Response to 2019/20 data for base cost models – working paper

1.1 Summary

1. In its working paper, the CMA is proposing to adopt an unjustified position that is not evidenced in relation to the base cost models. The CMA is proposing not to use the most recent data it has available, despite there being no conclusive evidence that there are issues with the data.

2. We can find no compelling reason why a rational and unbiased assessment would omit the 2019/20 water cost data from the modelling. In particular:

    *   The amount that costs increased in 2019/20 was below the AMP6 trend, which undermines the assertion that costs in 2019/20 were atypically high.

    *   Including the latest data does not reduce the statistical performance of the models. Indeed, one of the model coefficients becomes statistically significant with the inclusion of the data.

    *   The potential examples of companies that have brought base costs forward are speculative, with not a single robust case of water service base expenditure definitely being brought forward from AMP7.

    *   While it is possible that some companies may have brought forward some small amount of expenditure to 2019/20 from AMP7, the CMA has ignored the fact that its models include data from 2014/15, the last year of AMP5. It has provided no assessment of whether a similar phenomenon happened in 2014/15.

    *   In setting performance targets the CMA considered outturn service levels for 2019/20. By considering the performance but not the costs, the CMA is creating a further disconnect between costs and service levels.

3. We also note that the CMA has not performed any cross-checks on the results of including the data. Including the 2019/20 cost data would bring the CMA's cost estimates more in line with the extensive body of evidence we considered when developing our business plan and which we presented in our Statement of Case.

4. In the 2015 re-determination, the CMA considered using the latest data, but only chose not to once it was shown not to make a material difference to cost allowances. For this re-determination, no sensitivity testing was apparent for this paper.

5. If the CMA proceeds on the basis set out in the consultation paper, we have serious concerns that the Final Determination will not achieve the correct balance of the statutory duties which apply to the CMA. In particular, including 2019/20 data when setting performance targets, while at the same time excluding 2019/20 cost data when setting base cost allowances would be an inconsistent approach contrary to the overarching duty to have regard to the principles of best regulatory practice. These principles importantly include a requirement for regulatory decisions to be consistent.[1]

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[1] Section 2(4) WIA91

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6.   Furthermore, a decision not to include 2019/20 cost data when setting cost allowances would entrench a situation whereby Bristol Water is underfunded to deliver its service performance targets in AMP7. Given the existing financeability challenge which we evidenced in our Statement of Case and supporting submissions, if the CMA were to leave our service performance targets underfunded as proposed, that would represent a breach of the Finance Duty.

7.   In summary, the proposed position in the working paper is fundamentally flawed. We urge the CMA to take what should be a non-contentious decision to include the latest data in its final determinations.

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1.2 Biased approach

8.   In the working paper, the CMA explicitly recognised that there are advantages of including 2019/20 cost data. However, the CMA decided not to include the 2019/20 cost data, as it chose to place particular weight on the risk of biasing its predicted allowance of base costs by including in cost models investments brought forward by companies from AMP7.

9.   We have consistently argued that Ofwat's overall approach to cost assessment is biased towards producing allowances which are lower than required, and hence erroneous. This includes Ofwat's interpretation of 2019/20 water service base costs, and whether this is representative of the level of service, or some other factor.

10.   In our business plan, we considered a wide-range of evidence based on both top-down and bottom-up approaches. Our bottom-up approach led us to adopting a cost position towards the lower end of the range implied from the top-down modelling (i.e. it was more stretching). Further details of how we developed our plan are included in Annex 7 of our Statement of Case.

11.   **The CMA has not engaged with our evidence base, and instead solely used Ofwat's approach as its basis for determining costs**. The fact that Ofwat's modelling approach resulted in a materially lower cost allowance (contrary to the substantial body of evidence we provided) strongly suggests that the Ofwat framework is flawed.

12.   As set out in Paragraph 179 of our Response to CMA Provisional Findings[2], including the 2019/20 cost data in the models closes a material part of the gap between our assessment of costs and the cost estimate obtained from using Ofwat's approach (with the remaining gap closed by other cost issues such as leakage) – i.e. it brings the CMA's results closer to the results obtained from other approaches[3]. Therefore, **omitting this data does not avoid bias, it allows the existing bias to persist.**

13.   The CMA has performed no form of cross-check against other approaches to determine whether Ofwat's models including the 2019/20 data produce more appropriate results than without. Instead, the CMA has simply assumed that Ofwat's approach is unbiased without the most recent data. **Not testing the results nor testing the sensitivity of the inclusion on totex allowances, is fundamentally flawed.**

14.   The CMA states that *"Biased predicted allowances risk consumers overpaying or underpaying for water services. Our provisional view is that this is a high risk in comparison to the benefits 2019/20 cost data would provide".*[4] This suggests that the CMA views underfunding companies as being less detrimental than overfunding. Underfunding companies is not consistent with the CMA's Finance Duty. We have totex sharing rates proposed by the CMA which are asymmetric, and underfunding is not something supported by customers. The CMA's provisional view also relies on a false premise, namely that incorporating 2019/20 cost data risks under- or over-funding companies, whereas excluding that data raises no such risks. In fact, having set service levels based on 2019/20 performance data, excluding cost data from the same period when setting base allowances risks companies being under-funded, the very thing which the CMA states it is seeking to avoid.

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[2] This data has been superseded by the model data set provided by Ofwat following APR queries, as we recognised in our response to RFI25, Q5.
[3] Bristol Water Statement of Case, paragraph 332
[4] CMA (2021), '2019/20 data for base cost models – Working Paper', paragraph 64.

15. Making use of the most recent information is well established in terms of regulatory precedent. In the 2015 re-determination, the CMA considered the most recent data, and only decided not to reflect the data in its models due to the fact it did not have a significant effect on the modelling suite at the time.[5] Contrary to the position in the CMA's PR14 redetermination, the exclusion of 2019/20 cost data has a significant impact on cost allowances for AMP7, and accordingly proposals to exclude this data from modelling on the basis of supposed distortionary effects should face a high evidentiary bar.

16. In its Provisional Findings for this re-determination, the CMA stated *"when taking decisions regarding the determination, we should use the most up to date information available"*.[6] We also note that the CMA has used service performance data from 2019/20 in its provisional findings to justify setting stretching performance targets for the companies. When justifying its provisional decision to exclude 2019/20 cost data from the base cost models, the CMA notes that its 'Approach to the redeterminations' document made clear that *"[the CMA] will also consider whether information is complete and robust so that we can place reliance on it"*.[7] 2019/20 costs data has already been subjected to Ofwat's quality assurance process, and this should be sufficient grounds for the CMA to conclude that the data is "complete and robust".

17. There are two points of principle that we consider should apply to any rational and unbiased assessment of base cost allowances:

    • **using the most up to date information should be a regulatory authority's first preference**; and
    • **increasing the number of observations should increase the accuracy of the coefficient estimates**.

18. These positions should only be deviated from if there is compelling evidence of data issues. Such evidence has not been provided, and we do not believe that such issues are present in this data. We provide further detail in the next section on how there is insufficient evidence to determine that companies have 'brought forward' an atypical level of expenditure.

19. The CMA states that it is concerned that the 2019/20 could distort its cost estimates. **If the 2019/20 data was distortive, we would expect to see a deterioration in model performance. This is not the case**. All the model coefficients remain statistically significant with the inclusion of the 2019/20 data. Indeed, the variable for density squared in the WRP2 model becomes statistically significant at the 5% threshold, when previously it was not significant even at the 10% threshold.[8]

20. The CMA also expresses concerns that in the absence of 2010/11 data, two full AMPs would not be included. Therefore, the higher investment in 2019/20 cannot be compensated by the potentially lower investment in 2010/11. We do not believe these concerns carry any weight:
    • The CMA rightly has stated a preference to use more recent data.

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[5] Bristol Redetermination Appendices, ppA4(2)-50, paragraphs 217-220 and 223, in particular *"We also carried out further sensitivity analysis considering both an update for 2013/14 data and alternative potential changes to the approach to the regional wage variable (discussed in paragraphs 186 to 196 above). We considered a range of alternative approaches and these produced variations in the average of the estimate for Bristol Water from the seven preferred models that were within the range +2% to –1%. "*
[6] CMA (2020) 'Provisional Findings', para 3.53.
[7] CMA (2020), 'PR19 Water redeterminations: Approach to the redeterminations", paragraph 58.
[8] Further detail on the model performance is included in Annex 2.

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- The more recent data reflects the totex/outcomes framework, rather than the cost base prior to 2015 when the regulatory framework did not target service improvements other than through enhancement expenditure, with separate cost assessment and cost recovery arrangements for opex from capex.
- The application of the efficiency models is over 5 years, and using 2019/20 allows this to reflect five years of the AMP6 period which has been used to target future industry service level improvements.

1.3 No evidence that 2019/20 is an atypical year

21. There is no robust evidence that demonstrates that 2019/20 was an atypical year. Indeed, **the amount that costs increased in that year was below the AMP6 trend**.

Figure 1 - AMP6 water service modelled botex
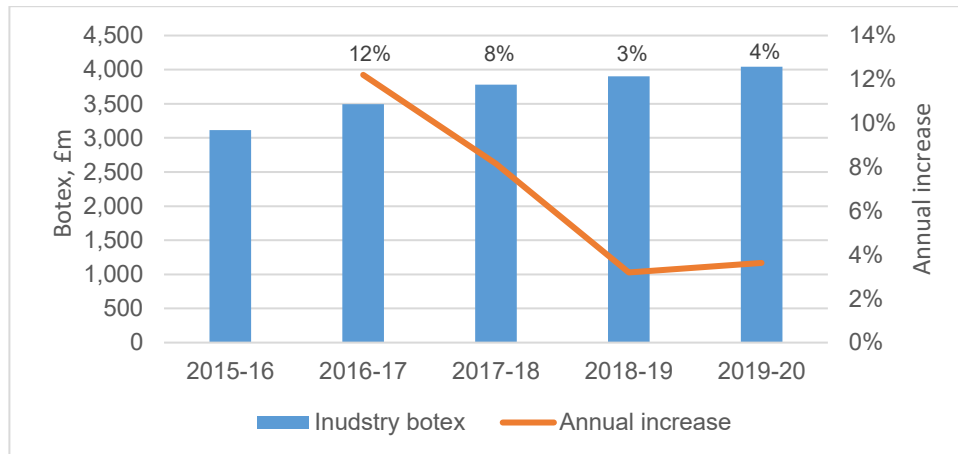
22. The CMA states that it is concerned that the 2019/20 data may introduce a bias in its estimates due to investment being brought forward from AMP7. It has not been proven that this has occurred to a greater degree than for 2014/15.

23. In its response to the CMA's Provisional Findings, Northumbrian Water provided the below examples of companies bringing forward spend in 2014/15. **We note that the CMA did not refer to this in its working paper, despite providing quotes of companies bringing expenditure forward to 2019/20**.[9] This evidence shows that investment was brought forward in 2014/15, the final year of AMP5, and supports the conclusion that this is a normal feature of companies' spending over the cost control period, which does not require correction.

Table 1 - examples of other factors increasing companies' 2014/15 costs

Company	Extracts from company reports
Anglian	"We delivered significant cost efficiencies against our Final Determination over AMP5, enabling us to reinvest an additional £235 million to further support resilience and the protection of customer supply." "Alongside our AMP5 programme, we also delivered a £57.0 million AMP6 Transition Programme. This early AMP6 spend has enabled us to mitigate the loss of efficiency resulting from the dip in activity from one AMP period to another, and reduces pressure on our supply chain caused by the stop-start approach experienced in previous AMP transition periods. By starting design work on our AMP6 schemes early, we enable construction through the summer months and ensure we deliver our early AMP6 outputs both efficiently and in line with our regulatory and customer commitments."

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[9] We provide further comment on the Ofwat examples in Annex 1

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Northumbrian	"We also brought forward investment into 2014-15 for three additional AMP6 phosphorus removal schemes. Also, two AMP6 bathing water schemes (Saltburn and Seaham) were brought forward and are due for completion in 2015-16."
South West	"In preparation for the European Union's revised Bathing Water Directive – which came into effect in 2015 – South West Water has already carried out an £18.9m programme of targeted improvements at key beaches around the region."
Thames	"We have generated capital efficiencies of circa £150 million in the last 5 years – the shareholders have reinvested these savings into our networks." "We have brought forward a scheme from the regulatory period 2015-20 to mitigate the previous risk seen to London, and in Guildford we have specifically targeted leakage control to address the shortfall reported last year."
United Utilities	"Around £200 million of capital savings has been reinvested in projects that deliver benefits to customers or the environment."
Yorkshire	"Over the AMP6 period a total of £2,141.5m of gross regulated capital expenditure associated with the delivery of the wholesale water and wastewater programmes has been invested including the early start spend of £15.2m in 2014/2015."

24.   In addition, we found the following examples:

Table 2 - further examples of other factors increasing companies' 2014/15 costs

Company	Extracts from company reports
Affinity	"Cumulatively capital expenditure for AMP5, which included a number of AMP6 projects started in the year, was in line with our forecast. £6.4 million primarily for the completion of mains cleaning projects and the replacement of our work management information system has been allocated to our AMP6 programme, which involves planned investment in our infrastructure of over £500 million over the five year period."[10]
Severn Trent Water	"This year's expenditure also included £60 million of investment we brought forward from AMP6. We used this to improve our sewer flooding performance and to invest in mains resilience. It also enabled us to accelerate some of our planned water quality schemes for AMP6 by 18 months, by carrying out feasibility studies and design work ahead of schedule."[11]

25.   A further explanation that might not be clearly reflected in companies' performance reports is that some companies may have back-end loaded their AMP6 programmes, or there was slippage in their delivery. As set out in Ofwat's Service Delivery report 2019-20, overall, the sector materially underspent relative to its cost allowances in the first two years of the control period. This was offset by increases in expenditure towards the back end of the control period. **The underspend in the first two years of AMP6 is important context which the CMA should take into account, and supports the inclusion of 2019/20 cost data in base models**. Such underspend in the early years was not seen in AMP5, which explains why the sector did not observe costs being back-end loaded in that control period.

26.   There was not atypical outperformance by companies of their 2019/20 performance commitment levels (something which would be expected, if companies had brought forward material levels of AMP7

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[10] Affinity Water (2015) 'Annual Report and Financial Statements', page 21
[11] Severn Trent (2015) 'Annual Report and Accounts 2015', page 25

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expenditure to improve service levels beyond the AMP6 expectations). The below table compares the proportion of performance targets met across 2018/19 and 2019/20.

Table 3 - sector PC performance 2018/19 and 2019/20[12]

Company	PCs met 2018/19	PCs met 2019/20	Change in performance
Anglian	93%	66%	Decreased
Welsh	63%	67%	Increased
Hafren	51%	51%	The same
Northumbrian	59%	70%	Increased
Severn Trent	62%	62%	The same
South West	71%	70%	Decreased
Southern	64%	33%	Decreased
Thames	55%	58%	Increased
United Utilities	74%	59%	Decreased
Wessex	77%	78%	Increased
Yorkshire	77%	88%	Increased
Affinity	90%	70%	Decreased
Bristol	43%	67%	Increased
Portsmouth	80%	75%	Decreased
South East	32%	50%	Increased
South Staffs	67%	73%	Increased
SES	71%	71%	The same
Median	**67%**	**67%**	

27. We note that Affinity Water and Thames Water delivered large reductions in leakage levels. However, this was predominantly to address the fact the companies had significantly missed their leakage targets in previous years.

28. In conclusion, **there is no evidence that the amount of future expenditure brought forward into 2019/20 was materially greater than for the previous control period** (which Ofwat and the CMA included in their modelling). **The only logical conclusion is that 2019/20 data should be used.**

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[12] Ofwat (2020) 'Service delivery report 2019-20'

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1.4 Cost-service relationship

29. We note that in the hearings (and repeated by the CMA in its working paper) Ofwat stated that *"companies felt 'challenged' by PR19 performance commitments and that was why they had started investing in 2019/20."*[13]

30. This position appears to be inconsistent with Ofwat's view that there is no link between costs and service. Ofwat appears to be simultaneously arguing:

    - that there is no cost of improving service levels; and
    - the 2019/20 cost data should be excluded as the costs are high due to companies' improving service levels.

31. Our position has consistently been that there is a link between costs and service. In our Statement of Case we estimated the additional cost that Bristol Water incurs due to operating with comparatively high service levels. We stand by our Statement of Case. However, if the rest of the industry has improved its service level, then including the associated costs in the botex models would somewhat offset the need for a separate service levels adjustment.

32. In the Provisional Findings, when setting performance targets the CMA considered outturn service levels for 2019/20. By considering the performance but not the costs, the CMA is creating a further disconnect between costs and service.

33. We also note the information we provided in Annex 2 of our Response to the Provisional Findings, which provided clear evidence to support a service-cost relationship once final outcomes and totex over AMP6 was available. In paragraph 12 of Annex 2, we explained the specific water service incentive pressures in AMP6, increasing for AMP7 related to leakage, supply interruptions, mains burst incentives and CRI.

34. At our post Provisional Findings hearing, our CEO Mel Karam explained the context for company performance in AMP6, and why there was an increasing level of expenditure across the period in order to meet AMP6 targets[14]. This is relevant, firstly because it indicates that companies need to make increased investment in the last year of the price control to meet current targets (rather than 'bringing forward' investment from the next price control period), and secondly because it shows that failing to take 2019/20 cost data into account in base models necessarily under-states the true costs borne by Bristol Water in providing services.

35. We have set out previously our positive comparative performance on the key aspects of the water service, which is confirmed in Ofwat's 2020 service delivery report[15] and its associated data tables[16]. **Bristol Water performance is better than other companies, and as a water only company, will be particularly affected if 2019/20 data is not used. Bristol Water is more at risk of base cost underfunding.**

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[13] CMA (2021), '2019/20 data for base cost models – Working Paper', paragraph 11.

[14] Page 66, from line 22.

[15] https://www.ofwat.gov.uk/wp-content/uploads/2020/12/Service-delivery-2020-final-1-Dec.pdf

[16] https://www.ofwat.gov.uk/publication/service-and-delivery-report-2019-20-data/

1.5 Concomitant points

Frontier shift

36.   In the working paper, the CMA proposed that if it did choose to include the 2019/20 data, it would apply the frontier shift adjustment from 2020/21. We agree with this proposal. There would be no reason to apply an assumed level of productivity improvement and real price effects when outturn data is available.

37.   The CMA may also wish to consider not applying the frontier shift adjustment to 2019/20 costs even if it did decide to not include the 2019/20 cost in the model. The increase in expenditure in 2019/20 suggests that delivering net efficiency gains of 1% was not deliverable in that year.

Merger of Severn Trent and Dee Valley

38.   As set out above:

- **using the most up to date information should be a regulatory authority's first preference**; and
- **increasing the number of observations should increase the accuracy of the coefficient estimates**.

39.   There is no compelling evidence that Hafren Dyfrdwy would distort the analysis. If the inclusion of Hafren Dyfrdwy's data was distortive, we would expect to see a deterioration in model performance. This is not the case. All the model coefficients remain statistically significant.[17]

40.   Hafren Dyfrdwy is not an outlier in terms of its size. Its expenditure is similar to Portsmouth Water, which is included in the modelling. It is significantly larger than Dee Valley Water (which used to serve part of the area now covered by Hafren Dyfrdwy) and Bournemouth Water, which were included in cost assessments in the past. **The models do not show economies of scale, and Bristol Water is a small company.**

41.   We can understand regulators being cautious of using small companies as the industry benchmark, but to exclude the data from the model entirely has no reasonable justification and would break from regulatory precedent. Therefore, data for Hafren Dyfrdwy should be included in the CMA's base cost models.

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[17] Further details on model performance are included in Annex 2.

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Annex 1 – response to Ofwat's examples of base costs brought forward

1. In its working paper, the CMA quoted a number of examples that Ofwat provided from companies' 2019/20 submissions. The examples do not provide compelling evidence that material base expenditure has been brought forward. We provide comment on each of these below.

Table 4 - review of examples of expenditure brought forward

Quote	BW comment
United Utilities confirmed it invested £96 million (roughly 11% of wholesale base costs in 2019/20) in its 'Flying Start' investment programme, designed to improve performance for both AMP6 and AMP7. United Utilities explained to Ofwat that the investment programme was incremental investment in 2019/20 in readiness for the 2020-25, rather than investment brought forward. The majority of this expenditure was related to improvements in the water network infrastructure, leakage and sewer flooding performance, and IT system.	Ofwat noted that while the majority of this expenditure may be base costs, there may be some enhancement as well, so the percentages may not be accurate. We see no evidence to prove that any of this expenditure is base.
	Some of the expenditure relates to the wastewater service.
	The quote says that the programme is designed to improve performance in both AMP6 and AMP7. It is not clear what the split between the two control periods might be.
	United Utilities stated "The £250m AMP6 resilience investment was designed to reduce the inherent risk within our asset base over the expected life of the assets and was not therefore specifically targeting AMP7 performance." This resilience investment sounds like it should be in base maintenance, but has been included as enhancement in 2019/20. This may suggest that 2019/20 base costs are understated (rather than biased up) for ongoing base costs, particularly for Bristol Water as we set out in our service-cost relationship evidence
South West indicated capital investments for a total of £19 million (7% of wholesale base costs in 2019/20) to ensure it was 'in the best possible position to deliver 2020-25 targets and customer expectations', in areas such as capital maintenance, leakage, sewer flooding and IT infrastructure.	Ofwat noted that while the majority of this expenditure may be base costs, there may be some enhancement as well, so the percentages may not be accurate.
	Of the stated expenditure on the Water service the total base appears to be c£9.5m of maintenance, which as well as leakage is described as "various investments to ensure the integrity of our works and

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	network. This is clearly not accelerated AMP7 base investments therefore.
Southern said it invested around £44 million (8% of wholesale base costs in 2019/20) in improving its operational effectiveness, performance and IT capabilities in preparation for AMP7 targets.	Ofwat noted that while the majority of this expenditure may be base costs, there may be some enhancement as well, so the percentages may not be accurate. The bulk of the base cost is capex insourcing of IT capability, which is a one off cost but can be expected to be an efficiency decision over time. It could not be considered investment brought forward, and would not be specific to 2019/20 (other companies would have similar expenditure in other time periods). Some of the expenditure relates to the wastewater service.
Dŵr Cymru incurred £9 million (2% of wholesale base costs in 2019/20) of capital investments in readiness for AMP7, most of which related to reducing external sewer flooding.	Most of this relates to the wastewater service. There were no material water investments, other than a small amount for leakage. As Dŵr Cymru stated "We have outlined five areas of expenditure, however given the nature of the capital programme there is typically reprofiling of expenditure within the AMP and between AMPs. It is also important to note that a number of our 2020-25 performance commitments are a continuation of our AMP6 performance commitments. Therefore, given the nature of the programme and the continual improvement of performance commitments there is typically an overlap of expenditure between the AMPs. In the same way some 2019-20 expenditure relates to AMP7, some 2014-15 expenditure relates to AMP6.
Severn Trent said it 'used the benefit of being fast-tracked to get a head start on our commitments for AMP7'. The company said in its response to Ofwat's queries that 'it is not straightforward to quantify which investment is specifically for 2020-25 targets, as many of our AMP7 performance commitments continue on from our AMP6 performance commitments as both are aligned to the similar long term outcomes.'	No estimate of base costs brought forward is provided. As the company cannot separate between AMP6 and AMP7 expenditure against long term outcomes, it is safe to assume that there was no explicit strategy to bring base expenditure forward. We note that Severn Trent stated to Ofwat "The statements that you have quoted above all demonstrate how we have been preparing for AMP7, but they do so in the context of delivering the best possible performance in AMP6 and investing our totex in the most efficient way." This does not imply any early investment – it is merely preparation as AMP7 is a continuation of

	AMP6. Therefore 2019/20 costs are an accurate reflection of on-going base costs if included in modelling.
Hafren Dyfrdwy indicated that it accelerated investments in maintenance activities to deliver immediate improvements as well as benefits into AMP7 and beyond, such as 'targeted mains renewal to improve leakage, supply interruptions and mains bursts', but that it was difficult to quantify the elements specifically relating to 2020-25 targets.	Same points as Severn Trent. HDD statement says "The statement quoted above demonstrates how we have invested to deliver our AMP6 performance commitments, but also to get our asset base into a good place going into AMP7." The investment implies this is to recover previous shortfalls. We note Ofwat's service delivery report assessment for HDD as a "poorer performer" compared to Bristol Water "better performer", confirming this interpretation.

2. As shown in the above the evidence of companies having brought base costs forward from AMP7 is weak, with not a single robust case of water service base expenditure definitely being brought forward from AMP7.

3. Where a fuller examination of the information from the Ofwat APR query is provided, it is quite clear this is improving performance to meet AMP6 targets, and is in most cases in areas where the companies are poorer than the level of performance of Bristol Water / other upper quartile service performing companies.

4. The CMA's working paper includes the conclusion *"Overall, all water companies' comments suggest that a substantial amount of investment is likely to have been brought forward from AMP7 to 2019/20."*[18] It is simply not true that the commentary demonstrates that a substantial amount of water base expenditure was brought forward.

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[18] CMA (2021), '2019/20 data for base cost models – Working Paper', paragraph 51.

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Annex 2 – Summary of model performance

1. The below tables provide a summary of model performance for the following scenarios:

   a) Exclusion of 2019/2020 data – i.e. the provisional findings
   b) Inclusion of 2019/2020 cost driver data, excluding HDD/2020 – i.e. the CMA's working paper proposal
   c) Inclusion of 2019/2020 cost driver data, including HDD/2020 – i.e. BW's position

2. Scenario (c) does not perform worse than the provisional findings or the CMA's working paper. This suggests that the inclusion of the 2019/20 cost data and Hafren Dyfrdwy as a separate compactor is not having a 'distortionary' effect on the models.

a) Scenario: Exclusion of 2019/2020 data						
Models		**Water resources plus**		**Treated water distribution**	**Wholesale water**	
Variable code	**Variable name**	**WRP1**	**WRP2**	**TWD1**	**WW1**	**WW2**
lnproperties	ln (number of properties)	1.007***	1.007***		1.034***	1.020***
		{0.000}	{0.000}		{0.000}	{0.000}
pctwatertreated36	% of water treated at complexity levels 3 to 6	0.008***			0.005***	
		{0.000}			{0.000}	
lnwedensitywater	ln (weighted average density)	-1.647***	-0.981**	-3.120***	-2.220***	-1.789***
		{0.001}	{0.047}	{0.000}	{0.000}	{0.000}
lnwedensitywater2	(ln(weighted average density))^2	0.103***	0.056	0.248***	0.156***	0.125***
		{0.003}	{0.120}	{0.000}	{0.000}	{0.000}
lnwac	ln (weighted average water treatment complexity)		0.486***			0.568***
			{0.000}			{0.000}
lnlengthsofmain	ln (lenghts of main)			1.049***		
				{0.000}		
lnboosterperlength	ln (number of booster pumping stations per lenghts of main)			0.455***	0.231**	0.256***
				{0.007}	{0.050}	{0.010}
_cons	Constant	-4.274**	-6.607***	5.686***	-1.106	-2.725**
		{0.017}	{0.000}	{0.000}	{0.483}	{0.016}
N		141	141	141	141	141
R_squared		0.934	0.921	0.967	0.975	0.977
RESET_P_value		0.542	0.159	0.124	0.229	0.148

b) Scenario: Inclusion of 2019/2020 cost driver data, excluding HDD/2020						
Models		**Water resources plus**		**Treated water distribution**	**Wholesale water**	
Variable code	**Variable name**	**WRP1**	**WRP2**	**TWD1**	**WW1**	**WW2**
lnproperties	ln (number of properties)	1.022***	1.024***		1.046***	1.036***
		{0.000}	{0.000}		{0.000}	{0.000}
pctwatertreated36	% of water treated at complexity levels 3 to 6	0.008***			0.005***	
		{0.000}			{0.000}	
lnwedensitywater	ln (weighted average density)	-1.689***	-1.075***	-3.212***	-2.265***	-1.844***
		{0.000}	{0.007}	{0.000}	{0.000}	{0.000}
lnwedensitywater2	(ln(weighted average density))^2	0.107***	0.063**	0.257***	0.160***	0.129***
		{0.000}	{0.029}	{0.000}	{0.000}	{0.000}
lnwac	ln (weighted average water treatment complexity)		0.447***			0.503***
			{0.007}			{0.000}
lnlengthsofmain	ln (lenghts of main)			1.066***		
				{0.000}		
lnboosterperlength	ln (number of booster pumping stations per lenghts of main)			0.499***	0.263**	0.263**
				{0.004}	{0.034}	{0.016}
_cons	Constant	-4.311***	-6.475***	5.939***	-1.021	-2.634**
		{0.007}	{0.000}	{0.000}	{0.512}	{0.015}
N		157	157	157	157	157
R_squared		0.929	0.915	0.962	0.973	0.975
RESET_P_value		0.464	0.175	0.062	0.185	0.087

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c) Scenario: Inclusion of 2019/2020 cost driver data, including HDD/2020						
Models		**Water resources plus**		**Treated water distribution**	**Wholesale water**	
Variable code	**Variable name**	**WRP1**	**WRP2**	**TWD1**	**WW1**	**WW2**
lnproperties	ln (number of properties)	1.033***	1.030***		1.036***	1.024***
		{0.000}	{0.000}		{0.000}	{0.000}
pctwatertreated36	% of water treated at complexity levels 3 to 6	0.008***			0.006***	
		{0.000}			{0.000}	
lnwedensitywater	ln (weighted average density)	-1.451***	-0.958**	-3.338***	-2.371***	-1.939***
		{0.001}	{0.024}	{0.000}	{0.000}	{0.000}
lnwedensitywater2	(ln(weighted average density))^2	0.091***	0.055*	0.266***	0.168***	0.137***
		{0.004}	{0.064}	{0.000}	{0.000}	{0.000}
lnwac	ln (weighted average water treatment complexity)		0.444***			0.533***
			{0.005}			{0.000}
lnlengthsofmain	ln (lenghts of main)			1.055***		
				{0.000}		
lnboosterperlength	ln (number of booster pumping stations per lenghts of main)			0.570***	0.316***	0.324***
				{0.000}	{0.004}	{0.001}
_cons	Constant	-5.307***	-6.979***	6.782***	-0.331	-1.948*
		{0.001}	{0.000}	{0.000}	{0.801}	{0.053}
N		158	158	158	158	158
R_squared		0.929	0.916	0.962	0.973	0.975
RESET_P_value		0.493	0.187	0.054	0.163	0.062

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