

**Cost Adjustment Claim:  
Absence of Large Water Recycling Works  
ANH CAC 2.1**

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**Anglian Water**

June 2023

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Document reference	Narrative file: ANH CAC 2.1		
Title of cost adjustment claim	Absence of large Water Recycling Works CAC		
Price control	Water Recycling Network Plus	Symmetrical?	YES/NO
Basis of claim	<p>Two alternative approaches are set out. The value of this CAC is the lower of the two values.</p> <p>Approach taken looks at the impact on costs of not having large works Alternative approach (set out but not used) considers the value of the PR24 model suite using only WATS as opposed to not using WATS at all</p>		
Gross value (£m five years)	£ 132.7 million		
Implicit allowance (£m five years)	£ 24.0 million		
Net value of claim (£m five years)	£ 108.7 million		
How efficiency of costs are demonstrated	Through benchmarking comparisons relative to industry		
Materiality (as % of totex for price control)	> 2.5%		
How customers are protected	Assurance on this CAC has been provided by Oxera		
Supporting document references	<p>Supporting Excel file for preferred approach: ANH CAC 2.2</p> <p>Supporting Excel file for alternative approach: ANH CAC 2.3</p> <p>White paper on economies of scale: ANH_CAC_2.4</p> <p>Assurance: ANH_CAC_0.1 Assurance PR24 Template ANH_CAC_0.2</p>		

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### 1. Initial points to note

This CAC is submitted on a contingent basis. Anglian Water notes the use of alternative variables included by Ofwat in its suite of models released in April 2023 to take account of the large works effect on required costs. If the weighted average treatment size (WATS) variable were to be used as the only driver capturing economies of scale in the models used by Ofwat for PR24, then this CAC would not be required. Anglian is submitting the CAC in accordance with advice provided by Ofwat during the Cost Assessment Working Groups during 2021 and early 2022 and the guidance set out in the PR24 Final Methodology.

Anglian Water submitted a claim to take account of this issue during the PR19 and subsequent CMA process. The claim was rejected on the grounds of incomplete data (data on large works were not available for 2014, 2015 and 2016). Since the CMA appeal, additional robust data on large sewage treatment works has been collated and there has been an exercise by Ofwat to assure the data used in recent months. This has enabled Ofwat to build alternative cost drivers for PR24. The CMA also gave the fact that Anglian does not appear to be unique in the relevant characteristics as a subsidiary reason for rejecting the PR19 large works CAC. As the current CAC includes symmetric adjustments for all companies, we consider that the issue of uniqueness does not constitute grounds for rejecting this CAC. As such, the concerns which led to the PR19 claim being dismissed have now been addressed.

The size of Water Recycling Centres (WRCs) is an exogenous variable and determined by local factors such as sparsity and topography. Looking at the structure of the cost models used by Ofwat at PR19 for sewage treatment, and at those put forward by Ofwat in the April 2023 suite of models, it appears that Ofwat accepts the basic premise of Anglian Water’s claim – that the size of WRCs is an exogenous variable and determines the costs required by companies to run their sewage treatment operations. We say this because Ofwat made it very clear throughout both PR19 and so far during PR24 that it would only use exogenous variables within its models.

Consequently, our concerns with the PR19 models were not that the problem was ignored by Ofwat but that the variables Ofwat had chosen to use (the share of load treated in Bands 1-3 and in Band 6) were not sufficiently tightly defined effectively to account for the issue. This was driven by the lack of more granular data in PR19. It would appear that Ofwat accepts (or at least is prepared to entertain) this contention as well, given that additional disaggregated data has been collated and that the two new variables (the WATS, and share of load treated in works larger than 100,000 p.e.), which Ofwat included in the April 2023 suite of models, are more tightly defined than the PR19 equivalent. However, only WATS is able to fully capture the impact of large works.

We present two alternative approaches to calculating the value of this CAC. The first follows the same approach we took at PR19. In the second, we ran two scenarios: one where WATS is used as the only cost driver capturing economies of scale in both SWT and WWWWNP models; and one where the load treated in bands 1-3 *and* the load treated in STWs larger than 100,00 p.e. are used in the modelling suite. The difference between the former and the latter constitutes the net value of the CAC. The value of the updated CAC is significantly lower than the alternative approach. For the purpose of our submission, we are using the lower of the two CACs.

The former approach is set out in sections 3 - 5, the latter in Appendix 2.

In the approach we have used for our submission, we have included, and netted off, the Implicit Allowance (IA) included in the Ofwat PR19 models for economies of scale in sewage treatment. The IA calculation follows the same general approach taken by the CMA in Bristol's 2015 appeal. The CMA overwrote the share of Band 1-3 load with the industry average figure for the most recent year's data. We have extended this approach by adjusting the Band 1-3 variable in PR19 model SWT1 to the 2022 industry average and separately adjusting >100,000 p.e and WATS variables to its industry average figures, also for 2022. In each case we compared the resultant assessment with the baseline assessment. We then triangulated the three differences to produce an overall IA.

In line with the guidance provided by Ofwat, this CAC:

- Relates purely to base costs;
- Includes explicitly calculated IA based on PR24 models;
- Sets out the symmetric adjustments relevant to all WaSCs; and
- Is above the materiality threshold set for Water Recycling Network Plus.

The rest of this CAC is set out as follows:

- Section 2 addresses the need for adjustment
- Section 3 addresses the efficiency of the costs proposed in the CAC
- Section 4 sets out the structure of the CAC
- Section 5 sets out the tables which make up the CAC
- Appendix 1 sets out this CAC's conformity with Ofwat's criteria for assessing CACs
- Appendix 2 sets out the alternative approach to computing the CAC

## 2. Need for adjustment

Anglian Water's CAC for the impact of not having any very large WRCs is based on the following four propositions:

- i) There is a material, observable reduction in the unit cost of treating wastewater as WRC size increases. Economies of scale are monotonic and decreasing up to the very largest works size. The evidence for this is set out in Table 2.
- ii) Whether or not a company has very large WRCs is dependent on the demographics of the appointed area – which is exogenous to management control.
- iii) It is the absence of large WRCs which causes Anglian Water's overall unit cost to be lower quartile. In other words, as a result of factors completely outside management control, Anglian Water's efficient costs for Wastewater Treatment are higher than other WaSCs
- iv) Based on the ratio of Anglian Water's unit costs per Band and the industry unit costs per Band, Anglian Water's costs for waste water treatment are shown to be efficient (better than the Upper Quartile, UQ) for Bands 1 – 6. Indeed, once economies of scale in larger bands are properly accounted for in the econometric modelling (i.e. with WATS), Anglian is estimated to be the most efficient company. (In contrast, the company is found to perform worse than the median or the lower quartile company in Ofwat's other two models (SWT2 and SWT1, respectively), which clearly indicates that Ofwat's proposed models are not able to correctly capture the impact of economies of scale).

Anglian Water has analysed its estate of WRCs and looked to see if there are any cost beneficial opportunities to merge works in order to access additional economies of scale. No such opportunities amongst larger works have been found.

The existence or otherwise of large works is a material driver of expenditure within Sewage Treatment as can be seen from Table 2 below. This underlying rationale for this CAC is not in doubt: Ofwat's PR19 models for Sewage Treatment included variables measuring the share of load handled at small (Bands 1-3) and large (Band 6) works at PR19. And within the suite of models recently released by Ofwat, two new variables have been included: the share of load treated at works handling p.e over 100,000 and the weighted average size of works (WATS) variable. Our purpose in submitting this CAC is that the control variables in PR19 models which are designed to take account of this factor do not do so adequately, and although the load treated at works handling p.e over 100,000 represents a *slight* improvement compared to its PR19 'equivalent' (load treated in bands 6 and above, i.e. >25,000 p.e.), unlike the WATS it is unable to fully capture the greater economies of scale arising from the operation in much larger sewage treatment works.

Were Ofwat to go ahead with the WATS variable in its modelling suite for PR24, this CAC would therefore be unnecessary. However, in line with Ofwat's guidance during the Cost Assessment Working Groups that CACs should be submitted based upon the cost drivers used at PR19, we submit this CAC but recognize that it is contingent on the WATS variable not being used at PR24.

At PR19, Anglian Water started the process of computing the Large Works CAC by proposing five new Bands to replace the existing Band 6, which covers all WRCs handling load from over 25,000 p.e. The proposed Bands are as set out in Table 1 below. Anglian Water fully accepts that the break points for the new Bands are just as arbitrary as those for the existing six Bands. They do however create a more even split of load across the Bands, with the shares being similar for those in Band 7 and above. Such a split also allows to identify Anglian (alongside South West Water and Southern Water) as an outlier in terms of load treated in larger STWs meaning that we do not benefit from the same efficiency opportunities as the rest of the industry.

**Table 1: New Band sizes**

Band	p.e. in Band
<b>6 (revised)</b>	25,000 – 125,000
<b>7</b>	125,000 – 250,000
<b>8</b>	250,000 – 500,000
<b>9</b>	500,000 – 1,000,000
<b>10</b>	>1,000,000

The analysis reported here is taken from the Excel workbook ANH Large Works CAC calculation.xlsx which forms an integral part of this CAC.

### 3. Demonstrate cost efficiency

#### Anglian Water analysis

Table 2 shows the unit costs in 2021/22 for each Band in £ per kg of BOD5 load.

**Table 2 Unit costs in 2022 (£/kg)**

Unit costs 2022 £/kg	Band 1	Band 2	Band 3	Band 4	Band 5	Band 6 mod	Band 7	Band 8	Band 9	Band 10	Total	Ofwat B6
p.e. in Band	<250	250-500	500-2,000	2k - 10k	10k - 25k	25k - 125k	125k-250k	250k-500k	500k - 1m	>1m		> 25k
ANH	4.08	2.99	1.61	1.02	0.73	0.48	0.42	0.39			0.64	0.43
NES	5.73	3.22	1.34	1.21	0.66	0.78	0.24	0.38	0.77		0.74	0.67
UU	7.73	3.57	2.87	1.28	0.81	0.62	0.43	0.33	0.33	0.28	0.55	0.44
SRN	29.18	4.12	2.75	1.49	1.09	1.53	0.67	0.41			1.17	1.02
SVT	6.67	3.06	2.22	1.33	1.06	0.26	0.42	0.37	0.32	0.24	0.49	0.30
SWB	4.85	3.56	1.99	1.26	1.00	0.95	0.21				1.06	0.74
TMS	5.58	4.12	1.99	1.17	0.83	0.91	0.89	0.52	0.32	0.48	0.59	0.56
WSH	5.69	3.49	1.61	1.13	0.81	0.61	0.65	0.13	0.38		0.72	0.50
WSX	7.25	3.18	1.97	1.20	0.90	0.79	0.62		0.29		0.77	0.59
YKY	3.49	2.37	1.66	0.74	0.61	0.99	0.21	0.50	0.48		0.63	0.58
<b>Total</b>	6.57	3.30	1.95	1.16	0.84	0.75	0.52	0.40	0.42	0.42	0.66	0.53
UQ	5.03	3.09	1.63	1.14	0.75	0.61	0.29	0.36	0.32	0.26		0.46

The following industry trends can be noted from Table 2:

- At an industry level, **unit costs across the Bands are monotonic and decreasing as the Band number increases**. This same trend is also observable for almost every individual company; where there are discontinuities in the trend, they are typically small and associated with a company having a single WRC in that Band;
- The difference in unit costs between Bands is large: **the average industry Band 1 unit cost is 16 times higher than the average industry Band 10 unit cost**;
- **The unit costs for each company's highest Band are (with one exception) significantly lower than the Ofwat Band 6 unit cost for that company**. The discounts range from 11% to 71%, depending on whether the company has relatively small works (such as Anglian Water), or very large works in Band 10 (such as Thames). As such, not accounting for this continuum of decreasing unit costs will over-estimate the efficiency of companies with very large work such as Thames and under-estimate the efficiency of companies with no very large work such as Anglian.

In addition, the following Anglian-specific information can be noted from Table 2:

- **Anglian Water's largest WRCs are in Band 8.** Its largest WRC is thus smaller than every other company's largest WRC, with the exception of South West Water;
- **Anglian Water's unit costs are below the industry average in all Bands and within the Upper Quartile for Bands 1 – 7 as well as for Ofwat's PR19 definition of bands 6+.**

It is instructive to compare the unit costs in newly defined Bands set out in Table 1 to the Ofwat Band 6 definition, to understand the loss of information resulting from Ofwat's implicit assumption that economies of scale cease at its Band 6. Despite above average unit costs in many individual categories within Bands 6 (revised) –10, the three companies with Band 10 works (as a result of having the largest WRCs in the industry) have very low unit costs when Bands 6 (revised) –10 are aggregated. By contrast, as a result of not having any Band 9 or Band 10 WRCs, Anglian has the fifth highest total unit cost (thus appearing to be inefficient) despite having Upper Quartile unit costs in Bands 1 – 6 (modified) and second Quartile unit costs in Bands 7 and 8.

In 2022/23 Price Base, the Anglian Water Large Works CAC is worth £93.13 million (see Table 13 in Section 5 below). At present, Anglian Water's Water Recycling Network Plus Totex for AMP8 currently estimated at around £4 billion. Given the level of materiality set by Ofwat for Water Recycling Network Plus CACs is 1% (i.e. £40 million), this CAC clearly exceeds the materiality threshold.

Oxera has provided external assurance for this CAC<sup>1</sup>

### **Third party corroboration**

Anglian Water is familiar with research undertaken at Loughborough University as part of a PhD thesis into "Development of Robust Empirically Implementable Benchmarking Methodologies to Better Inform and Target Managerial Efforts to Improve the Costs and Environmental Sustainability of Water and Waste Water Systems". The following tables are replicated with permission of the candidate from a White Paper<sup>2</sup> published recently which will form a chapter of the candidate's thesis.

The paper draws interesting and useful distinctions between Activated Sludge and Biological treatment works and computes the short and long run economies of scale for each.

However, the key area we would wish to draw to Ofwat's attention is the concluding analysis of Band 6 works by decile, comparing actual and predicted costs for all companies. The econometric underpinning of the analysis is set out in detail in the White Paper. The following three tables 12, 13 and 15, are taken from the White Paper. Tables 12 and 13 set out actual and predicted costs per decile for each company while Table 15 sets out the measured efficiency in each decile for each company.

Table 12 broadly corroborates the analysis in Table 2 above. Tables 13 and 15 together demonstrate that Anglian Water is upper quartile (UQ) efficient across all ten deciles of Band 6.

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<sup>1</sup> ANH\_CAC\_0.1

<sup>2</sup> ANH\_CAC\_2.4



**Table 12 : Actual Unit Cost by Company and Plant Size Decile**

Company	1	2	3	4	5	6	7	8	9	10	Total
ANH	0.641	0.638	0.586	0.480	0.659	0.260	0.497	0.507	0.474	0.408	0.544
NES	0.698	0.860	0.720	0.564	0.807	0.437	0.553	0.353	0.472	0.768	0.660
SRN	0.767	0.673		0.616	0.410	0.867	0.644	0.709	0.345		0.646
SVE	0.617	0.504	0.474	0.519	0.564	0.441	0.475	0.432	0.468	0.293	0.484
SWB	1.152	0.986	0.931	0.728	0.607	0.475	0.726		0.410		0.695
TMS	0.828	0.871	0.794	0.971		0.749	0.903	0.612	0.794	0.398	0.731
UU	0.936	0.668	0.793	0.649	0.584	0.701	0.596	0.457	0.445	0.310	0.617
WSH	1.303			0.316	0.632	0.346	0.537	0.508	0.432	0.280	0.509
WSX	1.178	0.831	0.755	0.723	0.703	0.886	0.815	0.384	0.670	0.396	0.753
YKY	0.974	0.588	0.519	0.422	0.636		0.582	0.603	0.523	0.471	0.586
All E&W	0.794	0.706	0.653	0.653	0.597	0.635	0.628	0.538	0.504	0.394	0.611

**Company Ranks based on Average Actual Unit Cost**

Company	1	2	3	4	5	6	7	8	9	10	Total
ANH	2	3	3	3	7	1	2	5	7	6	3
NES	3	7	4	5	9	3	4	1	6	8	7
SRN	4	5	#N/A	6	1	8	7	9	1	#N/A	6
SVE	1	1	1	4	2	4	1	3	5	2	1
SWB	8	9	8	9	4	5	8	#N/A	2	#N/A	8
TMS	5	8	7	10	#N/A	7	10	8	10	5	9
UU	6	4	6	7	3	6	6	4	4	3	5
WSH	10	#N/A	#N/A	1	5	2	3	6	3	1	2
WSX	9	6	5	8	8	9	9	2	9	4	10
YKY	7	2	2	2	6	#N/A	5	7	8	7	4

**Table 13: Predicted Unit Cost by Company and Plant Size Decile**

Company	1	2	3	4	5	6	7	8	9	10	Total
ANH	0.754	0.681	0.654	0.570	0.730	0.543	0.526	0.463	0.433	0.401	0.583
NES	0.734	0.697	0.608	0.764	0.716	0.571	0.626	0.564	0.495	0.466	0.619
SRN	0.771	0.563		0.607	0.529	0.509	0.478	0.437	0.368		0.526
SVE	0.722	0.631	0.533	0.604	0.621	0.552	0.518	0.529	0.465	0.417	0.570
SWB	0.861	0.840	0.720	0.720	0.534	0.515	0.648		0.481		0.637
TMS	0.757	0.700	0.632	0.751		0.612	0.590	0.551	0.530	0.355	0.582
UU	0.775	0.595	0.647	0.658	0.622	0.532	0.518	0.457	0.464	0.382	0.558
WSH	0.813			0.636	0.675	0.536	0.481	0.468	0.423	0.299	0.524
WSX	0.755	0.578	0.698	0.607	0.618	0.557	0.587	0.390	0.501	0.318	0.575
YKY	0.711	0.637	0.603	0.553	0.504		0.454	0.478	0.444	0.369	0.537
All E&W	0.751	0.650	0.622	0.654	0.606	0.545	0.529	0.485	0.459	0.381	0.569

**Company Ranks based on Average Predicted Unit Costs**

Company	1	2	3	4	5	6	7	8	9	10	Total
ANH	4	6	6	2	9	5	6	4	3	6	8
NES	3	7	3	10	8	8	9	9	8	8	9
SRN	7	1	#N/A	4	2	1	2	2	1	#N/A	2
SVE	2	4	1	3	5	6	5	7	6	7	5
SWB	10	9	8	8	3	2	10	#N/A	7	#N/A	10
TMS	6	8	4	9	#N/A	9	8	8	10	3	7
UU	8	3	5	7	6	3	4	3	5	5	4
WSH	9	#N/A	#N/A	6	7	4	3	5	2	1	1
WSX	5	2	7	5	4	7	7	1	9	2	6
YKY	1	5	2	1	1	#N/A	1	6	4	4	3

**Table 15: Overall Cost Efficiency by Company and Plant Size Decile**

Company	1	2	3	4	5	6	7	8	9	10	Total
<b>ANH</b>	0.838	0.824	0.854	0.843	0.826	0.944	0.855	0.811	0.801	0.805	0.831
<b>NES</b>	0.822	0.716	0.817	0.783	0.652	0.776	0.790	0.838	0.775	0.607	0.765
<b>SRN</b>	0.694	0.659		0.737	0.755	0.680	0.656	0.681	0.751		0.701
<b>SVE</b>	0.919	0.932	0.940	0.922	0.897	0.908	0.905	0.907	0.888	0.902	0.913
<b>SWB</b>	0.770	0.796	0.801	0.816	0.695	0.822	0.811		0.839		0.781
<b>TMS</b>	0.654	0.634	0.631	0.631		0.644	0.617	0.668	0.572	0.685	0.643
<b>UU</b>	0.706	0.698	0.709	0.773	0.736	0.712	0.724	0.746	0.792	0.752	0.736
<b>WSH</b>	0.703			0.861	0.816	0.864	0.877	0.771	0.801	0.803	0.815
<b>WSX</b>	0.577	0.614	0.669	0.637	0.669	0.611	0.624	0.592	0.662	0.651	0.636
<b>YKY</b>	0.736	0.760	0.767	0.770	0.710		0.711	0.718	0.730	0.717	0.739
<b>All E&amp;W</b>	0.784	0.744	0.785	0.776	0.760	0.751	0.748	0.761	0.765	0.749	0.762

**Company Ranks Based on Average Overall Cost Efficiency**

Company	1	2	3	4	5	6	7	8	9	10	Total
<b>ANH</b>	2	2	2	3	2	1	3	3	3	2	2
<b>NES</b>	3	5	3	5	9	5	5	2	6	8	5
<b>SRN</b>	8	7	#N/A	8	4	7	8	7	7	#N/A	8
<b>SVE</b>	1	1	1	1	1	2	1	1	1	1	1
<b>SWB</b>	4	3	4	4	7	4	4	#N/A	2	#N/A	4
<b>TMS</b>	9	8	8	10	#N/A	8	10	8	10	6	9
<b>UU</b>	6	6	6	6	5	6	6	5	5	4	7
<b>WSH</b>	7	#N/A	#N/A	2	3	3	2	4	4	3	3
<b>WSX</b>	10	9	7	9	8	9	9	9	9	7	10
<b>YKY</b>	5	4	5	7	6	#N/A	7	6	8	5	6

## 4. Structure of this CAC

In this section we set out the approach we have taken to computing this CAC. Having used only industry data which are freely available and have been thoroughly scrutinised, the approach is both transparent and replicable. All of the calculations are set out in the associated Excel workbook, ANH Large Works CAC calculations.

The first stage in calculating the Large Works CAC is to compute the efficient costs for all companies for sewage treatment, based on an average load per Band. Tables 3 and 4 together let us compute what each company would have had as load per Band if it had had the average spread of Band sizes. These are shown in Table 5.

Table 6 sets out the industry Upper Quartile (UQ) unit cost for each Band for each year. Table 7 then sets out the gap to those UQ unit costs for each company in each Band for each year. This then allows us to calculate efficient unit costs for each company. Table 8 does this for all companies as follows: If the actual unit cost is below the UQ unit cost, use the actual cost/kg. Otherwise use UQ cost/kg.

In Table 9, we then convert those efficient unit costs based on average loads into total costs for all companies. In Table 10, we take the same efficient unit costs and convert them into total efficient costs based on the actual load per Band. The difference between Tables 9 and 10 are set out in Table 11: this shows the gross impact on each company of having a spread of loads across Bands which is different to the average spread of loads.

Table 11, is, as we say, a gross measure of the impact of differing shares of load across Bands. To calculate the net CAC, the IAs for scales of economy need to be netted off. Table 12 sets out our calculation of the Implicit Allowance. We have followed the approach taken by the CMA in Bristol 2015, evaluating each of the cost drivers designed to take economies of scale into account at the average 2022 value one by one. We then triangulated the separate approaches to give an overall Implicit Allowance for all companies. Table 12 shows the modelled values before the application of RPE or Frontier Shift.

Finally, in Table 13, we netted off the IAs set out in Table 12 against the Gross impacts set out in Table 11. This provides the symmetric adjustments for all companies.

## 5. CAC Data Tables

All costs shown in this section are shown in 2017/18 Price Base. The final CAC figures, set out in Table 12, are shown in both 2017/18 and 2022/23 Price Bases.

The first stage is to calculate the efficient expected costs based on the average load per Band and lower of Actual or UQ costs for all companies. This covers Tables 3 – 9 inclusive.

**Table 3: Total load / day (kg/day)**

	ANH	NES	UU	SRN	SVT	SWB	TMS	WSH	WSX	YKY
<b>2022</b>	438,379	180,522	556,198	295,908	623,650	110,077	967,625	248,375	204,350	360,966
<b>2021</b>	430,209	167,700	547,298	300,850	623,157	109,287	954,060	234,352	204,341	349,007
<b>2020</b>	434,526	179,827	546,253	300,315	632,981	109,433	981,892	248,455	197,210	361,199
<b>2019</b>	428,975	178,350	550,281	297,937	629,762	107,427	955,325	246,025	190,108	349,865
<b>2018</b>	417,946	177,871	546,893	296,194	616,752	106,303	970,144	245,516	182,334	343,766
<b>2017</b>	418,393	177,756	537,709	292,432	611,765	105,401	960,572	250,453	185,628	368,290

**Table 4: Industry Average Load distribution by Band size**

Band	1	2	3	4	5	6	7	8	9	10
<b>2022</b>	0.4%	0.4%	1.9%	6.1%	8.3%	25.3%	14.3%	13.4%	13.8%	16.1%
<b>2021</b>	0.4%	0.4%	1.9%	6.1%	8.4%	26.7%	14.1%	14.5%	11.1%	16.4%
<b>2020</b>	0.4%	0.4%	1.9%	6.2%	8.3%	25.7%	13.9%	14.6%	12.4%	16.3%
<b>2019</b>	0.4%	0.4%	1.9%	6.3%	8.2%	25.7%	14.3%	14.4%	12.2%	16.2%
<b>2018</b>	0.4%	0.4%	1.9%	6.4%	8.1%	26.4%	13.5%	14.4%	12.3%	16.2%
<b>2017</b>	0.4%	0.4%	1.9%	6.3%	8.3%	26.1%	13.5%	13.8%	13.6%	15.8%

So, for example, in 2019/20, 6.2% of all load treated was treated in Band 4 works.

**Table 5: Load distribution (in kg/day) based on industry averages**

This sets out for each company how much load they would have had each year, if they had treated the industry average load shares set out in Table 4

### Anglian Water

Band	1	2	3	4	5	6	7	8	9	10
<b>2022</b>	1,787	1,760	8,331	26,687	36,274	111,099	62,804	58,563	60,347	70,727
<b>2021</b>	1,711	1,724	8,278	26,412	36,081	114,966	60,634	62,200	47,833	70,371
<b>2020</b>	1,702	1,731	8,320	27,014	35,916	111,608	60,223	63,331	53,731	70,949
<b>2019</b>	1,690	1,711	8,161	27,007	35,333	110,299	61,172	61,623	52,378	69,601
<b>2018</b>	1,660	1,699	8,028	26,839	33,669	110,425	56,369	60,198	51,265	67,794
<b>2017</b>	1,671	1,727	8,063	26,535	34,522	109,154	56,356	57,657	56,757	65,952

### Northumbrian Water

Band	1	2	3	4	5	6	7	8	9	10
<b>2022</b>	736	725	3,431	10,989	14,937	45,750	25,862	24,116	24,851	29,125
<b>2021</b>	667	672	3,227	10,296	14,065	44,815	23,636	24,246	18,646	27,431
<b>2020</b>	704	716	3,443	11,180	14,864	46,188	24,923	26,209	22,236	29,362
<b>2019</b>	702	711	3,393	11,228	14,690	45,858	25,433	25,620	21,777	28,937
<b>2018</b>	706	723	3,417	11,422	14,329	46,995	23,990	25,619	21,817	28,852
<b>2017</b>	710	734	3,425	11,274	14,667	46,375	23,943	24,496	24,113	28,020

**UU**

Band	1	2	3	4	5	6	7	8	9	10
2022	2,267	2,233	10,571	33,859	46,023	140,958	79,683	74,302	76,566	89,736
2021	2,176	2,193	10,531	33,600	45,901	146,256	77,137	79,128	60,851	89,524
2020	2,140	2,176	10,459	33,960	45,152	140,305	75,708	79,615	67,546	89,192
2019	2,167	2,195	10,468	34,644	45,324	141,490	78,471	79,049	67,190	89,283
2018	2,172	2,223	10,505	35,120	44,056	144,494	73,760	78,771	67,081	88,711
2017	2,148	2,219	10,362	34,103	44,366	140,283	72,427	74,100	72,942	84,760

**Southern Water**

Band	1	2	3	4	5	6	7	8	9	10
2022	1,206	1,188	5,624	18,014	24,485	74,992	42,393	39,530	40,735	47,741
2021	1,196	1,205	5,789	18,470	25,232	80,397	42,402	43,497	33,450	49,211
2020	1,176	1,197	5,750	18,670	24,823	77,136	41,622	43,770	37,135	49,035
2019	1,174	1,188	5,668	18,757	24,540	76,607	42,486	42,799	36,378	48,340
2018	1,176	1,204	5,689	19,021	23,861	78,257	39,948	42,662	36,331	48,045
2017	1,168	1,207	5,635	18,547	24,129	76,293	39,389	40,299	39,670	46,096

**Severn Trent**

Band	1	2	3	4	5	6	7	8	9	10
2022	2,542	2,503	11,852	37,965	51,605	158,053	89,347	83,313	85,852	100,619
2021	2,478	2,497	11,990	38,257	52,263	166,528	87,829	90,096	69,286	101,932
2020	2,479	2,522	12,119	39,352	52,320	162,581	87,728	92,256	78,270	103,353
2019	2,480	2,512	11,980	39,648	51,870	161,927	89,805	90,466	76,895	102,178
2018	2,449	2,507	11,847	39,606	49,684	162,952	83,182	88,833	75,650	100,043
2017	2,444	2,525	11,789	38,799	50,477	159,603	82,402	84,305	82,988	96,433

**South West Water**

Band	1	2	3	4	5	6	7	8	9	10
2022	449	442	2,092	6,701	9,108	27,897	15,770	14,705	15,153	17,760
2021	435	438	2,103	6,709	9,166	29,205	15,403	15,801	12,151	17,877
2020	429	436	2,095	6,803	9,045	28,108	15,167	15,950	13,532	17,868
2019	423	429	2,044	6,763	8,848	27,622	15,319	15,432	13,117	17,430
2018	422	432	2,042	6,826	8,564	28,086	14,337	15,311	13,039	17,243
2017	421	435	2,031	6,685	8,697	27,498	14,197	14,525	14,298	16,615

**Thames Water**

Band	1	2	3	4	5	6	7	8	9	10
2022	3,944	3,884	18,390	58,905	80,067	245,227	138,626	129,264	133,204	156,115
2021	3,794	3,823	18,357	58,572	80,015	254,957	134,467	137,938	106,077	156,060
2020	3,846	3,912	18,800	61,043	81,160	252,199	136,086	143,109	121,414	160,323
2019	3,763	3,811	18,174	60,145	78,685	245,637	136,231	137,234	116,646	155,000
2018	3,852	3,943	18,635	62,300	78,153	256,321	130,845	139,733	118,997	157,366
2017	3,837	3,964	18,511	60,922	79,257	250,603	129,385	132,373	130,305	151,416

### Welsh Water

Band	1	2	3	4	5	6	7	8	9	10
2022	1,012	997	4,720	15,120	20,552	62,946	35,583	33,180	34,191	40,072
2021	932	939	4,509	14,388	19,655	62,627	33,030	33,883	26,056	38,334
2020	973	990	4,757	15,446	20,536	63,816	34,435	36,212	30,722	40,568
2019	969	981	4,680	15,489	20,264	63,259	35,084	35,342	30,040	39,917
2018	975	998	4,716	15,766	19,778	64,868	33,113	35,362	30,115	39,825
2017	1,000	1,034	4,826	15,884	20,665	65,341	33,735	34,514	33,975	39,479

### Wessex Water

Band	1	2	3	4	5	6	7	8	9	10
2022	833	820	3,884	12,440	16,909	51,789	29,276	27,299	28,131	32,969
2021	813	819	3,932	12,545	17,138	54,607	28,800	29,544	22,720	33,425
2020	772	786	3,776	12,260	16,301	50,653	27,332	28,743	24,386	32,200
2019	749	758	3,617	11,969	15,658	48,881	27,110	27,309	23,212	30,845
2018	724	741	3,502	11,709	14,688	48,174	24,592	26,262	22,365	29,576
2017	741	766	3,577	11,773	15,316	48,428	25,003	25,581	25,181	29,261

### Yorkshire Water

Band	1	2	3	4	5	6	7	8	9	10
2022	1,471	1,449	6,860	21,974	29,869	91,480	51,713	48,221	49,691	58,238
2021	1,388	1,398	6,715	21,427	29,271	93,266	49,190	50,459	38,804	57,089
2020	1,415	1,439	6,916	22,455	29,856	92,774	50,061	52,644	44,663	58,977
2019	1,378	1,396	6,656	22,027	28,817	89,958	49,891	50,259	42,719	56,765
2018	1,365	1,397	6,603	22,076	27,693	90,826	46,364	49,514	42,166	55,762
2017	1,471	1,520	7,097	23,358	30,388	96,083	49,607	50,753	49,960	58,054

**Table 6: Upper Quartile £ per kg for each Band**

Band	1	2	3	4	5	6	7	8	9	10
2022	5.03	3.09	1.63	1.14	0.75	0.61	0.29	0.36	0.32	0.26
2021	4.35	2.87	2.00	1.11	0.84	0.57	0.42	0.33	0.31	0.26
2020	4.36	3.13	1.65	1.11	0.76	0.51	0.41	0.29	0.30	0.24
2019	4.32	3.26	1.78	1.07	0.73	0.59	0.44	0.34	0.29	0.21
2018	4.04	2.57	1.52	0.95	0.79	0.53	0.43	0.27	0.31	0.28
2017	3.67	2.25	1.53	0.98	0.75	0.55	0.46	0.30	0.32	0.25

**Table 7: Gap to Upper Quartile for each Company in each Band**

Table 7 sets out the ratio of company unit cost to Upper Quartile (UQ) unit cost. Negative figures are within the UQ. Positive figures are outside UQ

**Anglian Water**

Band	1	2	3	4	5	6	7	8	9	10
2022	-18.8%	-3.1%	-1.1%	-10.2%	-2.8%	-21.0%	45.8%	8.4%		
2021	-10.5%	-1.8%	-13.2%	-5.3%	-12.2%	-1.4%	5.4%	35.3%		
2020	1.5%	-2.3%	0.5%	-2.5%	-1.1%	9.1%	20.5%	48.3%		
2019	-4.1%	-7.2%	-5.9%	-0.3%	-4.0%	17.7%	5.3%	24.9%		
2018	-2.7%	10.6%	-6.5%	-10.7%	-17.6%	4.2%	20.3%	37.9%		
2017	13.3%	25.9%	4.4%	-0.2%	-0.4%	24.9%	20.6%	41.4%		

**Northumbrian Water**

Band	1	2	3	4	5	6	7	8	9	10
2022	13.9%	4.1%	-17.3%	6.5%	-12.2%	28.1%	-15.3%	7.4%	141.2%	
2021	-0.3%	5.4%	-15.9%	-0.8%	-1.4%	4.3%	15.2%	278.5%	62.0%	
2020	-12.2%	-18.1%	-10.2%	3.5%	-14.1%	-3.0%	33.1%	257.0%	53.7%	
2019	-10.3%	-1.9%	-2.4%	-0.4%	1.5%	-1.4%	10.4%	220.7%	48.1%	
2018	-20.2%	-0.9%	-0.3%	-3.8%	-0.3%	2.2%	29.0%	314.0%	29.8%	
2017	2.7%	8.2%	7.8%	-5.7%	6.8%	2.8%	4.3%	316.4%	11.8%	

**UU**

Band	1	2	3	4	5	6	7	8	9	10
2022	53.51%	15.58%	76.45%	11.92%	8.86%	1.20%	49.80%	-8.66%	2.54%	8.29%
2021	64.24%	57.55%	63.58%	19.63%	5.59%	13.98%	7.11%	9.54%	51.24%	19.58%
2020	100.66%	46.79%	74.43%	11.29%	10.96%	21.25%	14.47%	11.67%	32.14%	16.78%
2019	72.70%	19.67%	40.23%	0.91%	-0.50%	16.25%	-9.44%	11.98%	-2.45%	-4.05%
2018	105.79%	66.27%	85.60%	28.97%	7.43%	24.28%	11.21%	61.95%	13.17%	30.74%
2017	123.86%	74.23%	67.87%	14.69%	1.06%	13.36%	-1.77%	33.13%	14.39%	70.49%

**Southern Water**

Band	1	2	3	4	5	6	7	8	9	10
2022	479.8%	33.4%	69.0%	30.8%	45.9%	150.7%	134.9%	14.8%		
2021	112.2%	67.4%	58.4%	38.1%	29.6%	12.5%	-1.0%	0.3%		
2020	131.7%	23.5%	70.9%	36.7%	39.8%	35.9%	-4.8%	2.1%		
2019	123.2%	43.7%	73.9%	29.9%	29.7%	-17.1%	1.0%	4.3%		
2018	114.8%	66.3%	75.6%	22.7%	13.0%	-9.1%	-12.3%	-1.0%		
2017	33.7%	56.7%	53.7%	38.6%	27.2%	-0.9%	-1.4%			

**Severn Trent**

Band	1	2	3	4	5	6	7	8	9	10
2022	32.6%	-1.0%	36.3%	16.6%	42.0%	-57.6%	47.1%	2.9%	0.1%	-8.3%
2021	45.8%	13.9%	14.0%	17.4%	22.9%	-53.9%	2.9%	-1.0%	-18.6%	-19.6%
2020	53.9%	7.0%	25.1%	2.7%	11.9%	-14.0%	-9.9%	-6.4%	-8.9%	-16.8%
2019	84.0%	23.4%	34.7%	20.9%	26.2%	-11.2%	-0.3%	-13.0%	2.4%	4.0%
2018	45.7%	32.1%	26.8%	11.4%	1.0%	-4.4%	-3.7%	0.3%	-6.5%	-16.1%
2017	63.8%	48.2%	29.6%	9.6%	3.0%	-14.3%	-10.5%	-0.2%	-12.2%	-24.2%



### South West Water

Band	1	2	3	4	5	6	7	8	9	10
2022	-3.6%	15.4%	22.6%	10.4%	34.2%	55.4%	-24.9%			
2021	-0.5%	28.1%	11.9%	29.2%	38.8%	46.8%	-54.7%			
2020	-5.1%	21.8%	25.8%	24.2%	40.4%	22.0%	22.8%			
2019	-5.0%	5.6%	14.8%	34.3%	40.4%	22.2%	33.4%			
2018	-16.0%	28.4%	34.9%	43.1%	25.3%	20.8%	44.4%			
2017	-12.8%	26.7%	24.9%	34.6%	25.6%	44.4%	25.7%			

### Thames Water

Band	1	2	3	4	5	6	7	8	9	10
2022	10.9%	33.4%	22.6%	2.2%	10.5%	48.6%	210.8%	47.0%	-0.1%	86.0%
2021	25.7%	25.6%	5.7%	2.5%	16.4%	21.0%	58.1%	16.6%	1.0%	40.7%
2020	88.3%	34.9%	28.7%	5.1%	14.4%	53.9%	78.0%	53.3%	8.9%	33.2%
2019	94.3%	27.8%	7.2%	15.1%	25.8%	53.5%	64.2%	34.7%	32.2%	69.4%
2018	8.1%	-13.8%	-5.2%	12.6%	16.2%	53.4%	70.5%	74.8%	24.1%	16.1%
2017	-0.9%	-2.7%	-1.5%	-2.3%	-0.5%	56.7%	59.2%	59.7%	27.8%	24.2%

### Welsh Water

Band	1	2	3	4	5	6	7	8	9	10
2022	13.0%	12.9%	-0.8%	-0.7%	8.5%	-0.4%	126.9%	-62.1%	18.7%	
2021	91.2%	-3.7%	-1.9%	19.2%	4.2%	-18.1%	23.5%	-61.0%	-1.0%	
2020	-0.5%	16.3%	-0.2%	-0.9%	3.3%	-11.4%	21.5%	-32.2%	-22.7%	
2019	13.1%	-24.8%	-7.1%	3.8%	5.9%	4.3%	9.3%	-47.4%	-22.6%	
2018	8.6%	-10.4%	0.9%	14.8%	5.7%	-0.7%	32.1%	-26.9%	-18.6%	
2017	18.9%	-7.1%	-11.8%	0.7%	-1.8%	-11.0%	17.8%	-19.9%	-11.8%	

### Wessex Water

Band	1	2	3	4	5	6	7	8	9	10
2022	44.0%	3.1%	21.1%	5.1%	20.7%	29.3%	118.6%		-8.9%	
2021	51.9%	48.1%	12.2%	17.0%	28.0%	43.5%	30.0%		2.1%	
2020	63.6%	14.5%	25.7%	10.9%	35.6%	47.2%	63.5%		15.3%	
2019	67.4%	13.5%	16.8%	9.9%	36.7%	35.3%	53.1%		75.1%	
2018	80.1%	49.6%	31.9%	14.0%	26.1%	43.1%	60.8%		67.2%	
2017	80.2%	69.5%	34.4%	8.7%	34.9%	66.5%	57.2%		16.7%	

### Yorkshire Water

Band	1	2	3	4	5	6	7	8	9	10
2022	-30.6%	-23.2%	2.4%	-34.8%	-18.1%	62.2%	-24.9%	40.8%	51.8%	
2021	0.9%	-4.5%	6.5%	-35.2%	-19.3%	10.9%	-8.3%	75.7%	16.4%	
2020	16.3%	-18.6%	-1.5%	-34.0%	-18.9%	29.3%	-10.4%	104.6%	35.9%	
2019	12.2%	13.9%	29.8%	-15.7%	-6.3%	36.2%	-21.5%	61.6%	63.0%	
2018	37.1%	2.7%	69.0%	-35.6%	-12.9%	12.8%	-31.1%	94.9%	6.5%	
2017	-65.1%	-43.2%	-11.0%	15.0%	23.9%	49.4%	32.0%	115.3%	100.2%	

**Table 8: Efficient costs (£/kg) defined for all Companies as follows: If Actual cost/kg is below UQ, use actual cost/kg. Otherwise use UQ cost/kg**

**Anglian Water**

Band	1	2	3	4	5	6	7	8	9	10
2022	4.08	2.99	1.61	1.02	0.73	0.48	0.29	0.36	0.32	0.26
2021	3.89	2.81	1.73	1.05	0.74	0.57	0.42	0.33	0.31	0.26
2020	4.36	3.06	1.65	1.08	0.75	0.51	0.41	0.29	0.30	0.24
2019	4.15	3.02	1.67	1.07	0.70	0.59	0.44	0.34	0.29	0.21
2018	3.93	2.57	1.43	0.85	0.65	0.53	0.43	0.27	0.31	0.28
2017	3.67	2.25	1.53	0.98	0.75	0.55	0.46	0.30	0.32	0.25

**Northumbrian Water**

Band	1	2	3	4	5	6	7	8	9	10
2022	5.03	3.09	1.34	1.14	0.66	0.61	0.24	0.36	0.32	0.26
2021	4.33	2.87	1.68	1.10	0.83	0.57	0.42	0.33	0.31	0.26
2020	3.83	2.56	1.48	1.11	0.65	0.49	0.41	0.29	0.30	0.24
2019	3.88	3.20	1.74	1.07	0.73	0.58	0.44	0.34	0.29	0.21
2018	3.23	2.55	1.52	0.91	0.78	0.53	0.43	0.27	0.31	0.28
2017	3.67	2.25	1.53	0.92	0.75	0.55	0.46	0.30	0.32	0.25

**UU**

Band	1	2	3	4	5	6	7	8	9	10
2022	5.03	3.09	1.63	1.14	0.75	0.61	0.29	0.33	0.32	0.26
2021	4.35	2.87	2.00	1.11	0.84	0.57	0.42	0.33	0.31	0.26
2020	4.36	3.13	1.65	1.11	0.76	0.51	0.41	0.29	0.30	0.24
2019	4.32	3.26	1.78	1.07	0.72	0.59	0.40	0.34	0.28	0.20
2018	4.04	2.57	1.52	0.95	0.79	0.53	0.43	0.27	0.31	0.28
2017	3.67	2.25	1.53	0.98	0.75	0.55	0.45	0.30	0.32	0.25

**Southern Water**

Band	1	2	3	4	5	6	7	8	9	10
2022	5.03	3.09	1.63	1.14	0.75	0.61	0.29	0.36	0.32	0.26
2021	4.35	2.87	2.00	1.11	0.84	0.57	0.42	0.33	0.31	0.26
2020	4.36	3.13	1.65	1.11	0.76	0.51	0.39	0.29	0.30	0.24
2019	4.32	3.26	1.78	1.07	0.73	0.49	0.44	0.34	0.29	0.21
2018	4.04	2.57	1.52	0.95	0.79	0.48	0.38	0.27	0.31	0.28
2017	3.67	2.25	1.53	0.98	0.75	0.55	0.45	0.30	0.32	0.25

**Severn Trent**

Band	1	2	3	4	5	6	7	8	9	10
2022	5.03	3.06	1.63	1.14	0.75	0.26	0.29	0.36	0.32	0.24
2021	4.35	2.87	2.00	1.11	0.84	0.26	0.42	0.32	0.26	0.21
2020	4.36	3.13	1.65	1.11	0.76	0.43	0.37	0.27	0.28	0.20
2019	4.32	3.26	1.78	1.07	0.73	0.52	0.44	0.29	0.29	0.21
2018	4.04	2.57	1.52	0.95	0.79	0.51	0.41	0.27	0.29	0.23
2017	3.67	2.25	1.53	0.98	0.75	0.48	0.41	0.30	0.28	0.19

**South West Water**

Band	1	2	3	4	5	6	7	8	9	10
2022	4.85	3.09	1.63	1.14	0.75	0.61	0.21	0.36	0.32	0.26
2021	4.33	2.87	2.00	1.11	0.84	0.57	0.19	0.33	0.31	0.26
2020	4.14	3.13	1.65	1.11	0.76	0.51	0.41	0.29	0.30	0.24
2019	4.10	3.26	1.78	1.07	0.73	0.59	0.44	0.34	0.29	0.21
2018	3.39	2.57	1.52	0.95	0.79	0.53	0.43	0.27	0.31	0.28
2017	3.20	2.25	1.53	0.98	0.75	0.55	0.46	0.30	0.32	0.25

**Thames Water**

Band	1	2	3	4	5	6	7	8	9	10
2022	5.03	3.09	1.63	1.14	0.75	0.61	0.29	0.36	0.32	0.26
2021	4.35	2.87	2.00	1.11	0.84	0.57	0.42	0.33	0.31	0.26
2020	4.36	3.13	1.65	1.11	0.76	0.51	0.41	0.29	0.30	0.24
2019	4.32	3.26	1.78	1.07	0.73	0.59	0.44	0.34	0.29	0.21
2018	4.04	2.22	1.45	0.95	0.79	0.53	0.43	0.27	0.31	0.28
2017	3.64	2.18	1.51	0.96	0.74	0.55	0.46	0.30	0.32	0.25

**Welsh Water**

Band	1	2	3	4	5	6	7	8	9	10
2022	5.03	3.09	1.61	1.13	0.75	0.61	0.29	0.13	0.32	0.26
2021	4.35	2.76	1.96	1.11	0.84	0.47	0.42	0.13	0.31	0.26
2020	4.34	3.13	1.65	1.10	0.76	0.45	0.41	0.20	0.24	0.24
2019	4.32	2.45	1.65	1.07	0.73	0.59	0.44	0.18	0.22	0.21
2018	4.04	2.30	1.52	0.95	0.79	0.53	0.43	0.20	0.25	0.28
2017	3.67	2.09	1.35	0.98	0.74	0.49	0.46	0.24	0.28	0.25

**Wessex Water**

Band	1	2	3	4	5	6	7	8	9	10
2022	5.03	3.09	1.63	1.14	0.75	0.61	0.29	0.36	0.29	0.26
2021	4.35	2.87	2.00	1.11	0.84	0.57	0.42	0.33	0.31	0.26
2020	4.36	3.13	1.65	1.11	0.76	0.51	0.41	0.29	0.30	0.24
2019	4.32	3.26	1.78	1.07	0.73	0.59	0.44	0.34	0.29	0.21
2018	4.04	2.57	1.52	0.95	0.79	0.53	0.43	0.27	0.31	0.28
2017	3.67	2.25	1.53	0.98	0.75	0.55	0.46	0.30	0.32	0.25

**Yorkshire Water**

Band	1	2	3	4	5	6	7	8	9	10
2022	3.49	2.37	1.63	0.74	0.61	0.61	0.21	0.36	0.32	0.26
2021	4.35	2.74	2.00	0.72	0.68	0.57	0.39	0.33	0.31	0.26
2020	4.36	2.55	1.63	0.73	0.62	0.51	0.37	0.29	0.30	0.24
2019	4.32	3.26	1.78	0.90	0.68	0.59	0.34	0.34	0.29	0.21
2018	4.04	2.57	1.52	0.61	0.69	0.53	0.30	0.27	0.31	0.28
2017	1.28	1.28	1.36	0.98	0.75	0.55	0.46	0.30	0.32	0.25

**Table 9: Efficient costs per Company (in £m) based on average load per Band and actual load per Company per year**

**Anglian Water**

Band	1	2	3	4	5	6	7	8	9	10	Total
<b>2022</b>	2.66	1.92	4.89	9.97	9.62	19.57	6.54	7.62	7.02	6.67	76.50
<b>2021</b>	2.43	1.77	5.23	10.10	9.75	23.75	9.40	7.38	5.50	6.55	81.86
<b>2020</b>	2.71	1.93	5.02	10.64	9.84	20.60	8.96	6.65	5.98	6.33	78.65
<b>2019</b>	2.56	1.89	4.99	10.51	9.01	23.64	9.81	7.54	5.53	5.29	80.75
<b>2018</b>	2.38	1.59	4.18	8.29	7.96	21.44	8.82	5.92	5.73	6.87	73.19
<b>2017</b>	2.24	1.42	4.50	9.47	9.40	22.09	9.48	6.29	6.62	6.01	77.54

**Northumbrian Water**

Band	1	2	3	4	5	6	7	8	9	10	Total
<b>2022</b>	1.35	0.82	1.68	4.57	3.58	10.21	2.28	3.14	2.89	2.75	33.27
<b>2021</b>	1.05	0.70	1.98	4.12	4.27	9.39	3.67	2.88	2.14	2.55	32.76
<b>2020</b>	0.98	0.67	1.86	4.52	3.54	8.27	3.71	2.75	2.48	2.62	31.39
<b>2019</b>	0.99	0.83	2.15	4.37	3.90	9.69	4.08	3.13	2.30	2.20	33.64
<b>2018</b>	0.83	0.67	1.90	3.80	4.10	9.13	3.75	2.52	2.44	2.92	32.06
<b>2017</b>	0.95	0.60	1.91	3.81	4.01	9.39	4.03	2.67	2.81	2.56	32.74

**UU**

Band	1	2	3	4	5	6	7	8	9	10	Total
<b>2022</b>	4.16	2.52	6.27	14.09	12.56	31.46	8.30	8.83	8.91	8.46	105.56
<b>2021</b>	3.45	2.29	7.67	13.58	14.12	30.65	11.96	9.39	6.99	8.33	108.45
<b>2020</b>	3.40	2.49	6.31	13.73	12.51	25.90	11.26	8.36	7.52	7.96	99.42
<b>2019</b>	3.42	2.61	6.80	13.53	11.98	30.33	11.39	9.67	6.92	6.51	103.14
<b>2018</b>	3.20	2.09	5.85	12.15	12.64	28.06	11.53	7.75	7.50	8.99	99.75
<b>2017</b>	2.88	1.82	5.78	12.20	12.12	28.39	11.97	8.09	8.51	7.73	99.50

**Southern Water**

Band	1	2	3	4	5	6	7	8	9	10	Total
<b>2022</b>	2.22	1.34	3.34	7.50	6.68	16.74	4.42	5.14	4.74	4.50	56.61
<b>2021</b>	1.90	1.26	4.22	7.46	7.76	16.85	6.51	5.16	3.84	4.58	59.55
<b>2020</b>	1.87	1.37	3.47	7.55	6.88	14.24	5.89	4.59	4.13	4.38	54.36
<b>2019</b>	1.85	1.41	3.68	7.32	6.52	13.62	6.81	5.23	3.84	3.67	53.96
<b>2018</b>	1.73	1.13	3.17	6.58	6.85	13.81	5.48	4.15	4.06	4.87	51.83
<b>2017</b>	1.57	0.99	3.14	6.64	6.59	15.30	6.53	4.40	4.63	4.20	53.99

**Severn Trent**

Band	1	2	3	4	5	6	7	8	9	10	Total
<b>2022</b>	4.67	2.79	7.04	15.80	14.08	14.97	9.31	10.84	9.99	8.70	98.19
<b>2021</b>	3.93	2.61	8.73	15.46	16.07	16.09	13.62	10.59	6.48	7.63	101.22
<b>2020</b>	3.95	2.88	7.31	15.91	14.49	25.81	11.76	9.06	7.93	7.68	106.77
<b>2019</b>	3.91	2.99	7.78	15.48	13.78	30.84	14.35	9.63	8.11	7.76	114.63
<b>2018</b>	3.61	2.35	6.59	13.70	14.26	30.26	12.52	8.73	7.90	8.51	108.44
<b>2017</b>	3.28	2.07	6.58	13.88	13.79	27.69	12.41	9.18	8.51	6.67	104.06

### South West Water

Band	1	2	3	4	5	6	7	8	9	10	Total
2022	0.79	0.50	1.24	2.79	2.49	6.23	1.23	1.91	1.76	1.67	20.62
2021	0.69	0.46	1.53	2.71	2.82	6.12	1.08	1.88	1.40	1.66	20.35
2020	0.65	0.50	1.26	2.75	2.51	5.19	2.26	1.67	1.51	1.59	19.88
2019	0.63	0.51	1.33	2.64	2.35	5.92	2.46	1.89	1.38	1.32	20.43
2018	0.52	0.41	1.14	2.36	2.46	5.45	2.24	1.51	1.46	1.75	19.29
2017	0.49	0.36	1.13	2.39	2.38	5.57	2.39	1.59	1.67	1.52	19.47

### Thames Water

Band	1	2	3	4	5	6	7	8	9	10	Total
2022	7.25	4.38	10.92	24.51	21.85	54.72	14.44	16.82	15.50	14.71	185.10
2021	6.02	4.00	13.37	23.67	24.61	53.44	20.85	16.37	12.19	14.53	189.05
2020	6.12	4.47	11.34	24.67	22.48	46.55	20.24	15.02	13.51	14.31	178.71
2019	5.93	4.53	11.80	23.48	20.90	52.65	21.84	16.78	12.31	11.77	182.01
2018	5.68	3.19	9.83	21.55	22.42	49.77	20.46	13.74	13.30	15.95	175.91
2017	5.10	3.16	10.18	21.30	21.54	50.72	21.78	14.45	15.20	13.81	177.23

### Welsh Water

Band	1	2	3	4	5	6	7	8	9	10	Total
2022	1.86	1.12	2.78	6.25	5.61	13.99	3.71	1.63	3.98	3.78	44.71
2021	1.48	0.95	3.22	5.81	6.05	10.74	5.12	1.57	2.97	3.57	41.48
2020	1.54	1.13	2.86	6.19	5.69	10.44	5.12	2.58	2.64	3.62	41.81
2019	1.53	0.88	2.82	6.05	5.38	13.56	5.62	2.27	2.45	3.03	43.60
2018	1.44	0.84	2.62	5.45	5.67	12.50	5.18	2.54	2.74	4.04	43.03
2017	1.34	0.79	2.37	5.68	5.54	11.77	5.68	3.02	3.50	3.60	43.29

### Wessex Water

Band	1	2	3	4	5	6	7	8	9	10	Total
2022	1.53	0.92	2.31	5.18	4.61	11.56	3.05	3.55	2.98	3.11	38.80
2021	1.29	0.86	2.86	5.07	5.27	11.45	4.47	3.51	2.61	3.11	40.49
2020	1.23	0.90	2.28	4.96	4.51	9.35	4.06	3.02	2.71	2.87	35.89
2019	1.18	0.90	2.35	4.67	4.16	10.48	4.35	3.34	2.45	2.34	36.22
2018	1.07	0.70	1.95	4.05	4.21	9.35	3.85	2.58	2.50	3.00	33.26
2017	0.99	0.63	2.00	4.21	4.19	9.80	4.21	2.79	2.94	2.67	34.42

### Yorkshire Water

Band	1	2	3	4	5	6	7	8	9	10	Total
2022	1.88	1.25	4.07	5.96	6.67	20.41	4.04	6.27	5.78	5.49	61.84
2021	2.20	1.40	4.89	5.61	7.26	19.55	6.99	5.99	4.46	5.31	63.67
2020	2.25	1.34	4.11	5.99	6.71	17.13	6.67	5.53	4.97	5.26	59.96
2019	2.17	1.66	4.32	7.25	7.17	19.28	6.28	6.15	4.51	4.31	63.10
2018	2.01	1.31	3.67	4.92	6.92	17.64	4.99	4.87	4.71	5.65	56.70
2017	0.69	0.71	3.52	8.36	8.30	19.45	8.35	5.54	5.83	5.29	66.04

Next, in Table 10, we calculate the efficient cost per Band based on the actual load per Band for each company in each year.

**Table 10: Efficient costs (in £ million) for each company based on actual load / Band in each year**

**Anglian Water**

Band	1	2	3	4	5	6	7	8	9	10	Total
2022	3.85	3.11	10.27	22.75	17.59	17.65	13.57	7.52	0.00	0.00	96.31
2021	3.54	2.99	11.09	22.11	18.63	19.92	19.97	6.56	0.00	0.00	104.81
2020	3.93	3.24	10.63	23.44	18.13	21.21	17.04	5.91	0.00	0.00	103.53
2019	3.79	3.20	10.55	22.56	17.19	23.69	18.15	7.00	0.00	0.00	106.12
2018	3.64	2.81	8.90	18.61	14.85	22.51	15.80	5.44	0.00	0.00	92.57
2017	3.38	2.50	9.41	21.44	16.84	23.48	17.20	6.10	0.00	0.00	100.35

**Northumbrian Water**

Band	1	2	3	4	5	6	7	8	9	10	Total
2022	1.49	0.50	1.86	3.49	3.16	7.24	1.83	2.22	9.19	0.00	30.97
2021	1.34	0.60	1.77	4.02	2.79	10.99	1.77	2.88	6.17	0.00	32.31
2020	1.68	0.68	1.77	4.13	3.45	10.38	1.94	2.66	6.40	0.00	33.09
2019	1.64	0.65	1.80	4.85	2.47	12.43	2.08	2.93	5.98	0.00	34.82
2018	1.56	0.58	1.50	3.85	2.30	11.24	2.02	2.39	6.26	0.00	31.70
2017	1.48	0.49	1.63	4.44	2.69	11.52	2.04	2.74	6.61	0.00	33.64

**UU**

Band	1	2	3	4	5	6	7	8	9	10	Total
2022	3.56	2.08	2.49	5.92	8.95	30.60	9.71	15.54	4.66	6.75	90.27
2021	3.31	2.02	2.62	6.09	8.99	39.16	12.67	13.69	4.37	6.06	98.97
2020	2.80	1.69	2.66	6.83	9.15	33.92	12.36	11.89	4.20	6.25	91.74
2019	2.64	1.71	2.58	6.74	8.32	37.96	14.37	14.24	4.02	5.44	98.01
2018	2.52	1.50	2.20	5.29	7.75	34.17	13.97	11.42	4.43	6.93	90.18
2017	2.17	1.30	2.48	5.75	8.82	35.36	15.02	12.44	4.52	5.93	93.76

**Southern Water**

Band	1	2	3	4	5	6	7	8	9	10	Total
2022	1.01	0.70	3.58	7.76	5.78	21.70	5.18	9.51	0.00	0.00	55.20
2021	0.90	0.74	3.97	7.83	6.72	25.29	7.92	8.82	0.00	0.00	62.19
2020	1.04	0.80	3.72	8.37	6.51	20.23	7.39	9.29	0.00	0.00	57.35
2019	0.93	0.81	3.69	8.41	5.89	26.64	7.93	8.82	0.00	0.00	63.12
2018	0.87	0.70	3.18	6.95	4.80	24.41	7.64	7.02	0.00	0.00	55.57
2017	0.81	0.60	3.53	7.62	6.01	26.14	6.96	7.74	0.00	0.00	59.40

**Severn Trent**

Band	1	2	3	4	5	6	7	8	9	10	Total
2022	3.03	2.36	6.45	14.40	14.36	33.26	4.49	13.31	8.70	10.07	110.44
2021	2.89	2.20	7.18	14.60	14.63	40.37	5.38	12.05	8.80	9.97	118.07
2020	3.21	2.57	6.78	15.32	14.09	32.21	8.78	11.12	8.51	9.92	112.50
2019	3.21	2.38	6.71	15.16	13.06	37.29	9.53	13.08	8.15	8.11	116.67
2018	2.97	1.89	5.85	11.81	11.92	34.71	8.33	10.28	8.33	10.31	106.40
2017	2.82	1.67	6.14	13.78	14.51	37.42	6.92	11.43	8.70	9.07	112.46

### South West Water

Band	1	2	3	4	5	6	7	8	9	10	Total
2022	2.94	2.12	4.29	6.14	4.04	8.46	2.00	0.00	0.00	0.00	29.99
2021	2.78	2.00	4.62	6.18	4.05	9.87	2.97	0.00	0.00	0.00	32.47
2020	3.14	2.10	4.39	6.09	4.05	9.03	2.85	0.00	0.00	0.00	31.65
2019	2.97	2.03	4.28	6.47	3.92	9.88	2.98	0.00	0.00	0.00	32.52
2018	2.82	1.65	3.68	5.28	3.84	8.48	2.90	0.00	0.00	0.00	28.65
2017	2.59	1.53	3.71	5.98	4.61	8.73	3.05	0.00	0.00	0.00	30.20

### Thames Water

Band	1	2	3	4	5	6	7	8	9	10	Total
2022	0.73	1.06	2.92	8.31	7.25	20.26	10.06	12.57	16.16	43.79	123.11
2021	0.72	0.96	3.19	8.76	6.92	25.37	17.80	12.23	10.27	43.66	129.88
2020	0.94	1.11	2.91	9.18	7.34	21.30	14.95	10.14	15.82	42.00	125.70
2019	0.75	1.15	2.93	8.62	6.86	24.33	15.46	11.75	14.15	34.92	120.92
2018	0.67	1.01	2.62	6.59	6.71	22.78	15.40	9.64	15.30	46.94	127.66
2017	0.65	0.89	2.78	7.58	7.96	23.68	16.62	10.81	16.02	41.18	128.16

### Welsh Water

Band	1	2	3	4	5	6	7	8	9	10	Total
2022	4.30	3.13	5.38	7.36	7.53	11.79	4.48	2.35	6.68	0.00	52.99
2021	3.37	2.48	5.15	7.10	7.13	13.03	6.51	2.08	6.18	0.00	53.05
2020	4.39	3.19	5.63	8.43	8.51	10.41	7.55	1.89	6.21	0.00	56.21
2019	4.03	2.97	5.48	7.83	7.17	12.49	8.24	2.16	5.92	0.00	56.30
2018	4.05	2.78	4.85	6.44	6.21	12.95	6.71	1.74	6.26	0.00	52.00
2017	3.89	2.47	5.40	7.50	8.01	11.54	8.69	1.89	6.83	0.00	56.21

### Wessex Water

Band	1	2	3	4	5	6	7	8	9	10	Total
2022	0.89	0.82	4.12	6.82	7.43	12.60	2.98	0.00	5.77	0.00	41.43
2021	0.89	0.70	4.53	7.10	7.41	14.90	4.42	0.00	5.66	0.00	45.61
2020	1.04	0.77	4.19	7.32	6.96	14.33	3.00	0.00	5.24	0.00	42.86
2019	0.93	0.77	4.24	6.96	6.97	15.35	3.12	0.00	4.81	0.00	43.15
2018	0.91	0.62	3.56	5.93	6.45	12.59	2.95	0.00	4.92	0.00	37.93
2017	0.87	0.59	3.84	6.56	6.95	12.11	3.42	0.00	6.22	0.00	40.57

### Yorkshire Water

Band	1	2	3	4	5	6	7	8	9	10	Total
2022	2.43	1.61	3.11	7.72	11.38	14.43	5.19	6.26	12.71	0.00	64.83
2021	2.39	1.45	3.56	8.26	11.55	17.51	6.27	8.96	8.65	0.00	68.59
2020	2.71	1.59	3.42	8.66	12.20	16.25	6.41	8.16	8.57	0.00	67.98
2019	2.57	1.63	3.49	8.82	10.79	16.76	8.08	9.14	7.67	0.00	68.95
2018	2.24	1.35	2.70	6.70	9.56	16.43	6.62	7.36	8.01	0.00	60.98
2017	2.27	1.19	3.09	7.85	11.42	16.41	8.69	5.65	12.98	0.00	69.54

Next, in Table 11, we compare the total efficient costs on both the average and the actual loads per Band for each Company.

A positive figure represents additional efficient costs incurred as a result of not having average load per Band. As all companies have small works but only three have the very largest works, Table 11 captures the impact of having or not having those large works on efficient costs.

**Table 11: Efficient costs based on actual load per Band - Efficient costs based on average load per Band (£ million)**

	ANH	NES	UU	SRN	SVT	SWB	TMS	WSH	WSX	YKY
<b>2022</b>	19.82	-2.30	-15.30	-1.41	12.26	9.37	-61.99	8.28	2.63	2.99
<b>2021</b>	22.95	-0.45	-9.48	2.64	16.85	12.13	-59.17	11.57	5.12	4.93
<b>2020</b>	24.88	1.70	-7.69	2.99	5.74	11.76	-53.01	14.40	6.96	8.02
<b>2019</b>	25.37	1.18	-5.13	9.16	2.04	12.08	-61.09	12.70	6.93	5.85
<b>2018</b>	19.38	-0.36	-9.58	3.74	-2.05	9.36	-48.24	8.97	4.68	4.27
<b>2017</b>	22.81	0.91	-5.74	5.41	8.41	10.73	-49.07	12.93	6.14	3.50
<b>Total (last 5 years) 17/18 PB</b>	112.39	-0.22	-47.17	17.13	34.84	54.70	-283.50	55.92	26.32	26.06
<b>Total (last 5 years) 22/23 PB</b>	<b>132.69</b>	<b>-0.26</b>	<b>-55.69</b>	<b>20.22</b>	<b>41.13</b>	<b>64.58</b>	<b>-334.71</b>	<b>66.02</b>	<b>31.08</b>	<b>30.77</b>

Table 12 sets out our calculation of the Implicit Allowance. We have followed the approach taken by the CMA in Bristol 2015, evaluating each of the cost drivers designed to take economies of scale into account at the average 2022 value one by one. We then triangulated the separate approaches to give an overall Implicit Allowance for all companies. Table 12 shows the modelled values before the application of RPE or Frontier Shift.

**Table 12: Implicit Allowance calculation (£ million) NB all in 2017/18 PB until final row which is in 2022/23 PB**

	Models impacted	ANH	NES	NWT	SRN	SVH	SWB	TMS	WSH	WSX	YKY
<b>Baseline</b>		1,606.86	668.38	1,876.91	1,469.74	2,008.43	641.07	3,095.23	938.79	829.50	1,352.30
<b>B1-3 avg 3.77%</b>	SWT1, NT2, NT6	1,593.67	672.61	1,900.98	1,478.93	2,023.28	619.72	3,153.20	928.01	827.20	1,362.21
<b>p.e.&gt;100k avg 54.56%</b>	SWT2, NT3, NT7	1,590.10	671.94	1,894.03	1,465.80	2,023.47	623.46	3,196.67	940.51	816.63	1,361.27
<b>WATS avg 23,936</b>	SWT3, NT4, NT8	1,575.80	667.51	1,873.18	1,452.35	2,014.67	628.08	3,149.65	936.72	825.36	1,343.61
<b>Triangulated alternatives</b>		1,586.52	670.69	1,889.40	1,465.70	2,020.47	623.75	3,166.51	935.08	823.07	1,355.69
<b>IA in 2017/18 PB</b>		20.34	-2.30	-12.48	4.05	-12.04	17.32	-71.27	3.70	6.44	-3.40



<b>IA in 2022/23 PB</b>	24.01	-2.72	-14.74	4.78	-14.21	20.44	-84.15	4.37	7.60	-4.01
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We note in passing that using the PR24 suite of models generates a lower IA than is computed when the PR19 suite of models is used. This is due to the larger number of models being triangulated. Consequently, all other things being equal, using the PR19 models to generate the IA would have given a lower net value to the CAC

Finally, to populate Table CWW18, the gross CAC, the IA and the net CAC are computed on an annualised basis. This is set out in Table 13 below.

**Table 13: Annualised figures for CWW18**

<b>2022/23 PB £million</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>AMP8</b>
<b>Gross value of CAC before impact of Frontier Shift</b>	26.54	26.54	26.54	26.54	26.54	132.69
<b>IA</b>	4.80	4.80	4.80	4.80	4.80	24.01
<b>Net value of CAC</b>	21.74	21.74	21.74	21.74	21.74	108.68



## Appendix 1: Conformity with Ofwat’s criteria for assessing CACs

Category	#	Issue	Response
<b>Need For Adjustment: Unique Circumstances</b>	1	Is there compelling evidence that the company has unique circumstances that warrant a separate cost adjustment?	This CAC is put forward to address the contingency that WATS is not used as the cost driver to address economies of scale. This is because, in our view, this measure adequately takes account of economies of scale where the other two variables put forward do not. As such, and given the symmetric nature of the CAC, we do not consider that uniqueness is relevant.
	2	Is there compelling evidence that the company faces higher efficient costs in the round compared to its peers (considering, where relevant, circumstances that drive higher costs for other companies that the company does not face)?	Yes. This is central to our CAC and is set out in section 3.
	3	Is there compelling evidence of alternative options being considered, where relevant?	Yes. We put forward two alternative approaches within the CAC.
<b>Need For Adjustment: Management Control</b>	1	Is the investment driven by factors outside of management control?	Yes. The size and location of Water Recycling Centres (WRCs) is determined by the demographics of the area served. Demographics are clearly outside management control.
	2	Have steps been taken to control costs and have potential cost savings (eg spend to save) been accounted for?	Yes. We demonstrate the efficiency of our WRCs in section 3 of this CAC
<b>Need For Adjustment: Materiality</b>	1	Is there compelling evidence that the factor is a material driver of expenditure with a clear engineering / economic rationale?	Yes. We demonstrate the extent of the economies of scale and the impact of not having very large works in section 4 of this CAC
	2	Is there compelling quantitative evidence of how the factor impacts the company's expenditure? Adjustment to allowances (including implicit allowance)	Yes, this is central to our claim as is set out in section 4 of this CAC
	3	Is there compelling evidence that the cost claim is not included in our modelled baseline (or, if the models are not known, would be unlikely to be included)? Is there compelling evidence that the factor is not covered by one or more cost drivers included in the cost models?	Were Ofwat to use WATS as its measure to take economies of scale into account, then this CAC falls away

	4	Is the claim material after deduction of an implicit allowance? Has the company considered a range of estimates for the implicit allowance?	Yes, the IA has been calculated explicitly. Two separate approaches have been used to calculate the IA
	5	Has the company accounted for cost savings and/or benefits from offsetting circumstances, where relevant?	Not applicable
	6	Is it clear the cost allowances would, in the round, be insufficient to accommodate the factor without a claim?	That depends on which cost driver is used to take account of economies of scale. If WATS is used, then the CAC would not be needed.
	7	Has the company taken a long-term view of the allowance and balanced expenditure requirements between multiple regulatory periods? Has the company considered whether our long-term allowance provides sufficient funding?	Not relevant – demographics change little from AMP to AMP
	8	If an alternative explanatory variable is used to calculate the cost adjustment, why is it superior to the explanatory variables in our cost models?	See response to point 6 immediately above
<b>Cost efficiency</b>	1	Is there compelling evidence that the cost estimates are efficient (for example similar scheme outturn data, industry and/or external cost benchmarking, testing a range of cost models)?	Yes. See section 3
	2	Does the company clearly explain how it arrived at the cost estimate? Can the analysis be replicated? Is there supporting evidence for any key statements or assumptions?	Yes
	3	Does the company provide third party assurance for the robustness of the cost estimates?	Yes, Oxera has provided assurance. <sup>3</sup>
<b>Need for investment</b>	1	Is there compelling evidence that investment is required?	Not relevant. This CAC is not predicated upon a specific required investment
	2	Is the scale and timing of the investment fully justified?	Not relevant
	3	Does the need and/or proposed investment overlap with activities already funded at previous price reviews?	Not relevant
	4	Is there compelling evidence that customers support the need for investment (both scale and timing)?	Not relevant
	1	Did the company consider an appropriate range of options to meet the need?	Not relevant

<sup>3</sup> See ANH CAC 2.4

<b>Best option for customers</b>	2	Has a cost–benefit analysis been undertaken to select proposed option? There should be compelling evidence that the proposed solution represents best value for customers, communities and the environment in the long term? Is third-party technical assurance of the analysis provided?	Not relevant
	3	Has the impact of the investment on performance commitments been quantified?	Not relevant
	4	Have the uncertainties relating to costs and benefit delivery been explored and mitigated? Have flexible, lower risk and modular solutions been assessed – including where utilisation will be low?	Not relevant
	5	Has the company secured appropriate third-party funding (proportionate to the third-party benefits) to deliver the project?	Not relevant
	6	Has the company appropriately presented the scheme to be delivered as Direct Procurement for Customers (DPC) where applicable?	Not relevant
	7	Where appropriate, have customer views informed the selection of the proposed solution, and have customers been provided sufficient information (including alternatives and its contribution to addressing the need) to have informed views	Not relevant
	<b>Customer Protection</b>	1	Are customers protected (via a price control deliverable or performance commitment) if the investment is cancelled, delayed or reduced in scope?
2		Does the protection cover all the benefits proposed to be delivered and funded (eg primary and wider benefits)?	Not relevant
3		Does the company provide an explanation for how third-party funding or delivery arrangements will work for relevant investments, including the mechanism for securing sufficient third-party funding?	Not relevant

## Appendix 2: Alternative CAC calculation approach

### Structure of this CAC

In this section we set out the approach we have taken to computing this CAC. As explained above, the IA calculation follows Ofwat's guidance. That is, it has been estimated by comparing modelled costs resulting from different modelling specifications (i.e. models with WATS compared to models with the share of load treated in works larger than 100,000 p.e. or with bands 1-3). Having used only industry data which are freely available and have been thoroughly scrutinised, the approach is both transparent and replicable. All of the calculations are set out in the associated Excel workbook<sup>4</sup>.

First, we have derived cost driver forecasts for the whole industry over AMP8, in a similar way as for the purposes of the APH CAC. Depending on the cost drivers considered, three different types of projections have been made, namely:

- A linear extrapolation of the trend observed over 2011/12-2021/22 for each company with the aim of replicating Ofwat's PR19 approach. This applies to properties, sewer length, total load, pumping capacity, WAD LAD from MSOA and WAD MSOA.
- When a trend appears ambiguous/less obvious we have retained the 2022 value for the whole duration of AMP8. This applies to economies of scale and treatment complexity variables (WATS, load treated in STWs larger than a p.e. of 100,000, load treated in bands 1-3 and load treated with ammonia consents lower than 3mg/L).
- When the variable is highly volatile from one year to another, i.e. for urban rainfall, we have extrapolated forward the average observed over the last four years.

Then we have derived the normalised variables per sewer length by simply taking the ratio of the individual forecasted values. This applies to urban rainfall per sewer length, properties per sewer length and pumping capacity per sewer length.

Second, as explained earlier in the introduction of the claim, we have run two sets of models over the period 2011/12-2021/22, one with WATS as the only cost driver capturing economies of scale in both SWT and WWWWNP models, and one with the load treated in bands 1-3 and the load treated in STWs larger than 100,000 p.e. instead (the counterfactual scenario). We have then computed an UQ efficiency challenge on a historical basis (over 2017/18-2021/22), as per the CMA in PR19. We have followed Ofwat's guidance and applied equal weights in the triangulation of models within each level of cost aggregation and across levels of cost aggregation.

Third, by using the estimated coefficients derived in Step 2 and the cost driver forecasts derived in Step 1 above, we have computed the predicted costs of each company over AMP8. To ensure these costs are efficient, as per Ofwat's guidance, we have applied the UQ efficiency challenge derived in Step 2. The net amount of the claim is therefore simply the difference in efficient modelled costs between the two scenarios.

All the different steps are detailed in the associated Excel Workbook and can be easily replicated.

In 2022/23 prices, the gross value of the claim is £1,897m, the IA £1,763m which means that **the net value of the claim is £134m (well above the materiality threshold of c. £40m)**. This is before the application of a frontier shift target and any RPEs adjustments.

### CAC data tables

The final CAC figures, set out in Table Ap2.3 below, summarise the efficient modelled costs under both scenarios (using the UQ challenge displayed in Tables Ap2.1 and Ap2.2) which then allow us to estimate the net value of this CAC. This approach enables the computation of the symmetrical adjustments for the rest of the industry to be made.

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<sup>4</sup> Ref for Oxera workings here

**Table Ap2.1: Efficiency scores (2017/18-2021/22 ) under the WATS scenario**

WSX	0.9445
SVH	0.9687
ANH	0.9803
TMS	0.9976
SWB	1.0001
NES	1.0174
NWT	1.0250
YKY	1.0445
SRN	1.0633
WSH	1.0925
<b>UQ</b>	<b>0.9846</b>

**Table Ap2.2: Efficiency scores (2017/18-2021/22 ) under the counterfactual scenario**

WSX	0.9187
TMS	0.9495
SVH	0.9583
NES	0.9906
SWB	1.0068
ANH	1.0362
NWT	1.0562
WSH	1.0584
YKY	1.0654
SRN	1.1024
<b>UQ</b>	<b>0.9664</b>

**Table Ap2.3: Efficient AMP8 modelled costs and net claim (2022/23 prices)**

	WATS scenario (gross claim)	Counterfactual scenario (IA)	Net claim
<b>ANH</b>	1,897.0	1,763.1	134.0
<b>NES</b>	810.6	807.2	3.4
<b>NWT</b>	2,261.3	2,158.0	103.3
<b>SRN</b>	1,744.9	1,649.1	95.8
<b>SVH</b>	2,313.7	2,292.0	21.6
<b>SWB</b>	717.9	698.8	19.1
<b>TMS</b>	3,534.5	3,653.1	-118.6
<b>WSH</b>	1,066.9	1,082.9	-15.9
<b>WSX</b>	948.0	954.6	-6.6
<b>YKY</b>	1,601.7	1,539.5	62.2