Affinity Water

PR24 Cost Adjustment Claims

7th June 2023

Contents

Executive Summary

We propose a gross Cost Adjustment Claim (CAC) £53.5.m for base expenditure in the wholesale water network plus control, for regional wages. Our claim relates to this control because this business segment is most labour intensive and, for the most part, labour needs to be located near to the water supply system assets, not outside the region.

- **Unique circumstances -** We use reliable data sources to show that regional wages are 14% higher than average in our area of operation, above upper quartile and 3rd highest across the industry.

- **Need for adjustment -** There is a clear economic rationale that companies located in high wage areas will face higher costs and we show the correlation between regional wages and average costs. Econometric estimators of regional wages are statistically significant, improve adjusted R-squared, lead to more plausible efficiency ranges and bring additional information to cost models not already captured by density variables. The strength of our results shows that regional wages cannot be ignored in cost assessment work. Failing to adjust for regional wages either in cost models or CACs risks over-assessment of costs for companies in lower wage areas and under-assessment for those in higher cost areas.

- **Management Control –** In forming our claim, we have considered how far labour costs can be reduced or avoided through management action. We show how we have acted to mitigate labour costs and we have adjusted our claim value to reflect the degree of controllability.

- **Materiality -** Our net claim relates to labour, a significant input and driver of costs. Our CAC amounts to around 4% of 5-year base costs, fully satisfying the materiality threshold.

- **Adjustment to allowances (including implicit allowance)** We have estimated implicit allowance and our claim remains material after its deduction.

- **Cost efficiency** We tested our claim against labour cost indices used in electricity distribution and found it consistent and we applied the catch-up efficiency implied by Ofwat's PR24 models to ensure cost efficiency of our claim.

Regional Wages

Introduction

We have prepared our CAC in accordance with the guidance in Ofwat's Final Methodology section 2.4.4 and Appendix 9. We structure the document to provide the evidence, argument and discussion in the order of Ofwat's assessment criteria.

For CACs rejected at PR19, we expect to see a material change in circumstances surrounding the cost adjustment claim.

We proposed regional wages CAC at PR19 but this was not accepted. Ofwat has said that where it rejected claims in PR19, it expects to see a material change in evidence, or a material change in circumstances surrounding the claim for it to be accepted at PR24. The reasons why it is appropriate to re-consider the case are:

- We found statistically significant estimators for regional wages in a number of models and narrower efficiency score ranges. Our Variance Inflation Factor (VIF) measurements strongly suggest that inclusion of a regional wages variable brings additional information to the models that has not already been captured by density variables.

- Since FD19 Ofgem has published its ED2 determinations where it made regional adjustments to cost data prior to econometric estimation. This has provided fresh regulatory precedent for including regional wage effects in cost estimation work.

- Compared to PR19, there is now a longer times series of data available (new evidence) which allows us to identify better the relationship between regional wages and base costs.

Need for Adjustment

a) Is there compelling evidence that the company has unique circumstances that warrant a separate cost adjustment?

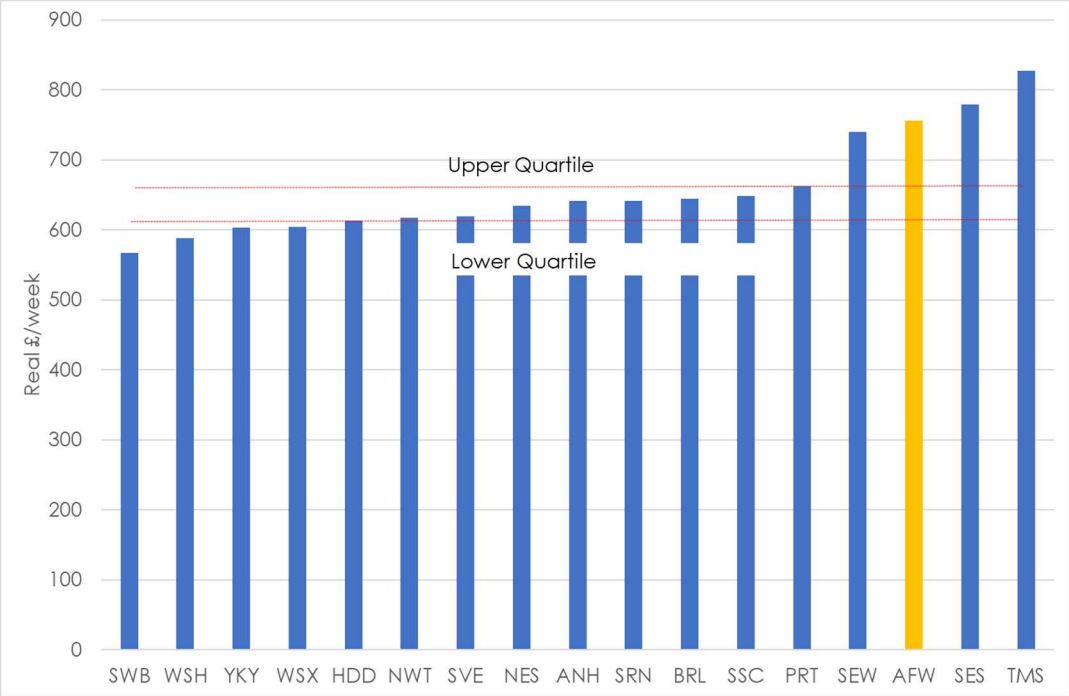
Water companies face different local labour market conditions which influence their costs directly through wages paid to water company employees plus associated employment costs (e.g. pensions) and indirectly through costs of services bought from suppliers. The existence and persistence of regional wage disparities is evidenced in ONS statistics, such as the Annual Survey of Hours and Earnings (ASHE).

There is ample evidence to show that labour market conditions vary across the country. We have focussed on ASHE as a reliable and authoritative source for regional labour market information. ASHE presents wages by local authority district so it is

possible to allocate ASHE wage rates to water company areas using allocation factors published by Ofwat.

Chart 1 summarises the position and shows that wage rates are highest in water company areas in and nearest to London. The four company areas where labour market rates are above upper quartile, TMS, SES, AFW and SEW are all in or around London.

Chart 1: ASHE Gross Weekly Regional Wages 2011-12 to 2021/22, by company area



It is also worth noting that the distribution is skewed. The gap between the upper quartile benchmark and the four highest companies exceeds the gap between the lower quartile and the four lowest companies. As discussed later, this has implications for the incidence of symmetrical adjustments.

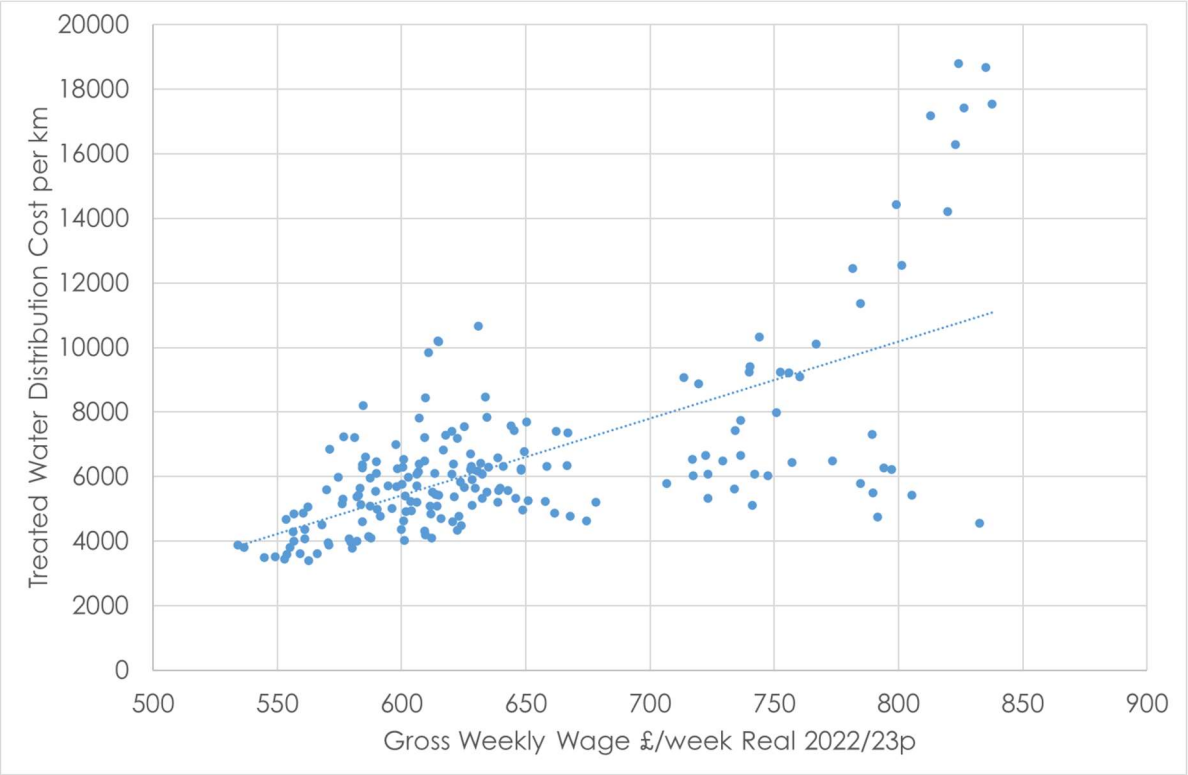
b) Is there compelling evidence that the company faces higher efficient costs in the round compared to its peers (considering, where relevant, circumstances that drive higher costs for other companies that the company does not face)?

In the round, there is a relationship between regional wages and costs. Chart 2 plots treated water distribution cost per km of mains against regional wages in each water company area and shows positive correlation coefficient, 0.65[3]. In this business segment, companies operating in high wage cost areas tend to have higher unit base costs[5].

[3] We found a similar correlation coefficient, 0.63 between water network plus cost per km and gross weekly regional wages

[5] We calculated correlation coefficients excluding i) TMS and ii) SES and returned results 0.43 and 0.77 respectively. Our result that companies in high wage cost areas tend to have higher TWD and N+ unit costs per km is insensitive to exclusion of 'outliers'

Chart 2: Relationship between treated water distribution costs and regional wages



c) Is there compelling evidence of alternative options being considered, where relevant?

We concluded that this CAC criterion is not relevant because there is no reasonable alternative option to employing labour to provide wholesale water base services.

d) Is the investment driven by factors outside of management control?

Regional labour market wage rates can be thought to be driven by the relative scarcity of workers and competition for those labour resources between employers. We think it self-evident that wage rates set in labour markets are outside of direct water company management control.

CEPA (2018) concluded that the degree to which regional labour markets influence costs is driven by 'structural differences in labour costs across regions, the type of labour being procured and the ability of companies to source labour from outside local (or regional) markets.'

We show evidence in e) below of mitigating our exposure to labour costs and in g) we describe the adjustment we make to our claim to allow for sourcing labour outside of local and regional markets. Further, we are not extending our regional wages claim to the retail price control, as retail activities such as call centre operations do not necessarily need to be located inside our supply area. We do not extend our claim to the water resources price control as this is less labour intensive than network plus.

e) Have steps been taken to control costs and have potential cost savings (eg spend to save) been accounted for?

Since labour is more expensive in our area of supply, it would be reasonable to see differences in our input mix, responding to the high price of labour. In Table App24 of PR19 business plans we reported that 26% of our network plus costs were labour. This is below the industry average, 31% and also below Ofwat's PR19 cost reconciliation labour cost share, 38%. This is consistent with our reducing exposure to expensive inputs.

Table 1 shows that since PR19 water companies have increased labour input overall, as the number of FTE employees is increasing. By contrast, our workforce has grown far more slowly than seen elsewhere. This further demonstrates our control of labour inputs and optimisation of input shares based on relative costs.

Table 1: Full-time equivalent employees in the E&W water industry

	E&W Water Industry FTE employees (excl. AFW)	Affinity Water FTE employees
2019	39,908	1,364
2020	41,265	1,296
2021	42,119	1,262
2022	43,768	1,373
% Change	**+9.7%**	**+0.7%**

Source : E&W Water Company Annual Reports and Accounts

f) Is there compelling evidence that the factor is a material driver of expenditure with a clear engineering / economic rationale?

Direct labour costs are a major component of water company costs, amounting to £2.188bn[6] across the industry in 2021. In 2019, Ofwat assessed that 38%[7] of water company totex could be attributed to labour. Given the high proportion of costs made up by labour it is reasonable to conclude that it is a material driver of expenditure.

There is a clear economic rationale to expect that persistent regional differences in wages, as evidenced in the ASHE, drive regional differences in costs across water companies, as noted for instance by CEPA (2018)[8]

g) Is there compelling quantitative evidence of how the factor impacts the company's expenditure?

[6] Source: England and Wales Water Company Annual Reports and Accounts.
[7] Section 11.6.6, p197 https://www.ofwat.gov.uk/wp-content/uploads/2019/12/PR19-final-determinations-Securing-cost-efficiency-technical-appendix.pdf
[8] Microsoft Word - CEPA cost assessment report (clean) (ofwat.gov.uk) p118 notes "The relative cost of labour in different regions of the country has the potential to influence the underlying cost base of companies operating in different regions."

We have used different approaches to assess and evidence the effects of regional wages on our expenditure.

- Econometric evidence (inclusion of regional wages variable)
- Pre-adjustment of costs

Econometric evidence

Our first approach to estimating the effects of regional wage variations compares predicted costs using Ofwat's PR24 treated water distribution model specifications (which do not include an explicit regional wages variable) with alternative specifications that do include a variable. Differences in the predicted level of costs under the different model specifications yield econometric estimates of the effect. We estimated models in this way, based on Ofwat's Master Dataset v4, having converted costs from 2017/18 prices to 2022/23 real terms, to align with the PR24 price base.

To construct our regional wage variable, we used the ASHE series Table 8.1a[9] which provides gross weekly earnings at local authority level. We allocated local authorities to water company supply areas using allocation factors published by Ofwat and used the logarithm of weekly wages by company area in our models. Our dataset is tabulated in Appendix B.

We noted that in previous cost assessment work, Ofwat, CEPA and Ofgem have used hourly wages to evaluate regional wage effects. However, most of our employees are salaried rather than paid hourly and we concluded that weekly wages better reflect employment arrangements in water companies.

Turning to estimation, we estimated all 6 variations of treated water distribution models published by Ofwat, then re-estimated those models that differed only in that they included a regional wages variable. Our full econometric results are shown in Appendix A.

Table 2 below shows triangulated predicted costs for 2017-18 to 2021-22 under Ofwat's PR24 specifications, and compares them with predicted costs under our specifications. We triangulated across the 6 models using equal weightings. Our result is that AFW's predicted TWD costs are £85.4m higher than Ofwat's over 5 years.

Table 2: Summary of triangulated predicted costs

	Ofwat PR24 specification - predicted costs 17/18 to 21/22	With addition of regional wages in TWD - predicted costs 17/18 to 21/22	Difference
2017-18	124.3	142.2	17.9
2018-19	124.1	140.5	16.4
2019-20	126.1	141.6	15.5

[9] Earnings and hours worked, place of residence by local authority: ASHE Table 8 - Office for National Statistics (ons.gov.uk)

2020-21	131.1	147.7	16.6
2021-22	128.9	147.9	19.0
Total	**634.5**	**719.9**	**85.4**

Pre-adjustment of costs

A second approach is to pre-adjust cost data for regional wages. To adjust costs we used PR19 share of costs for labour (as in Table App24 of PR19 business plans) and ASHE regional wages series.

For example, for AFW in 2021/22, actual treated water distribution modelled expenditure was £170.96m in 2022/23 prices. At PR19, AFW said that the share of base costs for labour was 26%, and ASHE data shows that in that year, regional wages in AFW's area of operations were 1.1412 times the E&W average. We noted that when Ofgem pre-adjusted costs for its RIIO-ED2 determinations, it assumed that 80% of labour costs arise in region with 20% arising elsewhere and we have used the same assumption in our calculations, to make allowance for sourcing labour outside local markets. We derived adjusted costs as follows:

Adj. costs = £170.96m x [(0.74 + (0.26 x 0.2)* 1.000) + (0.26 * 0.80 / 1.1412)] = £166.56m

This adjustment normalises costs for regional wage differences by increasing the costs of companies in low wage areas and decreasing those in high wage areas. Comparing the adjusted series with the original series yields a valuation of the CAC. As seen in the table 3 below, we assess with this approach that regional wage effects increase our costs by £21.1m over 5 years, equal to £4.2m per year.

Table 3: Summary of botex adjusted for regional wages (£m values are 2022/23 prices)

	Actual TWD Botex (Master Dataset v4)	Adjustment Factor	Adjusted Botex	Difference
2011-12	152.7	0.972	148.4	4.1
2012-13	155.6	0.970	151.0	4.0
2013-14	147.3	0.972	143.2	3.5
2014-15	150.5	0.974	146.5	4.6
2015-16	128.9	0.973	125.4	4.5
2016-17	171.9	0.973	167.3	4.1
2017-18	151.8	0.970	147.3	4.0
2018-19	154.6	0.973	150.5	4.0
2019-20	134.0	0.970	130.1	4.4
2020-21	155.2	0.974	151.2	4.1
2021-22	171.0	0.974	166.6	4.0
5 year total 17/18 to 21/22	766.7	-	745.6	21.1
Annual Average	153.3	-	148.1	4.2

Triangulating between the two approaches, at 50/50 weighting, our 5-year valuation of the gross regional wages CAC is £53.3m, or £10.7m per year.

For input to business plan tables, we apply catch-up efficiency to the claim. Ofwat's PR24 models suggest that our efficiency score is 0.99 overall, which is also the upper quartile efficiency benchmark. Following PR19 methodology which benchmarked against upper quartile, we apply catch-up efficiency, 0.0% to our claim value.

h) 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?

Ofwat contends that inclusion of density variables in models will include regional wage differences, as the two are correlated, however in the past it has included both population density and regional wages together. (PR14 models)

We tested whether there is likely to be multi-collinearity in our models that include regional wages and density, using the VIF statistic. CEPA (2023)[10] concluded that 'models with a max and/or mean VIF above 10 are considered to have a relatively high risk of suffering from multicollinearity, i.e. some of the variables are providing similar information into the model.'

In our estimations, when we included regional wages variables, we observed VIF scores in the range 1.8 – 2.1. These are similar to the VIF scores released by Ofwat for its PR24 models and well below the critical value 10.

Table 4: VIF result for models including regional wages variable

	VIF on Gross Weekly Regional Wages variable
	VIF (<10)
TWD1 + Reg Wages	1.870
TWD2 + Reg Wages	1.943
TWD3 + Reg Wages	1.902
TWD4 + Reg. Wages	1.992
TWD5 + Reg. Wages	2.027
TWD6 + Reg. Wages	2.106

We interpret this evidence to mean that the regional wages variable **is not** providing the same information in the model as other explanatory variables, i.e. density measures.

Second, we tested the correlation between the 3 density measures used by Ofwat, and regional wages. We are not aware of a commonly agreed rule for a critical value

[10] CEPA (2023) p13. https://www.ofwat.gov.uk/wp-content/uploads/2023/04/CEPA_Ofwat_Base_Cost_Models_Final_Report.pdf

for correlation, although we note that CEPA (2018)[11] considered 0.90 to be a suitable threshold. To some, CEPA's threshold might appear on the high side and we prefer 0.75. We tested the correlation between the logarithm of regional wages on weekly basis with the logarithm of each of the 3 alternative density measurements. There are no cases where thresholds are significantly breached as correlations are broadly in the 0.5 to 0.6 range.

Table 5: Correlation matrix for regional wages and density measures

	l_WADLADfromMSOAwater	l_WADMSOAwaterpopulation	l_density	l_GrossWeeklyRegionalWagesRea
l_WADLADfromMSOAwater	1.000	-	-	-
l_WADMSOAwaterpopulation	0.955	1.000	-	-
l_density	0.914	0.916	1.000	-
l_GrossWeeklyRegionalWagesRea	0.551	0.595	0.622	1.000

i) Is the claim material after deduction of an implicit allowance? Has the company considered a range of estimates for the implicit allowance?

We have used the PR24 Final Methodology 'Remove relevant expenditure' approach[12] to estimate the implicit allowance. To do this we estimated Ofwat PR24 specification models:

i) as they stand in the PR24 Econometric Base Cost Models consultation, having uplifted costs for inflation to 2022/23 price base; and

ii) with removal of relevant expenditure as described in g) above - the pre-adjustment of costs approach

The difference between the predicted costs estimated under i) and ii) provides an estimate of the implicit allowance. We triangulate the estimated implicit allowance across all 6 treated water distribution specifications to produce our valuation. This is set out in the Table 6 below.

Table 6: Estimated implicit allowance

	AFW Predicted costs 17/18 to 21/22	AFW Predicted costs 17/18 to 21/22	Difference
	Ofwat PR24 Specification	Ofwat PR24 – relevant	Implicit Allowance

[11] Microsoft Word - CEPA cost assessment report (clean) (ofwat.gov.uk) "we have not included any two variables in a model that are correlated by more than 90%."
[12] https://www.ofwat.gov.uk/publication/pr24-final-methodology-appendix-9-setting-expenditure-allowances/ section A 1.3.1 p159

		expenditure removed	
	£m 22/23p	£m 22/23p	£m 22/23p
2011-12	118.8	118.3	
2012-13	119.1	118.7	
2013-14	119.9	119.4	
2014-15	120.6	120.0	
2015-16	122.2	121.5	
2016-17	123.3	122.5	
2017-18	124.3	123.5	0.8
2018-19	124.1	123.3	0.8
2019-20	126.1	125.1	1.0
2020-21	131.1	130.0	1.1
2021-22	128.9	127.9	1.0
5-year Treated Water Dist. Botex Triangulated	634.5	629.7	4.8

We assess the value of the implicit allowance to be £4.8m. Our CAC, £53.5m, after deduction of implicit allowance becomes £48.7m. This is about 4% of total 5-year N+ botex, so exceeds the 1% threshold value for materiality.

j) Has the company accounted for cost savings and/or benefits from offsetting circumstances, where relevant?

When other companies' CACs are published, we will be able to make a fuller assessment of offsetting factors and circumstances.

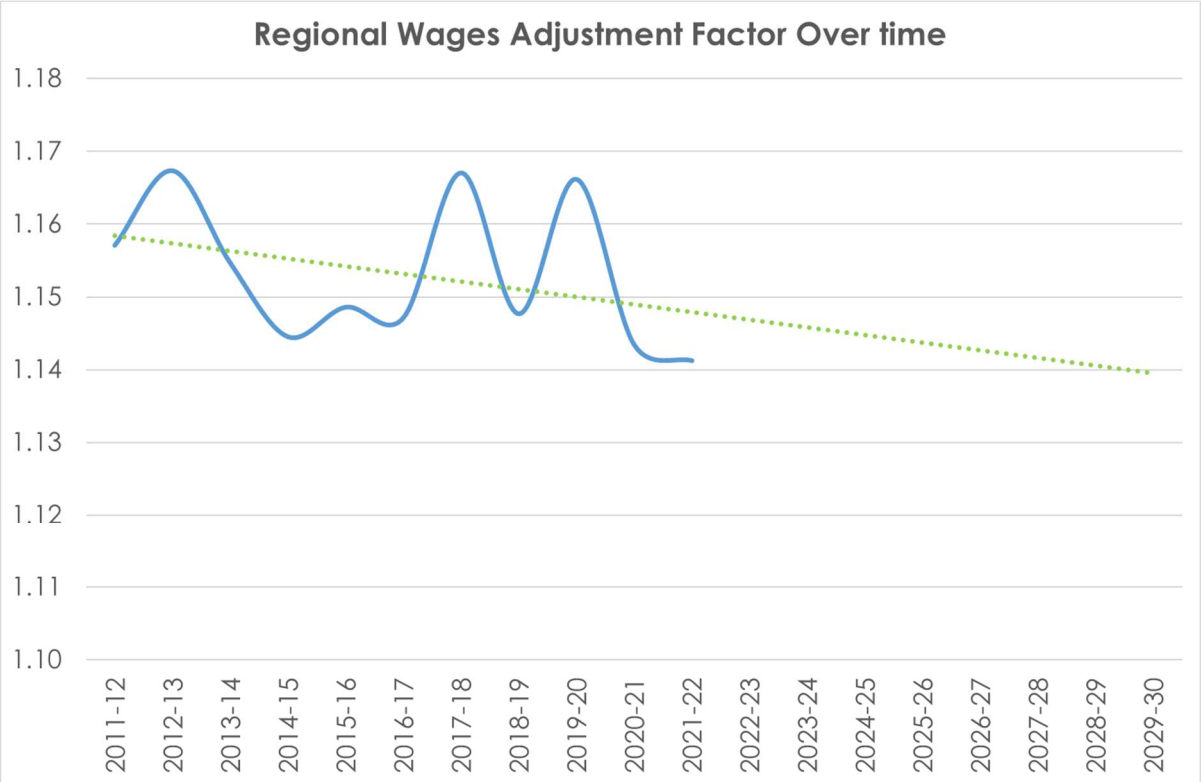
k) Is it clear the cost allowances would, in the round, be insufficient to accommodate the factor without a claim?

Our evidence suggests that failure to account for regional wages differences could overfund companies in low wage areas and underfund companies in high wage areas. As our post implicit allowance estimate of this CAC (around 4% of relevant botex) exceeds the materiality threshold, our assessment is that unadjusted cost allowances would be insufficient.

l) 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?

During our analysis we noted a trend in ASHE data where regional wage differentials appear to be marginally converging over time, at an average rate of about 0.1 percentage points per year. However, the persistence of regional wage differentials over long time series as seen in ASHE strongly suggests that this will be a driver of cost differences between water companies costs over the long term.

Chart 3: Regional wage differentials over time



m) If an alternative explanatory variable is used to calculate the cost adjustment, why is it superior to the explanatory variables in our cost models?

Rather than substitute a variable used by Ofwat, we have added a regional wages variable. Our econometric results are presented in Appendix A, but in summary, the following econometric evidence supports inclusion of the variable as a technique to estimate CAC value.

Adjusted R-square and efficiency range

Table 7 shows that our model specifications increase adjusted R square relative to Ofwat's specifications, by a minimum 0.1% up to 1.4%.

Table 7: Adjusted R-squared with regional wages variable

	Ofwat PR24 specification	With addition of regional wages variable
TWD1	0.955	0.969
TWD2	0.952	0.966
TWD3	0.958	0.969
TWD4	0.961	0.964
TWD5	0.965	0.967
TWD6	0.966	0.967

In addition, with inclusion of regional wages the efficiency range narrows in models TWD1-TWD5 to a more plausible range. It remains practically the same in model TWD6.

Table 8: Efficiency range with regional wages variable

	Ofwat PR24 specification	With addition of regional wages variable
TWD1	0.605	0.441
TWD2	0.675	0.556
TWD3	0.641	0.514
TWD4	0.593	0.554
TWD5	0.610	0.478
TWD6	0.536	0.540

Value of estimator & Statistical significance.

Ofwat expects that coefficients on regional wages should be less than 1.00, so that a 1% increase in wage costs would lead to less than 1% increase in total costs. Of the six models we estimated, our coefficient estimates are around 1.00, (max 1.29 and min 0.80), and we acknowledge that this is higher than might be expected. That said the coefficient estimators are statistically significant at 99% level in 3 cases, at 90% level in another case, and marginally below 90% in two others, so it would be unsafe to simply ignore the variable in cost assessments.

Table 9: Summary of coefficients and p-values for regional wages estimators

	Coefficient on (log) Regional Wage Estimator	P-value
TWD1 + Reg Wages	1.291	0.0007***
TWD2 + Reg Wages	1.248	0.0029***
TWD3 + Reg Wages	1.149	0.0012***
TWD4 + Reg. Wages	1.003	0.0602*
TWD5 + Reg. Wages	0.880	0.1017
TWD6 + Reg. Wages	0.803	0.1287

Cost efficiency

a) 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)?

We have tested our CAC results against a similar adjustment made in the electricity distribution industry. Table 10 below shows the regional adjustments determined by Ofgem[13] for electricity distributors in its RIIO-ED2 draft determinations, which were carried forward unchanged in the final determination. Ofgem decided that labour cost adjustments were necessary in 3 DNO regions, and used the factors to pre-adjust cost data, prior to econometric modelling. We found that our proposed uplift to treated water distribution costs for regional wages (around 7% of TWD costs and 4% of

[13] RIIO-ED2 Draft Determinations Core Methodology (1).pdf

N+), plausible against external regulatory adjustments made for the Eastern, London and Southern DNO areas.

Table 10: Ofgem Table 88 Regional Labour Indices (2017-2021) DNO Indices

Distribution Network Operator	Regional labour adjustment factor
ENWL	1.00
NPgN	1.00
NPgY	1.00
WMID	1.00
EMID	1.00
SWALES	1.00
SWEST	1.00
LPN	1.24
SPN	1.10
EPN	1.06
SPD	1.00
SPMW	1.00
SSEH	1.00
SSES	1.00

As noted in g) above, we tested 6 variations of treated water botex models to inform our estimates. This shows that we have tested a range of cost models and triangulated between them to produce our results.

We apply the same efficiency challenge on our modelling results as Ofwat would, described in section g) above. This ensures that the adjustment represents efficient costs. We have not applied frontier shift as the business plan table requires submission of claims prior to adjustment for frontier shift and real price effects.

b) 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?

We have explained our econometric and pre-adjustment of data approaches to estimating in cost adjustment claims in section g) above. In order that Ofwat may assess our claim, and as necessary replicate our results, we attach supporting data files setting out our data, calculations and econometric estimation results files. The index to supporting files is given below.

Table 11: Index of supporting files

File	Contents
CAC PR24-Cost-Assessment-Master-Dataset-Wholesale-Water-Base-Costs-v4.xls	Dataset used in our econometric models plus support for some of the tables and charts in this report

Gross Earnings Dataset (Weekly Wages).xlsx	Excel spreadsheet showing the construction of our regional wages variable from ASHE source data
TWD1 Regression Results.rtf	Random Effects estimation of Ofwat's specification
TWD1 Fitted.rtf	Actual, fitted values and residuals for above
TWD1 + GWW Regression Results.rtf	RE estimation of Ofwat's specification with the addition of the log(Gross Weekly Wage) variable
TWD1 + GWW Fitted.rtf	Actual, fitted values and residuals for above
TWD1 Adj.rtf	RE estimation of Ofwat's specification with adjusted dependent variable, removing regional wages effect on expenditure, used to estimate implicit allowance
TWD1 Adj Fitted.rtf	Actual, fitted values and residuals for above
We use the same file naming convention for models TWD2, TWD3, TWD4, TWD5 and TWD6	

c) Does the company provide third party assurance for the robustness of the cost estimates?

We appointed external experts to review our regional wages cost adjustment claim and provide critical assessment. Our reviewers suggested a number of refinements and extensions to our analysis. We have been able to address some of those observations in time for this early submission and we intend to address the remaining items for our final business plan.

Symmetrical Cost adjustment Claims

We calculate the following initial assessment of symmetrical adjustments, using the table format published in Appendix 9 of the final methodology. Column (1) shows the calculation of the CAC for each company, prepared on identical basis as AFW's claim. (3) is the implicit allowance calculated using the removal of relevant expenditure approach. (4) is Column (1) minus (3). Overall, the effect is to allow additional costs for the 4 upper quartile companies (see Chart 1 in section a) above) located in high wage cost areas, plus Anglian, but reduce the allowed costs for companies in lower cost areas.

We would have expected regional wages symmetrical adjustments to produce something more akin to a zero sum outcome across the industry than shown in Table 12 however this is our initial assessment for this early submission. We intend to review and further develop our symmetry adjustment calculation for final business plan.

Table 12: Symmetrical cost adjustment – initial assessment

	(1) Gross cost adjustment claim related to factor X (before deduction of implicit allowance)	(2) Scale variable	(3) Implicit allowance related to factor X	(4) Symmetrical cost adjustment*
	£m 2022/23p		£m 2022/23p	£m 2022/23p
ANH	38.6	-	28.9	9.7
NES	-5.0	-	6.8	-11.8
NWT	-28.2	-	15.8	-44.1
SRN	-6.1	-	0.0	-6.1
SWB	-19.5	-	9.4	-28.9
TMS	55.6	-	-152.2	207.8
WSH	-11.5	-	24.4	-35.9
WSX	0.8	-	8.2	-7.4
YKY	-11.8	-	17.7	-29.6
AFW	53.6	-	-4.9	58.5
BRL	-5.7	-	-1.9	-3.7
PRT	-3.6	-	-3.0	-0.6
SES	9.6	-	-2.2	11.8
SEW	48.7	-	7.3	41.4
SSC	-4.8	-	-3.2	-1.6
SVE	-16.6	-	15.0	-31.6
HDD	-5.2	-	0.9	-6.1
Total	**88.8**		**-32.9**	**+121.7**

*stated prior to application of catch-up efficiency,

Appendix A

Econometric Results – Ofwat PR24 specifications and with addition of regional wages variable

	Ofwat PR24 Specifications						Ofwat PR24 with regional wages variable					
	TWD1	**TWD2**	**TWD3**	**TWD4**	**TWD5**	**TWD6**	**TWD1+RW**	**TWD2+RW**	**TWD3+RW**	**TWD4+RW**	**TWD5+RW**	**TWD6+RW**
Dependent Variable	l_BotexNR_TWD	l_BotexNR_TWD	l_BotexNR_TWD	l_BotexNR_TWD	l_BotexNR_TWD	l_BotexNR_TWD	l_BotexNR_TWD	l_BotexNR_TWD	l_BotexNR_TWD	l_BotexNR_TWD	l_BotexNR_TWD	l_BotexNR_TWD
const	4.321 0.01***	15.809 0.00***	25.227 0.00***	2.158 0.180	16.749 0.00***	26.298 0.00***	-6.430 0.03***	3.072 0.460	9.483 0.05*	-5.777 0.230	8.867 0.240	16.738 0.04**
l_lengthsofmain	1.070 0.00***	1.026 0.00***	1.072 0.00***	1.062 0.00***	1.017 0.00***	1.045 0.00***	1.089 0.00***	1.060 0.00***	1.088 0.00***	1.079 0.00***	1.044 0.00***	1.057 0.00***
l_boosterperlength	0.461 0.00***	0.433 0.00***	0.489 0.00***				0.516 0.00***	0.465 0.00***	0.526 0.00***			
l_mhdAveragepumpingheadadistr				0.357 0.00***	0.411 0.00***	0.357 0.00***				0.308 0.00***	0.351 0.00***	0.305 0.00***
l_WADLADfromMSOAwater	-2.729 0.00***			-2.975 0.00***			-1.916 0.00***			-2.447 0.00***		
sq_l_WADLADfromMSOAwater	0.219 0.00***			0.229 0.00***			0.154 0.00***			0.185 0.00***		
l_WADMSOAwaterpopulation		-5.562 0.00***			-6.541 0.00***			-4.211 0.00***			-5.831 0.00***	
sq_l_WADMSOAwaterpopulation		0.393 0.00***			0.445 0.00***			0.294 0.00***			0.391 0.00***	
l_density			-14.919 0.00***			-16.625 0.00***			-10.650 0.00***			-14.257 0.00***
sq_l_density			1.898 0.00***			2.055 0.00***			1.357 0.00***			1.748 0.00***
l_GrossWeeklyRegionalWagesRea							1.296 0.00***	1.248 0.00***	1.149 0.00***	1.003 0.06*	0.881 0.100	0.803 0.130
Adjusted R-square	0.955	0.952	0.958	0.961	0.965	0.966	0.969	0.966	0.969	0.964	0.967	0.967
Efficiency Range	0.605	0.675	0.641	0.593	0.610	0.536	0.441	0.566	0.514	0.554	0.478	0.540

Appendix B

Affinity Water calculation of regional wages by company area, based on ASHE series

	Real (2022/23p) Mean Weekly Wage - £/week Gross - All employees - By Water Company Area												
	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
ANH	609	616	600	601	601	620	624	628	628	651	658	-	-
HDD	555	582	554	557	571	587	591	606	610	595	643	-	-
NES	615	614	602	609	624	623	625	632	620	639	646	-	-
NWT	587	588	583	579	596	598	604	614	606	621	630	-	-
SRN	622	613	612	612	622	634	633	641	628	648	649	-	-
SVE	600	601	584	585	606	611	603	618	607	613	639	-	-
SWB	556	545	536	534	562	559	553	566	549	571	584	-	-
TMS	820	801	785	781	799	823	826	835	824	813	838	-	-
WSH	557	562	553	560	580	576	571	584	574	590	604	-	-
WSX	584	581	568	579	590	583	601	598	583	607	628	-	-
YKY	577	570	561	561	576	582	587	598	590	609	617	-	-
AFW	740	740	719	713	736	744	760	752	751	756	767	-	-
BRL	620	615	615	611	628	621	625	634	631	645	666	-	-
PRT	649	633	639	640	662	707	678	658	648	668	674	-	-
SES	833	792	773	757	790	785	805	794	734	797	789	-	-
SEW	736	722	717	717	723	734	723	742	729	747	741	-	-
SSC	609	607	590	600	631	635	662	644	634	667	650	-	-