1.71	0.12
Southern Water	1.47	0.07	1.38	0.06
Thames Water	1.17	2.14	1.07	2.12
United Utilities	0.89	1.16	0.49	1.02
Wessex Water	1.44	2.02	1.24	1.74
Yorkshire Water	0.5	0.38	1.10	0.60
Range of efficiency scores	3.56	2.07	1.22	2.06
Median catch-up efficiency challenge		0.37		0.729
Upper quartile catch-up efficiency challenge	0.66	0.17	0.94	0.29

5.115 Southern Water's efficient allowance for IED increased in final determinations compared to draft determinations; from £68 million in draft determination to £135 million in final determination. Southern Water received an average cost per site of £8.5 million in PR24. In the PR19 redetermination, the CMA allowed Northumbrian Water an average site costs of £6 million per site for IED (£7.08 million in 2022-23 CPIH FYA prices).

Table 15: IED total requested and final allowances (£million, 2022-23 CPIH FYA prices)

[373] [OF-CA-127] Ofwat, PR24-DD-WW-IED-enhancement, 'Efficiency' sheet, June 2024
[374] [OF-CA-128] Ofwat, PR24-FD-CA89-Wastewater-Industrial-emissions-directive-enhancement-expenditure-model_redacted, 'Efficiency' sheet, December 2024
[375] We do not use Dŵr Cymru data in our benchmarking models

	PR24 Draft Determinations		PR24 Final Determinations	
Company	IED total requested costs[376]	IED final allowance[377]	IED total requested costs[378]	IED final allowance[379]
Anglian Water	29	28	116	102
Dŵr Cymru[380]	14	14	14	14
Northumbrian Water[381]	0	0	0	0
Severn Trent Water	195	181	214	269
South West Water	47	33	47	38
Southern Water	174	68	172	135
Thames Water	529	220	534	290
United Utilities	282	157	233	233
Wessex Water	148	48	117	74
Yorkshire Water	71	13	111	80
Total	1491	761	1559	1237

5.116 We have taken into account several other factors when setting the efficiency challenges including:

5.117 we are providing PR24 allowances for IED compliance obligations that were required to be delivered in the 2020-25 price control period, and could be considered to have been part of the PR19 settlement[382];

- there is still a level of uncertainty, which appears to have led to higher IED totex requests for some companies, particularly those that are less progressed within agreeing their permit requirements;

[376][OF-CA-127] Ofwat, PR24-DD-WW-IED-enhancement, 'Final allowances' sheet, June 2024.
[377][OF-CA-127] Ofwat, PR24-DD-WW-IED-enhancement, 'PCD' sheet, June 2024.
[378][OF-CA-128] Ofwat, PR24-FD-CA89-Wastewater-Industrial-emissions-directive-enhancement-expenditure-model_redacted, 'Final allowances' sheet, December 2024.
[379][OF-CA-128] Ofwat, PR24-FD-CA89-Wastewater-Industrial-emissions-directive-enhancement-expenditure-model_redacted, 'PCD' sheet, December 2024.
[380] Dŵr Cymru did not explicitly request expenditure in 2025-30 but we have assessed the company's requirements and made allowances based on the totex provided by the company in the Additional Table 14 (ADD14) submitted at draft determinations representations.
[381] Northumbrian Water did not submit the ADD14 table in response to draft determinations. The company said that it is not requesting any further IED expenditure.
[382] [OF-CA-077] Ofwat, Industrial Emissions Directive Letter from Ofwat to Companies, August 2023, pp.1-5
[382] [OF-CA-077] Ofwat, Industrial Emissions Directive Letter from Ofwat to Companies, August 2023, pp.1-5

- a more stringent challenge is based on the companies that are further progressed in IED implementation and are likely to have greater scope/cost certainty; and

- we are providing cost sharing of 25:25 to recognise the higher cost uncertainty compared to other costs.

Top down modelling of 'other IED' costs

5.118 We consider our approach to other IED costs by using the efficiency of tank covering and secondary containment costs as a proxy for the efficiency of other IED costs is reasonable because:

- Other IED costs account for 20% of total IED costs.

- It was not possible to identify robust cost drivers of other costs given the range of companies' proposals.

- Southern Water's other IED costs were much higher than other companies and it was not clear why this was the case given that IED permit requirements have a consistent approach across the sector.

5.119 Other IED costs are made up of control and monitoring; liquor sampling; permit application; and other. In our final determinations we assessed the activities within this category jointly and did not develop any disaggregated econometric models. We followed this approach because this cost category accounts for only 20% of total IED submitted costs. Also, it was not possible to identify suitable cost drivers given the variation in other IED cost proposals across companies. We therefore consider the efficiency of tank and secondary containment costs was a reasonable proxy for the efficiency of other IED costs.

5.120 We considered multiple options prior to deciding on our final determination approach to other IED costs. For example on monitoring and instrumentation costs, there was a significant variance in the nature and complexity of proposals across sites and companies. As different types of monitors were included by companies, it was not possible to use the number of monitors as a cost driver for control and monitoring activities.

5.121 Our analysis shown in the table below suggests that in final determinations:

- The whole sector requested £283 million on other IED costs. Out of £283 million Southern Water requested £71 million. This clearly demonstrates that Southern Water is an outlier.

- For the whole sector the other IED costs account for 18% of the total IED requested costs. However, for Southern Water this percentage split is significantly higher; other IED costs account for 41% of its total requested costs. This is another clear indicator that Southern Water is an outlier.

Table 16: Southern Water and sector-wide IED requested costs by category[383]

Final determinations	IED total costs	Secondary containment costs	Tank covering costs	Other IED costs
Southern Water's requested costs (£million in 2022-23 CPIH FYA prices)	172	99.9	1.1	71.1
% split of Southern Water's requested costs		58%	1%	41%
Sector-wide requested costs (£million in 2022-23 CPIH FYA prices)	1545	633.7	627.8	283.3
% split of sector-wide requested costs		41%	41%	18%

5.122 In its statement of case, Southern Water claims that its other IED costs include operating expenditure of £30.5 million for AMP8 for weekly sludge sampling, trade waste sampling and waste characterisation testing[384] . The company also states that other IED costs also include one-off capital needs of £26 million for several activities with Operator Control Unit (OCU) modification (£6.1 million), surveys relating to capital works (£4.2 million) and modifying sludge reception points (£4.3 million) accounting for the highest requested spend[385] . The company also provides a breakdown of other IED costs for each site[386] . Our key concerns in relation to these costs are:

- We have some concerns over Southern Water's 'IED - other costs' which include some interventions that appear, at least partially, to be above and beyond the IED scope requirements. This includes road layout modifications (and the extent that is specifically attributable to IED), site security or Leak detection and repair (LDR) remedials cost requirements.[387]
- We have concerns over scope items that appear to be already accounted for such as additional scope for tank covering included under 'other cost'.

[383] Sector-wide requested costs do not include costs from Northumbrian Water and Dŵr Cymru.

[386] [OF-OA-003] Southern Water, Southern Water PR24 CMA Redetermination Statement of Case, March 2025, p.252, s5.2.8 (p158).
[387] [OF-CA-130] Southern Water, SRN-DDR-042: Industrial Emissions Directive (IED) Enhancement Cost Evidence Case, SOC-3-0004, March 2025, pp. 36-68 (10).

5.123 We would expect other IED costs for Southern Water to be less than half the cost of secondary and tank covering costs, which is the case for other companies based on our analysis shown in the table below.

5.124 We therefore retain the view that at final determinations using the company level modelled efficiency of secondary containment and tank covering to other IED costs is appropriate as we avoid bundling very disparate activities falling in the 'other IED' cost category into a modelled approach. For Severn Trent Water and United Utilities, we cap the allowance at requested costs as modelled secondary containment and tank covering costs are higher than requested costs.

5.125 Our final determinations include 25:25 cost sharing rates for IED so companies are protected during 2025-30 should they incur in costs.

Table 17: IED requested costs (£million in 2022-23 CPIH FYA prices) and percentage split of IED requested costs by category

Company	IED total costs[388]	Secondary containment costs	Tank covering costs	Other IED costs
Anglian Water	116	57%	32%	11%
Severn Trent Water	214	34%	36%	30%
South West Water	47	86%	2%	12%
Southern Water	172	58%	1%	41%
Thames Water	534	32%	58%	10%
United Utilities	233	29%	53%	18%
Wessex Water	117	40%	35%	25%
Yorkshire Water	111	62%	32%	6%
Total	1545	41%	41%	18%

Flow monitoring at sewage treatment works

Our final determinations

5.126 Companies are legally required to provide MCERTs certified pass forward flow monitoring at sewage treatment works or last in line sewage pumping station overflows, under WINEP driver U_MON4. Investment for this enhancement line can be split into three types of interventions: permit changes only; simple meter installations (for example a monitor fixed to a chamber with standard fixings or those requiring only

[388] [OF-CA-128] Ofwat, PR24-FD-CA89-Wastewater-Industrial-emissions-directive-enhancement-expenditure-model_redacted, 'Final allowances' sheet, December 2024.

minor adjustments / modifications); or complex civils installations (monitoring that requires new permanent civils structure(s) to be built for example hydraulic gauging structures such as flumes or weirs). We asked companies to provide a breakdown of how their programmes (costs and number of schemes) are split across these three categories so that we could benchmark the programmes at a more granular level.

5.127 Our assessment for this enhancement expenditure used a shallow / deep dive approach, informed by a benchmarking costs model across these three types of interventions. Although we considered that the modelled approach was not sufficiently robust to determine allowances, we consider that the indicative benchmark provided a reasonable indication of relative efficiency. We therefore did not carry out a shallow dive challenge for companies that were efficient against the indicative benchmark and undertook a deep dive of companies that were inefficient against the indicative benchmark.

5.128 We allowed Southern Water £48.94 million out of a request of £69.91 million as its costs were above the indicative benchmark and it did not provide sufficient and convincing evidence for cost efficiency which we assessed via a deep dive.

Issues raised by disputing companies

5.129 Southern Water in its statement of case sets out concerns regarding our approach to assessment, that we applied arbitrary top-down challenges without sufficiently engaging with bottom-up costs.[389] Southern Water said:

- The challenge was arbitrary and lacked transparency. Ofwat carried out a deep dive of its programme and set an arbitrary cost efficiency challenge of 30% on the basis that it had "significant concerns" with our evidence, despite it providing extensive additional benchmarking evidence in response to draft determinations. There is no transparency over what was missing in our evidence to justify the 30% challenge.[390]
- The programme was atypical. Ofwat failed to take account of the atypical situation arising from our AMP7 WINEP which means we had additional scope in our AMP8 programme.[391]
- Ofwat did not take account of the difficulties caused by ambiguous regulatory guidance. There were differences between Ofwat's data table requirements and Environment Agency's driver guidance, leaving ambiguity and room for interpretation.[392]

[389] [OF-OA-003] Southern Water, PR24 CMA Redetermination Statement of Case, March 2025, pp.35, table 3
[390] [OF-OA-003] Southern Water, PR24 CMA Redetermination Statement of Case, March 2025, pp.255, para 180
[391] [OF-OA-003] Southern Water, PR24 CMA Redetermination Statement of Case, March 2025, pp.256, para 184
[392] [OF-OA-003] Southern Water, PR24 CMA Redetermination Statement of Case, March 2025, pp.256, para 185

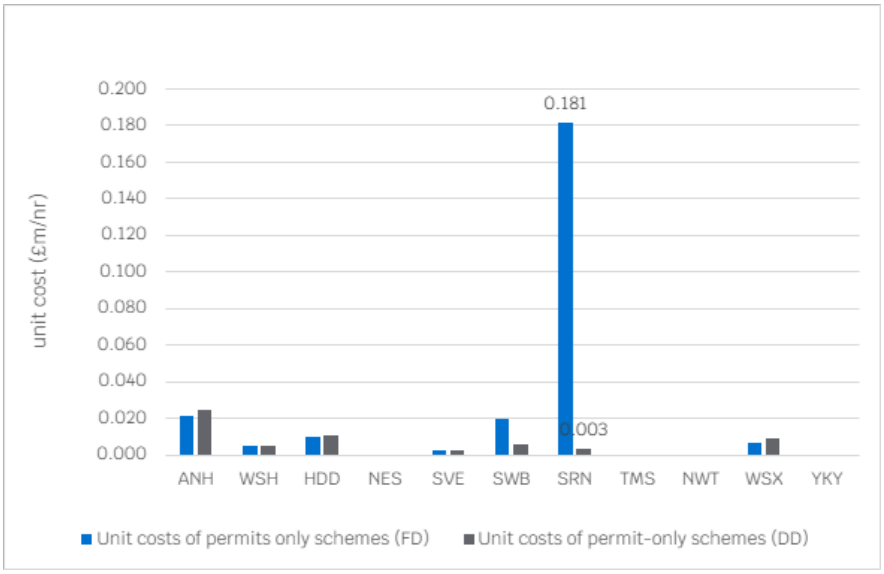
- There was an error of understanding. Ofwat made an error of understanding in our assumption that the size of the company's programme had reduced between draft determinations and final determinations without a corresponding reduction in costs.[393]

Our assessment

Arbitrary challenge lacking transparency:

5.130 The company's final determination costs were considered inefficient based on indicative unit cost benchmarking, particularly for permit-only schemes where it had a high number (168) of schemes at 20 times the industry median. Costs for simple and complex installations were also above the industry medians.[394]

Figure 29 29: Draft and final determination requested unit costs for permit-only flow monitoring at STW schemes.



5.131 Based on the unit cost benchmarking, we conducted a deep dive assessment, identifying that due to the company's significantly higher unit costs – for which we did not identify any exogenous reasons why its costs were higher than other companies - the overall gap between its unit cost and the indicative industry benchmark was 60% (or £42.3 million). But despite this we reduced the challenge to 50% of the gap between the company's costs and the modelled industry average, to allow for potential limitations with the benchmarking approach. We applied an overall cost efficiency

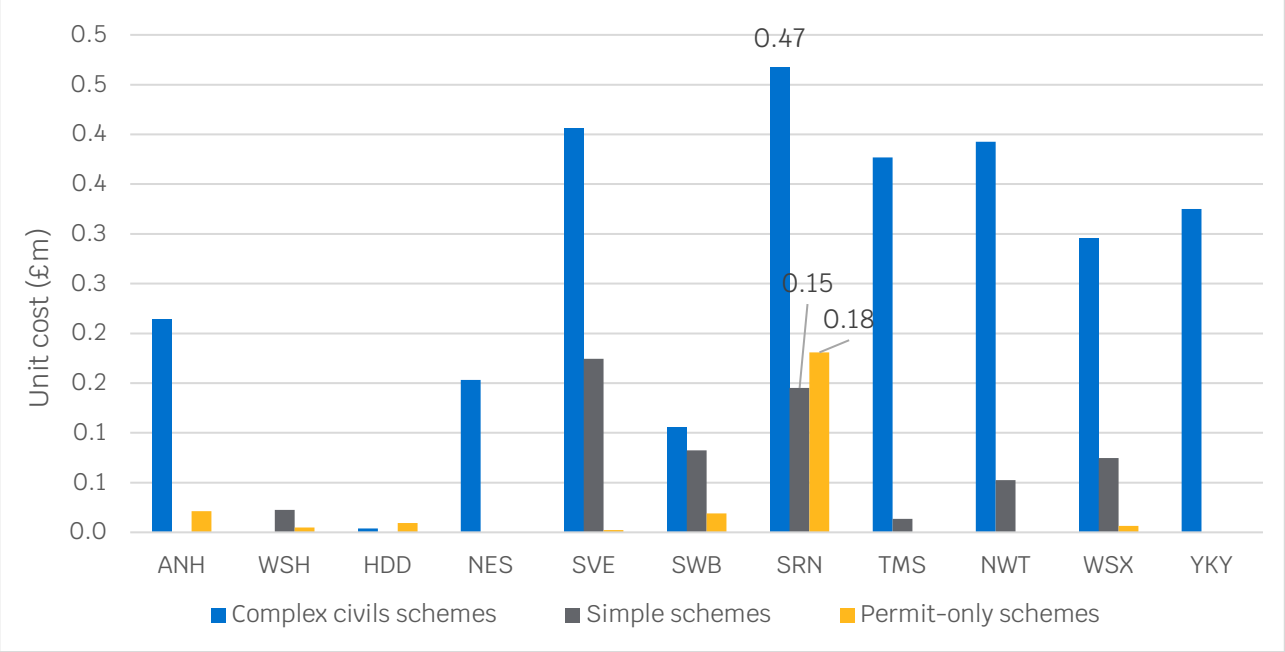
[393] [OF-OA-003] Southern Water, PR24 CMA Redetermination Statement of Case, March 2025, pp.256, para 183
[394] [OF-CA-137] Ofwat, PR24-FD-CA17-Wastewater-Flow-monitoring-at-sewage-treatment-works-costs-model, December 2024

challenge of 30% (£21 million). We do not consider this to be an arbitrary challenge, or that it lacks transparency. We applied the same approach to all deep dive companies.

5.132 In its representation to the draft determination, Southern Water stated that it had interrogated costs further and that costs were robust and efficient when benchmarked against industry cost curves and five other companies' data. The benchmarking undertaken by an external cost consultant relied heavily on comparably reported data across the same flow meter size assumptions made by Southern Water. The external benchmarking report itself states that a bottom-up estimate was carried out where there was not enough industry data available to increase the benchmarking coverage, confidence and accuracy, suggesting gaps in the analysis.[395]

5.133 Irrespective of this additional evidence, Southern Water's unit costs were still amongst the highest and above industry average at final determination for simple and complex installations, and significantly above the industry average for permit-only solutions ().

Figure 3030: Requested FD unit costs for categories of flow monitoring schemes



5.134 Southern Water explained in its representation to draft determination that its AMP8 programme is more complex (compared to AMP7) because there are schemes at larger sewage treatment works (>10,000 population equivalent) and that its estimated costs for monitoring have consistently been estimated as lower than other companies. However, this is not what our benchmarking shows.

[395][SRN-DDR-045] Mott Macdonald, Appendix 2 - PR24 Enhancement case Review – Monitoring – Flowmeter, November 2023, p.35

5.135 Our benchmarking considered companies' programmes presented for final determination at AMP8 only and considered the potential mis-categorisation of schemes between complexity categories by using the benchmarking to identify specific outlier costs that required a deep dive. Despite the possibility that other companies could have mis-allocated schemes to one of the three complexity categories, there were several opportunities for each company to have reviewed this as part of the responses to our queries and in discussion with the Environment Agency during WINEP scope amendments.

Atypical programme

5.136 In its statement of case Southern Water states that Ofwat failed to take account of the atypical situation arising from its AMP7 WINEP, which means it has additional scope in its AMP8 monitoring programme compared to the rest of the sector. It states that it was allowed funding for 240 investigations in AMP7, but no funding for installing new flow monitors that any investigation concluded were needed, with the industry allowed £97.3 million for flow monitoring investments, only £0.241 million of which was for Southern Water. It states that our PR24 final determination was made on the basis of a comparison with the rest of the industry which is an error due to the additional and legitimate scope of its PR24 flow to full treatment monitoring programme necessary to get to an AMP8 position that is the same as the rest of the sector, as is required by regulation.[396]

5.137 We are unclear as to the basis of Southern Waters claim. At PR19, the company requested £0.24 million for 4 schemes, while 98 investigations were included in a separate investigation enhancement model. We allowed the requested expenditure in full. All other companies put forward PR19 flow monitoring programmes which we assessed using median unit rates and deep dives.[397]

5.138 Equally, at PR24, all companies put forward flow monitoring programmes and Southern Water's is the fourth largest and is comparable in scale to South West Water's programme, but at five times the cost.[398]

5.139 The median unit cost for monitors requested at PR19 was £60 thousand per monitor (2017/2018 prices) with the sector delivering 1,264 monitors, so companies given higher

[396] [OF-OA-003] Southern Water, PR24 CMA Redetermination Statement of Case, March 2025, p.256, para 184
[397] [OF-CA-199] Ofwat, PR19 enhancement model for flow monitoring at sewage treatment works, Analysis tab.
[398] [OF-CA-137] Ofwat, PR24 enhancement model for flow monitoring at sewage treatment works, December 2024, Modelled costs tab.

allowances at PR19 have delivered their programmes for significantly less than Southern Waters PR24 request of £416 thousand per monitor.

5.140 Our PR24 assessment is informed by companies' unit rates for the three different categories of interventions. If the company had not installed any monitors in AMP7 it could be expected that it would have more monitor installations in AMP8, but this should not impact the unit cost for the type of installation. We do not penalise companies for the scale of their programmes as our assessment is based on the unit cost per monitor.

5.141 We consider that a company that delivered less monitors during PR19 could have a lower unit cost, as there are more likely to be simple/low cost installations remaining, whereas companies that have delivered larger PR19 programmes at £60k per monitor, may have left the more complex / difficult installations until PR24.

Ambiguous regulatory guidance

5.142 Southern Water states that for the great majority of its sites, the AMP7 investigations (known as U_INV2) revealed that it cannot use the existing flowmeter as it is not capable of meeting MCERT standards, and a new monitor needs to be fitted in AMP8. The Environment Agency has a category (U_MON4c) for such flowmeters where civil works are needed. However, if civil works are not needed, the company states that there is no appropriate Environment Agency category and so it included such sites in the category U_MON4b which is more closely aligned to requirements simply for data handling costs, categorised as "permit only" by Ofwat. It states that it is these costs that Ofwat says are atypically high in the final determination. Southern Water also states that other companies may have allocated such sites differently, meaning that Ofwat did not compare the same scope across all companies.[399]

5.143 Southern Water categorised its monitors for final determination. This was not done by Ofwat. In its statement of case, the company presents new evidence on scope and costs.[400] The data show that 95% of its 'permit-only' schemes require either monitor replacement, civils elements or bypass and other capital works. This does not fit with our 'permit-only' definition, which assumes no physical change. It is unclear why Southern Water did not provide this information earlier, as our classifications and its high comparative costs were clear in our draft determinations.

[399] [OF-OA-003] Southern Water, PR24 CMA Redetermination Statement of Case, March 2025, p.257 (para 190)
[400] [OF-CA-200] Ofwat, SOC-3-0016_Southern_Water_U_MON4_sites_and_costs, March 2025

5.144 Our guidance for table CWW20 lines 33 to 35 [401] was clear and followed by every other company. The company's cost for "permit only" schemes, whether it correctly classified them or not, remains higher than the industry median for simple installations.

5.145 Using the additional evidence provided by Southern Water as part of its CMA Statement of Case,[402] we revisited the categorisation of schemes based on the additional scope provided. Our assessment results in the following revised view of the company's programme: 108 complex sites; 133 simple sites and 13 permit only sites. If we apply the median sector unit rates, as per our PR24 final determination assessment, this would result in an allowance of £43.608 million (compared with our actual final determination allowance of £48.936 million). We consider that our final determination allowance will allow Southern Water to deliver its U_MON4 programme of works.

Error of understanding

5.146 Southern Water states that we made an error of understanding in our assumption that the size of its programme had reduced between draft determinations and final determinations without a corresponding reduction in costs. Southern Water states that in particular we misunderstood that a data table row entry in its original business plan submission (October 2023) had added the number of units of both event duration monitors (EDMs) and flow monitors together, but the costs for flow monitoring and EDMs were reported separately.

5.147 Our final determination allowance was based on the latest query response (01 October 2024).[403] We had concerns regarding the change in the size of Southern Water's programme and the movement between complexity categories between draft and final determinations. However, we used information in the company's latest query response to assess costs which were considered inefficient compared with other companies.

Monitoring Certification Scheme (MCERTS) monitoring at emergency overflows

Our final determinations

5.148 MCERTS is the Environment Agency's Monitoring Certification Scheme for environmental permit holders,[404] and provides an industry performance standard.

[401] [OF-CA-201] Ofwat, PR24-BP-table-guidance-part-4-Costs-wholesale-wastewaterV5, August 2023, p.97
[402] [OF-CA-200] Ofwat, SOC-3-0016_Southern_Water_U_MON4_sites_and_costs.xlsx, March 2025
[403] [OF-CA-202] Ofwat, OFW-REP-SRN-075, 1 October 2024
[404] [OF-CA-203] UK Government, Monitoring emissions to air, land and water (MCERTS), March 2025

5.149 MCERTS monitoring of emergency overflow operation on network sewage pumping station is a statutory WINEP / NEP requirement under driver code U_MON6. It requires that event duration monitors (EDM) are installed to record the frequency and duration of sewage discharges made in emergency situations, and also where a pumping station has a storm overflow, that pass forward flow (PFF) is monitored to distinguish between compliant wet weather discharges and emergency discharges. The solutions included in companies' business plans are spread across five subcategories; EDM only, EDM requiring civils works, EDM and PFF, EDM with PFF and civils works, and Permit change only. These subcategories formed the key determinants of the cost model.

5.150 In line with WINEP requirements, companies operating wholly or partially in England included schemes to put in place MCERTs monitoring at 25% of emergency sewage pumping station overflows in their business plans. In response to a request from Defra, for final determinations companies increased their coverage to 50% of all MCERTs monitoring at emergency overflow schemes, across all complexity categories by 31 March 2030. Companies submitted cost data within the PR24 data table CWW3 - MCERTS monitoring at emergency sewage pumping station overflows.

5.151 We assessed the investment for each company against the indicative benchmark unit costs for each of the subcategories. Those companies above the indicative benchmark were assessed through a deep dive. As we have reasonable confidence in the indicative benchmark, we passed through all companies below the indicative benchmark as efficient.

5.152 As the costs were above the indicative cost benchmark, we assessed the cost via deep dive and applied a 30% challenge as the company did not provide sufficient and convincing evidence for cost efficiency. This led to an allowance of £64.993m out of a request of £92.847 million.

Issues raised by disputing companies

5.153 Southern Water in its statement of case sets out concerns regarding:

5.154 Our approach to assessment under its Error 2 – applying arbitrary top-down challenges without sufficiently engaging bottom up costs.[405]

- Our approach to assessment under its Error 2 – applying arbitrary top-down challenges without sufficiently engaging bottom-up costs.[406]
- Poorly justified and arbitrary top-down challenge - Ofwat has not explained the basis for its residual concerns. Nor does Ofwat appear to have properly taken account of the

[405] [OF-OA-003] Southern Water, PR24 CMA Redetermination Statement of Case, March 2025, pp.35, table 3
[406] Southern Water Statement of Case: Table 3, p35

company's detailed bottom-up evidence describing the scope of work required and the benchmarking evidence that support the requested costs.[407]

- Failure to capture key factors - The top-down unit cost benchmarking undertaken by Ofwat in the draft determination did not take into account factors such as pumping station size and flowrates being measured. The company states that these are important factors for any benchmarking as flowmeters measuring high flows are more costly to buy and install than flowmeters measuring low flows. Failure to capture these factors means that the benchmarking was not prepared on an appropriate basis and will have produced unreliable results.[408]

Our assessment

Poorly justified and arbitrary top-down challenge

5.155 We assessed the investment for this enhancement expenditure area using a shallow / deep dive approach, informed by a benchmark modelled approach across five subcategories of solutions. Southern Water's costs were considered inefficient based on our indicative unit cost benchmarking for the most complex civils installation category and its business case was deep dived. This is summarised below

Table 18: Southern Water's MCERTs costs by category and industry benchmark

Cost Subcategory	Total Number of Schemes	Company Request (£m)	SRN FD Representation – Unit Cost (£m)	Industry benchmark (£m)
MCERTS EDM only	45	0.677	0.015	0.015
MCERTS EDM and civils	15	0.678	0.045	0.053
MCERTS EDM and pass forward flow monitor	0	0.000	0.000	0.065
MCERTS EDM with pass forward flow monitor and civils	191	91.492	0.479	0.096
Permit change only	0	0.000	0.000	0.000

5.156 In its October 2023 business plans, the company requested £38.900 million for 25% of its programme and were given a draft determination allowance of £27.230 million. At the draft determination, Southern Water appeared inefficient across all subcategories

[407] [OF-OA-003] Southern Water, PR24 CMA Redetermination Statement of Case, March 2025, pp.261, para 214
[408][OF-OA-003] Southern Water, Statement of Case, March 2025, p.261 (paragraph 215)

of solutions compared with the industry averages, in particular the more complex event duration and flow monitoring schemes requiring larger scale civils works. We therefore applied a 30% challenge (£11.670 million) on its MCERTs programme.

5.157 In its representations to the draft determinations, Southern Water stated that sites required for AMP8 had been agreed and prioritised with the Environment Agency who did not consider size or complexity of the scheme, and that the AMP8 schemes will include a higher proportion of medium and large sites (although not its largest sites). The company suggested that site size should have been considered as a proxy for complexity when setting allowances for this enhancement category.

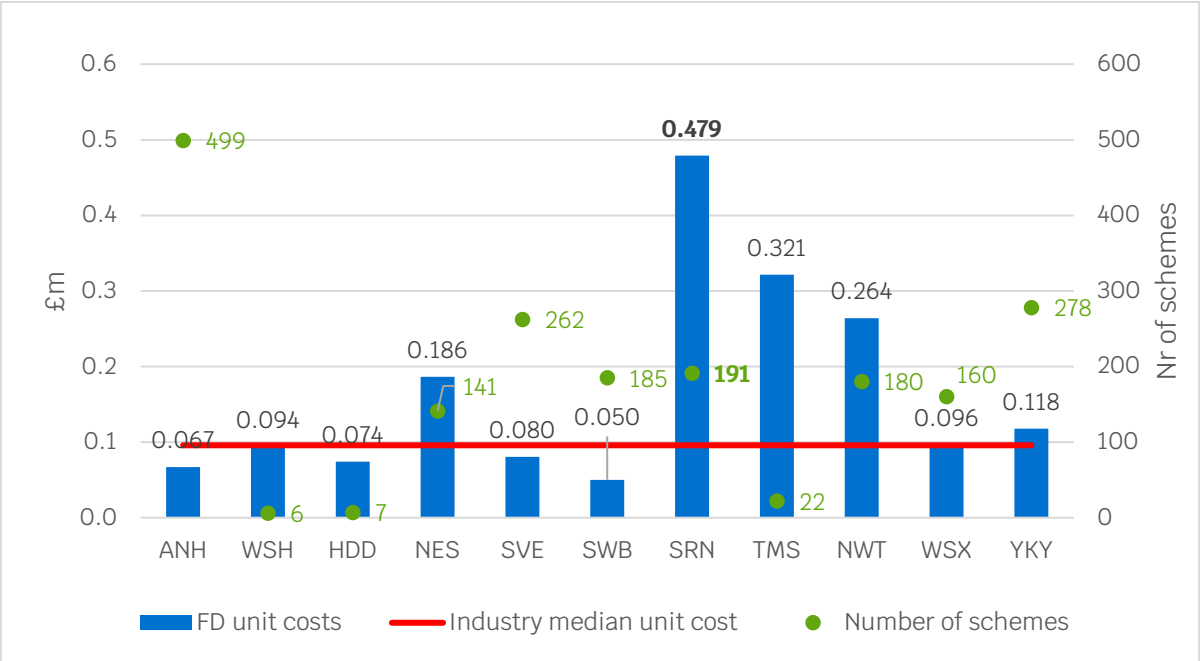
5.158 Southern Water states that it conducted cost checks ahead of final determinations based on a combination of actual schemes and notional schemes. The use of notional schemes leaves some room for error in cost estimates. It also said that its MCERTs costs were lower than our draft determination benchmark, but our industry-wide benchmarking suggests otherwise.

5.159 For final determinations, companies in England were asked to deliver 50% of their U_MON6 programmes in AMP8. The Environment Agency expectation was that there should be an uplift from 25% to 50% across the subcategories, with no movement between categories.

5.160 Southern Water's revised cost for final determinations (£92.847 million) was more than double the October 2023 submission. Costs for the most complex solution category (sites requiring EDM and flow monitoring with civils works) made up c. 98% of the company's total programme cost to deliver 191 out of a total programme of 251 schemes.

5.161 Across the sector, 1,931 schemes in this complex category are due to be installed in AMP8. Southern Water's requirement makes up only 10% of this complex category. However, the company's unit cost for this category is almost 5 times higher than the industry average (£0.096m), at £0.479 million per site (Figure).

Figure 3131: Unit costs for the most complex installation category (U_MON6d)



Southern Water's U_MON6 statutory obligation makes up less than 5% of total installations but represented 25% of the requested sector costs. As Southern Water is responsible for a small number of obligations, any changes to unit cost applied would lead to an uplift of allowance across the sector, which would be deemed inefficient.

Failure to capture key factors

5.162 Southern Water explains how it was unable to survey individual sites in costing this programme but had considered the size of schemes by permitted pass forward flow to categorise the complexity of installation.

5.163 The company states that some of its sites are highly complex and are in constrained locations, where any installation involves hazardous working in confined spaces, and that its programme may be particularly problematic compared to that of other companies since many of its emergency overflows are located in coastal sewerage networks where pumping stations intervene in what was originally designed as untreated or partially treated discharge to the sea.

5.164 Detailed bottom-up evidence provided by the company only goes so far in providing accurate costings where site surveys have not been carried out to identify any unique site features or complexities that it is claiming.

5.165 All companies could face similar issues with more complex installations across a range of pumping station locations, which is why we disaggregated costs and benchmarked across the different U_MON6 driver subcategories. The company provides no

supporting evidence to back up its assertion that it faces significantly different or more challenging schemes than other companies.

5.166 Our assessment benchmarks companies' unit rates across each subcategory, which would assume each company has a similar mix of schemes within their programmes. As previously noted, Southern Water's main investment category was within the most complex category – MCERTS EDM with pass forward flow monitor and civils. In context, compared to the wider sector within this subcategory, the company has 10% of the total obligations but requested 32% of the cost. The company provided no evidence for how this 10% of schemes are of significantly greater complexity compared to the 90% being installed across the rest of the industry.

6. Frontier shift efficiency and real price effects

Frontier shift efficiency

Frontier shift (or 'ongoing efficiency') is the rate of efficiency improvements that even the most efficient companies in the industry can achieve, from improvements in working practices and the introduction of new technology. It is intended to replicate the forces of competition which would incentivise companies to continually drive out inefficiencies over time by reducing costs.

CEPA and Europe Economics provided independent advice on frontier shift for draft and final determinations. For PR24 final determinations, we applied a frontier shift efficiency adjustment of 1% per year to wholesale and retail expenditure allowances. This was in the middle of CEPA's recommended frontier shift efficiency range of 0.8% to 1.2% per year.

The disputing companies refer to Economic Insights' frontier shift efficiency report that considers frontier shift efficiency should be set at a substantially lower level than that proposed by Ofwat. The main issues include:

wider UK productivity growth;

historical productivity growth and investment trends in the water sector;

technological progress in the water sector;

the application of frontier shift to enhancement expenditure allowances;

the degree of efficiencies of a larger investment programme; and

- **The disputing companies consider our frontier shift challenge does not align with broader UK productivity growth**. CEPA's recommended frontier shift range is informed in part by average total factor productivity (TFP) growth rates calculated over the period 1996–2019, which includes periods before and after the global financial crisis.

- **Economic Insight argues the water sector exhibits the same underinvestment trend as the UK economy more broadly**. We continue to consider that it is inappropriate to set the frontier shift efficiency challenge based on the water sector itself as this would cause perverse incentives. For avoidance of doubt, the water sector has not suffered from an underinvestment problem.

Economic Insight state the water industry is not "high-tech" and therefore should not be expected to substantially outperform the wider economy. Water companies provided many examples of innovation projects in business plans on areas such as environmental monitoring, customer interactions and the reduction of future costs.

- **Southern Water state frontier shift should not be applied to all enhancement lines as it incorporated an efficiency challenge in its enhancement business plan**. We assessed enhancement expenditure assessment using business plan forecast data before the application of frontier shift efficiency and real price effects.

- **Southern Water does not consider a 'learning by doing' productivity effect is feasible based on the speed of investment required and the need to work with multiple delivery partners**. Onboarding of new delivery partners is a business as usual activity that water companies should effectively deliver without any negative impact on productivity. In addition, water companies have been able to prepare for the step-change in investment over the 2025-30 period.

- **Anglian Water and Northumbrian Water consider there to be an** overlap between outcomes stretch and frontier shift in the water sector. While there could be a theoretical overlap between outcomes stretch and frontier shift in the water sector, this overlap is likely minimal.

Real price effects
Real price effects (RPEs) relate to input prices faced by water companies increasing or decreasing in real terms relative to general consumer price inflation (CPIH).

For PR24 final determinations, we applied an ex-post true-up for materials, plant and equipment enhancement expenditure between CPIH and infrastructure construction output prices published by the ONS. Anglian Water states that, as an output measure, the ONS construction price index double counts the frontier shift challenge applied to enhancement expenditure. But productivity growth in the construction sector has been negative over the period 1996–2019. This suggests it is implausible that there are material productivity gains embedded in the COPI index.

Frontier shift efficiency

Our final determinations

6.1 Water companies do not face competitive market pressures in most services they provide. We therefore set efficient base cost allowances so that customers do not pay for inefficiency.

6.2 Frontier shift (or 'ongoing efficiency') is the rate of efficiency improvements that even the most efficient companies in the industry can achieve, from improvements in working practices and the introduction of new technology. It is intended to replicate the forces of competition which would incentivise companies to continually drive out efficiencies over time by reducing costs. Frontier shift efficiency improvements are in addition to any catch-up efficiency challenge.

6.3 CEPA and Europe Economics provided independent advice on frontier shift for draft and final determinations. Our proposals aligned with CEPA's and Europe Economics' advice and recommendations.[409] [410]

6.4 For PR24 final determinations, we applied a frontier shift efficiency adjustment of 1% per year to wholesale and retail expenditure allowances. This was in the middle of CEPA's recommended frontier shift efficiency range of 0.8% to 1.2% per year. We did not consider any stakeholders to have presented sufficient and convincing evidence to justify a different assumption at final determinations.

6.5 This was a conservative frontier shift efficiency challenge to apply due to the range of factors that could support a more stretching challenge of up to 1.2% per year (eg including embodied technical shift; artificial intelligence driven acceleration in productivity growth expected in the future years; better use of big data and robotics; and the step-change in investment over the 2025-30 period, which should facilitate a 'learning by doing' productivity effect.

Issues raised by disputing companies

6.6 The disputing companies request different frontier shift efficiency challenges:

- Anglian Water and Northumbrian Water propose a frontier shift efficiency challenge of 0.8% per year[411][412]; and
- Southern Water, South East Water and Wessex Water propose a frontier shift efficiency challenge of 0.5% per year.[413,414,415]

6.7 The disputing companies refer to Economic Insights' frontier shift efficiency report that considers frontier shift efficiency should be set at a substantially lower level than that proposed by Ofwat.[416] The main issues raised are:

- consistency with wider UK productivity growth;
- historical productivity growth and investment in the water sector;
- technological progress in the water sector;
- application of frontier shift to enhancement expenditure allowances;
- degree of efficiencies of a larger investment programme; and

[409] [OF-CA-145] CEPA, 'PR24 Final Determinations - Frontier Shift', December 2024
[410] [OF-CA-146] Europe Economics, Response to Company Representations regarding Frontier Shift for PR24, December 2024
[411] [OF-OA-001] Anglian Water, PR24 CMA Redetermination Statement of Case, March 2025, p.74, para 298
[412] [OF-OA-002] Northumbrian Water, PR24 CMA Redetermination Statement of Case, March 2025, p.14, para 42
[413] [OF-OA-003] Southern Water, PR24 CMA Redetermination Statement of Case, March 2025, p.189, para 314
[414] [OF-OA-005] South East Water, PR24 CMA Redetermination Statement of Case, March 2025, p.64
[415] [OF-OA-004] Wessex Water, PR24 CMA Redetermination Statement of Case, March 2025, p.51, para 8.37
[416] [OF-CA-144] Economic Insight, Frontier shift at the PR24 redeterminations, March 2025

- overlap between outcomes stretch and frontier shift in the water sector.

Our assessment

6.8 No substantive new issues have been raised by the disputing companies. Many of the issues raised were in draft determination representations, which we addressed in our final determinations and in accompanying CEPA and Europe Economics reports.[417] [418] [419]

6.9 We therefore retain our view that a 1% per year frontier shift efficiency challenge represents a conservative and appropriate challenge due to the range of factors identified

6.10 More broadly, when setting an appropriate frontier shift efficiency challenge, it is important to consider the Growth Duty statutory guidance that requires regulators to have regard to the desirability of promoting economic growth as well other relevant considerations [420]

6.11 The UK Government's guidance to regulators on their growth duty highlights the key role played by productivity growth. The guidance outlines seven "Drivers of Economic Growth" of which two ("Innovation", "Efficiency and Productivity") relate to productivity;

6.12 The UK Government's growth policies should directly enable the water sector to achieve faster productivity growth. Examples include the following:

- 'The AI Opportunities Action Plan' should facilitate the sector in harnessing the productivity benefits of artificial intelligence (AI);
- 'The Planning and Infrastructure Bill' should help to reduce costs of capital projects, enabling greater capital productivity; and
- More innovation in other sectors due to the growth agenda may also lead to spillover benefits for the water sector.

6.13 The water sector can contribute to the UK Government's growth agenda by increasing productivity growth. It is the only way in which the water sector can deliver more output without diverting resources from other sectors. Water sector innovation may also lead to spillover benefits for other sectors.

[417] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, pp. 260-268, (s 4.1)
[418] [OF-CA-145] CEPA, PR24 Final Determinations - Frontier Shift, December 2024
[419] [OF-CA-146] Europe Economics, Response to Company Representations regarding Frontier Shift for PR24, December 2024
[420] [OF-CA-149] Department for Business & Trade, Growth Duty: Statutory Guidance – Refresh, May 2024

6.14 We set out our assessment of the issues raised by disputing companies in more detail below, which is informed by CEPA and Europe Economics independent assessment.[421] [422]

Consistency with wider UK productivity growth

Our final determinations

6.15 We used analysis of historical Total Factor Productivity (TFP) growth in comparable industries outside the water sector to help set the frontier efficiency challenge. TFP growth captures the change in the volume of outputs produced per volume of inputs (ie growth in output not attributable to changes in capital or labour inputs) and provides a proxy for the rate of technological progress.

6.16 We used the EU KLEMS database to calculate TFP growth rates, which has data for 40 industries and for a long time-series of data from 1995 to 2023.[423]

6.17 In calculating TFP growth rates, CEPA used data covering the period 1996 to 2019, which represents the latest business cycle as defined by the output gap. We present the estimates from CEPA's report below:[424]

Table 19: TFP Gross Output (GO) Productivity estimates (average annual growth rate) from 2023 EU KLEMS

Industry	1996 – 2019
Chemicals and chemical products	2.1%
Construction	-0.4%
Machinery and equipment n.e.c	0.9%
Manufacture of furniture; jewellery, musical instruments, toys; repair and installation of machinery and equipment	0.9%
Professional, Scientific, Technical, Administrative and Support Service Activities	-0.3%
Total manufacturing	1.1%
Transportation and storage	-0.3%
Unweighted average	0.6%

[421] [OF-CA-166] Europe Economics, Report on Frontier Shift for PR24 CMA Redeterminations, April 2025
[422] [OF-CA-167] CEPA, Response to Company Statements of Case for the PR24 CMA redeterminations, April 2025; [OF-CA-168] CEPA, PR24 Draft Determinations Frontier Shift, Real Price Effects and the energy crisis cost adjustment mechanism, June 2024
[423] EU KLEMS total factor productivity data is available back to 1971 in the EU KLEMS November 2009 release (revised in March 2011). There has been significant changes in the way ONS measures real gross domestic product (GDP) introduced in 2021. This means it is not possible to reconcile the 2023 EU KLEMS dataset with the EU KLEMS dataset that goes back to 1971.
[424] [OF-CA-145] CEPA, PR24 Final Determinations - Frontier Shift, December 2024. pp.4-5

Industry	1996 – 2019
Unweighted average of 4 highest performing industries	1.3%

Table 20: TFP Value Added (VA) Productivity estimates (average annual growth rate) from 2023 EU KLEMS

Industry	1996 – 2019
Chemicals and chemical products	5.9%
Construction	-0.5%
Machinery and equipment n.e.c	2.4%
Manufacture of furniture; jewellery, musical instruments, toys; repair and installation of machinery and equipment	2.0%
Professional, Scientific, Technical, Administrative and Support Service Activities	-0.5%
Total manufacturing	2.9%
Transportation and storage	-0.3%
Unweighted average	1.7%

6.18 Rather than selecting a specific value from the EU KLEMS analysis and applying it mechanistically, CEPA accounted for the principles established at PR19 that TFP data underestimates the scope for productivity growth because of:

- the scope for cost savings that water companies make through embodied technical shift (an increase in the quality of inputs – eg new technology);
- the stability provided by the regulatory framework; and
- the relevance of frontier shift challenges adopted in other recent price reviews.

Table 21: Comparison of recent CMA and UK regulatory decisions on frontier shift

	Control	Frontier shift efficiency challenge
Ofgem	RIIO-ED2	1.0%[425]
CMA	Final determination of the appeals of Ofgem's RIIO-GD2 and RIIO-T2 ('RIIO-2') price control reviews	• 0.95% capital expenditure (CAPEX) and replacement expenditure; and • 1.05% for operating expenditure.[426]

[425][OF-CA-150] Ofgem, RIIO-ED2 Final Determinations Core Methodology Document, pp. 357, para 7.632
[426][OF-CA-152] Competition and Markets Authority, Cadent Gas Limited, National Grid Electricity Transmission plc, National Grid Gas plc, Northern Gas Networks Limited, Scottish Hydro Electric Transmission plc, Southern Gas Networks plc and Scotland Gas Networks plc, SP Transmission plc, Wales & West Utilities Limited vs the Gas and Electricity Markets Authority - Final determination Volume 2B: Joined Grounds B, C and D, 2021, pp. 256, para 7.801

CMA	Final determination of the appeals of Ofwat's PR19.	1.0[427]

6.19 CEPA found no evidence to suggest the scope for frontier shift during PR24 was substantially different from that which other UK regulators have set in recent decisions, which cluster around 1%.

6.20 Europe Economics also identified several opportunities for higher productivity growth in the 2025-30 period. For example, the reversion of loose monetary policy should lead to inefficient firms exiting the market, leading to productivity improvements.

Issues raised by disputing companies

6.21 Anglian Water states that recent Bank of England and ONS analysis suggests that UK productivity growth is likely to remain weak.[428]

6.22 Northumbrian Water states that other sectors that its supply chain relies on, such as construction, have experienced negative productivity growth since 2008.[429]

6.23 Southern Water states that a frontier shift efficiency adjustment of 1% per year does not reflect AMP8 market conditions and recent productivity trends observed in comparator sectors.[430]

6.24 South East Water and Wessex Water state that our position to not align with recent trends in UK productivity.[431] [432]

6.25 Economic Insight states that inferences on TFP dispersion cannot be drawn from evidence on zombie firms. It states that trends in zombie firms are not, in of themselves, a measure of whether productivity dispersion is increasing or decreasing because there could be other factors that can have opposite effects. It adds that the extent of monetary tightening is limited when accounting for historical context, and recent data suggests the number of zombie firms is actually increasing.

Our assessment

[427] [OF-CA-013] Competition and Markets Authority, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations. Final report. p.263, para 4.616
[428] [OF-OA-001] Anglian Water, PR24 CMA Redetermination Statement of Case, March 2025, p.72, para 288-290
[429] [OF-OA-002] Northumbrian Water, PR24 CMA Redetermination Statement of Case, March 2025, pp. 114-115, para 412-414
[430] [OF-OA-003] Southern Water, PR24 CMA Redetermination Statement of Case, March 2025, pp. 178
[431] [OF-OA-004] Wessex Water, PR24 CMA Redetermination Statement of Case, March 2025, pp. 54
[432] [OF-OA-005] South East Water, PR24 CMA Redetermination Statement of Case, March 2025, pp. 35

6.26 We do not agree with the issues raised by the disputing companies and Economic Insight focus on economy-wide productivity growth and the post-crisis period. We consider that a frontier shift efficiency assumption of 1% per year is conservative.

6.27 CEPA's recommended frontier shift range is informed in part by average TFP growth rates calculated over the period 1996–2019. It assesses productivity growth in comparator sectors and accounts for productivity performance across the periods before and after the global financial crisis. Therefore, this includes a reflection of the wider productivity slowdown.

6.28 In addition, the factors driving the slowdown in UK average productivity growth do not apply to the regulated water sector.[433] Putting too much weight on the period after the Global Financial Crisis would therefore underestimate frontier shift efficiency.

6.29 The UK productivity growth slowdown is partly driven by sluggish recovery in UK business investment since the global financial crisis.[434] Our PR24 final determinations allowed total expenditure allowances of up to £104 billion, including contingent allowances. This represents a 71% increase in expenditure compared to PR19. We consider the scale, stability, and predictability of investment facilitated through our regulatory framework will enable the sector to drive significant efficiency gains.

6.30 In addition, recent publications by the Office for Budget Responsibility (OBR) assume partial unwinding of the UK productivity slowdown:

- In its October 2024 Economic and Fiscal Outlook, the OBR considers "*[A slowdown in labour supply growth] is countered by a recovery in productivity growth towards our estimated long-term rate which is roughly halfway between its pre- and post-financial crisis averages.*";[435] and
- in its March 2025 Economic and Fiscal Outlook, the OBR recognised productivity growth had disappointed since its October report. However, it treated this as a reduction in the starting level of productivity, while assuming similar medium-term productivity growth. It views "*Trend productivity growth from 2026 onwards is little changed from the October forecast. It returns to 1¼ per cent by 2029, broadly the average of the higher growth in the decade before and lower growth in the decade after the global financial crisis.*"[436]

[433] [OF-CA-153] Europe Economics, Frontier Economics and Outcomes Stretch at PR24, March 2023, pp. 3
[434] [OF-CA-145] CEPA, PR24 Final Determinations - Frontier Shift, December 2024
[435] [OF-CA-154] Office for Budget Responsibility, Economic and fiscal outlook, October 2024, p.26
[436] [OF-CA-155] Office for Budget Responsibility, 'Economic and fiscal outlook', March 2025, p.27, para 2.28

6.31 Government has recently had a strong emphasis on growth, issuing a letter to regulators asking how they are facilitating economic growth and targeting the delivery of 1.5 million new homes.[437]

6.32 We do not agree with Economic Insight's view that a reduction in the number of inefficient 'zombie firms' will not result in a decrease in productivity dispersion based on the idea that other factors may work in the opposite direction. Economic Insight does not identify what these factors are, nor provide any evidence for them. Europe Economics points out that while some measures of zombie firms will mechanically increase if interest rates rise (eg if based on interest cover), higher interest rates should result in inefficient firms exiting the market.[438] This is consistent with data from The Insolvency Service that presents a material increase in the number of company insolvencies since 2021.[439]

Historical productivity growth and investment in the water sector

Our final determinations

6.33 We did not use data on the water sector itself when setting the frontier shift efficiency challenge. This avoids creating a perverse incentive for the water companies to influence the frontier shift efficiency challenge at future price reviews. For example, under-performing in one-period to influence the next period.

Issues raised by disputing companies

6.34 Southern Water and Wessex Water view our frontier shift efficiency adjustment to be optimistic based on the levels of productivity the water sector has delivered historically. They view this to be consistent with the low productivity of the UK economy.[440] [441] They state that investment trends do not imply the water sector to have been protected from underinvestment historically.

6.35 Economic Insight reference a report by Fronter Economics that estimated quality adjusted TFP for the water sector. It found that the average productivity growth of the water sector was 3.2% per year from 1994-2008 and 0.1% per year from 2009-2017.[442] Economic Insight view underinvestment to be a driver of low TFP growth in the water

[437] [OF-CA-219] Ofwat, Ofwat's response to No 10 letter on growth and regulation, January 2025, and [OF-CA-221] Ministry of Housing, Communities and Local Government, Planning overhaul to reach 1.5 million new homes, December 2024
[438] [OF-CA-166] Europe Economics, Report on Frontier Shift for PR24 CMA Redeterminations, April 2025
[439] The Insolvency Service, 'Commentary - Company Insolvency Statistics February 2025
[440] [OF-OA-003] Southern Water, PR24 CMA Redetermination Statement of Case, March 2025, para 290
[441] [OF-CA-171] Wessex Water, Frontier Shift, Response to Ofwat's' PR24 draft determination, pp.1
[442] [OF-CA-144] Economic Insight (March 2025), Frontier shift at the PR24 redeterminations, pp. 13, para. 2.6; [OF-CA-173], Frontier Economics (September 2017) 'Productivity improvement in the water and sewerage industry in England since privatisation,' Final Report for Water UK

sector. It considers the drivers of UK productivity slowdown are economy-wide and these must impact the water sector.

Our assessment

6.36 We continue to consider that it is inappropriate to set the frontier shift efficiency challenge based on the water sector itself as this would cause perverse incentives. It is not appropriate to calculate TFP growth for the water sector directly because the ONS measures output in the sector by the volume of water delivered, which is not a good measure of what the sector is achieving. Most enhancement investment in the water sector is to improve environmental performance rather than increase water volumes.

6.37 For avoidance of doubt, the water sector has not suffered from an underinvestment problem post-2008. Europe Economics finds that water sector investment growth has been faster than the UK economy as a whole pre- and post-crisis. And investment by water companies roughly doubled shortly after privatisation and remained at that level all the way through to 2019-20, with a slightly positive trend from 1989-90 to 2019-20.[443]

6.38 We have also allowed total expenditure allowances of up to £104 billion, including contingent allowances at PR24. This represents a 71% increase in expenditure compared to PR19.

6.39 We do not agree with Economic Insights reference to a Fronter Economics report, published before PR19, that suggested average TFP growth of the water sector of 0.1% per year from 2009-2017. In its PR19 redetermination the CMA stated:

6.40 "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. 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."[444]

[443][OF-CA-146] Europe Economics, Europe Economics Response to Company Representations regarding Frontier Shift for PR24, December 2024. p.17
[444][OF-CA-013] Competition and Markets Authority, 'Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations. Final report, p.252, para 4.570

6.41 It is worth highlighting that investment does not affect TFP growth at a theoretical level because TFP growth is the residual increase in output after accounting for changes in the quantity and quality of inputs such as capital.[445]

6.42 We continue to consider that the appropriate starting point for setting a frontier shift challenge is an objective analysis of the historic TFP growth rates of relevant comparators. We then triangulate this information with other factors relevant to the scope for frontier productivity growth, including embodied technical shift; AI driven acceleration in productivity growth in the coming years; better use of big data and robotics; and the step-change in investment over the 2025-30 period, which should facilitate a 'learning by doing' productivity effect. This triangulation approach is consistent with regulatory best practice demonstrated by the most recent examples from Ofgem's RIIO-ED2 final determinations, the CMA's final determination of the appeals of Ofgem's RIIO-GD2 and RIIO-T2 ('RIIO-2') price control reviews and its final determination of the appeals of Ofwat's PR19.

Technological progress in the water sector

Our final determinations

6.43 Water companies provided many examples of innovation projects in business plans on areas such as environmental monitoring, customer interactions and the reduction of future costs. This was at odds with Economic Insights' conclusion that there is little scope for innovation within the water sector.

6.44 The water sector benefits from research and development carried out by other sectors when it purchases inputs (through embodied technical shift), and hence it is not just the research and development carried out by water companies that is relevant when setting frontier shift.

Issues raised by disputing companies

6.45 Economic Insight state the water industry is not "high-tech" and therefore should not be expected to substantially outperform the wider economy.[446]

6.46 Southern Water states that the water sector delivers a homogenous product where its core features do not change. It compares this to other industries, like pharmaceuticals, that rely on innovation to deliver new products.[447]

[445][OF-CA-146] Europe Economics, Europe Economics Response to Company Representations regarding Frontier Shift for PR24', December 2024, p.2
[446] [OF-CA-144] Economic Insight (March 2025), 'Frontier shift at the PR24 redeterminations' pp.34.
[447] [OF-OA-003] Southern Water, PR24 CMA Redetermination Statement of Case, March 2025, pp.186, para 300.

Our assessment

6.47 We accept that water is a homogenous product. We do not agree that this means there is less scope for innovation. Innovation can take multiple forms including reducing the costs of providing water, undertaking capital maintenance or reducing the environmental impacts of water and wastewater services.

6.48 We consider that examples of innovation in the water sector are relevant in disproving the claim that "the water industry is relatively 'low-tech' and does not utilise technologies that are "extremely advanced and highly sophisticated".[448]

6.49 Some themes of innovation that companies should be able to deliver over the 2025-30 period include:

- Smart metering projects geared to gathering more granular and frequent data on flow and pressure;
- Smart networks that use AI driven platforms to help identify early forming blockages and sense anomalies to reduce spillages and pollution events;
- the installation of sewer level monitors at risk points across the wastewater network to identify rising levels that might indicate emerging blockage issues; and
- the use of AI to help predict equipment failures and maintenance needs, leading to improved uptime and reduced downtime;
- the use of digital twins[449] will provide companies with the opportunity to stress test and trial operational changes and regimes to drive efficiency gains that would previously have been considered too high a risk or cost; and
- the use of modular construction approaches to effectively deliver complex treatment assets.

6.50 We disagree with the reference to a survey on a group of technology experts. The survey:

- does not appear to include experts with water sector experience. It is not appropriate to place weight on the views of experts that do not have experience on the application of technology directly in the water sector; and
- received just 30 responses with a response rate of 3.5%. It is not appropriate to place weight on responses to a survey with a response rate of 3.5%.

6.51 Finally, we consider that the Economic Insights analysis is inconclusive when comparing different industries. For example, it states the pharmaceuticals industry

[448] [OF-CA-144] Economic Insight (March 2025), 'Frontier shift at the PR24 redeterminations' pp.36.
[449] A digital twin is a virtual representation of a process, product or service. It is a digital information model that represents a physical asset. This could be an individual asset like a pump or a group of assets like a treatment works. It could also be a network which includes water mains, sewers and assets like pumping stations.[450] [OF-OA-003] Southern Water, PR24 CMA Redetermination Statement of Case, March 2025, pp.187, para 305-306.

contributes 6 times more to UK's total research and development expenditure than the telecommunications industry. But total factor productivity growth in the pharmaceuticals industry is 1.15% a year compared to 12.3% a year for telecoms.

Application of frontier shift to enhancement expenditure allowances

Our final determinations

6.52 We assessed enhancement expenditure assessment using business plan forecast data before the application of frontier shift efficiency and real price effects. We also utilised historical cost benchmarking analysis where possible. On this basis, it is entirely appropriate to apply frontier shift to enhancement expenditure allowances.

6.53 We applied frontier shift efficiency to enhancement areas that are more common across companies at PR19, including wastewater water industry national environment plan (WINEP) and metering costs. We concluded the potential gains from productivity improvements were likely to be more significant for large, relatively homogenous programme of work that are common across companies.

Issues raised by disputing companies

6.54 Southern Water state frontier shift should not be applied to all enhancement lines as it incorporated an efficiency challenge in its enhancement business plan. It states the majority of its enhancement plan will be delivered through target cost contracts that already include efficiency assumptions.[450]

Our assessment

6.55 We consider it was appropriate to apply frontier shift to enhancement expenditure allowances at PR24. This prevents customers paying for inefficiency.

6.56 We assessed enhancement expenditure assessment using business plan forecast data before the application of frontier shift efficiency and real price effects. All companies were required to report on this basis in line with our published business plan guidance. It is therefore unclear why Southern Water alone did not apply the guidance.

6.57 Nevertheless, even if Southern Water has embedded an efficient challenge into its requested costs, it is unclear the level of stretch applied by Southern Water and which enhancement lines it applies to. In addition, evidence of prices obtained through procurement is not sufficient to demonstrate efficiency. Southern Water may be being charged more than any other company for the same service(s), which is why

[450] [OF-OA-003] Southern Water, PR24 CMA Redetermination Statement of Case, March 2025, pp.187, para 305-306.

benchmarking costs between companies is so important is ensuring that customers do not over pay.

6.58 Finally, we note the CMA considered it appropriate to apply frontier shift to enhancement expenditure allowances in its PR19 redetermination.[451]

Degree of efficiencies of a larger investment programme

Our final determinations

6.59 We viewed a 1% per year frontier shift efficiency challenge to be conservative due to the range of factors that could support a more stretching challenge of up to 1.2% per year. One of these factors is the step-change in investment over the 2025-30 period, which should facilitate a 'learning by doing' productivity effect.

Issues raised by disputing companies

6.60 Southern Water does not consider a 'learning by doing' productivity effect is feasible based on the speed of investment required and the need to work with multiple delivery partners some of whom it has not worked with before.

6.61 Southern Water view the Price Control Deliverables (PCDs) framework reduces opportunities to achieve efficiencies and can reduce flexibility in managing delivery.

Our assessment

6.62 We consider it is reasonable to assume that companies will increase productivity through a 'learning by doing' effect as they find better ways of working to deliver the increase in workload during the 2025-30 period. We also expect companies to benefit from innovation in delivery through the increased use of digital twins and modular construction approaches.

6.63 Onboarding of new delivery partners is a business as usual activity that water companies should effectively deliver without any negative impact on productivity. In addition, water companies have been able to prepare for the step-change in investment over the 2025-30 period years in advance. Companies submitted business plans in October 2023. Draft water resource management plans (WRMP24) and drainage and wastewater management plans (DWMPs) were mostly completed in 2022.

[451] [OF-CA-013] Competition and Markets Authority, 'Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations. Final report.', p. 268., para 4.636-4.637.

6.64 PCDs are not a new phenomenon but we have expanded the use of them at PR24 to encourage timely delivery and to protect customers from under-delivery. At PR19, PCDs were defined as a bespoke performance commitment. Ofgem has widely used PCDs at RIIO-1 and RIIO-2 and have consistently applied a 1% or more per year frontier shift efficiency challenge. We note there remains substantial flexibility within the PCD design to allow companies to deliver investment flexibly and efficiently.[452]

Overlap between outcomes stretch and frontier shift

Our final determinations

6.65 We viewed that while there could be a theoretical overlap between outcomes stretch and frontier shift in the water sector, this overlap is minimal in practice.

Issues raised by disputing companies

6.66 Anglian Water state that the outputs and performance required to be delivered create significant "base over-stretch" before the application of frontier shift. In this context, it views a frontier shift efficiency challenge less than 1% per year to be more appropriate.[453] It considers Europe Economics did not account for the actual costs associated with the stretch at PR24.

6.67 Northumbrian Water states that the frontier shift challenge should account for expectations of service quality improvements. It points to the PR19 leakage reduction targets as an example of high expectations from base expenditure. It also views targets at PR24 to be stretching targets and considers this should be reflected in the frontier shift efficiency challenge.

Our assessment

6.68 While there could be a theoretical overlap between outcomes stretch and frontier shift in the water sector, this overlap is likely minimal. This is primarily because only four performance commitments are relevant to quality adjustments of water sector output – the theoretical basis for frontier shift being “double-counted” when Ofwat sets both a frontier shift challenge and includes outcomes stretch in performance commitment levels.[454]

6.69 These are outcomes that relate to the specification of the service delivered to end-customers: water supply interruptions, internal sewer flooding, customer contacts

[452] See price controls deliverables section below for more detail.
[453] [OF-OA-001] Anglian Water, PR24 CMA Redetermination Statement of Case, March 2025, pp.74, para 296.
[454] See Europe Economics, Frontier Shift and Outcomes Stretch at PR24, March 2023 and Europe Economics, Response to Company Representations regarding Frontier Shift for PR24, November 2024.

about water quality, and external sewer flooding. Other PR24 outcome performance commitments cover environmental standards (such as serious pollution incidents), asset health (such as mains bursts) or measures of customer experience (such as C-MeX). ONS does not apply quality adjustments for environmental standards achieved in the production process, changes in asset health, or customer satisfaction.

6.70 Moreover, even among these specific outcome measures, only a part of the required stretch reflects frontier shift. The remainder relates to catch-up efficiency and potentially an increase in capital inputs. For performance commitment levels set on a common basis, we considered median sector performance as an appropriate benchmark for our expectations of sector-wide performance. For total pollution incidents, water supply interruptions and internal sewer flooding, the majority of catch-up efficiency related to poorer performing companies that have to deliver very significant improvements to meet the median sector performance. We did not consider it appropriate to set less challenging PCLs solely on the basis of a company performing poorly in comparison to others, which would mean it was managing its operational performance less effectively than others. For example, at final determinations, we retained the use of the PR19 2024-25 performance commitment level of 5 minutes for the water supply interruptions performance commitment. Eight companies in the 2020-24 period met or exceeded this performance commitment level.[455] We do not view this to represent an increase in stretch compared to PR19. Therefore overall, the theoretical risk of "double-counting" frontier shift is limited.

6.71 We do not agree with the issues raised by the disputing companies. We reassessed performance commitment levels in response to stakeholder responses to our draft determinations and 2023-24 outturn performance. When setting the 2024-25 baseline, we have put a greater emphasis on recent performance levels and moved away from the default position of adopting PR19 performance commitment levels. We have also placed less emphasis on company forecast performance commitment levels at PR24, which helps address potential issues around companies being overly optimistic on what is achievable (ie different risk appetites).

6.72 Overall, we have set performance commitment levels at final determinations that are achievable. In setting PCLs, we have sought to best achieve a range of objectives, reflecting both consumer and wider strategic priorities. To do this, we have considered a combination of historical performance, econometric modelling, engineering rationale, long-term targets, our efficient cost allowances, and companies' own forecasts to set forecasts of good performance for PR24. Please see 'PR24 final determinations: Delivering outcomes for customers and the environment' for more details.

[455] These are Affinity Water, Bristol Water, Northumbrian Water, Portsmouth Water, SES Water, South Staffordshire Water, United Utilities and Wessex Water.

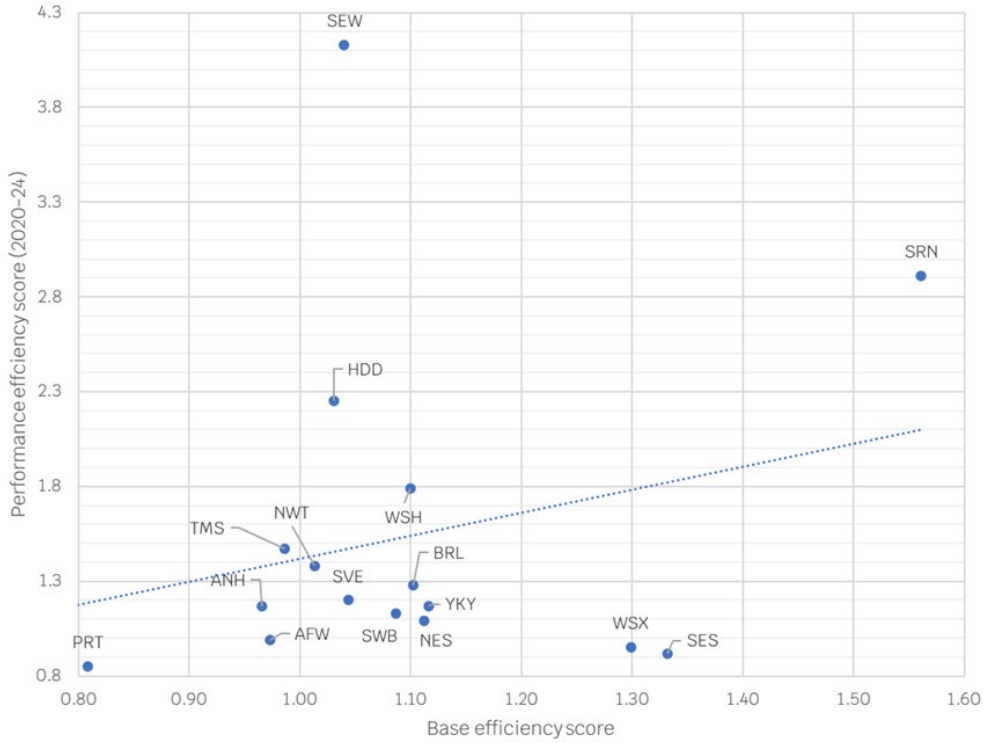
6.73 The figures below show performance efficiency scores against historical base efficiency scores. Performance efficiency scores are calculated by comparing performance in the 2020-24 period against the PR19 2020-24 PCL. We take the average of all performance commitment efficiency scores to create a one performance efficiency score. This includes water supply interruptions, internal and external sewer flooding, compliance risk index, total pollution incidents, sewer collapses, mains repairs, unplanned outage, leakage and customer contacts about water quality.[456] A performance efficiency score greater than one for the 2020-24 period indicates the company has not delivered the PR19 PCL. Performance efficiency scores increase as the performance gap to PCL increases.

6.74 Historical base cost efficiency scores are calculated by comparing outturn costs over last five years (2019-20 to 2023-24) versus predicted costs from the base cost benchmarking models. A base cost efficiency score above one indicates the company incurred higher costs than the models predicted over the 2019-24 period.

6.75 Like in PR19, we find no evidence to suggest that cost efficient companies perform poorly on outcomes. This is consistent with the findings of the CMA PR19 redeterminations.[457] It is possible to be efficient on cost and high performing on service. For example, Portsmouth Water perform well on wholesale water base cost efficiency and service performance.

[456] We exclude per capita consumption due to the impacts of COVID-19 on PCC performance.
[457] [OF-CA-013] Competition and Markets Authority, 'Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations. Final report.', pp.29.

Figure 32: Water base cost efficiency versus service performance[458]



[458] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, pp. 277-278.

Figure 3333: Wastewater base cost efficiency versus service performance

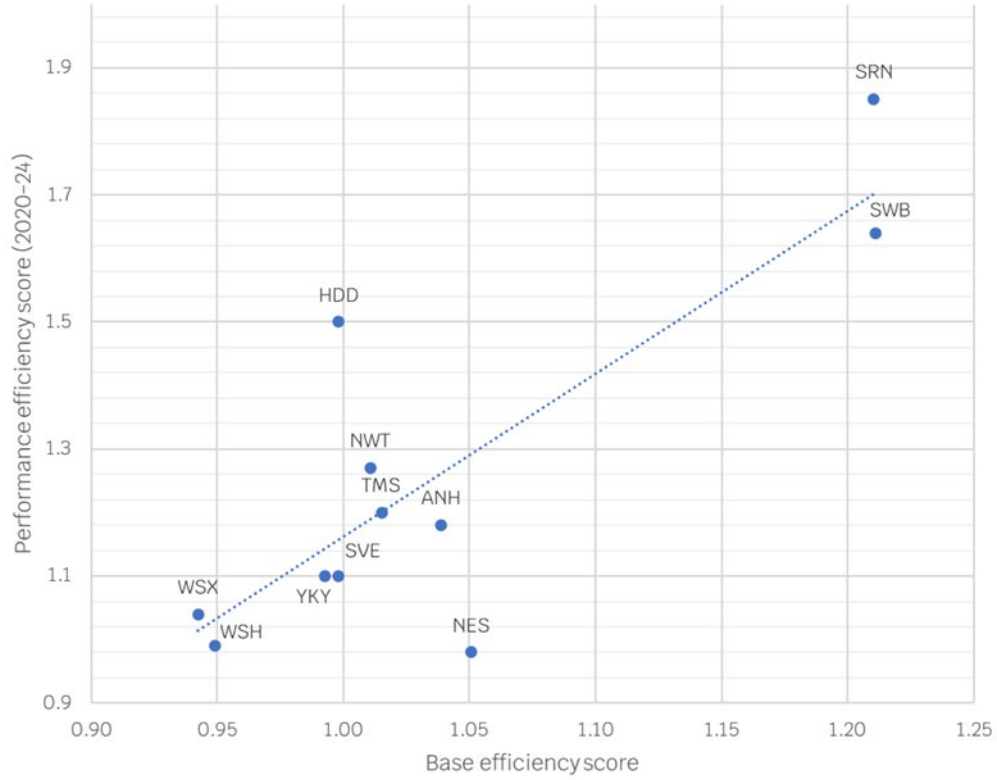
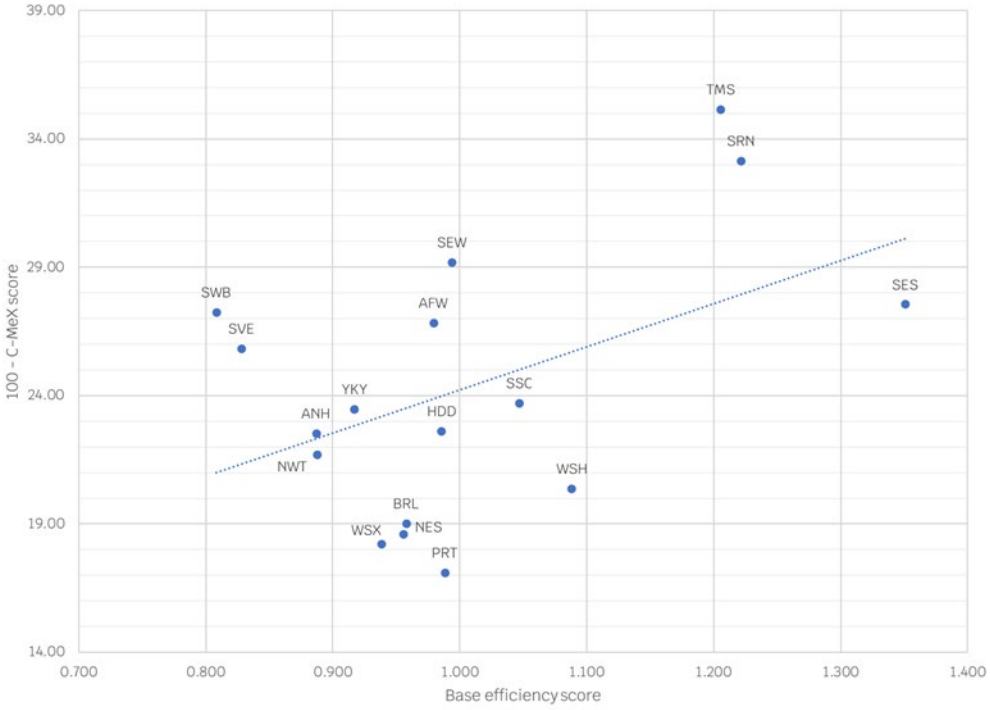


Figure 3434: Residential retail base cost efficiency versus C-MeX performance



Other arguments raised in relation to frontier shift

Issues raised by disputing companies

6.76 Southern Water consider our final determinations have not accounted for factors that are outside of company control when setting the frontier shift efficiency challenge. It refers to examples that can impact scope for efficiency improvements such as:

- regulatory changes;
- economic fluctuations; and
- natural disasters.

Our assessment

The broader regulatory framework accounts for factors that are outside of company control

6.77 We do not agree with the issues raised by Southern Water, and do not understand the relevance to frontier shift efficiency:

- Southern Water has not identified specific concerns, areas or evidence of regulatory changes and their impact on frontier shift.

- Water companies are less exposed to economic fluctuations than other businesses due to price control protections such as CPIH indexation. In addition, CEPA's recommended frontier shift range is informed in part by average TFP growth rates calculated over the period 1996–2019. It assesses productivity growth in comparator sectors and accounts for productivity performance across the periods before and after the global financial crisis. Therefore this includes a reflection of the wider productivity slowdown as well as economic fluctuations.

- Southern Water has not identified specific concerns, areas or evidence of natural disasters and their impact on frontier shift. Frontier shift is not the appropriate mechanism for dealing with these impacts.

Real Price Effects

Our final determinations

6.78 In the final determinations we applied an ex-post true-up for materials, plant and equipment enhancement expenditure between CPIH and infrastructure construction output prices published by the ONS. [459][460]

Issues raised by disputing companies

6.79 Anglian Water states that, as an output measure, the ONS construction price index double counts the frontier shift challenge applied to enhancement expenditure. It also questions the validity of the index as a basis for the ex-post true up since it is based on the construction of roads and bridges. [461]

Our assessment

6.80 Recognizing that the perfect index does not exist, CEPA recommended RPE indices which are a broad proxy for inflation in the prices of materials, plant and equipment used by the water and wastewater companies. Adopting a consistent approach, CEPA recommended a holistic, 'in the round' assessment of the scope for frontier shift that should be applied to enhancement expenditure.[462]

6.81 CEPA's analysis, and the analysis of the disputing companies' advisers, shows that productivity growth in the construction sector has been negative over the period 1996–2019. This suggests it is implausible that there are material productivity gains embedded in the COPI index. It would therefore not be appropriate to make an adjustment to the scope for frontier shift to account for the theoretical drawback about COPI being an output index.

6.82 A robust way to quantify any theoretical double-count between the materials plant and equipment RPE and frontier shift is unlikely to exist. Anglian Water does not suggest any way to do so.

6.83 We recognise that new infrastructure COPI is not a perfect index as it is based on road and bridge construction. However, no perfect index exists, and CEPA have recommended the best index available. The COPI index is part of the ONS' designated National Statistics dataset for inflation in UK construction prices, which gives us good

[459] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, pp.260-261
[460] [OF-CA-073] CEPA, Real Price Effects and the energy crisis cost adjustment mechanism, December 2024,page 38, Construction output price indices – Table 2
[461] [OF-OA-001] Anglian Water, PR24 CMA Redetermination Statement of Case, March 2025, pp.108, para. 390
[462] [OF-CA-256] CEPA, PR24 Final Determinations Frontier Shift, December 2024

confidence in the validity of index methodology and its results. Additionally, whilst the composition of the index might be based on highways and bridges projects, we expect similar cost pressures across a range of construction materials for infrastructure projects and there will be some overlap in terms of the materials used by the water and wastewater companies, including concrete and asphalt.

6.84 The true-up, which will account for differences between CPIH and the new infrastructure COPI index, will provide some protection to water companies if there are constraints in the infrastructure supply chain. These constraints, which we would expect to impact the construction market in general rather than the water sector specifically, include shortages of materials and delays in production or shipping, and could otherwise inhibit the delivery of the ambitious PR24 enhancement programme.

7. Price control deliverables

We use price control deliverables (PCDs) to **hold companies to account** and encourage them to deliver the outputs that customers are paying for.

Anglian Water and Southern Water state that PCDs do not allow for changes that are in the interest of customers. We are providing companies with **flexibility** to deliver PCD outputs in the most efficient way by tracking generic outputs at a programme level. Where a PCD tracks specific schemes we do not prescribe scope of work and leave this for the company and relevant regulator (Environment Agency, Natural Resources Wales, DWI) to agree.

Anglian Water and Southern Water state that PCDs **duplicate other incentives** such as outcome delivery incentives (ODIs). There is little duplication between PCDs and ODIs. Where the duplication is material, for example on leakage, we did not include a PCD.

Anglian Water states that **time incentive PCDs** constrain the ability of companies to deliver in the most efficient way and increase the risk of non-delivery. Our PCD regime allows companies to manage delay risks by allowing delivery of output at a programme level over a five year period. By encouraging companies to deliver on time and spread delivery more evenly across the period, time incentives will reduce pressure on supply chain and thus reduce risk of non-delivery.

Anglian Water and Southern Water state that the **calibration of time incentive rates** should not be based on PR19 delivery data. Companies are delivering similar schemes across PR19 and PR24. Using PR19 delivery data gives us the confidence that time incentives will provide companies with balanced risks.

Anglian Water and Southern Water state that **reporting and assurance requirements** for PCDs add significant administrative burden. Transparency over what companies deliver in PR24 and independent assurance on this will be critical to maintaining the trust and confidence in the sector. The administrative costs of our reporting and assurance requirements will be small compared to the significant step up in enhancement allowances.

Overall framework

Our final determinations

7.1 Price control deliverables or PCDs set out the key outcomes or outputs from enhancement and related expenditure. PCDs also set out output targets for some areas of base expenditure. PCDs:

- increase our oversight of delivery through increased reporting and the assurance requirements on what companies are delivering;

- protect customers from companies failing to deliver the funded improvements by returning the funding to customers; and
- incentivise companies to deliver 'on time' by applying underperformance payments where companies deliver late and applying outperformance payments where companies deliver on time.

7.2 In final determinations we introduced two PCD incentives[463]:

- **Non-delivery PCD.** This is a claw-back mechanism that will return funding to customers where companies fail to deliver the stated benefit by the end of the regulatory period. We apply this incentive to material investments which are not protected by a gated process. Non-delivery PCDs cover c.75% of enhancement expenditure.
- **Time incentives PCD**. This is a two-way incentive to encourage timely delivery of outputs by rewarding on time delivery and penalising late delivery. We apply this incentive to key areas of expenditure covering c.50% of enhancement expenditure.

Issues raised by disputing companies

7.3 The disputing companies raised the following issues:

- PCD framework lacks flexibility
- PCDs overlap with other incentives
- Time incentive PCDs should be removed or modified
- PCDs add a negative skew to the balance of risks
- PCD reporting should be simplified

Issue 1 – PCD framework lacks flexibility

Our final determinations

7.4 The PCD framework provides companies with flexibility through a range of measures[464]:

- Setting PCDs at the programme level rather than at a scheme level. This means that we have grouped scheme outputs into themes of expenditure, such as water supply, storm overflows, phosphorus removal.[465] For example, the water supply PCD tracks the amount of water available for use to be delivered by all schemes within the company's water supply programme. Setting PCDs at the programme/theme level will allow companies to

[463] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p. 306
[464] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, pp. 312-315
[465] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p. 314

manage delivery risks across a portfolio of projects while protecting customers from companies not delivering the funded improvements.

- Where possible, setting PCDs based on generic outputs rather specific solutions. For example, in storm overflows, we track delivery of equivalent storage. Equivalent storage can be delivered through grey, green or hybrid (mixed grey and green) solutions. This allows companies flexibility to substitute between grey and grey-green hybrid solutions.[466]
- Using end of period incentives which means that revenues are not adjusted until the end of the period. This allows companies time to catch up with programmes over the period.[467]
- Designing time incentive PCDs so that companies do not face underperformance payments if they deliver 75% of the benefit to schedule. We have also allowed a one year grace period in areas where time incentive PCDs apply to a small pool of schemes. This applies to water supply, supply interconnectors and resilience interconnectors.[468]
- Allowing companies to request a waiver on the application of non-delivery PCD payments if the company has not delivered the benefit by the end of the control period but is on track to deliver the benefit within few months from the start of PR29.[469]
- Allowing companies to retain 6% of the allowance, to cover development costs, where they demonstrate that under-delivery is due to an investment no longer being required (in the short term and long-term) and where there are material benefits to customers from stopping the investment.[470]

Issues raised by disputing companies

7.5 Anglian Water and Southern Water raise four concerns over the flexibility of the PCD framework.

7.6 The framework tracks outputs rather than outcomes and does not allow for changes that are in the interests of consumers, could improve efficiency and may be required to reflect factors beyond companies' control (Anglian Water and Southern Water).[471]

7.7 The ability of companies to retain 6% of the allowance if the output is no longer required does not sufficiently compensate companies for costs incurred (Anglian Water).[472]

7.8 The framework requires companies to repay the allowance if the output is not delivered at the end of AMP8 which could leave companies with considerable unfunded

[466][OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.312
[467][OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.314
[468][OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, pp.314-315
[469][OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.313
[470][OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.313
[471][OF-OA-001] Anglian Water, Statement of Case, p.158 (s581 and 583); and [OF-OA-003] Southern Water, Statement of Case, March 2025, pp.333 (s45)
[472] [OF-OA-001] Anglian Water, Statement of Case, March 2025, pp.162 (s611)

expenditure (Anglian Water and Southern Water).[473] Instead Southern Water requests a change control process which allows PCD outputs or delivery dates modified in period.[474]

7.9 The framework does not reflect changes to delivery dates which companies have agreed with the relevant quality regulator.[475] (Southern Water)

7.10 Both Anglian Water and Southern Water suggest Ofgem's approach to using evaluative PCDs, which allows for an ex-post assessment of output delivery, would address their concerns.[476] Anglian Water states that this approach would be beneficial to scheme-level PCDs.[477]

Our assessment

Flexibility of framework to allow changes

7.11 We introduced PCDs to protect customers from risk of companies not delivering the funded improvements or delivering them late. PCDs protect customers from this risk by clawing back the funding where company fails to deliver the funded enhancement.

7.12 PCDs track outputs rather than outcomes. The impact of enhancements on outcomes is harder to measure and so an outcome-based PCD would be less effective at protecting customers from non-delivery. This is a challenge we have faced in PR19 as it has been unclear what companies have delivered from enhancement allowances. This is going to be more critical to demonstrate in PR24 given the big step up in investment compared to PR19. In most cases, we use the cost drivers from our cost assessment to identify PCD outputs. These cost drivers have the advantage that are generally easy to measure and have a direct link to company funding.[478]

7.13 We provide flexibility by tracking generic output and delivery across the programme rather than for specific schemes. For examples, for storms overflows programme, the PCD tracks volume of equivalent storage to be delivered across the programme (which may involve hundreds of schemes/sites). This means that companies will have the flexibility to use the most efficient solutions to deliver PCD output. It also means that they will have the ability to manage risks (which may be driven by factors beyond the companies' own control) across a portfolio of projects and over the 5 year period.

[473] [OF-OA-001] Anglian Water, Statement of case, p.159 (s594); and [OF-OA-003] Southern Water, Statement of Case, p.333 (s45)
[474] [OF-OA-003] Southern Water, Statement of Case, p.327, para. 4
[475] [OF-OA-003] Southern Water, Statement of Case, p.333 (s45) and 339.
[476] [OF-OA-001] Anglian Water, Statement of Case, p.161-162; and [OF-OA-003] Southern Water, Statement of Case, p.339
[477] [OF-OA-001] Anglian Water, Statement of Case, p.162 (s613)
[478] [OF-OA-027] Ofwat, PR24 final determinations: Price control deliverables appendix, December 2024, p.10

7.14 There are a number of PCDs which hold companies to the delivery of specific schemes[479]. Where we do this the PCD does not specify the scope of work. Instead we require the company to secure confirmation from the relevant regulator (DWI, Environment Agency, Natural Resources Wales) that the scheme has been completed.[480] This allows PCD to reflect changes in the scope of work within the period. For reservoir safety we allow for substitutions and cost reallocations across sites provided that the company delivers equivalent or better outcomes.[481]

7.15 To not discourage companies from stopping investments where they are not in the customers' interest, we are allowing companies to make claims to retain 6% of allowances where non-delivery is due to the investment no longer required in the short- and longer-term and where there are material benefits to customers from stopping the investment. The 6% allowance should cover for development costs, including feasibility studies and detail design work. We would expect an efficient company to make the 'go' or 'no go' investment decision no later than at the 'detail design work' stage of the project and before starting any construction work.

7.16 Anglian Water expressed concerns about our PCD framework not allowing the reallocation of funding between activities. We note that allowances are inherently flexible, and so companies can reallocate expenditure across activities (including from enhancement to base and vice versa). We use incentives like PCDs to encourage companies to deliver what customers have paid for but allow flexibility to substitute across PCDs in areas where schemes address a similar problem. For example, to address storm overflows we allow substitution between grey and hybrid storage solutions and green only solutions; and between flow to full treatment (FFT) and grey and hybrid storage solutions.[482] We also allowed substitution from wastewater treatment related nature-based solutions and catchment solutions PCDs to phosphorus removal PCD (conventional solutions).[483] In response to further feedback received post final determinations, we will also allow conventional to green substitutions for phosphorus removal and sanitary parameters[484].

Companies can request to retain 6% of the allowance if output no longer required in the short- and longer-term

7.17 Anglian Water states that the 6% allowance retention option is too limited. It further states that any expenditure beyond the 6% limit, or where the customer savings cannot

[479] WINEP Investigations, PR19 WINEP Carryover, water quality (Raw water deterioration and taste odour and colour), Security (SEMD), cyber, Treatment for Nitrogen Removal, Reservoir safety.
[480] As an example, see [OF-OA-027] Ofwat, PR24 final determinations: Price control deliverables appendix, section 5.4.2, for WINEP investigations PCD
[481] [OF-OA-027] Ofwat, PR24 final determinations: Price control deliverables appendix, p.190
[482] [OF-OA-027] Ofwat, PR24 final determinations: Price control deliverables appendix, p.66
[483] [OF-OA-027] Ofwat, PR24 final determinations: Price control deliverables appendix, p.82
[484] Ofwat, Response to query OFW-FD-SBB-014

be shown to meet the 1% of totex threshold, would be borne by investors (subject to cost sharing).

7.18 We would not expect companies to spend significant amounts of customer money before deciding whether to go ahead with an investment. This decision should be made during the planning phase of the project, before the construction phase of the project starts. We consider that an efficient level of investment for planning and development should be no greater than 6% of the scheme allowance. This is in line with our approach to setting allowances for development costs in relation to large and major projects.[485]

7.19 In relation to our decision to impose a materiality threshold, we consider that it is reasonable and proportionate to focus our assessment on those claims which are most material to customers. We also do not want the flexibility we are providing to distract companies from delivering their programmes; for example, we do not expect this flexibility to be required for programmes such as storm overflows.

Flexibility to deliver schemes late

7.20 We disagree with Southern Water that our PCD regime would claw-back funding leaving companies with significant unfunded expenditure. We would expect companies to plan to deliver output well ahead of March 2030. However, where companies are slightly late in delivering the output by the end of the five-year period we will withhold claw-back. Instead, we will apply late delivery penalties so that companies are not better off from delivering outputs late. Where a company is significantly late in delivering an output by end of the control period, we reserve the right to apply claw-back for non-delivered outputs.

7.21 Consistent with PR24 final determinations we will consider whether to extend PCD for non-delivered elements and introduce a time penalty for these elements. We used this approach for PR19 WINEP carry over schemes.[486] This protects customers from non-delivery and late delivery, while providing companies with sufficient funding to meet their statutory obligations.

7.22 We consider that Southern Water's proposal to not apply claw-back insofar as delivery has commenced risks weakening the incentives for companies to deliver the funded output in a timely manner. The enhancement requirements in AMP9 are only likely to increase compared to PR24[487], so pushing delivery to the following control period will only make delivery in the sector the more challenging.

[485] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p. 188-189, 325
[486] [OF-OA-029] Ofwat, PR24 final determinations: Accounting for past delivery, p.38
[487] As part of business plans companies submitted long term enhancement forecasts which show an increase in enhancement expenditure AMP9

Delivery delays agreed with other regulators

7.23 Southern Water states that some delays to delivery from AMP8 to AMP9 are agreed with the relevant quality regulator (for example, the Environment Agency and Natural Resources Wales). It further states that the company can therefore face a claw-back notwithstanding that the statutory delivery deadline has been extended. It states that this would be in conflict with Ofwat's duty to secure that companies can finance their statutory duties.

7.24 It is for our fellow regulators to determine the appropriateness of agreeing to delays to scheme delivery to meet their own requirements. We want to make sure customers do not lose out from these delays. Customers have paid for the delivery of these benefits and so we would expect companies to deliver these benefits in line with the profile of funding. Our approach provides flexibility for delivery dates to change within the five year period of the control before any claw-back and time penalties apply. Therefore we consider it reasonable for us to apply a claw-back if output is expected to be delivered significantly later than March 2030. This should reduce the financial incentive for companies to delay delivery and encourages companies to manage delays within period.

Ofgem's use of evaluative PCDs

7.25 Both Anglian Water and Southern Water suggest that a better approach would be using Ofgem's evaluative PCDs. This approach involves an in-depth ex post assessment of the output delivered and whether an adjustment to allowances is necessary to protect customers.[488] This may include examining the reasons for a company not achieving the specified outputs before determining whether a claw-back applies. Evaluative PCDs therefore have a significant administrative burden.

7.26 Ofgem uses this approach where there is some flexibility in the output to be delivered and an in-depth assessment is needed. Evaluative PCDs provide flexibility in terms of the scope of works, costs, the specifications delivered, or the timing of delivery.[489]

7.27 Ofgem uses both evaluative and mechanistic PCDs. Ofgem uses PCDs to track outputs for specific projects. For example, Ofgem uses an evaluative PCD to specify the outputs, delivery dates and associated allowances for the London Medium Pressure project[490].

[488] [OF-CA-264] Ofgem, RIIO-2 Final Determinations – Core Document, p.24 (s4.7)
[489] [OF-CA-265] Ofgem, Price Control Deliverable Reporting Requirements and Methodology Document: Version 5, p.9 (s3.2)
[490] For example, please see Ofgem, Cadent Gas Limited, [OF-CA-266] Gas Transporter Licence Special Conditions, p.123 – 126

7.28 Ofgem applies PCDs across all regulated sectors[491]. Although subject to change, we understand that Ofgem's RIIO-2 Final Determinations provided for less than ten evaluative PCDs in each of electricity transmission[492], gas distribution[493] and gas transmission[494] price controls.

7.29 Ofgem is currently assessing its approach to PCDs based on its RIIO-2 experience. We understand that Ofgem is considering how to reduce the regulatory resource burden of PCDs for RIIO-3.[495]

7.30 Evaluative PCDs can be useful where the scope of work is highly uncertain in relation to significant investments, justifying the additional regulatory and administrative burden. Our approach in PR24 to dealing with this level of uncertainty for large investments is to apply a gated process and apply PCDs at a later stage when the scope of work becomes clearer.[496]

7.31 Applying evaluative PCDs across all our PCDs would require doing an ex-post assessment at the end of the period for over 250 PCDs. This would be a significant administrative burden as a change control request could take months or years to address.[497] This would not be proportionate as the scope of the work covered by PCDs is clearly set out in the PCD and is directly linked to the funding provided by customers. This would not bring significant value given that our PCD regime already provides flexibility in terms of outputs and timing of delivery over a five-year period. Where appropriate we have introduced enhanced cost sharing rates, sector-wide uncertainty mechanism for storm overflows and notified items for bioresources, PFAS and cyber security.

7.32 We have flexed the design of our PCDs to reflect the different levels of certainty in relation to the scope of work. Where the scope of work is less certain we are providing flexibility for companies to substitute between schemes within the PCD and, where relevant, across PCDs (for example, between phosphorus removal and catchment solutions). As stated above, where we do not track PCDs at the programme level (but at a scheme-level), we do not specify the scope of work and instead require the company to complete the scheme to the satisfaction of the relevant regulator. This allows the

[491] Electricity transmission, electricity distribution, gas transmission and gas distribution. There are also a small number of cross-sector policies that have associated PCDs.
[492] [OF-CA-257] Ofgem, RIIO-2 Final Determinations - NGET Annex
[493] [OF-CA-258] Ofgem, RIIO-2 Final Determinations – Cadent Annex (REVISED), and [OF-CA-259] Ofgem, RIIO-2 Final Determinations – SGN Annex
[494] [OF-CA-257] Ofgem, RIIO-2 Final Determinations - NGGT Annex
[495] [OF-Ca-260] Ofgem, RIIO-3 Sector Specific Methodology Decision – Overview Document, para 6.13, p.42
[496] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.315
[497] This is based on our experience in PR19 where we applied bespoke performance commitments which are similar to PCDs.

PCD to reflect changes in the scope of work within period, without the need for an onerous change control process.

7.33 Anglian Water suggests that evaluative PCDs would be particularly beneficial for scheme-level PCD areas. Our PCDs in these areas already capture elements of what an evaluative PCD would entail. They allow for substitution between schemes and solution types. Some of them allow for substitution between different but related PCDs (for example, between flow to full treatment and storage solutions).[498] Our supply interconnectors PCD allows for companies to retain allowances as long as they deliver 80% of the length of the interconnector.[499] The PCD approach therefore provides flexibility to companies, while keeping proportionate regulation and protecting customers from non-delivery or late delivery.

Issue 2 – PCDs overlap with other incentives

Our final determinations

7.34 We want companies to have sufficient incentives to deliver the improvements that customers are paying for. Our analysis at final determinations suggested that non-delivery of enhancement schemes could lead to Outcome Delivery Incentives (ODI) underperformance payments equivalent to around 1% of the value of expenditure across the whole enhancement programme.[500] This impact is not significant. We therefore decided to not allow ODI payments to be netted off from PCD payments.[501]

7.35 We also decided to apply PCD payments and cost sharing sequentially to avoid double counting of these incentives. We will apply PCD payments first. We will then adjust baseline allowances by any non-delivery PCD payments before applying cost sharing.[502]

Issues raised by disputing companies

7.36 Southern Water disagrees that there are limited overlaps with ODIs. It asks for an offset mechanism where the PCD penalty is reduced by an amount equal to any ODI payment associated with a failure to deliver the relevant PCD output.

7.37 Anglian Water and Southern Water raise the following two additional issues:

- The overlap with statutory obligations could lead to penalties from enforcement action . Anglian Water and Southern Water state that companies already face an incentive to

[498] [OF-OA-027] Ofwat, PR24 final determinations: Price control deliverables appendix, p.66
[499] [OF-OA-027] Ofwat, PR24 final determinations: Price control deliverables appendix, pp.113-114
[500] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025 pp.309-310
[501] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.310
[502] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.310

deliver projects on time from existing regulatory and statutory obligations. PCDs are therefore unnecessary or disproportionate.

- The overlap with the Delayed Delivery Cashflow Mechanism could double count clawback. Anglian Water and Southern Water state that the scope of the PCD would need to be revised downward to reflect any reduction in allowances from the delayed delivery cashflow mechanism.

Our assessment

Overlap with ODIs

7.38 Southern Water states that our analysis of overlap between PCDs and ODIs only considers short term impacts, and that the effects are larger if the impact on ODI payments is considered across the lifetime of the investment.

7.39 We want companies to have strong incentives to deliver the improvements that customers are paying for. In our PR24 methodology we set out our expectation that the combination of outcome delivery incentives (ODIs), PCDs and cost sharing should more than cover the cost of the improvement so that companies are worse off if they do not deliver the funded improvement.[503]

7.40 In our further guidance issued in July 2023 we said that we would be concerned if the combination of outcome delivery incentive payments and price control deliverables would expose companies to too much risk from non or partial delivery.[504]

7.41 Our analysis of business plans suggested that the overlap between PCDs and ODIs is zero or near zero for majority of PCDs (see Table 22) The overlap is only material for a handful of PCDs and even for these PCDs the overlap is not significant. The areas where there is some overlap between enhancement expenditure and ODIs are biodiversity and leakage reduction.[505] We are not applying PCDs to leakage reduction activities (other than for mains renewals). Therefore we did not allow ODI payments to be netted off from PCD payments.[506] This was consistent with our policy that companies should not be better off from non- or partial delivery.

7.42 In its Statement of Case, Southern Water provides its estimates of the performance improvements from base and enhancement expenditure for each common PC . These estimates however are not provided in pounds value so is difficult to understand how material these improvements are. They also reflect improvements from both base and enhancement expenditure, whereas PCDs mainly relate to enhancement expenditure.

[503] [OF-OA-022] Ofwat, PR24 Final Methodology – Appendix 9 Setting expenditure allowances, p.121
[504] [OF-Ca-261] Ofwat, IN 23/05 Further guidance on price control deliverables for PR24, p.9
[505] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p. 309
[506] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p. 310

This means that the estimated improvements will overstate the overlap between PCDs and ODIs.

7.43 In final determinations we addressed these shortcomings by applying the ODI rates to the estimated performance improvements from enhancement expenditure. This represents the value that would be returned to customers through ODI payments if company were to fail to deliver the improvement. We then normalise these monetary values by dividing them by the enhancement expenditure impacting each common PC. This provides a view of the proportion of enhancement expenditure that is covered by ODIs. We then map these results to each PCD. The table below summarises the results of our analysis, showing the median coverage of ODI for each PCD. This shows that the overlap between ODIs and enhancement expenditure is small and is only material for a handful of areas[507].

Table 22: Median ODI coverage (as a % of enhancement expenditure) by enhancement PCD area[508]

Wastewater enhancement PCD area	Median ODI coverage	Water enhancement PCD area	Median ODI coverage
Flow monitoring at sewage treatment works	0.0%	Biodiversity and conservation	31.7%
MCERTs monitoring at emergency sewage pumping station overflows	0.0%	Eels/fish entrainment screens	0.0%
Increase flow to full treatment	0.3%	Invasive Non Native Species	0.0%
Addressing storm overflows	1.1%	Drinking Water Protected Areas	0.0%
Storm overflow - new / upgraded screens	0.1%	Water Framework Directive	0.0%
Treatment for chemical removal	0.0%	25 Year Environment Plan	0.0%
Chemicals and emerging contaminants monitoring/ investigations/ options appraisals	0.0%	WINEP Investigations	0.0%
Treatment for total nitrogen removal (chemical)	0.0%	Demand-side improvements delivering benefits in 2025-30	9.3%
Treatment for phosphorus removal (chemical)	0.0%	Leakage improvements delivering benefits in 2025-30	19.4%
Treatment for nutrients (N or P) and / or sanitary determinands, nature based solution	0.0%	Water supply and supply interconnectors	0.0%
Treatment for tightening of sanitary parameters	0.0%	Metering	6.9%
Catchment management - chemicals source control	1.7%	Improvements to taste, odour and colour	0.2%
Microbiological treatment - bathing waters, coastal and inland	0.0%	Addressing raw water quality deterioration	0.0%

[507] Biodiversity, Demand-side improvements, leakage, metering and flooding risk.
[508] [OF-CA-067] Ofwat, ODI and PCD overlap analysis, April 2025

Wastewater enhancement PCD area	Median ODI coverage	Water enhancement PCD area	Median ODI coverage
Septic Tank Replacements	0.0%	Conditioning water to reduce plumbosolvency for water quality	0.0%
25 Year Environment Plan	0.0%	Resilience	0.0%
WINEP Investigations	0.0%	Security - SEMD	0.0%
Contribution to third party schemes under WINEP/NEP only	0.0%	Greenhouse gas reduction (net zero)	0.9%
Restoration management	0.0%		
Advanced WINEP	0.0%		
Sludge storage -Tanks	0.0%		
Sludge treatment - Anaerobic digestion and/or advanced anaerobic digestion	0.0%		
Growth at sewage treatment works	0.0%		
Reduce flooding risk for properties	5.2%		
First time sewerage	0.0%		
Sludge enhancement (growth)	0.0%		
Resilience	0.1%		
Greenhouse gas reduction (net zero)	0.0%		

7.44 Southern Water states that our analysis of the impact of enhancement expenditure on ODIs should have considered a longer time horizon and asks for an offset mechanism that reduces PCD payments by ODI payments resulting from non-delivery of PCD. We do not support this proposal for the following reasons:

- Calculating the impact of non-delivery on performance is not straightforward and could lead to perverse incentives. The impact of non-delivery will need to be based on ex-ante assumptions about the linkage between enhancement and performance commitment levels. If forecast impacts are too high, then companies could have an incentive not to deliver a scheme.
- We will not know the long-term impact of non-delivery on performance when we reconcile PCDs at the end of 2029-30 period. Therefore, it would not be possible to offset an impact that has not materialised yet.
- We will reset performance commitment levels as part of PR29, so we will consider the extent to which we will reflect the impact of non-delivery in performance commitments at that point in time.

Overlap with statutory obligations and enforcement action

7.45 Southern Water states that a significant number of PCDs overlap with existing obligations under statutory and other regulatory regimes. It states that this may give rise to overlapping penalties from enforcement action by Ofwat, as well as by the quality regulators (the Environment Agency, DWI and Natural England). Anglian Water points at the role the Environment Agency plays in ensuring delivery of WINEP. It states that the Environment Agency uses the Environmental Performance Assessment (EPA) to incentivise delivery and can take enforcement action where companies fall behind. Both companies suggest that this overlap means that the application of either non-delivery or time incentive PCDs is unnecessary or disproportionate.

7.46 Ofwat's PCD framework is a tool within the price control used to encourage timely delivery of output and return money to customers for non-encourage timely delivery of output and return money to customers for non-delivery. It does not enable Ofwat to impose financial penalties for failure to comply with legal obligations and is not part of Ofwat's enforcement function. Under section 22A of the Water industry Act 1991, we can impose a financial penalty on a company if they are breaching, or have breached, certain obligations we are responsible for enforcing. Financial penalties must be paid into the Consolidated Fund and are not returned to customers. As set out in our "statement of policy with respect to financial penalties" in setting penalties, we consider several factors in deciding whether to impose a penalty, and if so, what level of penalty.[509] This includes among other things that we will take into account the various regulatory mechanisms already in place that give companies an incentive to comply with the requirements.

7.47 PCDs are an ex-ante intervention which seeks to encourage timely delivery through the use of by using incentive payments. Timely delivery will avoid the need for any enforcement action in the first place. We consider that PCDs are a proportionate and necessary customer protection measure for PR24 given the scale of the step-up in investment compared to previous price reviews.

7.48 We consider that the possibility of enforcement action, on its own, will not fully address our concerns on non- or partial delivery because:

- Formal enforcement action might not be taken, or be appropriate, in all cases of non or partial delivery.
- Enforcement action will not necessarily protect customers by holding companies to account where improvements are not delivered according to the timing profile funded by customers. For example, such considerations are not necessarily relevant to environmental obligations that quality regulators such as the Environment Agency need to enforce.

[509] [OF-CA-267] Ofwat, Statement of policy with respect to financial penalties, jointly issued with the Secretary of State and Welsh Ministers, pp.4-6

- The outcome of any enforcement action may not be known in sufficient time to take into account in the next price review.

Overlap with Delayed Delivery Cashflow Mechanism

7.49 Anglian Water and Southern Water state that there is some duplication between PCDs and the Delayed Delivery Cashflow Mechanism (DDCM). Southern Water states that while the DDCM could theoretically avoid a duplicative effect with PCDs, Ofwat has failed to clearly present how this would be achieved and scope for duplication exists.

7.50 The DDCM is a mechanism that seeks to better align revenue allowances with actual spend during the control period. This is not a mechanism that will claw-back expenditure allowances or penalise companies for under delivery or underspend over the period. If there are any adjustments to revenue allowances that are applied in period as part of the DDCM, these will be reversed at the end of the period.

7.51 Non-delivery and time incentive PCDs will be reconciled at the end of the control period so there will be no duplication or double counting with the DDCM.

Issue 3 – Time incentive PCDs

Our final determinations

7.52 We apply time incentive PCD's to encourage companies to deliver 'on time' in selected areas of expenditure.[510] This is a two-way incentive to encourage timely delivery by rewarding on time delivery and penalising late delivery. This incentive is applied in addition to the non-delivery PCD.

7.53 We do not reward early delivery over and above timely delivery. We considered that providing additional rewards for early delivery could risk unintended effects, such as favouring traditional solutions over nature-based solutions.[511]

Issues raised by disputing companies

7.54 Anglian Water raised the following four concerns. It states that time incentives:

- Remove the company's ability to deliver work in the most efficient way and adopt best value solutions;
- Increase risk of non-delivery;

[510] Water supply, supply interconnectors, resilience interconnectors, metering, mains renewals, storm overflows and phosphorus removal.
[511] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.310

- Create perverse incentives, encouraging companies to deliver schemes that are no longer needed due to change of circumstances; and
- Incentivise companies to prioritise delivery of time incentive areas at the expense of other areas.

Our assessment

Flexibility of approach

7.55 Time incentives seek to encourage timely delivery of outputs.

7.56 We provide flexibility in the timing of delivery by applying time incentives to the output at the programme level. This means that rather than tracking the timing of delivery of output for a specific scheme, we track the aggregated output across all schemes within a programme. For example, for storm overflows, we track the total volume of equivalent storage and, for water supply, we track the total volume of water available for use. This provides companies the flexibility to offset delays in the delivery of certain schemes with early delivery of other schemes. Companies will break-even if they deliver 75% of the PCD output on time. This should provide companies with flexibility to manage delivery risks, including risks around land purchase and other factors that may be beyond their own control.

7.57 In areas where the pool of schemes is smaller such as water supply, supply interconnectors and resilience interconnectors, we allow a one-year grace period before late delivery penalties start to apply.[512] This should provide companies with additional headroom for them to manage delivery risks.

7.58 Anglian Water states that time incentives limit the company's ability to identify optimal and best value solutions. It states that they reduce the ability for companies to develop solutions that have beneficial changes to overall projects across the sector. Companies however have had time to develop best value solutions through the WRMPs, DWMPs and WINEP processes. We are not expecting significant delivery to be completed on most time incentive areas but until year three of the period. This should allow enough time for companies to identify and deliver the improvements that customers are paying for.

Facilitating deliverability of programme

7.59 Anglian Water states that the application of time incentive PCDs across the sector with similar delivery profiles could result in stretched supply chains, shortage of labour or increased costs for delivery, thus increasing the risk of companies not meeting the PCD. It also states that time incentives will require companies to incur expenditure earlier in

[512] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p. 313

a project but expose them to the risk of not receiving the funding if the PCD is not delivered on time or is delayed due to factors outside of the company's control.

7.60 We have set time incentives to support the deliverability of PR24.

7.61 For water related time incentive PCDs we apply these incentives to the companies' own delivery profile as set out in their business plans. For storm overflows and phosphorus removal, we have challenged companies to bring forward the delivery of output compared to business plans.[513] This is because delivery profiles in business plans were significantly backloaded towards the last two years of the period. We did not consider these profiles to be realistic given that:

- Companies tend to set profile to reflect WINEP statutory dates which typically are due at the end of the five-year period. These dates represent a regulatory backstop date rather than being reflective of when it would be optimal for companies to deliver schemes from a programme delivery perspective.
- Companies are likely to have greater delivery risks if they wait to deliver everything in the last two years of the period. This is likely to increase pressure on the supply chain. Delivery risks can be mitigated if companies make progress earlier in the period.

7.62 Some companies did propose delivery profiles that broadly match the profile we set out in final determinations.[514]

7.63 Time incentives will incentivise companies to speed up delivery and spread delivery more evenly across the period. This will reduce pressure on the supply chain and therefore reduce the risk of non-delivery and late delivery.

7.64 In its capital markets day, Severn Trent Water announced that it is forecasting to outperform its time incentive PCD targets and gain up to £50 million in on time delivery rewards.[515] We are also encouraged to see that Severn Trent is introducing innovations in its capital delivery programme that will allow it to cut delivery times by a significant amount. Severn Trent Water is one of the companies that presented a significant back loaded profile for storm overflows in its business plans and so an example of a company we applied a delivery profile challenge on. This supports our view that the delivery profiles we set at final determinations are achievable and will encourage companies to deliver to schedule.

Stopping inefficient investments

[513] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p. 311
[514] [OF-OA-027] Ofwat, PR24 final determinations: Price control deliverables appendix, p.67
[515] [OF-CA-204], Seven Trent Water, Transcript of James Jesic presentation, Severn Trent's Capital Markets Day, 5 March 2025

7.65 Anglian Water states that time incentives will encourage companies to deliver schemes that are no longer required.

7.66 We do not want PCDs to discourage companies from stopping investments that are not in the interest of customers to deliver. In response to queries from companies on our final determinations we set out further details on our approach. Where schemes are dropped because they are no longer required we will consider adjusting the company PCD output profile to avoid companies being penalised for this.[516] This will be subject to:

- the company providing compelling evidence that the investment is no longer required in the short and longer term. This is to avoid companies pushing investment to the next regulatory cycle to avoid time penalties.
- the overall impact of all scheme removals within a PCD should be material.

Prioritising timely delivery in selected areas

7.67 Anglian Water states that time incentives will encourage companies to prioritise delivery in areas of enhancement with time incentives potentially at the detriment of other areas.

7.68 Time incentives apply to almost half of the enhancement expenditure. We apply these incentives to areas with a large programme of work that companies can phase over time and where they can manage delivery risks.

7.69 Irrespective of whether time incentives apply or not, companies should meet their statutory obligations. We expect companies to meet all of their statutory dates and not just those within time incentive areas.

7.70 We consider that we have struck an appropriate balance between incentivising companies to deliver across the price review period, while providing companies with flexibility to choose how to do this.

Issue 4 – PCDs add a negative skew to balance of risks

Our final determinations

7.71 To balance the risks for companies, we set the late delivery incentive rate at three times the rate of that on time incentives. This is to reflect the relative proportions of late and on time delivery of enhancement projects based on PR19 WINEP delivery data.[517]

[516] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.313
[517] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p. 310

Issues raised by disputing companies

7.72 Anglian Water and Southern Water raised the following three issues in relation to the impact of PCDs on the balance of risk:

- Ofwat does not factor risk of non-delivery into analysis of balance of risks
- Time incentive rates are calibrated based on data which is not representative of AMP8 programme
- KPMG study indicates that 60% of projects are delivered on time (rather than the 75% implied by time incentive rates)[518]

7.73 Southern Water further states that delivery risks for the company are higher compared to other companies given that it faces significant exposure to ecological characteristics which make operating and delivering projects more challenging.

Our assessment

Risk of non-delivery

7.74 Anglian Water and Southern Water state that our analysis of the impact of PCDs on the balance of risks ignores non-delivery PCDs.[519] They state that non-delivery PCDs are inherently asymmetric as there is no countervailing opportunity to earn more than the allowed revenue for over-delivery.[520] They further state that although a delivery buffer of a few months from the start of AMP9 is provided before a claw-back applies, it is unclear how Ofwat would disallow a clawback.[521]

7.75 While Anglian Water and Southern Water emphasise that non-delivery PCDs allow for a delivery buffer of only a few months from the start of AMP9 before a claw-back applies, non-delivery PCDs provide companies with five years for them to deliver PCD outputs. It is for companies to manage delivery risks. We expect companies to plan to deliver outputs well ahead of the end of the five year period. In the event that companies fail to deliver a PCD output by the end of the period, we will not apply claw-back if the company is expecting to deliver the PCD output within a few months from the start of the next period. We consider that this gives companies enough time for them to manage delay risks within each PCD.

[518] Northumbrian Water, South East Water and Wessex Water also mention the KPMG study in their statement of case and suggest that the risk analysis conducted by KPMG is more appropriate than Ofwat's.
[519] [OF-OA-001] Anglian Water, Statement of Case, p.159 (s594); [OF-OA-003] Southern Water, Statement of Case, p.341 (s64)
[520] [OF-OA-001] Anglian Water, Statement of Case, p.159 (s594); and [OF-OA-003] Southern Water, Statement of Case, p.341 s(64)
[521] [OF-OA-001] Anglian Water, Statement of Case, p.159 (s594); and [OF-OA-003] Southern Water, Statement of Case, p.341 (s64)

7.76 As set out in paragraph 7.21, if companies expect to deliver a PCD output significantly later than the end of the period we will consider whether to extend the PCD for non-delivered elements and introduce a time penalty for these elements in PR29. We used this approach for PR19 WINEP carry over schemes in our final determinations.

7.77 In summary, for an efficient company managing delivery risks effectively we would not expect to apply a claw-back unless company is not planning to deliver a PCD output. If not planning to deliver an output, the company should not be spending allowances associated with this output. Clawing back these allowances therefore should not introduce a downside risk for an efficient company. It removes the upside that companies currently enjoy as they can keep the cost savings from not delivering a funded improvement (subject to cost sharing). We consider that applying a claw-back for non delivered outputs is consistent with providing companies with a balanced incentive package.

Calibration of time incentive rates

7.78 Anglian Water and Southern Water do not consider it appropriate to calibrate incentives rates based on PR19 delivery data. Anglian Water asks for this to be based on forward looking data.[522] Southern Water argues that many of the PR19 WINEP schemes are low complexity and relate to short duration projects.[523] It refers to the WINEP programme as an example, where it states that schemes included installing monitors at WTWs (42% of schemes) and investigations into the presence of monitors at WTWs (17% of schemes). The company argues that this is not a representative sample of the significantly more complex PR24 enhancement programme.

7.79 The activities that companies will need to carry out in PR24 are similar to those carried out in PR19. For example, in PR19, companies have been installing meters, mains renewals, interconnectors, storm tanks and wastewater treatment upgrades. Companies will continue carrying out these activities in PR24. Monitoring and investigation actions will still account for more than two thirds of WINEP actions in PR24.

7.80 We recognise that the scale of these activities will grow in PR24. However companies have been learning from PR19 delivery as well as from the delivery in previous periods. We expect companies to enhance their delivery capabilities over time as they learn and test new approaches. PR19 delivery was particularly challenging for companies given COVID and supply-chain disruptions caused by the war in Ukraine and Brexit. This could arguably overstate the extent of late delivery in future periods.

[522] [OF-OA-001] Anglian Water, Statement of Case, p.159 (s595)
[523] [OF-OA-003] Southern Water, Statement of Case, p.343 (s74)

7.81 Companies did not face time incentive PCDs in PR19. This means that companies may not have had the same incentives to deliver on time as they will in PR24. This is demonstrated by the difference in performances between companies which had some financial incentives to deliver on time in PR19 and those which not. In PR19 some companies[524] had a bespoke performance commitment (PC) on their WINEP delivery. This provided them with financial incentives to deliver their WINEP programme in a timely manner. Our analysis of PR19 WINEP delivery data suggests that companies with a bespoke WINEP PC performed significantly better than those without a bespoke WINEP PC. The table below shows that companies with a bespoke WINEP PC deliver to schedule c.90% of the times compared to the 76% average across all companies. This also suggests that our estimate of on time delivery may be conservative for PR24.

Table 23: Frequency of on time delivery for companies with bespoke WINEP PC[525]

	% of on time delivery
Anglian Water	92%
Bristol Water	92%
SES Water	96%
South East Water	88%
Sector	76%

7.82 Our view that our calibration of time incentive rates may be conservative for PR24 is further supported by Severn Trent Water's recent announcement that it plans to earn £50 million from time incentive PCD outperformance in PR24.[526]

KPMG study

7.83 Southern Water refers to an analysis conducted by KPMG,[527] This analysis looks at projects within its infrastructure database that most closely reflect the characteristics of the PR24 capital programme.[528] Based on this, KPMG concludes that 60% of capital projects are delivered on time, lower than the 75% implied by our time incentive rates.

7.84 In our final determinations we expressed concerns about the sample of projects used by the KPMG study.[529] The study looks at 57 projects across eleven countries. Of these 57

[524] Anglian Water, Bristol Water, SES Water and South East Water.
[525] [OF-CA-068] Ofwat, PR19 WINEP Delivery, April 2025
[526] [OF-CA-204] Severn Trent Water, Transcript of James Jesic presentation, Severn Trent's Capital Markets Day, 5 March 2025
[527] See section 8.2.3 of KPMG, PR24 Final Determinations – risk analysis for a notional company, 24 January 2025.
[528] [OF-OA-003] Southern Water, Statement of Case, p.343 (s75).
[529] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.310

projects, 12 focus on the water sector. The remainder 45 projects are infrastructure projects in industries such as rail, road and aviation.

7.85 The projects in the KPMG study are mainly large and major projects with an average cost of £36 million for 27 projects (Cluster 1), £433 million for 14 projects (Cluster 2) and £1,371 million for 15 projects (Cluster 3). The average and median cost of schemes in PR24 are shown in Table 24 for selected time incentive areas.[530] This shows that the typical PR24 project has a cost of less than £10 million. This is significantly less than the cost of the projects considered by the KPMG study.

Table 24: Average and median cost of AMP8 schemes in selected areas of expenditure[531]

	Number of schemes	Average scheme cost	Median scheme cost
Water supply	101	25.3	9.9
Supply interconnectors	19	82.3	45.7
Storm overflows	2884	4.0	2.1
Phosphorus removal	924	5.0	4.0
Total	3,842	5.2	2.5

7.86 By contrast PR19 delivery looks more representative of PR24. The table below shows the unit costs for similar areas of expenditure. It shows that schemes in PR19 and PR24 are more similar in size compared to the sample in the KPMG study.

Table 25: Average and median cost of AMP7 schemes in selected areas of expenditure[532]

	Number of schemes	Average scheme cost	Median scheme cost
Water supply[533]	47	36.5	4.7
Supply interconnectors	34	40.0	15.6
Storm overflows[534]	517	3.1	0.9
Phosphorus removal	761	3.9	2.5
Total	1358	5.7	1.9

[530] We have not included data for metering and mains renewals which are routine activities and are not comparable to infrastructure projects in terms of unit costs.
[531] [OF-CA-066] Ofwat, Average WINEP scheme expenditure, April 2025
[532] OF-CA-066] Ofwat, Average WINEP scheme expenditure, April 2025
[533] Ofwat, Response to Statement of Case,
[534] PR24 FD CA55 Wastewater storm overflows enhancement expenditure

7.87 In its updated report, KPMG tried to address our concern on the sample of projects used by the study. The report states that AMP7 performance was collected for completed schemes for four water companies (Anglian Water, Southern Water, South East Water and Thames Water). Based on this data the report concludes that the average performance indicated by the infrastructure database used by its study is reasonably in line with empirical sector performance.

7.88 We have the following concerns in relation to the additional analysis conducted by KPMG:

- **The sample of projects is small compared to the size of PR19 programme**. For example, for Thames Water, the analysis includes 33 projects. This compares to 627 completed schemes within its WINEP programme. We do not know how KPMG or the companies have selected the projects within the sample.
- **A significant number of projects are AMP6 rather than AMP7 projects**. For example for Southern Water, 92 out of the 102 schemes are AMP6 schemes. These are carry over schemes which are already late or are multi-AMP scheme and thus more complex than those for which we apply time incentives in PR24.
- **Many of the projects have missing data on start and completion dates**. For example, 341 out of 592 projects included for Anglian Water have missing actual completion dates, despite having cost data.
- **Quality of data on dates is questionable**. For example, for Southern Water projects, actual start dates are always 1 April and actual completion dates are always 31 March. This is highly unlikely.
- **Project delays are calculated incorrectly**. Rather than calculating delays by comparing actual completion date to the planned completion date, KPMG compares the actual duration of the project to the planned duration of the project. This means that the analysis will show delays if the duration of the project is extended even if the project still meets the desired date to be in service.

Southern Water's specific ecological characteristics

7.89 Southern Water states that it faces significant exposure to ecological characteristics (protected habitats and ecosystems, areas of outstanding natural beauty) which make operating and delivering projects more challenging compared with other areas in the country, and necessitate the delivery of novel and complex schemes in AMP8. The company states that its enhancement programme includes novel schemes for storm overflows and wastewater treatment, and technically complex solutions to address supply demand balance deficit (given significant drought pressure and proportion of protected ecosystem in the South East region).

7.90 The company however did not provide evidence to demonstrate that the ecological characteristics it faces are more challenging than for other companies. There are other companies in the South East region and elsewhere in the country that face similar challenging ecological characteristics.

7.91 The solutions that the company will deliver in AMP8 are not more complicated than those which other companies will deliver during this period. For example, on water supply schemes, the company will deliver 80% of the funded AMP8 benefit through low and medium complexity solutions.[535] By comparison, Severn Trent Water will deliver 80% of the funded AMP8 benefit through treatment solutions which have a higher complexity.

7.92 Where a company is delivering a more complicated solution we have provided a higher allowance. For example, for storm overflows, we provided Southern Water with 170 million additional allowances through our deep dive process (compared to what the company would have received through our modelled approach).

Issue 5 – PCD reporting should be simplified

Our final determinations

7.93 Given the significant step up in investment in PR24 compared to previous price review periods, we are enhancing the transparency of what companies deliver and increase the frequency at which we collect delivery data.[536]

7.94 We asked companies to publish a delivery plan showing how they will meet their PCD targets and interim milestones. We asked companies to report on progress against delivery plan on a six-monthly basis in October/November and April/May of each year. We also asked companies to submit an independently assured report of their progress against their delivery plan in July each year, alongside their annual performance reporting.[537]

7.95 For Southern Water and Thames Water we are applying greater oversight to address our deliverability concerns. We asked the companies to publish a delivery action plan setting out the actions they need to take to expand their delivery capabilities and get them to a position where they can deliver their programme in full. We also requested

[535] [OF-CA-139] Ofwat, Water – Supply; enhancement expenditure cost model, February 2025, PCD Analysis Tab
[536] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.351
[537] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, pp.351-353

these companies to report against delivery plan and delivery action plan up to every quarter of each year.[538]

Issues raised by disputing companies

7.96 Anglian Water and Southern Water raised the following three issues:

- Six-monthly reporting is onerous and ask for reporting to be once a year;
- Granular information should be requested for companies or enhancement areas that are 'off-track' or show delayed delivery; and
- Reporting and assurance requirements will add significant administrative burden to Ofwat and companies.

Our assessment

Purpose of our delivery monitoring regime

7.97 To improve the accountability of companies and to encourage them to deliver the significant investment in PR24, we are increasing the transparency over what companies need to deliver and the progress they make on delivery over the control period.

7.98 We will do this by asking companies to set out delivery plans and report progress against these plans on a six-monthly basis. As part of the delivery plan, we are asking companies to set out the profile of delivery of PCD outputs. Where delivery of PCD outputs is back-loaded towards the end of the period we are asking companies to set out interim milestones so we can track progress early in the period. Where companies are not on track to deliver their PCD outputs we are asking them to identify the root causes of delay and the actions they are taking or planning to take to get them back on track.

7.99 Delivering PR24 will require companies to work in partnership with third-parties, including the supply chain, other regulators, local and central governments. Having visibility of up to date data on what companies are expecting to deliver will be important to maximise the deliverability of PR24. Up to date data on delivery output profiles could help the supply chain be better prepared to address the requirements of the sector and make adjustments where needed. It could also help other regulators local and central governments identify delivery risks that could be mitigated by their own actions early in the period. Therefore, frequent delivery data reporting will enable companies and stakeholders take actions in a timely manner to support the delivery of PR24.

[538] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, pp.334-335

Frequency of reporting

7.100 Anglian Water and Southern Water stated that six-monthly reporting is too onerous and asked for reporting to be once a year.

- Anglian Water questioned the value added by the six-monthly reporting, stating that these reports take up valuable time and resource.
- Southern Water stated that Ofgem requires energy companies to report on the delivery progress of all PCDs on an annual basis.

7.101 Our delivery monitoring regime has a wider purpose than just reconciling PCDs. As stated above the main purpose of this monitoring regime is to allow us and stakeholders track progress of delivery across the wider PR24 programme, and to identify early warning signs of potential delivery risks. We consider that six-monthly reporting is necessary to achieve this objective. Yearly data will not allow us and other stakeholders to act in a timely manner and therefore maximise delivery of PR24. For companies where we have additional delivery concerns (ie, Southern Water and Thames Water) we are requiring quarterly reporting.

7.102 The six-monthly reporting will be particularly important for the initial years of the 2025-30 period. In final determinations we said that after these initial years we will consider whether the six-monthly reporting is no longer required for those companies that are showing good progress on delivery. We will consider this as part of our annual delivery assessments.[539]

Granularity of reporting

7.103 Anglian Water asks for granular reporting to be only required for companies or enhancement areas that are 'off-track'. It states that Ofgem's RIIO-3 methodology decision requires lighter touch reporting from companies in relation to mechanistic PCDs. It asks Ofwat to consider a similar reporting arrangement for high-volume low-value PCDs. Southern Water also refers to Ofgem's approach to only require a high-level PCD report in the first instance and a more extensive report in the event of delayed delivery.

7.104 Our approach to delivery plans already flexes the granularity of information required based on materiality of costs and delivery concerns. Delivery plans require companies to show progress on delivery in expenditure areas which are subject to PCDs. PCDs are applied to material areas of investment, and so delivery plans already focus on those areas which are most cost material or where delivery concerns have been identified. We are also requiring reporting against interim milestones only for those PCD areas where output is back loaded towards the end of the period. This means that companies will not

[539] [OF-OA-022] PR24 final determinations: Expenditure allowances, February 2025, p.353

have to report on interim milestones for PCDs such as metering, mains renewals, investigations and monitors.

7.105 We consider it important that consistent delivery data is collected across the whole sector. Collecting this data for a subset of companies would defeat the purpose of the regime which is to track delivery of PR24.

7.106 Anglian Water also stated that the requirement for ex ante consent for changes to PCDs is inefficient and inflexible and that this will slow down delivery times. We do not agree with the company that we are requesting companies to secure consent from us before they can make changes to their programme. Companies are free to make the changes they want to their programme at any time during the control period. We are only asking companies to inform us of these changes (where material) for the purpose of supporting the assurance process and the reconciliation of PCDs at the end of the period.[540]

Administrative burden

7.107 Anglian Water and Southern Water express concerns about the administrative costs that the reporting and assurance requirements will entail. Anglian Water states that it is forecasting to spend at least [redacted] in PR24 to comply with these requirements, of which [redacted] is for assurance. It further states that these costs are not remunerated through base expenditure allowances.

7.108 For PR24 we are setting enhancement expenditure allowances of £44 billion. This is around four times the level of enhancement expenditure in PR19. The reporting and assurance requirements that we are applying through the delivery plans are needed to maximise the deliverability of PR24 and provide assurance that companies are using the additional allowances to deliver the benefits that customers are paying for.

7.109 To keep the data requirements proportionate we engaged with companies (during the first three months of 2025) to understand the delivery data that companies already collect through their own project management systems.[541] The purpose of this was to align the data requirements to the data companies already collect. We had good engagement with companies and the vast majority of them confirmed that the data requirements can be met with the information they already collect.[542]

7.110 Regarding the administrative costs of these reporting requirements, Anglian Water does not provide the costs it incurred to comply with the reporting and assurance

[540] [OF-OA-026] Ofwat, PR24 final determinations: Expenditure allowances – Assurance requirements for delivery of enhancement schemes, pp. 11-13
[541] We held a workshop with companies on 12 February 2025. Drawing on this workshop we issued further guidance on delivery plans in early March 2025
[542] [OF-CA-205] Ofwat, Summary note of delivery plan workshop, p.7

requirements in PR19. Therefore we cannot ascertain the relative increase in administrative costs from PR19 to PR24. Even if the £10 million costs (cited by the company) are purely incremental to the reporting and assurance of delivery plans (which is unlikely given that companies have told us that the information requested will be collected by companies anyway for their own project management purposes), this represents a small fraction (0.2%) of the company's £5 billion PR24 enhancement programme.[543] Assurance of what companies deliver in PR24 will be critical to maintaining stakeholder trust and confidence in the water sector.

7.111 To reduce the administrative burden on companies we have been engaging with the Environment Agency, Natural England, DWI and Natural Resources Wales, to discuss how we join up in monitoring delivery of PR24. We will continue to work with our fellow regulators to make sure we maximise information synergies and minimise the duplication of information requested from companies. We will also continue to work with the sector to further develop our approach to monitoring delivery of PR24.

Price control deliverables – Area specific

Our final determinations

7.112 In our final determinations we have set out our approach to setting PCDs and have identified requirements for the delivery of PCDs[544]. We provide a summary of our final determinations for the PCD areas raised by the disputing companies below.

Issues raised by disputing companies

7.113 Anglian Water, Northumbrian Water and Southern Water raise six concerns for the following five PCD areas:

- For metering PCD Anglian Water requests the removal of distinction in existing meters upgrades between household and non-household meters[545].
- For lead PCD Northumbrian Water requests substitution between internal, external and communication supply pipes546. Anglian Water argues that the lead PCD focuses on the number of pipes replaced annually, rather than allowing for risk-based prioritisation[547].

[543] [OF-OA-006] Ofwat, PR24 final determinations: overview of Anglian Water's PR24 final determination, April 2025, p.7
[544] [OF-OA-027] Ofwat, PR24 final determinations: Price control deliverables appendix, February 2025, pp.10-16
[545] [OF-OA-001] Anglian Water, Anglian Water PR24 CMA Redetermination Statement of Case, March 2025, p. 159 (p590)
[546] [OF-OA-002] Northumbrian Water, Northumbrian Water PR24 CMA Redetermination Statement of Case, March 2025, p. 136 (p522)
[547] [OF-OA-001] Anglian Water, Anglian Water PR24 CMA Redetermination Statement of Case, March 2025, p. 159 (p591)

- For Cyber (NIS) PCD Southern Water requests more flexibility in the PCD in terms of output and/or delivery dates[548]. The company states that this is due to our framework where the entire allowance is clawed back following a failure to deliver a PCD output by Ofwat's prescribed date[549].
- For storm overflows PCD Southern Water has concerns with our approach to measure equivalent storage for non storage solutions[550].
- For phosphorous (P) removal PCD Southern Water argues that PCD payments overlap with penalties from other regulators following a failure to deliver this PCD on time[551].

Issue 1 – Metering PCD

Our final determinations

7.114 In our final determinations we set out the requirement for the delivery of PCD outputs for metering[552]. The PCD tracks new meter installations, meter upgrades and meter replacements. We split the meter upgrades into household and non-household meters to hold companies to delivering both meter types. Company can substitute up to 25% of upgrades to existing meters in non-household properties with upgrades to existing meters in household properties[553].

7.115 We apply time incentive performance payments to the yearly profile of delivery for each deliverable type. This aligns with our proposal to not allow flexibility for companies to substitute between new installations, upgrades and meter replacements. For meter upgrades, we apply time incentives to the overall number of meter upgrades and do not apply these separately to household and non-household meters[554].

Issues raised by disputing companies

7.116 Anglian Water has concerns with our approach to allow substitution upgrades in existing meters between household and non-household properties. The company states that the smart metering PCD specifies the type of customer meter to be installed (e.g. household and non-household) despite not distinguishing between these types of

[548] [OF-OA-003] Southern Water, Southern Water PR24 CMA Redetermination Statement of Case, March 2025, pp. 338-339
[549] [OF-OA-003] Southern Water, Southern Water PR24 CMA Redetermination Statement of Case, March 2025, p. 339
[550] [OF-OA-003] Southern Water, Southern Water PR24 CMA Redetermination Statement of Case, March 2025, p. 337
[551] [OF-OA-003] Southern Water, Southern Water PR24 CMA Redetermination Statement of Case, March 2025, pp. 357-358
[552] [OF-OA-027] Ofwat, PR24 final determinations: price control deliverables appendix, February 2025, p. 158
[553] [OF-OA-027] Ofwat, PR24 final determinations: price control deliverables appendix, February 2025, p. 158
[554] [OF-OA-027] Ofwat, PR24 final determinations: price control deliverables appendix, February 2025, p. 156

meter in the cost model that determines cost allowances. Anglian Water argues that this PCD should be simplified to count meters installed[555].

Our assessment

7.117 In our final determinations we recognised that, despite our analysis not identifying a cost difference between household and non-household meters, non-household meters can deliver more benefits in water demand reductions than household meters[556]. Some stakeholders, including MOSL and Strategic Panel expressed concerns that companies could prioritise the delivery of household meters over non-household meters.[557] To address these concerns and to encourage companies to deliver the mix of meter upgrades presented in WRMPs and therefore the benefits that customers are paying for we decided to split the number of meter upgrades in the PCD by meter type.[558]

7.118 Due to the potential for non-household meters to deliver greater reductions in water demand, we want companies to be able to go beyond their initial plan and deliver more non-household meters where appropriate to do so. Therefore we allow companies to swap household meters for non-household meters without a PCD claw-back kicking-in.[559] However we only allow companies to swap up to 25% of non-household meters for household meters to make sure that companies install most of the non-household meters included in their business plan.[560]

Issue 2 – Lead PCD

Our final determinations

7.119 In our final determinations we set a PCD for companies to meet lead standards in accordance with the Water Supply (Water Quality) Regulations 2016 for England and the Water Supply (Water Quality) Regulations 2018 for Wales over the 2025-2030 period, insofar as those regulations relate to the reduction or elimination of lead contamination in drinking water. The PCD tracks progress on the number of lead communication, external and internal supply pipes replaced or relined for water quality purposes[561].

7.120 We assess lead supply pipe replacement costs for schools separately to those for other property types. This is to reflect the higher costs expected for replacing lead supply

[555] [OF-OA-001] Anglian Water, Anglian Water PR24 CMA Redetermination Statement of Case, March 2025, p. 159 (p590)
[556] [OF-OA-027] Ofwat, PR24 final determinations: price control deliverables appendix, February 2025, pp. 150-151
[557] [OF-OA-027] Ofwat, PR24 final determinations: price control deliverables appendix, February 2025, p. 150
[558] [OF-OA-027] Ofwat, PR24 final determinations: price control deliverables appendix, February 2025, p. 151
[559] [OF-OA-027] Ofwat, PR24 final determinations: price control deliverables appendix, February 2025, p. 151
[560] [OF-OA-027] Ofwat, PR24 final determinations: price control deliverables appendix, February 2025, p. 151
[561] [OF-OA-027] Ofwat, PR24 final determinations: price control deliverables appendix, February 2025, p.168

pipes in schools[562]. Therefore, the non-delivery PCD tracks supply pipe replacements in schools separate from other property types.

7.121 The company cannot substitute between deliverable types. The company needs to deliver the full quantity funded for each deliverable type[563].

Issues raised by disputing companies

7.122 The disputing companies raised the following two issues:

Northumbrian Water states that the PCD for lead replacement lacks flexibility[564]. The company states that our PCD does not allow for either additional activity, or flexibility between the different components of lead replacements. Northumbrian Water states that it is likely that they will find a different distribution between these components when they discover lead pipes in practice. The company therefore states that it would be sensible to allow for the possibility that they do more of one type of activity and less of another, rather than restricting activity once they have met the individual quotas for different types of lead pipes.
Anglian Water states that the lead PCD focuses on the number of pipes replaced annually, rather than delivering the optimal health outcomes.[565]

Our assessment

Flexibility of approach

7.123 The main purpose of the PCD is to protect customers from non-delivery or under delivery. Customers are providing funding at different unit cost rates for companies to deliver the different lead pipe replacement activities. We are concerned that allowing flexibility will financially incentivise companies to deliver the cheaper replacement types and not fully remove all segments of lead pipes from the addressed premises. Therefore, we do not allow for substitution between lead pipes based on their replacement types.

7.124 PCDs are a protection mechanism rather than a tool to incentivise companies to outperform and deliver more outputs than funded. We are setting allowances for companies to trial approaches to reduce exposure of lead to customers from drinking water. We consider that these allowances will provide sufficient funding for companies to perform this activity. For these reasons we do not consider it appropriate to put in

[562] [OF-OA-027] Ofwat, PR24 final determinations: price control deliverables appendix, February 2025, p.167
[563] [OF-OA-027] Ofwat, PR24 final determinations: price control deliverables appendix, February 2025, p.168
[564] [OF-OA-002] Northumbrian Water, Northumbrian Water PR24 CMA Redetermination Statement of Case, March 2025, p. 136 (p522)
[565] [OF-OA-001] Anglian Water, Anglian Water PR24 CMA Redetermination Statement of Case, March 2025, p.159 (p591)

place an uncertainty mechanism to provide further enhancement allowances where companies go beyond their business plan in relation to its lead reduction activities.

Deliverable

7.125 We consider that holding companies to the number of lead pipes replaced is appropriate. This is a transparent measure that allows us and stakeholders to track what companies deliver with the enhancement allowance provided. This is also the driver we used to assess the efficiency of costs included in company business plans. Therefore, the protection provided by the PCD based on number of lead pipe replacements is directly linked to company funding.

7.126 We do not consider that PCD should track progress by looking at health outcomes as suggested by Anglian Water. Customers have paid for lead pipe replacements. Improved health outcomes could be met by increased orthophosphate dosing. This however is a short term solution whereas lead pipe replacement is a long term solution.

7.127 We disagree with Anglian Water that PCD tracks number of lead pipe replacements on an annual basis. Non-delivery PCDs track delivery by the end of the control period rather than on an annual basis. We have set out the annual profile of these replacements for monitoring purposes. As set out in our draft PCD reconciliation model, we will calculate adjustments on allowances from PCDs based on the cumulative quantity of PCD output delivered by the end of 2029-30.

Issue 3 – Cyber (NIS) PCD

Our final determinations

7.128 In our final determinations we set a PCD for all companies to meet their obligations under the Network and Information Systems (NIS) Regulations 2018[566] and the requirements to be resilient against 'limited capability attacks' by March 2025 and against 'moderate capability attacks' by March 2028, following Government guidance[567] and DWI requirements[568].

7.129 We apply a non-delivery PCD specific to each DWI legal instrument where enhancement allowances have been made, regardless of materiality, to monitor performance across the sector, promote timely delivery for customers and meet regulatory expectations.

[566] [OF-CA-206] UK Government, The NIS Regulations, 2018
[567] [OF-CA-207] National Cyber Security Centre, Cyber Assessment Framework, 2025
[568] [OF-CA-208] Drinking Water Institute, Drinking Water Standards and Regulations

7.130 We adopt a common PCD approach to all DWI legal instruments and acknowledged actions that also apply to our approaches to Water Quality and Security (SEMD) PCD's. Our approach is as follows:

- We apply a non-delivery unit rate specific to each legal instrument (one per company).
- Where the legal instrument is not met by the end of the 2030-35 period (AMP9), the full allowance will be clawed-back.

7.131 For the legal instrument to be deemed delivered, we expect the company to secure confirmation from DWI that the legal instrument has been completed to the DWI's satisfaction.

Issues raised by disputing companies

7.132 Southern Water raises the following two issues:

- The PCD does not provide flexibility to implement changes agreed with the DWI.
- Any delay in agreeing changes will impact the final delivery of the PCD.
- PCD claw-back applies to whole programme funding regardless of number of non-delivered schemes.

Our assessment

Flexibility of approach

7.133 Southern Watern states that companies still need to agree on what needs to be delivered with DWI. It explains that its cyber projects are currently in the discovery phase and that it will not be able to agree the required delivery outputs with the DWI until the end of this phase. The company also states that the notified item mechanism may provide for additional allowances to accommodate within-AMP changes. However, it argues that this will not provide sufficient assistance with the challenge they face in satisfying the singular deliverable under the PCD in circumstances where the relevant delivery outputs have changed materially.

7.134 We disagree with Southern Water's statement that our approach to the cyber PCD is not flexible in terms of output. We have not prescribed the specific outputs or actions that the company needs to carry out. Instead we are holding the company to meet the legal instrument to the satisfaction of the DWI. This provides flexibility for the company and DWI to agree on the outputs that need to be delivered as part of the legal instrument. It also allows for these outputs to change within the period.

7.135 It is at Southern Water's discretion to define the scope of actions within the legal instrument and agree with DWI for the delivery of these actions. The company

understands and accepts the risks of the acknowledged actions because they have been agreed with the DWI. We would expect Southern Water to maximise its cyber resilience programme within the cyber allowance as it is receiving £71 million more than the average sector allowance.

7.136 We recognise that cyber resilience is an emerging and fast-moving area. We consider that it is critical that water companies are resilient against cyber threats to allow the continued supply of drinking water. Thus, in our final determinations we include an uncertainty mechanism in the 2025-30 period. This uncertainty mechanism will apply to any significant increase in costs due to any new or changed legal requirements on cyber security or changes in relation to the level of threat. By significant we consider the costs would need to exceed the shallow dive threshold of 0.5% of relevant wholesale totex or £10 million[569]. If these changes arise, we will undertake an in-period assessment of additional costs, and where costs are material, we will allow additional costs to be recovered in period. If costs are not material, then we will allow them to be recovered at the end of the period. Thus, Southern Water can use this mechanism to request additional allowance if needed to deliver its agreed actions with DWI.

Impact of delays

7.137 The company states that any delay in agreeing the required delivery outputs with the DWI could impact the final delivery of the PCD.

7.138 The regulatory date for companies to meet the legal instrument is 2031-32. This goes beyond the AMP8 period. This means that companies have until the end of 2034-35 to deliver actions agreed within the legal instrument. This gives companies 10 years to meet their Cyber PCD. Thus, PCD provides companies with sufficient time to accommodate any changes agreed with the DWI and deliver all the actions covered by the legal instrument. We are not expecting to set additional expenditure allowances in PR29 (over and above the uncertainty mechanism) for companies to deliver these actions.

7.139 It is each company's duty to improve the cyber resilience of its systems, technology and processes and to meet its statutory obligations and DWI legal instruments and agreed actions.

Clawback application

7.140 Southern Water states that if the DWI does not sign-off a single action specified in the legal instrument at the prescribed delivery date, then it needs to return its full allowance, regardless of the costs incurred in other actions.

[569] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.241

7.141 As the company states, there is still uncertainty around what needs to be delivered as part of the company's Cyber legal instrument. We have therefore designed a PCD that allows flexibility for this output to be defined in period while protecting customers from non-delivery. We have also introduced an uncertainty mechanism that will provide companies with additional revenue if there is a significant increase in costs due to any new or changed legal requirements on cyber security or changes in relation to the level of threat. The PCD holds companies to meeting the legal instrument over a period of 10 years.

7.142 Given the flexibility built within the PCD and the importance that companies improve their cyber security to reduce the risk that customers suffer interruptions in supply as a result of cyber-attacks, we consider that clawing-back the full allowance if companies fail to meet their cyber security legal instrument by 2034-35 is proportionate and reasonable.

Issue 4 – Storm overflows PCD

Our final determinations

7.143 In our final determinations we set enhancement allowances for all wastewater companies to support storm overflow investments required to achieve a target spill frequency. We use scheme level econometric cost models to assess grey and grey-green hybrid storage solutions[570]. We assess costs of green only solutions through a separate deep dive process[571].

7.144 The storm overflows PCD holds companies to delivering the schemes and equivalent storage funded in final determinations. We use the econometric models and deep dives to assess if a non-delivery PCD adjustment is needed at the end of the control period. We do this by applying the model parameters used in final determinations to the equivalent storage delivered by companies. We will assess the delivery of equivalent storage for deep dive schemes separately.

7.145 At final determinations we state that equivalent storage can be delivered through grey schemes such as storage tanks, green schemes which can include a range of sustainable urban drainage systems (SuDS) features and grey-green hybrid schemes which comprise of a mix of grey and green solutions[572]. We allow flexibility for companies to deliver equivalent storage through a combination of grey and grey-green hybrid solutions[573]. All WINEP enhancement schemes must be designed to meet the

[570] [OF-OA-023] Ofwat, PR24 final determinations: Expenditure allowances – Enhancement Cost Modelling appendix, February 2025, pp.30-61
[571] [OF-OA-023] Ofwat, PR24 final determinations: Expenditure allowances – Enhancement Cost Modelling appendix, February 2025, pp.30-61
[572] [OF-OA-027] Ofwat, PR24 final determinations: price control deliverables appendix, February 2025, p. 68
[573] [OF-OA-027] Ofwat, PR24 final determinations: price control deliverables appendix, February 2025, p. 68

Storm Overflow Discharge Reduction Plan spill frequency target by 2035 if a high priority site, or 2050 if not high priority. If delivering schemes not in the WINEP, or are being delivered in Wales, the scheme must be delivered as a modular solution with a plan to meet 10 spills, or other spill frequency target, by the required date.

7.146 We apply time incentives penalties on the profile of equivalent storage (in m^3) at an aggregate level across all solution types. This will enable companies to manage delivery risks across the whole storm overflows programme, while encouraging them to the deliver the total amount of equivalent storage on a timely basis.

Issues raised by disputing companies

7.147 Southern Water raises the following three issues:

- Ofwat has not provided detailed guidance for how equivalent storage should be measured. Southern Water state that equivalent storage will be measured using traditional storage volume (m3) and calculation methods for non storage solutions. For non storage solutions, the company argues that our final determinations provide that equivalent storage will be calculated by running a hydraulic model with the solution included within the model and assessing the extent to which the storage requirement to meet the Storm Overflows Discharge Reduction Plan (SODRP) target is reduced. The company states that Ofwat has not provided detailed information to support its calculation of equivalent storage, particularly in respect of how the proposed hydraulic model should be applied to various non-storage solutions, including sewer lining, surface water separation and sustainable drainage systems.
- Spill reductions required are much more significant than at the point it prepared its SOAP. Southern Water states that that its Storm Overflow Action Plan (SOAP) data was submitted in October 2023, which set out plans for reducing spill frequency according to SODRP targets based on 2021 and 2022 spill frequencies. The company also states that due to 2023 and 2024 data being exceptionally wet, they are required to meet spill reductions that are much more significant than that they originally proposed.
- The equivalent storage measure will incentivise the delivery of grey solutions. Southern Water states that due to there being no established method of evaluating non-storage solutions, it will incentivise grey end of pipe storage solutions at treatment works to reduce deliverability risk. In relation to this the company additionally states that the modelling required to demonstrate equivalent storage delivered for Ofwat's PCD metrics will increase costs considerably.

Our assessment

Equivalent storage measurement

7.148 Southern Water states that Ofwat has not provided detailed guidance for how equivalent storage should be measured, particularly in respect of how the proposed hydraulic model should be applied to various non-storage solutions, including sewer lining, surface water separation and sustainable drainage systems.

7.149 In our final determinations we set out our expectations for how companies should measure equivalent storage for the purposes of PCD.

7.150 For traditional storage solutions, equivalent storage should be measured as the volume of storage and capacity increase required to meet the target spill frequency set by the Storm Overflow Discharge Reduction Plan (for EnvAct_IMP2 and EnvAct_IMP4 this is the lower of the number required to meet UPM FIS and 99 percentile standards or no more than 10 times per year over a 10 year period)[574].

7.151 For non storage solutions (such as sewer lining, surface water separation and sustainable drainage systems), equivalent storage should be calculated by running a hydraulic model with the alternative solution included within the model, and assessing the extent to which the storage requirement is reduced. Equivalent storage must be assessed against the storage volume required at the storm overflow, and not using theoretical conversion rates based on area removed, unless the impact of the alternative works on the required storm overflow storage volume can be clearly demonstrated.[575]

7.152 When developing a hydraulic model it is expected that during verification, sewer systems that are impacted heavily by sewer infiltration are identified and infiltration included within the model to replicate the observed infiltration. This is standard practice, as outlined in CIWEM UDG Code of Practice, 2017.[576] Therefore, sewer lining can be replicated in the model through the reduction or removal of the infiltration in the same manner as non storage solutions referred to above.

7.153 We state that the model used to assess equivalent storage should be fit for purpose and constructed in accordance with the Code of Practice for the Hydraulic Modelling of Urban Drainage Systems, CIWEM UDG, 2017.[577] This Code of Practice[578] was first introduced in 1996 and is the best practice guide for the industry.

Impact of wetter years on scope of work

7.154 Southern Water states that its Storm Overflow Action Plan (SOAP) data was submitted in October 2023, which set out plans for reducing spill frequency according to SODRP

[574] [OF-OA-027] Ofwat, PR24 final determinations: price control deliverables appendix, February 2025, p. 69
[575] [OF-OA-027] Ofwat, PR24 final determinations: price control deliverables appendix, February 2025, p. 69
[576] [OF-CA-213] CIWEM, UDG Code of Practice for the hydraulic modelling of urban drainage systems p22, p36, p44
[577] [OF-OA-027] Ofwat, PR24 final determinations: price control deliverables appendix, February 2025, p. 69
[578] [OF-CA-213] CIWEM, UDG Code of Practice for the hydraulic modelling of urban drainage systems

targets based on 2021 and 2022 spill frequencies. The company also states that due to 2023 and 2024 data being exceptionally wet, they are required to meet spill reductions that are much more significant than they originally proposed.

7.155 We do not agree that the higher spill frequency seen in 2023 and 2024 due to higher rainfall should impact the sizing of solutions. We expect companies to have followed industry best practice / guidance, which is to use long term modelled rainfall to correctly size solutions, and should not be reliant on single year rainfall events.

7.156 Southern Water states that it did not factor in climate change and growth into the development of its SOAP due to tight restrictions in developing its plan for 2020-21, but this pre-dates SOAP which was initiated in 2023. Southern Water indicated as part of their final Drainage and Wastewater Management Plan (DWMP) submission in May 2023, that they used climate change variables in their future planning and adaptive pathways and published a technical summary of the specific climate change details they included. Therefore, it is unclear why Southern Water state that they were not able to factor in climate change in their scheme designs submitted at PR24 when they had already undertaken climate change impact assessments on all their storm overflows as part of the DWMP, which should have helped inform their business plan submission.

7.157 We would not expect the design of the asset to be based solely around 2021 and 2022 spill frequencies. The storm overflow solutions should be sized to meet the Storm Overflow Discharge Reduction Plan (SODRP) target for 2050. We would expect this to be undertaken in accordance with industry best practice / guidance. This includes using a long term historical rainfall dataset, as set out in the CIWEM Rainfall Guide[579], which recommends that for storm overflow studies, due to the variability of rainfall, it is recommended that a rainfall series of up to 25 years is used, but a minimum of 10 years. Given that the SODRP target is 2050, we would also anticipate that this includes an allowance for climate change uplift, such as that set out in the latest industry guidance 'Guidance for applying a climate change rainfall tool for long term drainage and wastewater management in the water industry', UKWIR, 2024.[580] The impact of recent annual rainfall fluctuations should be minimised when a long term dataset is used, and any minor change is likely be within the tolerances of the climate change adjustment. Therefore, we reject that the spill reductions required are greater than originally set out.

Equivalent storage measure should not disadvantage green hybrid solutions

[579] [OF-CA-211] Chartered Institution of Water and Environmental Management, CIWEM, CIWEM Rainfall Guide, 2016
[580] [OF-CA-212] UKWIR, Guidance for applying a climate change rainfall tool for long term drainage and wastewater management in the water industry, 2024

7.158 Southern Water states that the complexities in measuring equivalent storage provided in order to set the ex-post allowance, especially where a fit for purpose methodology is unavailable, will result in an incentive to prioritise grey end of pipe storage solutions at treatment works in order to reduce deliverability risk. It states that delivering hybrid solutions will result in significant costs, and that the measurement and modelling required to demonstrate equivalent storage will increase costs significantly.

7.159 They state that due to there being no established method of evaluating non-storage solutions, using equivalent storage for tracking PCD will incentivise grey end of pipe storage solutions at treatment works to reduce deliverability risk. Southern Water also states that the modelling required to demonstrate equivalent storage delivered for Ofwat's PCD metrics will increase costs considerably.

7.160 We do not agree that there are no established methods for calculating equivalent storage for non-storage solutions. We have included one methodology as part of the final determination. We do not agree that providing evidence for equivalent storage will require significant additional work or cost, as the process for evidencing will be the same as the requirements for detailed design work that the company will be required to do before proceeding to build a scheme that the company is confident will meet its statutory requirements. Companies proposed grey/green hybrid solutions as part of PR24, and in order to propose these solutions they must have undertaken some level of assessment to determine that the scheme would deliver the required reduction in spills and develop a costed proposal for inclusion in the PR24 submission. The requirement is to update this assessment once the scheme is completed, which we would expect companies to assess regardless of the PCD in order to satisfy themselves that the WINEP outcomes will be achieved.

7.161 The company states that the development of hybrid solutions will require significant stakeholder and customer engagement; the purchase of land, modifications to existing wastewater and drainage systems; and potential works on private land and privately owned drainage systems. This is acknowledged, and we provided uplifts to allowances to account for this and have accepted Southern Waters proposals for multi AMP schemes to facilitate this. As we require all storm overflow solutions to be permanent, we expect that these issues and associated costs will only occur once.

Issue 5 – Phosphorous removal PCD

Our final determinations

7.162 In our final determinations we set enhancement allowances for all wastewater companies for delivering the PR24 WINEP / NEP phosphorus removal enhancement

schemes using scheme level econometric modelling approach[581]. We hold all wastewater companies to delivering the PR24 WINEP / NEP phosphorus removal enhancement schemes that we allowed investment for through a scheme level PCD. We use the final determination cost model to recalculate allowances and determine if a claw-back is needed at the end of the control period[582].

7.163 We expect PR24 WINEP / NEP phosphorus removal enhancement programmes to be subject to a relatively lower number of significant changes of circumstances compared to other enhancement areas. This is because companies need to agree any changes to their WINEP / NEP phosphorus removal schemes at specific STWs with the Environment Agency or Natural Resources Wales. We only allow the companies to substitute schemes if approved by the Environment Agency/Natural Resources Wales.

7.164 We apply time incentives on the cumulative Population Equivalent (PE) served companies deliver through their PR24 WINEP / NEP phosphorus removal enhancement programmes. We apply these incentives on the profile of cumulative PE served at an aggregate level. This will enable companies to manage delivery risks across their phosphorus removal programme whilst also encouraging timely delivery.

Issues raised by disputing companies

7.165 Southern Water raises the following two issues:

- Southern Water states that the PCD for phosphorus removal enhancement schemes is unnecessary given that phosphorous levels are directly regulated and routinely enforced by the Environment Agency via permit conditions. The company considers that there is a material risk that they could face a double penalty in the event of breach of permit conditions relating to phosphorus, resulting in enforcement action by the Environment Agency, and a financial penalty being imposed by the courts for what is essentially the same non-compliance.
- Southern Water also states that the PCD incentives fail to recognise any alternative delivery dates which may form part of WINEP scope or the conditions of the permit itself, nor does the PCD provide any flexibility to implement any changes even if agreed with the Environment Agency.

Our assessment

Need for PCD

[581] [OF-OA-023] Ofwat, PR24 final determinations: Expenditure allowances – Enhancement Cost Modelling appendix, February 2025, pp.62-81
[582] [OF-OA-027] Ofwat, PR24 final determinations: price control deliverables appendix, February 2025, p. 83

7.166 We disagree with Southern Water that potential enforcement action from the Environment Agency removes the need for a PCD. PCDs aim to protect customers from non-delivery or late delivery. The Environment Agency will perform its duties with regards to protecting the environment and this may require adjusting permit levels within the control period. This could mean that the need and scope of improvements funded by customers may change in period. We consider that customers should be protected from these changes.

7.167 Our approach to phosphorus removal PCD involves applying our cost model parameters to outturn delivery in relation to the cost drivers we used in the model (including permit levels and population equivalent). This approach provides flexibility for the scope of work to go up or down at the scheme-level but we cap ex-post allowances to the overall programme allowances set at final determinations.

Flexibility of approach

7.168 We want to encourage companies to deliver the PCD outputs in relation to WINEP / NEP phosphorus removal schemes in a timely manner. Customers have paid for the delivery of these benefits and so we expect companies to deliver them in line with the profile of funding. This is why we only allow PCD profile to change in specific circumstances (see further below) to reflect changes that may be agreed between companies and relevant regulatory authorities in relation to delivery dates, for example through the WINEP/NEP alterations process.

7.169 As explained in 7.13, we have built in flexibility within the PCD for companies to manage delay risks. We do this by applying time incentives to the PCD output across the whole programme rather than to specific schemes. We also allow for changes to the PCD output profile to reflect schemes that are cancelled where this is in the interest of customers. If the company has not delivered the benefit by the end of the control period but is on track to deliver the benefit within few months from the start of PR29, then it can request a waiver on the application of non-delivery PCD payments.

8. Uncertainty mechanisms

We use uncertainty mechanisms to deal with delivery concerns or to manage cost and output uncertainty over the price review period. We use a range of mechanisms, including cost sharing, delivery mechanism, large scheme gated approach and uncertainty mechanism.

Southern Water stated that the **delivery mechanism** should allow allowances to be reassessed in period. The delivery mechanism will delay access to funding to when the company confirms that it is ready to deliver the additional schemes. The mechanism does not seek to deal with uncertainty around costs or outputs but with our concern regarding the company's ability to deliver the programme as a whole.

Southern Water asked for the **large scheme gated approach** to be extended to all schemes within its "five-sites strategy" ([redacted] and [redacted]). We apply a gated approach to large schemes costing £100 million or more to deliver and where company is not already late in delivering scheme. Work at [redacted] and [redacted] has a combined value of £50 million and its delivery has been pushed back from AMP7 into AMP8.

Anglian Water states that the **storm overflow uncertainty mechanism** only applies where companies overspend their storm overflow allowances and so the benefits to customers are limited. Companies should not be requesting additional expenditure allowances where they have not fully spent existing allowances. This will reduce public trust and confidence in the sector. We expect companies to go further in addressing storm overflows where they have fully spent the funding available.

Anglian Water states that the materiality threshold for the **bioresources notified item** should be reduced to reflect the risk of cost increases in this area. The bioresources notified item provides sufficient coverage and risk management for companies when considered alongside other protections (such as cost sharing for bioresources and the funding of increased bioresources storage under the WINEP /NEP -SUiAR drivers).

Anglian Water states that protections do not go far enough and they are insufficient to cover the significant risk associated with larger enhancement programme. We implemented a range of enhancements to **cost sharing rates** in recognition of the potentially lower certainty of enhancement costs and upcoming challenges for the sector to deliver the large PR24 enhancement programme that we consider strike the right balance for dealing with the inherent cost forecasting risk so that it is shared between customers and companies.

Delivery mechanism

Our final determinations

8.1 The delivery mechanism delays the access by the company to a portion of the funding until it can demonstrate that is ready to deliver schemes included in the mechanism[583]. This protects customers for paying upfront for schemes that the company may not start delivering to plan.

8.2 We included some expenditure in a delivery mechanism for Thames Water and Southern Water as they were unable to provide assurance that they can deliver their full business plan. To address these delivery concerns, we included £1.2 billion of expenditure for Thames Water and £553 million of expenditure for Southern Water in a delivery mechanism[584].

8.3 Companies can access funding in the delivery mechanism by submitting a funding request in years two, three and four of the control period. [585] We will approve request where company can show that is ready to deliver additional schemes.

8.4 Companies with expenditure in the delivery mechanism will have to submit delivery plans, delivery action plans and delivery progress reports to Ofwat[586]. This additional oversight and monitoring will provide the best opportunity of delivering all schemes included in the mechanism and provide us with early sight of when either company may have potential issues. We will engage with companies on these components through quarterly checkpoint meetings in order to support their upcoming draft and final submissions.

Issues raised by disputing companies

8.5 Southern Water raised the following three issues:

- The delivery mechanism should allow allowances to be assessed at the point of funding requests[587] and there should be an appeal mechanism to appeal Ofwat's decision on the funding[588];
- The delivery mechanism creates perverse incentives to not deliver schemes included in the mechanism[589];

[583] [OF-OA-022] PR24 final determinations: Expenditure Allowances February 2025, p.338, S4.7.4
[584] [OF-OA-022] PR24 final determinations: Expenditure Allowances, February 2025, p.339, S4.7.4
[585] [OF-OA-022] PR24 final determinations: Expenditure Allowances, February 2025, p.335, S4.7.4
[586] [OF-OA-022] PR24 Final determinations: Expenditure Allowances, February 2025, pp. 334-335, S4.7.4
[587] [OF-OA-003] Southern Water, Southern Water PR24 Redetermination Statement of Case, March 2025, pp302-303, S4 (30)
[588] [OF-OA-003] Southern Water, Southern Water PR24 Redetermination Statement of Case, March 2025. pp302, S4, (26)
[589] [OF-OA-003] Southern Water, Southern Water PR24 Redetermination Statement of Case, March 2025. pp300, S4, (15)

- The regime is too restrictive and would penalise companies for scheme delays that are out of its control and also exposes companies to a higher level of downside risk[590].

Issue 1 – Reassessment of funding in-period and an appeal mechanism

Our final determinations

8.6 The delivery mechanism was proposed for Southern Water and Thames Water as they were unable to provide assurance that they could deliver their full business plan. It includes an additional oversight and monitoring regime that provides the best opportunity of delivery. It also protects customers from paying upfront for benefits that companies may not be able to deliver to schedule. Once a company shows that it can deliver a scheme, the mechanism will release funding for the scheme. This is the point at which the scheme cost allowance could be reflected in customer bills.

8.7 The funding for schemes in the delivery mechanism is pre-set in final determinations, just as funding for other companies equivalent schemes was set in final determinations. This means that the level of funding is unchanged whether the scheme is delivered inside or outside the delivery mechanism. Companies have until 31st July 2025 to provide the full list of schemes that will be funded through the delivery mechanism.

Issues raised by disputing companies

8.8 Southern Water proposes a flexible approach to funding for schemes included in the delivery mechanism. It considers that the scheme allowances should be reassessed at the point of the funding request because it considers that there are material uncertainties in the future costs and scope of schemes included in the mechanism. [591]

8.9 Southern Water therefore asks for the mechanism to be re-specified as a notified item. It argues that this process has a lower materiality threshold than the totex for the delivery mechanism: "For PR24, Ofwat is proposing a notified item materiality threshold of ('at most') 2% of revenues." For Southern Water this is c. £25 million – a fraction of the scheme value included in the DM."[592].

8.10 Southern Water also considers that there should be an appeal mechanism on Ofwat's decision on whether to approve the funding request. It considers that this is due to the risk that Ofwat could deny the funding request and this puts them at risk of non-

[590] [OF-OA-003] Southern Water, Southern Water PR24 Redetermination Statement of Case, March 2025, pp37, S1 (37) [OF-OA-003] Southern Water, Southern Water PR24 Redetermination Statement of Case, March 2025 pp37, S1 (37)
[591] [OF-OA-003] Southern Water, Southern Water PR24 Redetermination Statement of Case, March 2025, pp303, S4(32) [OF-OA-003] Southern Water, Southern Water PR24 Redetermination Statement of Case, March 2025 pp303, S4(32)
[592] [OF-OA-003] Southern Water, Southern Water PR24 Redetermination Statement of Case, pp303,S4,(34)

compliance of their statutory requirements, and therefore at risk of receiving non-compliance fines.

Our assessment

Flexibility of approach

8.11 We disagree with Southern Water that the main reason for including schemes in the delivery mechanism is to deal with the uncertainty around the scope and costs of these schemes. This uncertainty is no different to the uncertainty of schemes outside the delivery mechanism. Moreover, we are not applying the delivery mechanism to similar schemes for other companies.

8.12 The purpose of the delivery mechanism is to deal with our specific deliverability concerns regarding Southern Water and Thames Water. These companies could not provide assurance on their ability to deliver their PR24 programme in full. Both companies have also been struggling with delivering their PR19 programme[593]. We have concerns that the schemes in the delivery mechanism will not be delivered as per the companies' business plan and so we are incentivising delivery and protecting customers by ensuring that they only pay for the delivery of these schemes when companies are ready to deliver them. The schemes in the delivery mechanism do not have a statutory date early in the control period and so phasing their delivery towards the end of the period would help in the deliverability of the whole programme for the two companies.

8.13 Given our deliverability concerns about the two companies we do not find it appropriate to remove upfront certainty as to cost allowances and shift risks that companies are best placed to manage to customers in relation to schemes in the delivery mechanism by allowing the costs of these schemes to be reassessed at the point of the funding request. Transferring these risks to the customers of these companies would mean rewarding the companies for not preparing for delivery of PR24 in a timely manner and building their delivery capabilities to deliver their PR24 programme in full. Further to this, the allowances for these schemes is determined by cross company modelling at the scheme level, therefore it would not be appropriate to apply bespoke allowances for Southern that are different to those for similar schemes delivered by other companies.

8.14 There is also a risk that the reassessment of cost allowances for these schemes would lead to potential delays in delivery. Reassessing allowances would lengthen the delivery mechanism funding process, and could impact the timeline in which Ofwat approves the funding request. Considering that the purpose of the mechanism is to encourage delivery, any delay would result in lost benefits for customers and the environment, and constrain the time the company has to deliver.

[593] [OF-OU-017] Ofwat, Water Company Performance Report 2023-24, October 2024, pp.33-34

8.15 Assessing the costs of these schemes in period would also be disproportionate given the relatively small size of these schemes. The median value of schemes included in the mechanism is less than £2 million. This would require a large additional administrative burden and is consistent with our approach to not applying a gated process for schemes of less than £100 million. The table below shows the median allowances for schemes included in the delivery mechanism.

Table 26: PR24 median delivery mechanism scheme allowances (£m)[594]

	Thames Water	Southern Water
Median scheme allowance	1.9	0.8

Notified items

8.16 Notified items are eligible for consideration as part of the standard interim determination provisions in Part 4 of Condition B of Southern Water's appointment (licence). Condition B specifies a materiality threshold of 10% of regulated business turnover before price controls would be changed during the price control period (although multiple eligible items can be aggregated to meet the materiality threshold). There are no plans to change this threshold. In relation to specific items, including some items that are currently notified items, we intend to propose a licence modification to introduce a bespoke interim determination process for the 2025-30 period with a lower materiality threshold[595]. The bespoke interim determination process would not apply to all notified items.

8.17 We set a high evidential bar for accepting notified items because such mechanisms reallocate risk from companies to customers and companies already benefit from a suite of risk sharing and reconciliation mechanisms that provide significant protection[596]. When considering the introduction of an uncertainty mechanism such as a new notified item we consider several factors. These include the materiality of each issue, the extent to which companies can control the associated risks or impacts of the risks, and whether the proposed uncertainty mechanism helps to support policy objectives, the proportionality of introducing a notified item, and whether it will support policy objectives, including protecting the interests of customers.[597]

8.18 Allowances for schemes included in the delivery mechanism are assessed by cross company modelling, and Southern Water's schemes do not have any characteristics that make them unique compared to other companies equivalent schemes. Therefore

[594] [OF-OA-076] Ofwat, PR24-FD-CA150-Delivery mechanism allowances, December 2024.
[595] [OF-OA-015] Ofwat, PR24 Final determinations In-period allowances, December 2024, p.17, S3
[596][OF-OA-022] Ofwat PR24 Final determinations: Expenditure allowances, February 2025, p. 346, (s.4)
[597] [OF-OA-015] Ofwat, PR24 Final determinations In-period adjustments, December 2024, p.15, S3

there is no sufficient reason to treat Southern Water differently than other companies in relation to when and how allowances for such schemes are determined.

8.19 For schemes where we accept that is uncertainty around the allowances that will be required to deliver the programme, we allocate the relevant uncertainty mechanism. For example, for storm overflows we recognise that there is uncertainty around over the number of schemes that will need to be delivered in the period[598], therefore we apply an uncertainty mechanism that will provide additional funding subject to companies having delivered all of their existing investigations and spent all existing funding. This mechanism applies to all companies.

8.20 It would not be appropriate to make the delivery mechanism a notified item. The focus of the delivery mechanism is to address the lack of readiness of the company to deliver its PR24 programme in full, rather than to address significant uncertainty.

Appeal mechanism

8.21 We do not consider that the introduction of a specific appeal mechanism for in-period determinations (which would require a licence modification) is necessary or proportionate because of the relative small size of the schemes and the focus on delivery. If a company is ready to deliver additional schemes and meet its statutory obligations then it should be able to meet the criteria set out in final determinations for approval of its funding request.

Issue 2 - The mechanism creates perverse incentives

Issues raised by disputing companies

8.22 Southern Water raised the following three issues in relation to the mechanism creating perverse incentives:

- There is a risk that Ofwat will reject the funding request and this will act as an incentive to not deliver the additional schemes[599].
- There is an incentive to not incur any development costs in developing these schemes as there is a risk that Ofwat will deny the funding request after they have invested in the development of the scheme[600].

[598] [OF-OA-022] Ofwat PR24 Final determinations: Expenditure allowances, February 2025, p. 343, S4
[599] [OF-OA-003] Southern Water, Southern Water PR24 Redetermination Statement of Case, p.296, S4 (296)
[600] [OF-OA-003] Southern Water, Southern Water PR24 Redetermination Statement of Case, March 2025, pp.304, S4 (36)

- There is a risk of a material cost gap arising due to changes in the cost and scope of schemes throughout the period. The risk of this cost gap will incentivise the company to not deliver the schemes included in the mechanism.[601]

Our assessment

Risk of rejecting funding request

8.23 The schemes included in the delivery mechanism are all part of the WINEP. As such the companies have a statutory obligation to deliver these schemes. Although we are including schemes in the delivery mechanism, we still expect both companies to deliver the schemes in line with the legal deadlines[602].

8.24 Where the company is ready to deliver a scheme, we will release the requested funding. For the company to show it can deliver a scheme, it should provide confirmation from the independent third-party assurer that:

- the start date and target completion date of the scheme included in the delivery progress report are correct;
- the company has a plan in place to deliver the scheme;
- the company has appropriately identified all the delivery risks for the scheme and has put in place actions to mitigate these risks; and
- the target completion date of the scheme is deliverable by the end of the 2025-30 period or no more than 3 months after the end of this period.

8.25 If company does not meet the set criteria it is highly unlikely that company will be able to commence work to deliver scheme and so would not need the additional funding. Submitting a request in one year does not prevent the company from submitting the funding request again for a specific scheme in the following years once it meets the stated criteria.

8.26 We expect the company to expand its delivery capabilities and get itself into a position to deliver all the schemes in the delivery mechanism during this period.

Development costs

8.27 We disagree with Southern Water that the delivery mechanism does not incentivise companies to incur development costs. As mentioned above, we do not expect the company to have detailed design work completed to demonstrate that is ready to deliver schemes and therefore trigger the additional funding. We expect the company to have

[601] [OF-OA-003] Southern Water, Southern Water PR24 Redetermination Statement of Case, March 2025, pp.83, S1 (146)
[602] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, pp.256

done some planning work ahead of requesting the additional funding, including identifying the best option. Companies are funded for this initial planning work through base allowances[603].

Cost gap

8.28 We do not accept that the emergence of cost gaps is a feature specific to the delivery mechanism. Cost gaps can arise for schemes inside or outside the delivery mechanism and can be positive or negative. It is the responsibility of companies to manage cost risks across their programme. We allow these risks to be shared with customers through cost sharing.

8.29 Southern Water suggests that the emergence of cost gaps will incentivise the company to not deliver schemes within the delivery mechanism. As stated, we expect the company to meet its WINEP statutory obligations. Late delivery penalties will apply if schemes (that are also subject to PCDs) are not delivered by the end of the control period.

Issue 3 – The delivery mechanism is restrictive and exposes the company to risk

Our final determinations

8.30 We have set a fixed level of expenditure to be included in the delivery mechanism. However we have allowed companies to confirm the list of schemes to be included in the mechanism until July 2025[604].

8.31 We have set out the process for assessing requests under the delivery mechanism in our final determinations. In each of years two, three and four of the 2025-26 to 2029-30 period, each company will set out annually in advance (as part of the delivery plan progress report) the individual schemes in the delivery mechanism it considers it could deliver in the 2025-26 to 2029-30 period and would request the release of funding for those schemes ("the Funding Request"). We expect funding requests to be submitted in May 2026, 2027 and 2028[605].

8.32 If we have confidence that the company can deliver those schemes, its price controls for one or more subsequent years would be adjusted to include the RCV run-off and allowed return arising from those schemes.[606]

[603][OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, pp.338
[604] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, pp.336
[605] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.335, S4
[606] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, pp.335. S4

Issues raised by disputing companies

8.33 Southern Water consider that the mechanism is too restrictive. It considers that it would penalise the company for delays due to factors beyond its control. For example, it has concerns that if the Environment Agency agrees to a scheme delay of 4 months or more post 1 April 2030, Ofwat has no discretion or ability to release funds for that scheme[607].

8.34 Southern Water considers that the delivery mechanism exposes it to a higher level of downside risk than other companies. Southern Water states that delivery mechanism totex is equivalent to a RoRE impact of 2.4% in a single year[608]. Southern considers that there is a risk that this will not be reflected in their allowed returns.

Our assessment

The mechanism is restrictive

8.35 Schemes are included in the delivery mechanism where we do not have assurance from companies that they can deliver projects in the 2025-30 period. The schemes included in the mechanism are schemes that were set out by the company to be delivered as part of their enhancement programme for the 2025-30 period.

8.36 We expect the company to submit its funding request based on the information available at the time of the request. If the company can demonstrate that it can deliver the additional schemes in this period (or no later than 3 months after the end of the period)[609], allowances will be adjusted to include the efficient cost of delivering these schemes. A funding request will not be impacted by changes in statutory dates which happen after the request has been accepted. Delivery mechanism schemes are subject to PCDs (similar to schemes outside the delivery mechanism) and so late delivery penalties may apply if schemes are delivered late.

8.37 If the company plans to deliver a delivery mechanism scheme in the 2030-35 period, the company can request funding for this scheme in PR29. This may include requesting transitional funding for 2029-30. This will prevent customers from paying upfront for schemes which will be delivered until the next control period.

Exposure to risk

[607] [OF-OA-003] Southern Water, Southern Water PR24 Redetermination Statement of Case, March 2025, p.305, S4(41)
[608] [OF-OA-003] Southern Water, Southern Water PR24 Redetermination Statement of Case, March 2025, p.305, S4(44)
[609] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, pp.335-336, S4

8.38 We disagree with Southern Water that the delivery mechanism exposes the company to a higher level of risk than other companies. Where the company can show that it is ready to deliver the additional schemes, the funding request will be approved and the company will be able to access the funding. It is unlikely that the company will be incurring costs on the scheme, beyond development costs covered by base funding, unless the delivery mechanism is triggered, at which point the company will receive additional revenue in the form of RCV run-off and allowed return.

Large Schemes Gated Process

Our final determinations

8.39 The large schemes gated process is a mechanism for large enhancement schemes. This approach was applied when an enhancement scheme's requested value was greater than £100 million and where we had concerns around scope, cost, deliverability, complexity or if schemes involve novel elements or complex technologies[610].

8.40 We included 13 schemes with a total value of £2.3 billion in the large scheme gated process. This includes Colchester water recycling for Anglian Water; Lowestoft water recycling and Bran Sands long sea outfall from Northumbrian Water; [redacted] water treatment works resilience, Hastings and Isle Sheppey network resilience, Sandown and Sittingbourne water recycling and Whitfield growth at STW from Southern Water.

Issues raised by disputing companies

[redacted] Southern Water is the only company to raise an issue with our large scheme gated process. It disputes our decision on its water treatment work upgrades, to pass only two sites [redacted] the large scheme gated process from their "five-sites strategy" [redacted] The company states that all five sites should be subject to the same uncertainty mechanism as they are all part of the same programme of works. Southern Water states that [redacted] have the same project characteristics as the other projects that were allocated to the large scheme gated process. [redacted]

8.42 Southern Water further states that the cost of delivering these investigatory DWI scope items at [redacted] can only be fully assessed once the scope items are

[610] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.315,S4

known. The company states material uncertainty remains as to what specific solutions are required [redacted]

8.43 The company states all five sites are linked. In the case of [redacted] it states that this linkage is direct as the works both feed into North Sussex. At non hydraulically linked sites, the linkage is through the ability to provide emergency response contingency to ensure that customers are protected when work is planned for our water treatment and network assets.

Our assessment

Project linkages

8.44 We understand that schemes at [redacted] are similar to those at [redacted] However, we continue to consider that [redacted] are not material enhancement to qualify for the large scheme gated process as they are below the £100 million materiality threshold (the value of the combined schemes is £50 million). We are also concerned that gating work [redacted] could create further delays to deliverables under DWI oversight that have already been pushed back from AMP7 into AMP8.

8.45 In response to the company's position that sites are hydraulically linked, the large scheme gated process will not be setting the schedule of work across the five sites. If the sites are linked it is within management control to schedule the works appropriately and make contingencies. This is not sufficient reason for the schemes to be allocated to the same uncertainty mechanism. We are also concerned that Southern Water has not addressed issues at its water treatment works until now where it is undertaking works at all five plants at the same time.

Cost increases and uncertainty

8.46 We continue to have concerns about the cost and scope certainty at [redacted] but consider that the scope and proposed costs at the other three works should be more certain.

8.47 Southern Water considers that there is major cost uncertainty at [redacted] The table below shows Southern Waters proposed cost increases at the sites from its PR19 base submissions to its draft determination representations. As of February 2024, the company overspent its PR19 base allowance at [redacted] and stated it was forecast to significantly overspend at these two sites by the end of AMP7. The company underspent its base allowance at [redacted] but forecast to overspend at these two sites by the end of AMP7. It also stated that it was forecast to

overspend at [redacted]. The overspend at [redacted] is less material compared to [redacted]. We continue to consider the costs and scope of [redacted] are more certain given the lower levels of spend in AMP7.

Table 27: Proposed cost increases at [redacted] (£m)

Scheme	AMP7 base requested[611]	AMP8 Enhancement Requested £m
[redacted]	36.387	101.455
[redacted]	23.539	105.714
[redacted]	11.071	27.740
[redacted]	38.678	47.210
[redacted]	2.680	74.336

8.48 In its statement of case, the company's new best estimate of costs at [redacted] for AMP8 is now £127 million. This is an increase of 170% from the costs submitted in their draft determination response[612]. We consider the increase is from pushing back of deliverables that were due in AMP7. [redacted] The scope of work is not uncertain and is known to Southern Water. Its cost estimates should not continue to increase based on these enabling works.

8.49 At [redacted] it states estimated cost increases include a further c.£15 million for a potential additional treatment capacity if the use of groundwater sources is disallowed;

[611] [OF-SRN-009] Southern Water, TA.11.WN03 Water Treatment Business Case, September 2018, page 6, CPIH uplifted to 2022-23 prices
[612] [OF-OA-003] Southern Water, Southern Water PR24 Redetermination Statement of Case, March 2025, p.312
[613] [OF-OA-003] Southern Water, Southern Water PR24 Redetermination Statement of Case, March 2025, pp.312 [redacted]

c.£10 million for Cryptosporidium risk management and c.£50 million for a new Rapid gravity filter block[615]. The issues raised causing major cost uncertainty at [redacted]

8.50 For [redacted] the company has proposed rebuilding the site after demolishing it. This type of scheme does not meet criteria for the large scheme gated process. It is not under high levels of optioneering, the scope and cost are not uncertain, and novel technologies are not being used for the site rebuild. Customers are sufficiently protected by the price control deliverable. A proposal for this scheme has been presented to and accepted by the DWI, as shown in its latest notice. The company states it should qualify for a gated delivery in line with the timeframes agreed with DWI[616]. Southern Water does not provide sufficient and convincing evidence that there is enough uncertainty in the scope of the scheme to allocate to the large scheme gated process. The company can report on their progress through the delivery plan, which will allow us to progress the scheme without the need to redetermine cost allowances.

8.51 We suggest that the CMA undertakes a thorough analysis of the reasons for the claimed cost increases, whether these relate to new or existing requirements and the scale and efficiency of the proposed costs, before deciding whether to include each of the three schemes in the large schemes gated process.

Storm overflows uncertainty mechanism

Our final determinations

8.52 In our final determinations expenditure allowance, we proposed to include a storm overflows uncertainty mechanism where companies identify additional schemes required under Urban Waste Water Treatment Regulations 1994 (UWWTR) requirements, to meet newly designated bathing waters, or due to revision of the Storm Overflows Discharge Reduction Plan[617] (SODRP), and it is not possible to swap out existing schemes [618].

Issues raised by disputing companies

8.53 Anglian Water states that the "mechanism only applies if companies are overspending their PR24 allowance. Therefore, any benefit companies and customers earn from delivering storm overflow reduction benefits more efficiently would be removed through

[615] [OF-OA-003] Southern Water, Southern Water PR24 Redetermination Statement of Case, March 2025, pp.312-313
[616] [OF-OA-003] Southern Water, Southern Water PR24 Redetermination Statement of Case, March 2025, p.312
[617] [OF-CA-215] Defra, Storm Overflow Discharge Reduction Plan, 2023
[618] [OF-OA-027] Ofwat, PR24 final determinations Price control deliverables appendix, December 2024, p.60.

the addition of new storm overflow schemes. The mechanism doesn't cover any new standards emerging from Ofwat's wastewater enforcement activities, work other than overflows to meet new bathing water (e.g. disinfection of final effluents), or additional work required on emergency overflows" [619].

Our assessment

8.54 The removal of the requirement to overspend on storm overflows was rejected at final determination.[620] We do not consider that companies should be requesting additional expenditure allowances where they have not fully spent existing allowances. This will reduce public trust and confidence in the sector. We expect companies to go further in addressing storm overflows where funding is available. We expect companies to ensure that they are efficient in delivering the assigned enhancement allowance before requesting additional funding.

8.55 There are no new standards emerging from Ofwat's enforcement activity. At final determination we rejected the expansion of the storm overflow uncertainty mechanism due to new standards arising from ongoing enforcement activities. Our enforcement activities relate to existing legal obligations and do not impose new standards [redacted] The storm overflows uncertainty mechanism allows for companies to request additional funding for the outcome of any UWWTR improvements that go beyond current permit requirements. We will not provide enhancement funding for companies to meet existing permit requirements.[622]

8.56 Work other than overflows to meet bathing water standards, such as disinfection of final effluent, are not related to the storm overflows uncertainty mechanism as they do not relate to storm overflows. At final determination we rejected the inclusion of final effluent treatment within the storm overflows uncertainty mechanism. The inclusion of storm overflows in the uncertainty mechanism covers the majority of the risk/cost that is likely to be incurred by companies for new bathing water designations. We have included additional funding for microbiological treatment from new bathing water designations in the final determinations. Broader risk can be managed through the cost sharing mechanism.[623]

8.57 Work required on emergency overflows is not related to the storm overflow uncertainty mechanism as they are not classified as storm overflows. At final determination we

[619] [OF-OA-001] Anglian Water, Anglian Water PR24 CMA Redetermination Statement of Case, March 2025, Table 5, p107
[620] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.342, section 4.7.5
[redacted]
[622] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, section 4.7.5 Storm overflows uncertainty mechanism, p.343
[623] [OF-OA-022] Ofwat, 'PR24 final determinations: Expenditure allowances, February 2025, section 4.7.5 Storm overflows uncertainty mechanism, p. 342

rejected the inclusion of emergency overflows as part of the storm overflows uncertainty mechanism. We provided funding for the current level of emergency overflow monitors included within the WINEP and are not aware of any plans to extend the scope/scale of the current programme. We consider compliance with the existing permits is covered by base expenditure allowances.[624]

Notified Item for Bioresources

Our final determination

8.58 Land application of treated sewage sludge is currently the primary outlet for sewage sludge for the sector (water and sewerage companies). During PR24 companies' raised concerns that there was a risk of significant loss of landbank availability for sewage sludge recycling to agriculture. We held extensive discussions with the companies, the Environment Agency and other relevant stakeholders in relation to these concerns.

8.59 In response to companies' concerns and the uncertainty that may affect bioresources activities and sludge management chain as a result of loss of landbank, we included a Notified Item[625] in respect of sludge spreading in the final determinations.

8.60 We recognised that uncertainty[626] remains around landbank availability, both within the 2025-2030 period and beyond, and proposed a 50:50 (dependent on the company's QAA outcome) base cost sharing mechanism for the bioresources control and enhancement expenditure subject to 40:40 rates (in addition to 25:25 sharing for IED) to support companies in managing this uncertainty. We proposed a Notified Item to cover any increase in costs to bioresources reasonably attributable to any new or changed legal requirements or guidance from Defra or the Welsh Government in relation to the application to agricultural land of fertiliser derived from sludge over the 2025-26 to 2029-30 period.

8.61 This Notified Item applies to any increase in costs to bioresources that is reasonably attributable to:

- Any new, changed legal requirement (as defined in the Notified Item) in relation to the application to agricultural land of fertiliser derived from sludge, whether or not that requirement applies to the wastewater company; or
- Any new or changed guidance or direction from Defra or the Welsh Government under any enactment or subordinate legislation to the Environment Agency or Natural

[624] [OF-OA-022] Ofwat, 'PR24 final determinations: Expenditure allowances', February 2025, section 4.7.5 Storm overflows uncertainty mechanism, p. 342
[625] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p. 349 (s 4.7 Dealing with uncertainty)
[626] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p. 158

Resources Wales with respect to the exercise of its functions in relation to the application to agricultural land of fertiliser derived from sludge.

Issues raised by disputing companies – Anglian Water

8.62 Anglian Water [627] states that "the materiality threshold relevant to this notified item should be reduced to reflect the risk that cost increases that would be very material to bioresources may not be considered material under the terms set out in Condition B of companies' licences and that the notified item would therefore be worthless".

Our assessment

8.63 We continue to consider that the notified item, when considered alongside other protections (such as the introduction of cost sharing [628] to bioresources and the funding of increased bioresources storage under the WINEP[629]/NEP[630]–Sludge Use in Agriculture (SUiAR) drivers) provides sufficient coverage and risk management associated to the company's sludge management activities given the evidence available and sector circumstances.

8.64 We introduced cost sharing for bioresources in our PR24 Final Determination (a change from our PR19 approach) which provides increased protection to companies for cost overspends. This included:

- Base expenditure would be subject to cost sharing of up to 50:50 [631]
- Enhancement expenditure would be subject to 40:40[632] cost sharing rates
- IED enhancement expenditure would benefit from a cost sharing rate of 25:25[633].

8.65 The materiality threshold for standard interim determinations is specified in Part 4 of Condition B of water companies' appointments (licences). [634] There are no plans to change this threshold. We first proposed this Notified Item so that companies would have the same level of protection whether any changes in legal requirements in relation to landbank use for bioresources apply directly or indirectly to companies. New or changed legal requirements that apply directly to companies in their capacity as a sewerage undertaker (or a water undertaker) are specified in Condition B as an eligible item (a Relevant Change of Circumstance) for interim determinations. We do not consider it appropriate for the interim determination materiality threshold to be

[627][OF-OA-001] Anglian Water, Anglian Water PR24 CMA Redetermination Statement of Case, March 2025, pg. 107 (Table 5)
[628] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p. 298 (s 4.7)
[629] [OF-CA-134] Environment Agency, PR24 WINEP driver Guidance – Sewage Sludge, 2022
[630] {OF-CA-129] Natural Resources of Wales, Biosolids driver, 2023
[631] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.303 (Table 39)
[632] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.305
[633] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.304
[613] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p. 346

different for different potential changes in legal requirements that could affect companies during the price control period.

8.66 In relation to potential changes in legal requirements, we acknowledged that bioresources activities might be affected by the Environmental Permitting Regulations[635] (EPR) replacing[636] the Sludge (Use in Agriculture) Regulations (SUiAR). These requirements are due to be defined within the Environment Agency's Sludge Strategy and its implementation date is yet to be confirmed. Any new or changed legal requirements in relation to the application to agricultural land of fertiliser derived from sludge that are introduced as part of that process will, because of the Notified Item, be an eligible item for a standard interim determination, whether or not that requirement applies to the wastewater company.

8.67 During the price review we carried out significant engagement with the companies, the Environment Agency and Defra to understand the risk to the supply chain. Following continued liaisons with the Environment Agency and companies, we recognised that although WINEP covers resilience to the current supply chain, it may not fully cover the impacts of any changes that occur as a result of changes to, or removal of, the statutory guidance to the Environment Agency on applying the Farming Rules for Water[637]. We note that the sector received a total allowance of £715.95 million for all the actions approved under WINEP[638]/NEP[639] –SUiAR. These actions included the provision of additional sludge storage capacity and interventions to improve resilience in the sludge supply chain to agriculture. Anglian Water received an allowance of £65.63m for its proposed actions under WINEP SUiAR.

8.68 We recognise that Ministerial guidance or directions could impact on the operation of the legal regime and that there is some uncertainty because Defra is currently undertaking a review of its existing statutory guidance to the Environment Agency regarding the application of the Farming Rules for Water. This was the basis on which we widened the scope of the Notified Item we proposed in our draft determinations to include the impact of any new or changed statutory guidance, or direction from Defra or the Welsh Government, to the Environment Agency or Natural Resources Wales in relation to the exercise of their functions in this area. In this instance, the notified item for bioresources covers any new, changed legal requirement, guidance or direction from Defra or the Welsh Government[640] in relation to the application to agricultural land of fertiliser derived from sludge that may affect companies' strategic operations.

[635] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p. 304
[636] [OF-CA-216] Environment Agency, Environment Agency strategy for safe and sustainable sludge use, updated August 2023.
[637][Of-CA-217] Defra, Applying the farming rules for water - Statutory Guidance, updated June 2022
[638] [OF-CA-134] Environment Agency, PR24 WINEP driver Guidance – Sewage Sludge, Environment Agency,2022
[639] [OF-CA-129] Natural Resources of Wales, Biosolids Bioresources driver, 2023
[640] Under any enactment or subordinate legislation to the Environment Agency or Natural Resources Wales with respect to the exercise of its functions.

Enhancement Cost Sharing

Our final determinations

8.69 Cost sharing refers to the policy treatment of over- or underspend against efficient cost allowances we set for water companies:

8.70 the cost sharing rate on underspend captures the share of underspend that the company gets to keep; and

- the cost sharing rate on overspend captures the share of overspend that the company needs to bear.

8.71 For example, when a company has a 40% underspend rate, it keeps 40% of its underspend with the other 60% transferred to customers. If a company has a 55% overspend rate, it bears 55% of this overspend with the other 45% borne by customers. cost sharing allows for the inherent cost forecasting risk to be shared between customers and companies.[641] By sharing the burden of overspend risks that companies face within the control period, cost sharing acts to reduce the level of risk that companies price into their business plans every five years and encourages them to respond effectively to unforeseen events.[642]

8.72 In our final determinations we set the cost sharing rate for enhancement at 40:40, with lower cost sharing rates for enhancement expenditure areas where there is potentially higher uncertainty:

8.73 We set 25:25 cost sharing rates for IED enhancement expenditure, environmental permitting regulation (EPR) permits, schemes included in enhanced engagement and the large scheme gated process.

8.74 We set 40:10 cost sharing rates for continuous water quality monitoring and investigations. [643]

[641] Throughout this section we refer to cost sharing rates in the following format (x:y) where 'x' captures the applicable cost sharing rate on overspend compared to PR24 cost allowances and 'y' captures the applicable cost sharing rate on underspend compared to PR24 cost allowances.
[642] [OF-CA-001], Ofwat, Creating tomorrow, together: Our final methodology for PR24: Appendix 9 Setting expenditure allowances, December 2022, pp.39-45.
[643] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, pp.303-305

Issues raised by disputing companies

8.75 Anglian Water state that the protections do not go far enough and they are insufficient to cover the significant risk associated with such a large expansion of the enhancement programme as Anglian Water and other companies will experience in AMP8, especially regarding major projects.[644]

8.76 It also states that while differential cost sharing rates for enhancement programmes help to mitigate risk it is targeted to very specific areas of enhancement, and does not address the need to reflect the overall change in the risk and reward profile of the sector.[644]

Our assessment

8.77 For PR24 we lowered the cost sharing rate for enhancement expenditure to 40:40 in recognition of the potentially lower certainty of enhancement costs and upcoming challenges for the sector to deliver the large PR24 enhancement programme. We also did not vary the rates based on the outcome of the quality and ambition assessment.[645]

8.78 For the final determination, we assigned large schemes (where requested value was greater than £100 million) and where we had concerns around scope, cost, deliverability, complexity, or if schemes involved novel or complex technologies, to either the large gated schemes process, where the allowances would be determined once the scheme was further developed, or enhanced engagement schemes with 25:25 cost sharing.[646] On strategic regional options, there is no cost sharing as we provided funding allowance on a 'use it or lose it basis.[647]

8.79 In response to our draft determination, Anglian Water put forward three areas that it considered should be subject to 25:25 costs sharing rates – interconnectors, continuous water quality monitoring and compliance with waste permitting regulations in bioresources. Anglian Water does not provide any additional evidence as part of its statement of case.

8.80 We disagreed that Anglian Water's interconnectors programme should have enhanced 25:25 cost sharing rates. Two out of seven of Anglian Water's interconnector schemes accounting for 75% of the cost, are included in the enhanced engagement process, so

[644] [OF-OA-001] Anglian Water, Statement of Case, March 2025, p.109, Table 5
[645][OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, pp.299-305, Section 4.7.1
[646] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p315
[647] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p188

are subject to 25:25 cost sharing rates. The other schemes are not sufficiently material or uncertain to justify 25:25 cost sharing rates.[648]

8.81 For final determination, we extended the enhanced cost sharing rate of 25:25 to cover Environmental Permitting Regulations (EPR) for sludge-to-land management activities, i.e. the permit costs associated with enabling recycling of sludge to agriculture in compliance with EPR.[649]

8.82 We assessed the requirements for continuous river water quality monitors in detail, including meeting with the Environment Agency and supply chain. We determined that the risk of cost escalation was lower than the potential for rapid innovation leading to significant cost reductions. We provided the sector with an allowance that was in line with requested costs and is sufficient to deliver this new programme of work. But we recognised that options for lower cost monitors may emerge in the short term, given the large quantity of monitors required, and so applied 40:10 cost sharing so that customers do not overpay should there be significant outperformance due to a new and rapidly evolving market.[650]

8.83 Overall we consider that the risk protections including reducing the enhancement cost sharing rate, the scope and coverage of differential enhancement cost sharing, the aggregate sharing mechanism, our large scheme approach and our approach to setting enhancement allowances strike the right balance for dealing with the inherent cost forecasting risk so that it is shared between customers and companies, and is sufficient to cover the significant risk associated with the large expansion of the enhancement programme that companies will experience in AMP8.

[648] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p303
[649] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p305
[650] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p304

9. Other Issues

The disputing companies raise several other cross-cutting issues in relation to costs.

Northumbrian Water raise concerns about our correction of **unambiguous errors**, requesting that we make correction to an error on septic tanks and apply the impact of this and previous corrections on the Storm Overflows to shallow dive efficiencies. We have corrected for first order errors and unambiguous errors, and consider that our approach is justified given the materiality and complexity of the potential adjustments.

Southern Water and South East Water raise concerns over our approach to **shallow dive efficiencies**. We continue to consider that the application of shallow dive efficiency challenges is appropriate given the low materiality of the expenditure. We consider that the enhancement benchmarking models used in the assessment are robust and provide a good indication of the efficiency of enhancement expenditure of each company.

Unambiguous errors

Our final determinations

9.1 We have corrected errors that were flagged to Ofwat by companies after the publication of the final determinations if they meet the criteria of an unambiguous error. In general, we considered an 'unambiguous error' to be:

- Unambiguous that an error was made;
- Unambiguous in terms of the impact of the error;
- Direct to detect;
- Straightforward to correct; and
- Be able to be reasonably detected by a diligent company.

9.2 We also considered the materiality of errors when making decisions about whether to make adjustments, particularly given the asymmetric nature of responses from companies, in that a company is only likely to flag errors that lead to higher allowances.

9.3 We have only corrected errors that have first-order effects. If the correction of errors has second-order effects that affect other companies, and these costs are not material, these changes have not been made. By first order effects, we mean where a number has been incorrectly applied in a model, and adjusting it would change the modelled

allowance, we adjusted for these errors where they were material. Second order effects are areas such as shallow dive efficiencies, that take the output from all models and aggregate them to determine the shallow dive efficiency to be applied to a range of other models. Second order effects are more complex to address, as they require amendments to a significant number of related models, and the impacts of errors in one model are often immaterial at this scale. As a result, areas subject to second order effects were locked down earlier in the process, and were not amended after final determination.

9.4 As adjusting for errors can impact other companies, for example if modelled allowances change and the importance of regulatory certainty for both companies and customers, there is a high bar for making post-final determination adjustments. We therefore suggest that the CMA should prioritise making adjustments that are material and unambiguous in its redetermination.

Issues raised by disputing companies and our assessment

9.5 The disputing companies raised issues listed in the table below.

9.6 For completeness we have included material errors that Ofwat has corrected for the disputing company, as these would also need to be considered if making second order corrections, and the updated allowances for previously agreed errors can be used in the CMA's re-determination.

Table 28: Unambiguous error summary

Area	Raised by / Impacted companies	Description of error as presented by company	Ofwat recommendation for CMA redetermination
Septic Tanks model (CA68)	Raised by Northumbrian Water: (+£2.187m impact). impacts all companies. Five companies would be impacted by correction ranging from -£2.361m to £2.187m. This correction would not change any of the	• A formula error in the septic tanks model that does not count any population equivalent for the years 2023/24 and 2024/25. • The error impacts the median cost, such that allowances are overstated for every company apart from Northumbrian Water.	**No correction recommended.** • Low materiality. • Northumbrian Water made the error in its completion of business plan data tables resulting in population equivalent not being counted. • Does not meet the criteria for an unambiguous error as it was not Ofwat's error. • Not straight-forward to correct. • Amending error would impact all company allowances for this cost line. Some companies' allowances would be reduced by up to £2.361m.

Area	Raised by / Impacted companies	Description of error as presented by company	Ofwat recommendation for CMA redetermination
	efficiency challenges to 1 decimal place.		• Cost line contributes to the company specific shallow dive efficiency calculation.
Storm Overflows (CA55)	Not raised by any company. Impacts six companies (-£31.03 to £38.38m).	• Scheme level cost data provided by companies did not fully reconcile with total enhancement requests in the business plans. A reconciliation value was calculated to return the scheme level allowances to the total business plan request. This was calculated in the BPDT and ADD20 Reconciliation tab. • A formula error on the Total allowances tab meant that some company allowances were multiplied by incorrect reconciliation values.	**Corrections undertaken.** • We have corrected the error in an updated version of the model as found on our website.[651] Errors are clearly stated in the error log. The allowances have been corrected in the Total allowances tab. • We ask the CMA to use these updated storm overflow allowances in its redetermination.
Growth at STWs model (CA83)	Not raised by any company. Impacts all companies.	• Error 1: AMP9 adjustment double counted for schemes receiving a DWF non-compliance adjustment, due to corrected formula not dragged down. • Error 2: Aggregate per-company AMP8/9 adjustment applied to allowances is incorrectly weighted by portfolio of company requests instead of portfolio of company modelled allowances.	**Corrections recommended.** • We have corrected for both errors in an updated version of the model as found on our website.[652] Changes are clearly stated in the error log. • We ask the CMA to use these updated growth allowances in its redetermination.
Shallow Dive Efficiency model (CA110)	Raised by Northumbrian Water (+£3.6m impact) Impacts all companies (range £1.14m to -£1.36m excluding Northumbrian Water)	• For Continuous Water Quality Monitoring, "assessed" value does not reflect the updated request between the draft determination and final determination. • Error that was corrected in the storm overflows model (CA55) through the blind year process should also be applied to the company-specific shallow dive efficiency challenge calculation.	**No correction recommended.** • Not straight-forward to correct as would require amending multiple models. • Low materiality. • We have not corrected second order errors where not material.

[651] [OF-CA-111] Ofwat, PR24 FD CA55 Wastewater Storm overflows enhancement expenditure model redacted, December 2024
[652] [OF-CA-220] Ofwat, PR24-FD-CA83-Wastewater-Growth-at-sewage-treatment-works-enhancement-expenditure-model-v2, February 2025

Company-specific shallow dive efficiency challenge

Our final determinations

9.7 Detailed investigation of every small element of enhancement costs is disproportionate to the benefits provided. Requiring 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.[653]

9.8 For final determination, we carried out shallow dives on less material investment lines. In general, we carried out a shallow dive assessment if the expenditure was less than 0.5% of the water or wastewater wholesale totex or less than £10 million.[654] Where appropriate we applied discretion for investments close to this threshold or with a higher risk profile, as to whether to apply a deep dive assessment instead. The shallow dive assessment is useful as it enables us to adopt a risk-based process to setting allowances for requests that cannot be modelled, and that are not material enough to justify a full deep dive assessment.

9.9 Where costs were above the shallow dive threshold and we did not consider our dataset to be sufficiently robust to undertake econometric modelling, but we considered that it provided an indication of the efficient cost benchmark, we assessed costs against the indicative cost benchmark. If we considered the cost benchmark to provide a reasonable indication of efficiency, we removed the shallow dive challenge, giving companies that are efficient against the indicative benchmark their full request. Where we had low confidence in the indicative benchmark, we applied the shallow dive challenge to those companies below the indicative benchmark. Companies above the indicative benchmark were assessed via deep dive.[655]

9.10 We recognise that the shallow dive approach may result in a less precise answer than a detailed assessment might produce, but we considered it appropriate to minimise the risk of the regulatory regime becoming too burdensome and intrusive.

Issues raised by disputing companies

9.11 The disputing companies raise the following issues:

- Southern Water and South East Water raise issues with the models used to calculate efficiency challenges, and the approach to aggregation including the use of unrelated models to develop cost efficiency challenges in other areas[656].

[653] [OF-RR-011] CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, final report, March 2021. pp.444, Paragraph 5.178
[654] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, pp.104
[655] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, pp.108
[656] [OF-CA-195] South East Water, South East Water - Annex G - Enhancement costs, March 2025, pp.93

- Southern Water and South East Water disagree with the shallow dive assessment approach for multiple enhancement areas.

Our assessment

Approach to calculating shallow dive efficiency challenge

9.12 Southern Water and South East Water raise issues with the models used to calculate efficiency challenges, and the approach to aggregation including the use of unrelated models to develop cost efficiency challenges in other areas.[657]

9.13 For PR19 we calculated the company specific efficiency challenges on shallow dives from the modelled base costs, the CMA adopted the same approach which it considered to be reasonable.[658]

9.14 For PR24, given the greater scale of enhancement expenditure and the greater scope and detail of enhancement cost benchmarking models, we considered that PR24 enhancement models provided a reasonable indication of a company's opportunity for efficiency in other enhancement areas. We therefore used enhancement cost benchmarks as the basis for the company specific efficiency challenges on shallow dives.

9.15 We consider that enhancement costs are a better proxy for efficiencies in enhancement spend as base costs cover a much broader set of activities and requirements than covered by enhancement, for example operations and capital maintenance activities. The enhancement benchmarking models better reflect the range of activities covered by other areas of enhancement spend. For example, we would expect all enhancement activity to require capital delivery and client-side management, and most also to require some form of procurement. This is not the case for base activity. In addition, there is not the same degree of asymmetry of information in the base models.[659]

9.16 In deriving the company specific shallow dive efficiency challenges, we included areas where modelled costs make up most costs, and costs are not subject to significant post modelling adjustments. At PR24 draft determination we included modelled costs only, but for final determination we included modelled costs and outlier or deep dive elements associated with modelled areas, to account for areas where companies provided justification for higher efficient costs than modelled allowances alone, which reduced the efficiency challenge. We also reduced the PR24 cap on shallow dive efficiency challenges from 20% at draft determination to 10% at final determination[660]

[657] [OF-CA-195] South East Water, South East Water - Annex G - Enhancement costs, March 2025, pp.93
[658] [OF-RR-011] CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, final report, March 2021. pp.445, Paragraph 5.181
[659] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.105
[660] [OF-OA-022] Ofwat, PR24 final determinations: Expenditure allowances, February 2025, p.105

to avoid potentially disproportionate interventions for companies where we have not examined costs in detail.

9.17 In its statement of case, South East Water queried Ofwat's application of the general shallow dive approach, as it considered that some models / areas used to generate the efficiency challenge are unrelated to the work it has been applied to.[662]

9.18 The intention of the shallow dive approach was to provide a balanced view on the efficiency of a specific company based on multiple areas of enhancement that reflect the range of activities covered by other areas of enhancement, that could be applied to lower materiality schemes. It reflects company efficiency 'in the round' using all available and suitably robust areas.

9.19 South East Water states that if we had used supply interconnector costs in the appropriate model as opposed to reallocating them to resilience interconnectors, they would have been efficient.[661]

9.20 We assessed the interconnector schemes presented by South East Water and do not consider them to be supply interconnectors. We have concerns over their WRMP modelling approach, it does not provide comparable "water available for use" benefits as a model driver for its proposed interconnectors. The model drivers provided are not reliable to use in the supply interconnectors cost model. We have not developed a separate benchmark model for resilience interconnectors due to range in scope and cost drivers, and so these schemes do not meet the criteria for inclusion in the shallow dive calculation, as modelled costs do not make up most costs. Therefore, we disagree that these costs should have been used.

9.21 South East Water states that it appears that a single outlier (i.e., 'demand') is driving its overall efficiency challenge, and that it considers it has provided compelling arguments to justify its higher cost in this area.[662]

9.22 We continue to consider that demand (water efficiency) should be included in South East Water's shallow dive efficiency calculation. While South East Water correctly points out that its efficiency score on demand (water efficiency) measures is much higher (implying lower efficiency) than other areas, this is not the only area where South East Water fails to justify its higher costs, for example its costs are also high on leakage and WINEP investigations which were not included in the shallow dive efficiency calculation. We therefore consider that South East Water's shallow dive efficiency challenge is appropriate.

[661] [OF-OA-005] South East Water, 'South East Water Limited Statement of Case', March 2025. Pp.53 Paragraph 4.72
[662] [OF-CA-195] South East Water, South East Water - Annex G - Enhancement costs, March 2025. pp.94

9.23 Southern Water states that for companies with a programme which is concentrated in an area where the model works least well and provides a more material challenge, this challenge, disproportionately, impacts on all shallow dives.[663] Southern Water in its draft determination representation requested that we exclude a range of models from the shallow dive efficiency challenge. At final determination, we removed the leakage model from the benchmark, but rejected its request to exclude supply interconnectors, phosphorus removal, and IED models. In its statement of case, Southern Water still has concerns with the inclusion of supply interconnectors and IED in the shallow dive efficiency calculation, on the basis that the use of these models amplifies the error from the weak top-down modelling approach.[664] We provide detailed responses on the robustness of the supply interconnectors and IED in sections 4 and 5, we consider that both models demonstrate sufficient explanatory power and perform reasonably well given the data limitations and therefore, we retain our view on their use in the shallow dive calculations, and reject the exclusion of individual models for individual companies, as this would lead to an inconsistent and asymmetric approach to determining efficiency, given that all companies would request that we remove the models which deem them to be inefficient. For final determination we reduced the cap on the efficiency challenge from 20% to 10% to avoid disproportionate impacts.

9.24 We also note that for other enhancement areas included in the shallow dive efficiency calculations, retaining the draft determination approach of including only modelled costs, and not additional uplifts and deep dives, would have resulted in a greater efficiency challenge for Southern Water. For example, Southern Water received a 15% efficiency challenge against the network Storm Overflow model and a 10% efficiency challenge against the STW model as it is inefficient when it comes to delivery of grey solutions. It received scheme level adjustments to support/encourage delivery of innovative green solutions, which reduced the cost gap, and this reduced its overall efficiency challenge.

Application of the shallow dive assessment to specific areas

9.25 At the PR19 redeterminations, the CMA agreed with our approach of using a shallow dive factor, stating that "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."[665]

[663] [OF-OA-003] 'Southern Water, 'Southern Water Limited Statement of Case', March 2025, pp.263, paragraph 228-233
[664] [OF-OA-003] 'Southern Water, 'Southern Water Limited Statement of Case', March 2025, pp.230, Paragraph 65
[665] [OF-RR-011] CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, final report, March 2021, pp. 444

9.26 Both Southern Water and South East Water highlight a number of areas where they consider application of a shallow dive approach was inappropriate. This includes for Southern Water Event Duration Monitoring, Nature Based solutions for sanitary parameters and Phosphorus, microbiological treatment, Budds Farm Storm Overflow and water WINEP[666] and for South East Water elements of the lead programme and raw water deterioration[667]. A range of reasons are given for the issues raised, which are highlighted below.

9.27 In general, we consider that the enhancement areas that Southern Water and South East Water have concerns about are either of low materiality or difficult to benchmark due to the extent of scope variation or low number of companies requesting costs, and therefore we continue to consider applying the shallow dive is justified. In addition, specific schemes or sub programme areas have been highlighted, such as Budds Farm Storm Overflow, and turbidity elements of the raw water deterioration programme, where we have made an assessment at a programme level. Detailed investigation of these small elements of enhancement costs would be disproportionate to the benefits provided. We provide further details on specific elements below:

Southern Water

- Event Duration Monitoring - costs were immaterial. We applied the same approach across all companies.
- Nature Based solutions for sanitary parameters and phosphorus - Southern Water costs were above the indicative benchmark against all cost drivers, and cost were below the 0.5% materiality threshold, so a shallow dive challenge was considered appropriate.
- microbiological treatment - costs were not material but appeared high when considered in terms of cost per population equivalent of treatment, and so a shallow dive challenge was considered appropriate.

9.28 Budds Farm Storm Overflow - The scheme is a combined solution to relocate the discharge point and deliver storage over a multi-AMP period to reduce spills down to the required Storm Overflows Discharge Reduction Plan levels. As the costs of the discharge relocation and the storage were combined, it was found that the costs for the scheme were high when considered in the econometric model, with a requested allowance of £48.4 million for 12,222m^3 storage, and a modelled allowance of £12.7 million. Due to concerns over the scale of the challenge, and whether the cost of the relocation was fully accounted for in the model, a shallow dive challenge was applied. The 10% was applied based on an early iteration of the shallow dive efficiency calculation, which later reduced to 8% as the input models changed in the lead up to

[666] [OF-OA-003] Southern Water, 'Southern Water Limited Statement of Case', March 2025, pp.35, Table 3.
[667] [OF-OA-005] South East Water, 'South East Water Limited Statement of Case', March 2025. pp.53, Paragraph 4.71

publication of the final determination, but did not update due to the complexity of the storm overflow model. However, we note that the resulting impact is less than £1 million and is therefore not considered material.

9.29 Water WINEP – The company requested £35.968 million for Water WINEP actions against Invasive Non Native Species (INNS), Drinking Water Protected Areas (DrWPA) and Water Framework Directive (WFD). The request against WFD and INNS were low materiality, 0.23% and 0.1% respectively, and within the shallow dive assessment threshold, so a shallow dive challenge was considered appropriate. Southern Water requested £22.775 million for DrWPA which we assessed against the median unit cost per action. While Southern Water were below the indicative cost benchmark, we had low confidence in the indicative benchmark to set allowances as some types of WINEP interventions are more bespoke in nature, so we applied a shallow dive challenge, in line with our methodology as outlined above.

South East Water

9.30 Lead – South East Water states that a shallow dive should not be applied to individual elements of the lead programme rather than considering the overall lead programme. The decision to separate the Lead programme was carried out to reflect the difference in the types of work. We grouped similar activities where they could be benchmarked, such as replacement of lead communication pipes and supply pipes. This left a number of disparate activities that could not be modelled, and were considered to be different in nature to the modelled activities, including lead sampling, lead locator spatial assessment, phosphate disengagement (inc. management/ delivery costs) and lead programme management. Given that the sum of these costs was below the materiality threshold, we considered it appropriate to apply a shallow dive challenge in accordance with our shallow dive methodology.

9.31 Raw Water deterioration – South East Water state that Ofwat found all schemes which it could benchmark to be efficient. But for the one scheme which it shallow dived, Ofwat assumed it to be inefficient based on benchmark evidence from completely unrelated enhancement schemes.[668] The schemes were grouped by similar themes where feasible, including PFAS, nitrate removal and ultraviolet treatment. Where the grouped schemes were considered material they were assessed through deep dive / modelling. Where they were assessed as non material, they were assessed via shallow dive. This was the case for the turbidity (NTU[669]) scheme which was below the £10 million threshold and shallow dived. South East Water's other schemes were nitrate schemes and were subject to a benchmark model.

[668] [OF-OA-005] South East Water, Statement of Case, March 2025, p.53 (Paragraph 4.72)
[669] Nephelometric Turbidity Units (NTU) is the industry measurement standard for turbidity in drinking water. Turbidity is the cloudiness or haziness caused by large numbers of suspended particulate matter

9.32 We consider that each of the areas where we have applied shallow dive challenges is consistent with our shallow dive methodology. We consider that adopting a consistent approach minimises the risk of the regulatory regime becoming too burdensome and intrusive. The challenges applied represent a balanced view on the efficiency of a specific company based on multiple areas of enhancement covering a range of enhancement activities.

Ofwat (The Water Services Regulation Authority) is a non-ministerial government department. We regulate the water sector in England and Wales.

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