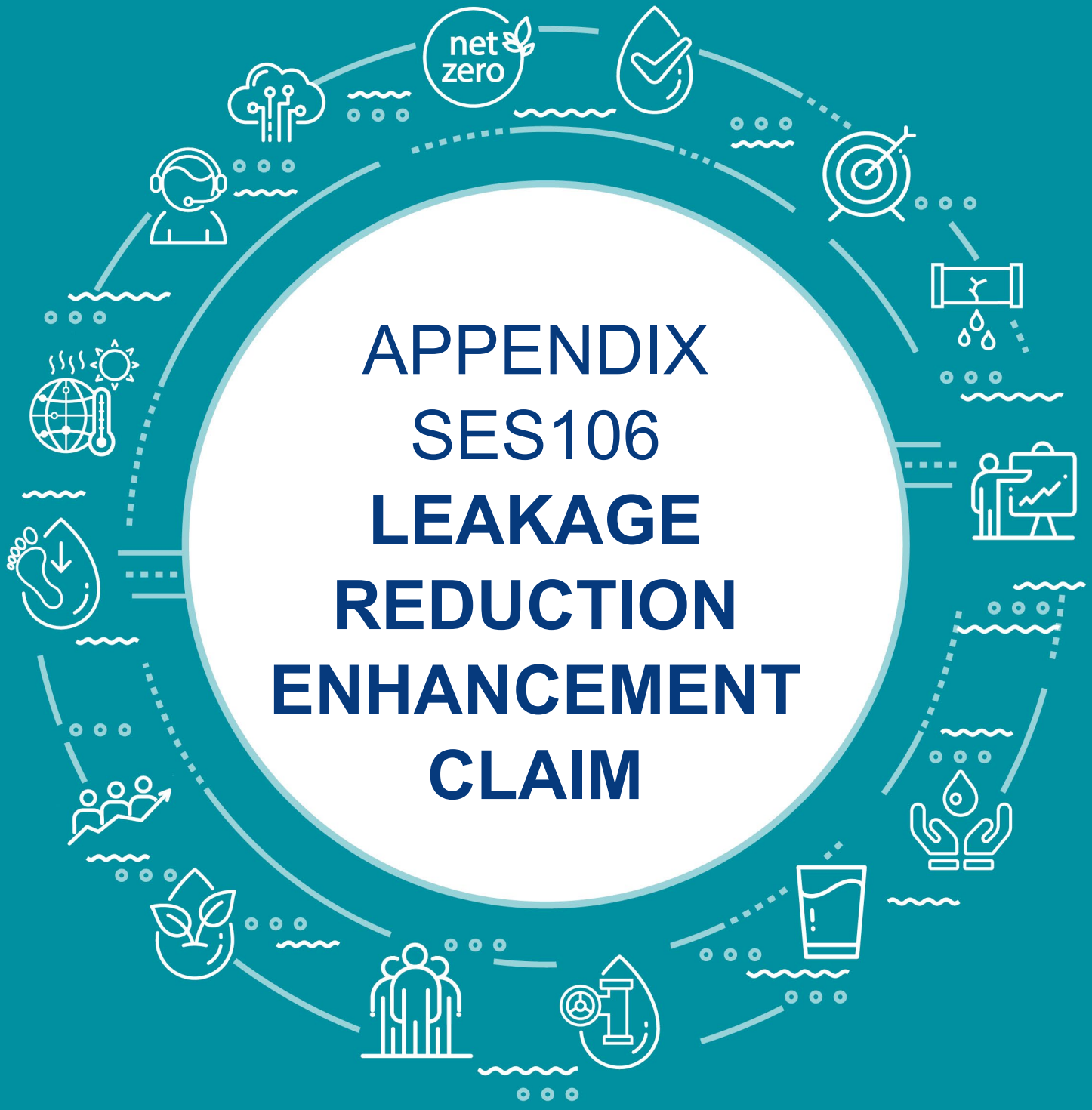
ses WATER



APPENDIX SES106 LEAKAGE REDUCTION ENHANCEMENT CLAIM

Contents

APPENDIX SES106: LEAKAGE REDUCTION ENHANCEMENT CLAIM

We are proud of the work we have conducted and continue to deliver in the sustainable reduction of leakage across our supply area. A record of meeting our leakage target every year since they have been set by Ofwat, and the achievement of the lowest level of leakage as a ratio of water supplied is a position we believe we will continue to build on, subject to receiving the requested level of funding in our Business Plan.

We are seeking full funding of our original Business Plan enhancement case for leakage of £10.5m, plus an additional £2.5m for what we consider to be a new requirement set out by Ofwat in its draft determination. This representation case for £13.0m has been developed in response to Ofwat's PR24 draft determination in July 2024 and it consists of three different elements.

First, in its unit cost assessment of our leakage reduction enhancement expenditure proposals, Ofwat included the costs of our DMA asset health and asset condition (DMAAH) investments. This initiative will not provide leakage reduction benefits during AMP8, but in AMP9 and beyond. Thus, Ofwat overstates our unit cost of achieving leakage reduction during the next AMP, which disallows a large component of our submitted funding request. Therefore, we request that Ofwat removes our DMAAH costs from its unit cost calculation and assesses it separately.

Second, even after the removal of our DMAAH costs from its unit cost calculation, Ofwat's approach to calculating an industry benchmark unit cost for future leakage enhancement allowances understates the unit cost of leakage enhancement achieved historically, due to limitations in the calculation methodology. Ofwat's approach to mitigating data variability in historical unit costs selects only particular historical years, fails to recognise that leakage enhancement projects take many years to reduce outturn leakage, and that real leakage changes for reasons besides companies' investments to reduce it. In addition, the use of historical unit costs understates the efficient unit costs of leakage enhancement for the industry, which will tend to rise over time as companies exceed the sustainable, economic level of leakage (SELL). Therefore, we suggest Ofwat considers assessing companies' leakage enhancement costs using forecast data only.

Thirdly, the ability to continue to deliver our leading-edge work on DMAAH is integral to future sustainable leakage reduction and provides wider benefits in a range of other network resilience areas, including helping us derive the

optimal level of asset (mains) replacement to achieve intergenerational fairness on the costs of this work.

Finally, we also request an additional enhancement funding of £2.5 million required to complete upstream flow monitoring zones (uFMZ) that was not included in our original enhancement case for leakage as we were not aware of its requirement in order to achieve compliance at the time of submission. Following the publication of the draft determination, we see clear direction from Ofwat to move towards the use of uFMZs for the quantification of leakage on trunk mains and upstream of DMAs.

A. Introduction

1. This document is structured in the following way:

   - In Section B we provide an overview of our Leakage Reduction and Network Resilience Enhancement case;
   - In Section C we summarise Ofwat's position at draft determination;
   - In Section D we assess Ofwat's position, challenging its unit cost calculation and its decision to include our DMAAH costs in its assessment. Additionally, we set out the logic for Ofwat funding our DMAAH activities to support longer-term leakage reduction. Finally, we provide evidence that we require additional enhancement funding of £2.5 million to complete upstream flow monitoring zones (uFMZ) that was not included in our original enhancement case for leakage; and

     Finally, Section E concludes.

2. Throughout this document we make reference to a number of documents including:

   - SES Water (October 2023), Appendix SES008 Enhanced Leakage Reduction and Network Resilience;
   - SES Water (October 2023), Long-term Delivery Strategy 2025 to 2050;
   - Artesia (October 2023), Sustainable economic level of leakage analysis for baseline WRMP24 forecast, a report prepared for SES Water;
   - Ofwat (July 2024) PR24 draft determinations Expenditure allowances; and
   - Ofwat (July 2024) PR24 draft determinations Water – Leakage: enhancement expenditure model.

B. Overview of Our Leakage Reduction and Network Resilience Enhancement Case

3. Central to our long-term ambition is to continue to deliver sustainable leakage reduction across our supply area. We are proud to have achieved the lowest level of leakage in the industry (measured as leakage per distribution input) and securing the level of funding sought within our Business Plan is essential to continue this work through AMP8.
4. In our PR24 Business Plan, we put forward our case for £10.5 million of enhancement expenditure to fulfil our ambitious leakage reduction and network improvement plans. This was consistent with, and formed part of, the core pathway of our Long-term Delivery Strategy (LTDS) and would enable us to deliver the leakage reductions set out in our Water Resources Management Plan (WRMP).
5. Our leakage reduction glidepath will enable us to achieve a 50% reduction in leakage by 2043, which is faster than the target set in the Government's Environmental Improvement Plan (EIP). This stretching target was set in response to the feedback we received from our customers, the majority of whom scored leakage reduction as their second highest priority behind water quality. When presented with different leakage investment options, 75% of customers surveyed wanted SES to either achieve the 50% leakage reduction earlier than 2050 or reduce leakage by more than 50% by 2050.
6. The activities comprising our enhancement case were designed to deliver best value for our customers, by targeting leakage reduction across a range of intervention types, which seek optimally to balance cost, deliverability, and long-term asset improvement. In doing so, we will deliver leakage reductions and network performance improvements that are sustainable and deliver value for money for current and future generations.
7. Our enhancement case for AMP8 included £4.2 million funding for activities that would enable us to continue to reduce leakage by 26% from 2019/20 levels, specifically, enhanced active leakage control (ALC), advancements in the adoption and usage of our smart supply network (iDMA), and the delivery of network optimisation and pressure management (PM) schemes informed by DMAAH activities already carried out in AMP7.
8. In addition, it included funding for us to continue to enable and inform the delivery of innovative enhancements to our network, the benefits of which would not translate to leakage reductions in AMP8 but would enable us to deliver our long-term leakage targets. Specifically, this was £6.3 million to allow us to undertake the next phase of DMAAH activities (comprising survey and assessment work and deterioration modelling), which will enable us to continue to appropriately target future network optimisation, pressure management and asset (mains) replacement schemes, which collectively are critical to our long-term, sustainable leakage reduction programme.
9. Table 1, below, summarises the interventions in our enhancement case. It also highlights the secondary benefits to other performance commitments that the enhancement funding requested will contribute to.

Table 1: Summary of Interventions Including

	Intervention	Description	PC Benefit(s) in AMP8	AMP8 Totex cost (£m)	Cost (£m) per Ml
1	Enhanced Active Leakage Control (ALC) (CW3.47)	Enhancement funding is requested in addition to base funding in this area to deliver transitional performance in leakage ALC activities. Each year of the AMP we will reduce leakage to new lower levels with savings then committed to base.	**Leakage**: 0.1Ml/d per year (0.5Ml/d total for the AMP)	1.0	2.0
2	Smart Supply Network (iDMA) (CW3.47 and CW3.48)	Complementing but independent to our ALC intervention, enhancement funding is needed to continue to enhance and grow our smart supply network infrastructure and processes. We will target expansion of our existing systems plus adoption of new technologies, sensors and software.	**Leakage**: 0.1Ml/d per year (0.5Ml/d total for the AMP). Also unlocks further benefits from AMP9 onwards. **Water Supply Interruptions**: 0.02 minutes per property (AMP total)	1.1	2.2
3	Network Optimisation and Pressure Management (PM) (CW3.47)	Enhancement funding in this area will be used to improve our network focusing on optimum network layout, optimal pressure regimes and the removal of network transients to create calm resilient networks. This intervention is targeted at background leakage reduction as well as preventing leak outbreak.	**Leakage**: 0.4Ml/d per year (2.0Ml/d total for the AMP) **Mains Repairs**: 0.5 repairs per 1000kms (AMP Total)	2.1	1.1
4	DMA Asset Health and asset condition assessment (DMAAH) (CW3.53)	Enhancement spend is requested to enable progression of our DMAAH initiative started in AMP7. We will complete the appraisal of the whole of our network producing a targeted enhanced mains renewal programme for AMP9 onwards. We will also collect repeat survey data in 10% of our network which we will use to create deterioration models so we can predict future poor performance before it happens.	**Mains Repairs** Benefits to be realised from AMP9 onwards. **Water Supply Interruptions**: Benefits to be realised from AMP9 onwards. **Leakage**: Benefits to be realised from AMP9 onwards.	6.3	N/A (See case for removal below)
	Total		**Leakage**: 0.6Ml/d per year (3Ml/d total for the AMP or 14%)	**10.5**	

Source: Adapted from Business Plan appendix SES008 – Oct 2023

10. This table shows that within our enhancement case, three of the four elements it comprises will deliver leakage reduction within AMP8 – a total of 3.0Ml/d at a total cost of £4.2 million – along with a number of other beneficial contributions to our performance commitment delivery.

11. The table also clarifies that the fourth element – at a cost of £6.3 million – is required to enable the delivery of leakage reductions in later AMPs via the implementation of the network optimisation, mains replacement and pressure management schemes it informs.
12. At the time of the submission of our Business Plan in October 2023, we had not intended to undertake works to install flow meters on all of our trunk mains to create upstream flow monitoring zones (uFMZ): this direction came from Ofwat within the publication of its draft determination. As such, the additional investment required to deliver this work - £2.5 million – was not included in our original enhancement case.

C. Our Interpretation of Ofwat's Position at Draft Determination

13. In its draft determination, Ofwat calculated leakage reduction unit costs for other leakage activities i.e. excluding mains renewal and customer supply leakage (CSL), from historical cost information to set allowances for AMP8. Ofwat applied its efficient unit cost benchmark of £1.11m/Ml/d and calculated the allowances by multiplying the benchmark with each company's proposed leakage reduction over AMP8.

14. According to Ofwat, companies either included CSL saving costs within their smart metering programmes or within leakage enhancements. For consistency, where CSL was included in leakage enhancement, Ofwat reallocated this cost to metering enhancement, as the identification of CSL will be proportional to the delivery of smart meters.[1]

15. As shown in Table 1, we have requested £10.5 million to deliver 3Ml/d of benefits over the AMP when CSL costs are reallocated to metering enhancement and removed from leakage enhancement. Applying Ofwat's benchmark would generate a £7.1 million disallowance on our leakage requests. With all adjustments combined, we were granted an allowance of only £3.4 million.[2]

16. We have identified that some of the disallowance arises because Ofwat has incorrectly included our DMAAH costs in the unit cost calculation. As we will explain with more detail below, this investment will not deliver benefits in leakage reduction during AMP8 but will provide leakage benefit from AMP9 and beyond. Hence, we consider these costs should be removed from the unit cost benchmarking and assessed separately.

17. We also identified problems with Ofwat's unit cost modelling, which causes some of the disallowance.

18. The next section sets out our responses to Ofwat's position, demonstrating that (i) Ofwat's unit cost calculation is misleading and requires improvement, (ii) we have provided economic and technical evidence to support and justify our cost requests in leakage activities, and (iii) the DMAAH costs need to be funded separately. In addition, we provide evidence that we require additional enhancement funding of £2.5 million to complete uFMZ that was not included in our original enhancement case for leakage.

[1] Ofwat (July 2024), PR24 draft determinations Expenditure allowances, p.99-100.
[2] Ofwat (July 2024), PR24 draft determinations Expenditure allowances, p.99-100, table 24.

D. Our response to Ofwat's Position – Making our Case for a Greater Enhancement Allowance

19. We submit this representation covering all elements of our original enhancement claim of £10.5 million. Of this original claim, £4.2 million of funding was required to deliver the necessary leakage reductions in AMP8, and the balance – £6.3 million – was required to facilitate leakage reductions in future AMPs.

20. This section initially addresses the shortfall in funding assessed by Ofwat in its draft determination against the request of £4.2 million for schemes that will deliver 3Ml/d of leakage reduction in AMP8.

21. We then address the need to still include the allowance for the remaining £6.3 million of funding requested for DMAAH activities that will facilitate the necessary leakage reduction in subsequent AMPs.

22. We offer the following information in response to Ofwat's challenge on unit cost and support our enhancement funding:

    (a) The DMAAH costs should be excluded from the unit cost calculation. Whilst this intervention provides future benefit to leakage reduction (in AMP9 and beyond), it does not provide leakage benefits in AMP8. Instead, these costs need to be funded separately, and we set out evidence for our DMAAH investments.

    (b) Our leakage enhancement allowances are understated due to an imprecise and understated unit cost calculation performed in Ofwat's benchmarking. Specifically, we find that:

        (i) Ofwat has selected only particular years for its unit cost calculation and ignores other factors that could influence a company's leakage level;

        (ii) By relying on achieved reductions in leakage in particular years, Ofwat's unit cost calculation ignores the fact that benefits from investments for reducing leakage can be long-lived; and

        (iii) By using historical data, Ofwat's approach does not recognise that there are diminishing marginal returns to leakage investment, especially for companies already exceeding the SELL, including ourselves.

    (c) The unit rate calculated for us as presented is exaggerated, as it includes our DMAAH costs. Following the removal of DMAAH costs from the leakage unit rate calculation, we set out a case for why we require the funding we have submitted to support future leakage reductions. These measures to reduce leakage will allow us to continue our track record of strong performance in leakage reduction amongst our industry peers, while acknowledging that the marginal cost of leakage reduction will tend to rise as we reach lower levels of leakage.

23. Finally, we also request an additional enhancement funding of £2.5 million required to complete uFMZ that was not included in our original enhancement case for leakage as we were not aware of its requirement in order to achieve compliance at the time of submission.

Unit Costs

Summary of Ofwat's Unit Cost Modelling for Leakage Enhancement

24. Ofwat calculates leakage enhancement allowances for AMP8 using a unit cost model, by multiplying companies' requested leakage reductions, or benefits, by the industry benchmark unit cost. For each company, Ofwat calculates the unit cost of leakage reduction in each year over the historical period from 2019/20 and 2021/22, by dividing

the company's historical expenditure on reducing leakage *in each year* by the achieved change in leakage delivered *each year*.

25. The consequence of Ofwat's approach is that, for some years, when companies spent some money on leakage reduction, but leakage went up, e.g. due to growth of the system putting upward pressure on leakage, weather patterns increasing leakage, or leakage reduction expenditure having only long-lived effects, unit costs are negative. For some companies in some years, Ofwat's unit costs are also extremely high, where companies' leakage reduction expenditure is divided by the achievement of very small reductions in leakage.

26. This results in annual unit cost calculations as shown in Table 2, below, and flags three key issues of concern:

    (a) There is an extremely wide variance in the rates calculated for each company;

    (b) The data set is comparatively limited, and based on Ofwat's decision to select only some of the data, for more than half of the sector comprises only one data point per company; and

    (c) Collectively, these limitations question the appropriateness of the calculation as a representative view on the true costs of leakage reduction.

Table 2: Ofwat Unit Cost Calculation

Company	2017/18 (£m / Ml/d)	2018/19 (£m / Ml/d)	2019/20 (£m / Ml/d)	2020/21 (£m / Ml/d)	2021/22 (£m / Ml/d)	2022/23 (£m / Ml/d)
ANH	6.050	-1.432	1.037	1423.836	3.861	-2.619
HDD		-0.380	0.000	-0.139	0.115	-37.809
NES	0.000	0.000	0.000	0.000	0.296	0.187
NWT	-0.095	-0.995	2.615	0.650	1.496	-1.031
SRN	-0.136	2.926	0.353	-0.481	1.366	-0.184
SVE		0.000	1.016	-2.845	-0.151	0.592
SWB	6.258	-6.350	-1.566	-0.276	0.225	-0.226
TMS	-1.377	13.492	0.838	7.573	-17.093	-3.299
WSH	0.760	0.879	1.764	0.773	0.548	-0.049
WSX	-1.332	1.439	2.827	-3.635	6.728	-1.247
YKY	-1.020	2.209	2.838	-0.319	1.511	113.096
AFW	0.000	-0.161	0.716	-2.092	1.984	2.854
BRL	-1.846	0.376	0.413	0.846	-16.169	-1.044
PRT	-0.033	0.297	0.201	31.049	-0.228	-0.057
SES	0.000	0.000	0.000	-4.823	1.041	-2.581
SEW	2.194	1.748	1.305	-0.482	0.648	-0.684
SSC	-0.060	0.156	0.535	0.467	-2.000	6.234

Note: Figures that Ofwat excluded from its unit cost calculation are shaded in this table.
Source: SES Water calculation.

27. Ofwat deals with this data variability by setting the efficient unit cost benchmark for the industry at £1.11m/Ml/d, based on industry median unit costs in 2019/20 and in 2021/22.

It excludes the observations with negative leakage reductions (i.e. leakage increases). According to Ofwat, it picks these two years as they "avoid distortions in leakage costs and reductions (or potentially increases) from extended hot weather conditions".[3]

Our Unit Cost Position for Leakage Enhancement

28. As set out in Table 1, we submitted a request of £10.5 million of leakage enhancement for 3Ml/d of total benefits over AMP8.

29. In our original enhancement case, we had attempted to set out the true cost of leakage-reduction related interventions that we assessed as required in AMP8 in order to deliver our long-term ambition on leakage reduction. We continue to believe that this approach was sound in order to provide transparency of our no-regret interventions needed to deliver our core LTDS pathway.

30. Upon review, we have identified that Ofwat included our DMAAH costs in its AMP8 leakage reduction unit cost calculation. We now put forward a case for the removal of our DMAAH costs from our unit cost of leakage reduction. We now recognise that its inclusion alongside leakage interventions in the Leakage and Network Resilience Enhancement Case may have led to confusion as to its relevance to leakage reduction in AMP8. To provide clarification, we therefore request that Ofwat remove the £6.3m for DMAAH activities from the leakage cost per Ml/d calculation.

31. Table 3 below shows that doing this reduces our unit cost from £3.5m/Ml/d to £1.4m/Ml/d. This puts us much closer to the industry benchmark of £1.11m/Ml/d. As described in our original enhancement case and explained in the section DMAAH costs, there are legitimate reasons why our unit costs are slightly higher than the rest of the industry.

Table 3: SES Water's AMP8 Leakage Unit Cost, Submitted and Revised

	Cost (£m)	Benefits (Ml/d)	Cost per Ml (£/Ml)
Intervention 4 – DMAAH Excluded (revised)	4.2	3	1.4
Intervention 4 – DMAAH Included (as submitted)	10.5	3	3.5

Source: SES Water calculation.

32. Once the DMAAH costs of £6.3 million are removed, our AMP8 unit cost for leakage reduction becomes £1.4m/Ml/d. This unit cost is still marginally higher than the benchmark calculated by Ofwat, resulting in a disallowance of approximately £0.83 million, after applying Ofwat's benchmark unit cost.[4]

Unit Cost Calculations Disproportionately Impacts Cost Disallowance

33. Ofwat's approach to calculating an industry benchmark unit cost for setting future leakage enhancement allowances, described above, is misleading for a number of reasons, and understates our efficient costs of leakage reduction over AMP8.

34. First, Ofwat's approach to addressing data variability involves what appears to be a form of "cherry-picking" particular years for its unit cost calculation and ignores other factors that could influence a company's leakage level. Its justification for this approach is controlling for atypical weather conditions, and these years may have exhibited unusual conditions. Weather conditions vary in all years, so it would be more accurate, and

[3] Ofwat (July 2024) PR24 draft determinations Expenditure allowances, p.100. Detailed unit cost calculations are included in Ofwat's leakage enhancement feeder model.
[4] Once DMAAH costs are removed from the unit cost calculation for separate funding, our request of £4.16m on 3 Ml/d of benefits feeds into the unit cost model. Applying Ofwat's benchmark of £1.11m/Ml/d would provide an allowance of £3.33m, or a disallowance of £0.83m.

require less subjective judgment on what does or doesn't constitute a typical year, to use the whole dataset.

35. One way to make better use of the outturn data to set the benchmark would be to divide each company's total leakage enhancement expenditure, by the *detrended* reduction in leakage achieved over the period, instead of simply picking two years. To illustrate how this could be done, we tested a trend analysis using available data over a five-year period from 2018/19 to 2022/23. For each company, we estimate the leakage trend by regressing it (in log terms) on a time trend variable. We use this estimate to calculate the trend reduction in leakage over the period from 2018/19 to 2022/23, as shown in the table below.

Table 4: Alternative Trend Analysis on Historical Data

Company	Total expenditure on reducing leakage over the period, £m	Trend leakage reduction over the period, Ml/d	Unit expenditure per leakage reduction, £m/Ml/d
ANH	79.99	10.42	7.68
HDD	13.46	0.25	54.06
NES	6.51	24.83	0.26
NWT	57.37	38.94	1.47
SRN	9.79	-6.21	-1.58
SVE	50.54	-7.65	-6.60
SWB	29.62	0.08	362.34
TMS	283.43	53.75	5.27
WSH	14.53	-53.11	-0.27
WSX	57.84	-4.48	-12.92
YKY	107.88	0.49	221.36
AFW	77.86	38.42	2.03
BRL	9.39	2.30	4.07
PRT	4.70	-4.31	-1.09
SES	11.42	2.22	5.13
SEW	14.23	-12.65	-1.13
SSC	12.60	4.66	2.70
Industry median			2.03

Source: SES Water calculation

36. The table shows that, across all companies, we obtain a median unit cost of around £2m/Ml/d, which is higher than our enhancement unit cost programme after the originally included DMAAH costs are removed.

37. An additional problem arises from the use of unit costs calculated using individual years to calculate companies' historical unit costs. For all companies, even in normal weather years, leakage may vary, rising and falling for reasons unrelated to companies' own performance or expenditure. Hence, companies' efforts to reduce leakage will not necessarily be realised immediately when costs on leakage enhancement are incurred but are likely to have long-lived effects.

38. We find evidence of this in the outturn leakage level and associated expenditure data from the company APRs,[5] as shown in Table 5, below.

Table 5: Examples of Reduction Expenditures and Total Leakage Level

	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	Total
Anglian Water							
Reduction expenditure, £m	10.54	10.40	7.78	12.06	29.33	20.42	**90.5**
Total leakage, Ml/d	182.66	191.24	182.39	182.38	173.41	182.61	**-0.05**
Northumbrian Water							
Reduction expenditure, £m	0.00	0.00	0.00	0.00	4.08	2.43	**6.51**
Total leakage, Ml/d	203.21	200.44	198.05	206.02	189.76	174.43	**-28.78**

Source: SES Water analysis on Ofwat Leakage Enhancement model.

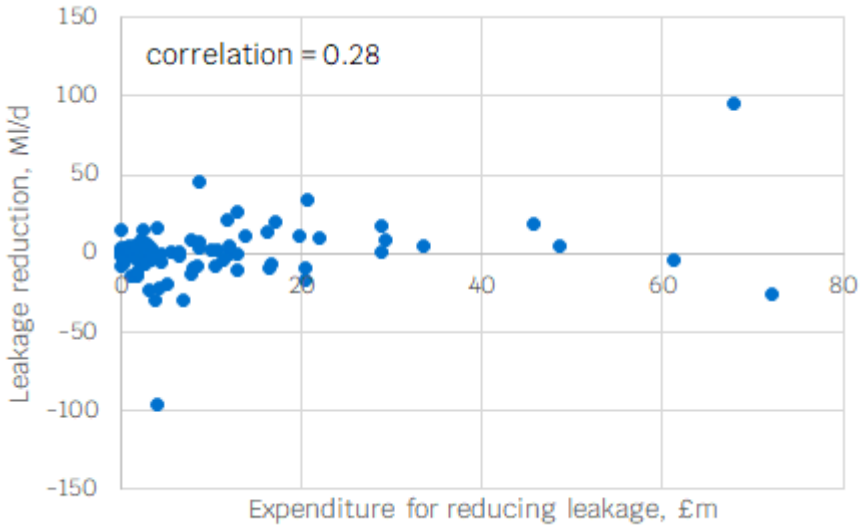
39. The table shows that Anglian Water spent £90.5 million on leakage reduction from 2017/18 to 2022/23, but its net decrease in leakage over the years was only 0.05Ml/d. On the other hand, some companies spent very little on leakage reduction, but managed to improve their leakage by a significant amount over the same period, potentially benefitting from previous leakage improvement investment. For example, Northumbrian Water, which has a similar distribution input level to Anglian Water, has spent only £6.5m but reduced its leakage level by 29Ml/d over the years.

40. It is also evident from the table that sometimes investment in reducing leakage in a particular year does not necessarily contribute to leakage reduction in that year, as reflected in Anglian Water data in 2022/23 where the company spent £20.4 million, but its total leakage level increased from 173.4Ml/d to 182.6Ml/d. These examples show how Ofwat's unit cost calculation, relying on achieved reductions in leakage in particular years, ignores the fact that benefits from investments for reducing leakage can be long-lived.

41. We see a similar pattern when we compare historical, annual leakage reduction with historical, annual leakage enhancement expenditure. The scatter plot in the figure below illustrates the weak correlation between annual expenditure and annual leakage reduction.

[5] Ofwat (July 2024) PR24 draft determinations Water – Leakage: enhancement expenditure model, tab "Lkg APR Data Real".

Figure 1: Relationship between Leakage Reduction and Expenditure Aimed at Reducing Leakage



Source: SES Water analysis

42. Using the leakage reduction trend analysis approach outlined above helps to address this issue, but only to a limited extent, as leakage reduction expenditures may only have real effect over decades, and may not be visible over relatively short periods, e.g. the period from 2018/19 to 2022/23 used by Ofwat.

Ofwat's Historical Unit Cost Calculation Is Likely Biased Downwards

43. A further problem with Ofwat's calculation arises from the inconsistency between how the benchmark unit cost is estimated, and how it is applied.

44. Ofwat provides funding for leakage reduction enhancement expenditure, the unit cost of which is determined (as calculated by Ofwat in its Leakage Enhancement feeder model) by expected enhancement expenditure, divided by the expected effect of this reduction expenditure. This concept compares the costs of leakage reduction programmes with their *incremental impact*.

45. Ofwat applies a different approach to calculate the historical cost benchmark used to set allowances for these programmes, which compares leakage enhancement costs to outturn leakage reduction for the business as a whole. This is conceptually very different from how companies report the costs and impact of their leakage reduction enhancement expenditure proposals for AMP8. The historical calculation used for the benchmark takes a consistent measure of cost in the numerator (i.e. leakage enhancement costs), but a different denominator (i.e. overall outturn leakage reduction), which conflates both the incremental effects of leakage enhancement, and the changes in leakage that would have occurred anyway.

46. Therefore, if leakage (as measured in Ml/d) would trend upwards for most companies, e.g. due to the effects of growth, then Ofwat's unit cost calculation is likely biased downward, as the denominator in the historical benchmark unit cost understates the effects of companies' leakage enhancement programmes.

47. This problem cannot easily be solved using the historical data available to Ofwat, as it does not provide a clean estimate of how the effect of companies' leakage enhancement activities, as compared to a counterfactual in which this expenditure did not take place. Outturn leakage conflates underlying, upward pressure on leakage, companies' efforts to reduce leakage, and random variation in leakage, e.g. due to the weather.

48. Therefore, historical unit costs over a short period provide a severely limited indication of the future efficient costs of reducing leakage. Instead, Ofwat might want to consider alternative approaches to assessing companies' leakage enhancement costs using forecast data. We discuss alternative options at the end of this subsection.

By Already Exceeding SELL, Our Leakage Cost Estimates Are Reasonable

49. As leakage reduction increases, an extra pound spent on leakage reduction will tend to lead to a lower reduction in leakage (i.e. there are decreasing returns to scale). As we have been operating well below the SELL, as discussed in the independent review[6] of our leakage costs, further leakage reduction will require us to incur higher per unit costs of improvement. We would expect other companies to face similar cost pressures, once the equivalent level of leakage is reached, which further shows the importance of using forward-looking data to assess companies' leakage enhancement cost requests.

50. In our enhancement case we have set out our drivers for the requested investment and, in doing so put forward our case for the funding we believe that we need to meet our ambitious leakage reduction targets in AMP8 and beyond. At £1.39m/Ml/d – comprising enhanced active leakage control, advanced adoption and utilisation of our smart supply network and ongoing network optimisation and pressure management – we believe this offers good value for our customers, given our already low leakage level, relative to the rest of the sector.

51. We provide evidence in the form of an independent review[7] of our leakage costs. This work has highlighted that we are operating well below our SELL level.[8] This is important, because it means that, relative to other water companies who are operating closer to their SELL, our costs to deliver further reductions are higher.

52. Our ALC costs are based on the SELL method set out in the 'Marginal Cost of Water (MCW) approach as defined in the Tripartite Report'. This is applied for us by Artesia Consulting. The approach calculates the reduction of annual average leakage that is needed to meet targets. Our method then calculates the costs needed each year to deliver the additional leak repairs (on top of base) to drive leakage down. The transitional cost that this generates also considers the reducing leakage benefit obtainable as we approach the minimum achievable leakage (MAbL) value. This explains why our unit cost for this intervention is at £2m/Ml/d and is above the industry benchmark.

53. We point to our strong performance in leakage in AMP7 as both evidence that our strategy is working but also is acting to limit our opportunities to drive leakage reduction through traditional means alone in future AMPs. Put simply, we have already exhausted many of the less expensive leakage reduction interventions.

54. This concept of 'expensive continuation' or 'diminishing returns' of interventions is explored in the work conducted by Water UK in 2022[9]. In the context of adaptive pathways, it means that it becomes disproportionately more expensive to continue to reduce leakage using the same intervention type once all of the low hanging fruit is picked off. Companies are required to adapt their strategies and intervention types to move to more appropriate options that offer best value to customers whilst still delivering leakage reductions. We have experienced this and during AMP7 have transitioned away from an increasingly expensive traditional approach to leakage reduction (ALC), to

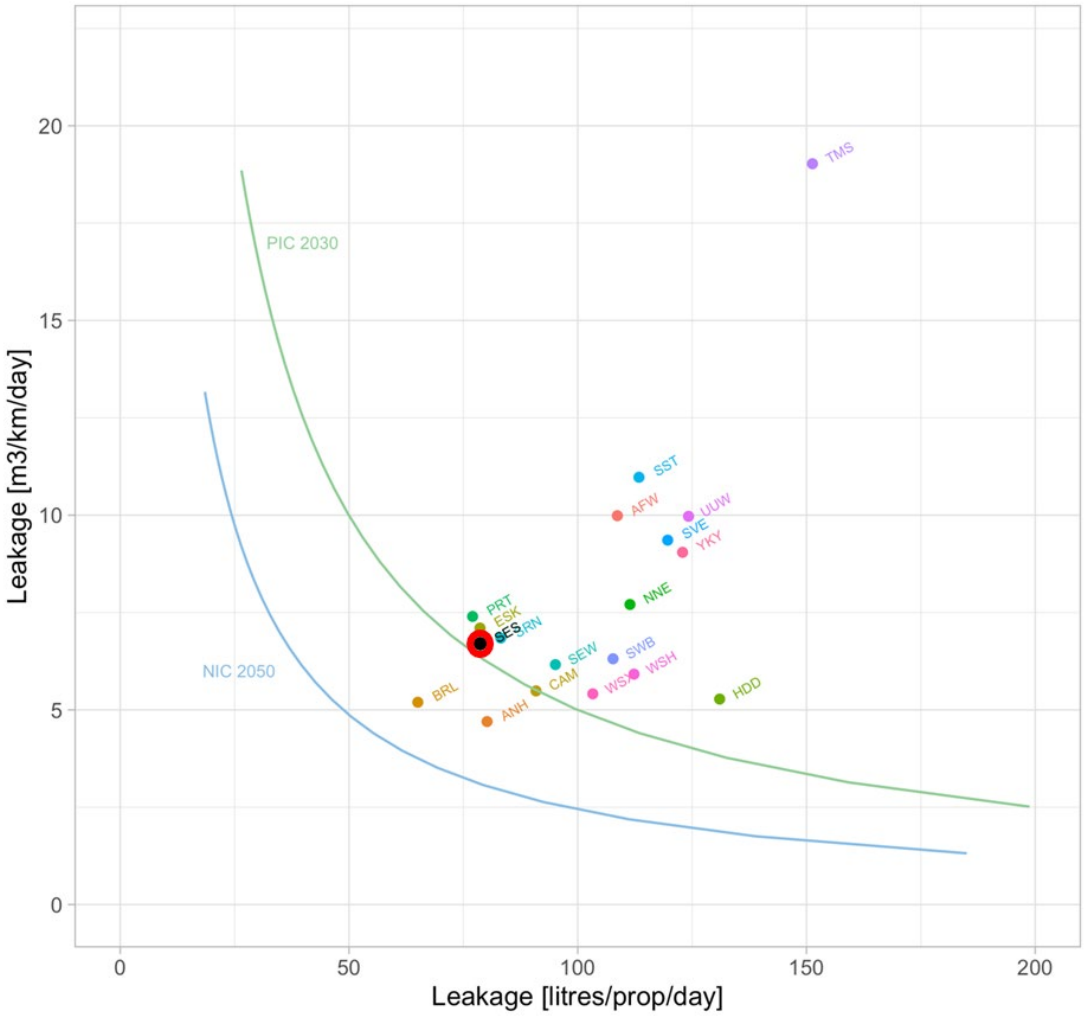
[6] Artesia Consulting (27 October 2023), SES Water Sustainable economic level of leakage analysis for baseline WRMP24 forecast, p.15.
[7] Artesia Consulting (27 October 2023), SES Water Sustainable economic level of leakage analysis for baseline WRMP24 forecast, p.15.
[8] The average level of leakage during 2021/22 was 21.1 Ml/d, lying significantly below the economic SELL range from 26.8 to 36.3 Ml/d. Source: Artesia Consulting (27 October 2023), SES Water Sustainable economic level of leakage analysis for baseline WRMP24 forecast, p.15.
[9] A Leakage Routemap to 2050, Water UK, 17 March 2022

adopting more innovative approaches such as our smart supply network approach to reducing leak runtime.

55. Following great success with the first phase of our smart supply network (iDMA), including full network roll out and 'business as usual' adoption by our operational teams, we now seek funding to embark on a second phase of works targeting the 'location' element of our Prevent, Aware, Locate & Mend (PALM) strategy. The £1.1 million enhancement funding being sought for this phase of our smart supply network (as shown in Table 1), has a unit cost of £2.2m/Ml/d. We make the point that whilst this is higher than Ofwat's benchmark. It is perfectly logical for it to be so, given that it is at the cutting edge of innovation and not yet benefiting from the economies of scale of technologies that have seen mass adoption in the industry yet.

56. As further evidence of relative performance to the industry, when we consider the PR24 base year of 2021/22, we are upper quartile performers in the industry for leakage when expressed in l/prop/day, percentage of distribution input and using a combined leakage indicator. More details can be found in Chapter 2 of the Artesia report, and we replicate the illustration below, which shows we are ranked fourth when we consider the combined leakage indicator.[10]

Figure 2: Benchmarking of our level of leakage in 2021/22 against other companies



[10] Artesia Consulting (27 October 2023), SES Water Sustainable economic level of leakage analysis for baseline WRMP24 forecast, p.3.

Source: Artesia report, set against public interest commitment (PIC) and Nation Infrastructure Commission (NIC) target for 2030 and 2050 respectively

57. We also draw attention to the fact that in our plan we will deliver up to 0.5Ml/d leakage reduction benefit through base, demonstrating our commitment to continuous improvement and efficiency. Furthermore, we have included all leakage transitional costs incurred in AMP7 as base in our AMP8 modelled costs. Examples of such costs include:

    (a) Ongoing costs to run our smart network – including software costs, sensor maintenance and replacement and resourcing costs.

    (b) Satellite Leakage Surveys – Following successful trials in AMP7 we are now planning to deliver this activity entirely through base in AMP8.

    (c) Newly installed Pressure Management Schemes – All maintenance of schemes delivered in AMP7 will be delivered through base In AMP8.

58. We therefore maintain that all enhancement expenditure that is sought meets the stipulated requirements for enhancement.

Our proposed approach

59. As discussed above, relying on historical unit costs over a short period, as Ofwat has done in its assessment of leakage enhancement costs, provides a severely limited indication of the future, efficient costs of reducing leakage. By considering outturn data only, Ofwat has ignored that other factors other than enhancement expenditure could influence a company's leakage level and that leakage reduction becomes harder as leakage falls.

60. Therefore, we suggest Ofwat considers assessing companies' leakage enhancement costs using forecast data. We have developed two alternative approaches that Ofwat might want to consider:

    (a) Option 1: Cost benchmarking using companies' business plan submissions.

    (b) Option 2: Technical assessment of companies' leakage cost by individual activity.

61. Option 1 would involve calculating the leakage enhancement unit costs across the industry using companies' business plan submissions, and selecting an industry benchmark, similar to the current approach but relying on forward-looking data. We have performed a preliminary analysis using the data available and calculated an industry median unit cost at £3.62m/Ml/d (for our costs, we have removed DMAAH costs. See further details in subsection "DMA Asset Health Costs" below), which is much higher than the current target at £1.11m/Ml/d and provides uplifts in allowances for some of the companies.

62. Alternatively, Ofwat could select the lower of company forecast unit costs and the industry median unit cost to set the allowances.

63. However, we still observe large variation in unit cost across different companies. It is very unlikely that all these differences across companies are solely attributed to differences in efficiency, and rather reflect differences in their investment cycles, asset condition, regional topography, position relative to the SELL, and so forth, suggesting that the benchmarking method might not be suitable for setting future leakage enhancement allowances.

    Therefore, we consider option 2 may be more appropriate. In this case, Ofwat would need to perform a technical assessment of leakage enhancement proposals from the companies, and provide allowances based on its assessment of whether the companies' costs are justified.

DMA Asset Health Costs (seeking £6.3 million investment in AMP8)

64. We propose that Ofwat consider our DMAAH activities separately from the balance of our enhancement case for leakage reduction. This is due to the fact that these DMAAH activities do not give rise to leakage reduction within the AMP that they are expended, but instead inform material aspects of the interventions that should take place in the subsequent AMP – thereby acting as enablers to future leakage reduction.

65. A direct result of this is that Ofwat's modelling of leakage reduction unit costs in AMP8 would assess a significant proportion of our original enhancement claim as not deriving an in-AMP leakage benefit, therefore materially increasing the calculated unit cost.

66. Removing our DMAAH costs reduces the enhancement claim from £10.5 million to £4.2 million, and our unit costs of interventions delivering leakage benefits within the AMP to £1.4m/Ml/d. As set out within the preceding section, and for the reasons given, this unit rate is well within the level that could be assessed as efficient from an industry standpoint.

67. This section addresses the issue associated with how the benefits of the DMAAH element of our original enhancement claim should be assessed. To achieve this, the relationship between the enablers and the interventions within our multi-AMP leakage reduction strategy must be understood.

68. DMAAH activities provides crucial insights into the operation and health of our network and highlights opportunities to make specific network interventions - primarily network optimisation including pressure management (PM) and secondarily to help inform aspects of intelligent network (iDMA) and enhanced active leakage control (ALC) implementation – along with targeted asset (mains) renewal to deliver a range of benefits, primarily leakage reduction.

69. DMAAH and our iDMA activities were commenced as small-scale proof of concepts at the end of AMP6, and rapidly scaled up in AMP7. Both have become award-winning and are now key to the delivery of a range of outcomes for our customers including resilient and high-quality water supply, reduction of wastage and strong environmental stewardship. These activities are deemed an essential part of our LTDS core pathway.

70. By the end of the current AMP, both initiatives will be part-completed, and additional investment required to fully implement. As set out in our original enhancement claim (Appendix SES008) submitted as part of our Business Plan, we envisage seeking enhancement funding for aspects of these works in subsequent AMPs.

71. To date, our DMAAH work has comprised surveys and assessments in around 30 DMAs at the end of AMP6, and the same in around 150 DMAs (collectively, roughly 50% of our DMAs), with a third of these surveys now converted into intervention recommendation reports. DMAs are prioritised for assessment broadly on the basis of perceived opportunity to improve the range of parameters that collectively comprise network resilience, including but not limited to leakage reduction.

72. Our AMP6 work has enabled a range of interventions within the current AMP in the form of network optimisation and pressure management, to help deliver our AMP7 leakage target, for which we remain on-track to achieve, along with supply interruptions and mitigate the challenges posed by weather throughout AMP7 impacting the level of mains repairs we undertake. In all three of these areas, we remain upper quartile performers in the industry. In addition, this work has enabled us to better target our priority mains replacement programme (funded via base expenditure). Our work has confirmed improved targeting of mains requiring priority replacement in excess of 25% compared to conventional methods of prioritisation.

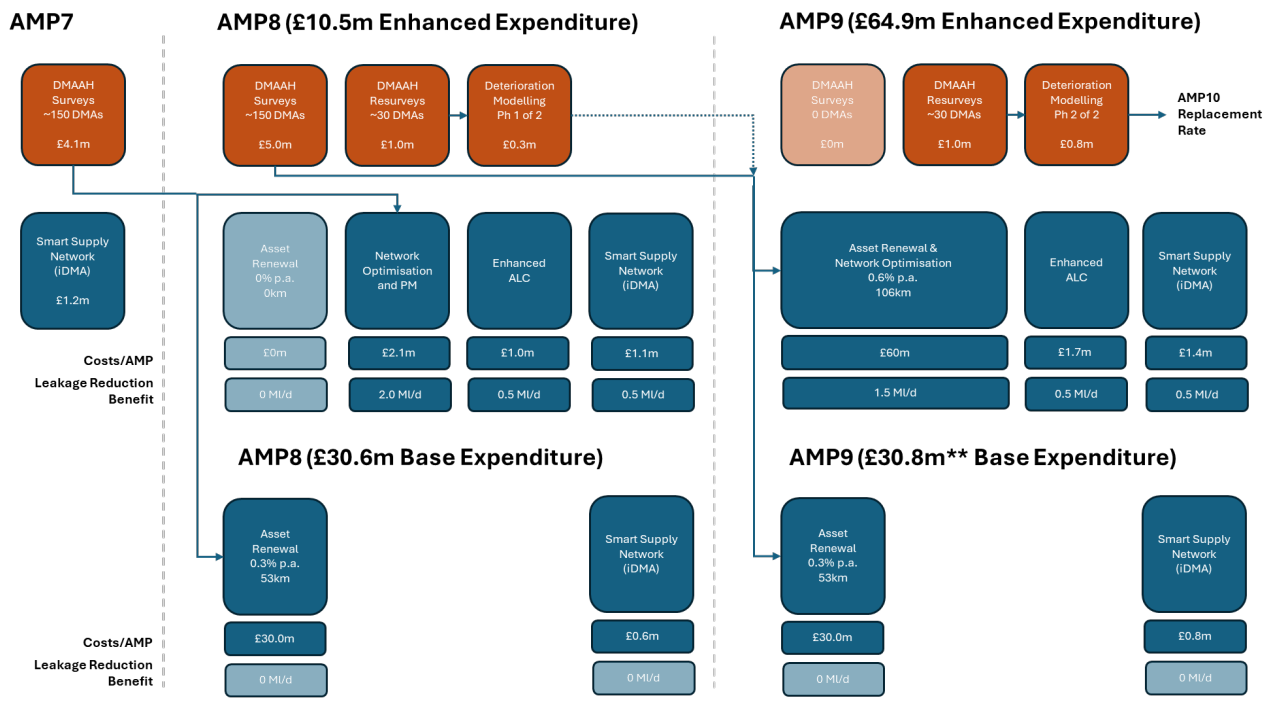
73. Similarly, DMAAH work carried out in the current AMP informs the shape of our AMP8 interventions on network optimisation, pressure management and our proposed mains

replacement programme. This process will be repeated for AMP8, with subsequent interventions conducted in AMP9. Unlike DMAAH, our iDMA work is more of a direct intervention, with benefits being generated at the time it is introduced to the business.

74. Figure 3, below, looks to summarise these relationships, commencing with our DMAAH work conducted in AMP7 informing both the leakage reduction interventions of network optimisation and pressure management in AMP7, along with the prioritisation of asset (mains) renewal in the same timeframe.

75. DMAAH interventions are shown by AMP across the top (in orange) and the resultant leakage reduction activities they subsequently give rise to shown below (in blue). All activities funded though enhancement expenditure associated with leakage are shown, along with an element of (relevant) activities funded through base expenditure. The figure excludes activities associated with customer side leakage (CSL), as this is now accounted for separately in our smart metering representation (Appendix SES107), and for simplicity, does not depict the secondary benefits of DMAAH survey work summarised above.

Figure 3 - Leakage Reduction Strategy AMP8 and AMP9 (excluding customer-side leakage – CSL)



Source: SES Water Analysis

76. A number of important points are highlighted by this figure. First with respect to AMP8:

(a) Our Investment in DMAAH survey work in AMP7 (£4.1 million) derives both leakage reduction benefit in AMP8 and better targeting mains (asset) renewal work. The exact cost/benefit analysis associated with each output continues to be assessed by us but assigning (for illustrative purposes) a nominal 50/50 split would result in an indicative leakage unit cost, albeit not aligned with Ofwat's current modelling, calculated over two adjacent AMPs of around £2.0m/Ml/d and demonstrate tangible savings in the net cost of asset renewal compared to traditional methods.

(b) For DMAAH activities we request total funding of £6.3 million. This investment is split as follows:

(i) £5 million to complete our full DMAAH survey and assessment work in the remaining DMAs in our network, including all trunk main areas

(ii) £1 million for retesting to establish an updated condition assessment in 10% of the network (~30 DMAs), and

(iii) £0.3 million to conduct analysis and build a deterioration curve model to help us predict and prevent future asset failure.

Secondly, with respect to AMP9:

(c) Due to the increased size (and therefore reach) of the asset renewal programme (proposed to include both base and significant enhancement expenditure) the network optimisation interventions are considered to be contained within this work. By AMP9, it is predicted that additional pressure management interventions are exhausted.

(d) Leakage reduction unit rates, if based on asset renewal funded via enhancement expenditure, would create a highly misleading figure, being £40 million in this case. It is important to note that this work is being undertaken for two reasons: firstly to improve network resilience in a cost-effective way within the AMP and secondly, to balance the inevitable cost and inconvenience of mains replacement across multiple generations.

(e) If the costs of AMP8 DMAAH survey work were to be applied to AMP9 interventions, at a time where leakage reduction unit costs would be expected to increase further (to £3.1m/Ml/d on average), the costs of this final tranche of DMAAH surveys (£5.0 million) would easily be absorbed in a far larger targeted asset renewal activity and still generate a material net efficiency in programme delivery compared to traditional methods.

(f) DMAAH resurvey costs (£1.0 million) and the first of two phases of asset deterioration modelling (£0.3 million) conducted in AMP8, designed ultimately to calculate the optimal speed of asset renewal to balance network resilience, cost and therefore intergenerational fairness), will begin to influence the asset renewal rate in this AMP. This is of fundamental importance as the sheer scale of cost associated with renewal of the network has a massive impact on totex and hence customer bills, coupled with the fact that current industry replacement rates are based primarily on theory. By the end of phase two of this work at the end of AMP9, it will be capable of fully informing future optimal asset renewal rates.

77. In addition to the benefits summarised above relating to leakage reduction and improved operational efficiency, the ongoing delivery of this work generates a range of wider benefits, including:

(a) Contribution to ongoing reductions in common performance commitments including mains repairs, supply interruptions, customer contacts about water quality, PCC, pollution incidents and operational greenhouse gas emissions and improvements in C-MeX, D-MeX and BR-MeX.

(b) We are committed to using this data to improve our own knowledge of our asset health and this forms a major part of our asset management improvement plan in response to Ofwat's asset management maturity assessment (AMMA).

(c) We have also committed to continuing to share the outputs of our work with the industry and propose to do so through industry groups and forums, including the Ofwat-led Operational Resilience Group.

78. Our ability to continue our DMAAH work – and the interventions it informs – is vital to controlling future leakage reduction and asset renewal costs in AMP9 and beyond. So too will it help facilitate ongoing upper-quartile performance in network resilience – measured

across a number of common PCs. Beyond this, we are clear that a broader benefit is generated across almost all common PCs.

Having also generated significant external interest as a result of this work and our ongoing commitment to share our findings transparently across the sector, we believe it is essential that this work be correctly funded through AMP8 and beyond.

Additional Enhancement Funding Required for Upstream Flow Monitoring Zones (uFMZ) Creation in AMP8

79. In its draft determinations[11], Ofwat stated when referring to the estimation of leakage outside of DMAs "that the use of the background and bursts estimates (BABE) approach should be phased out by PR29". We have interpreted this as a clear direction from Ofwat to move towards the use of uFMZs for the quantification of leakage on trunk mains and upstream of DMAs by the end of AMP8.

80. Whilst as a business we had already recognised the need to transition away to uFMZ, we were awaiting further instruction from Ofwat before seeking funding. We had already acknowledged the need to transition towards a uFMZ approach to trunk main leakage quantification in AMP8 but had been working towards completion at the end of AMP9. As a result, we had only included schemes in AMP8 where we knew we had existing infrastructure, where we had approved AMP7 funding as part of our PR19 FD, or where other projects were already funding the infrastructure (for example our iDMA project which already targeted some of the same meters for the benefit of smart network coverage).

81. As set out in table CW19 lines 40-42, we had planned to commission FMZs to cover 55% of our supply zone in AMP8. For the reasons given above we did not seek any additional enhancement funding in our PR24.

82. In light of the need to expedite this work, we have identified the requirement to install 49 new electromagnetic flow meters at strategic points in our upstream network. These meters will enable us to create compliant trunk main flow balances and move away from the current BABE approach. The meters will be installed in a phased approach throughout AMP8 to ensure that we meet Ofwat's expected level of compliance (100% coverage) by the end of AMP8.

83. We request enhancement funding of £2.5 million to complete these works (CW3.136) The table below shows how we have arrived at summarises the composition of this figure. In producing these cost estimates we have used rates acquired from recent procurement exercises for similar meter installation works. As a result, we have a high confidence that the cost build-up reflects the actual cost to deliver this work over the next five years. The meters need to be installed on large diameter mains, often in difficult to reach locations and sometimes at considerable depth below the ground. These engineering complexities have been factored into our costings.

84. We have classified our meters as 'inline' or 'bypass', reflecting the complexity of the installation and the need to maintain supplies to our customers without detrimental impact to other performance commitments.

[11] Ofwat (July 2024 Draft Determinations – Delivering outcomes for customers and the environment p.88

Table 6: Meter Installation costs in AMP8 (uFMZ Project)

	Number of meters	Average Cost per meter (£k)	Total Cost (£m)
New Meter Installations – Inline meters	35	35	1.3
New Meter Installations – Bypass Configuration	14	90	1.2
All New Meter Installations	**49**	**63**	**2.5**

Source: SES Water calculation.

85. We ask Ofwat to recognise that this expenditure should be considered separately from and not be considered in our unit cost to reduce leakage. as this funding is for compliance only and do not lead directly to any leakage reduction benefits in our AMP8 plan.

    We did not include this request for funding in our original enhancement case for leakage as we were not aware of its requirement in order to achieve compliance at the time of submission.

E. Conclusions

86. In AMP7 we have proved that we can be trusted to invest well in a robust strategy that drives down leakage. Our smart network is a prime example of such investment, where we followed our plan, saw it through to a natural (end of phase) conclusion and demonstrated through our leakage reduction glidepath and in our response to shock weather events how our smart network could help us to follow through on our promises to customers on leakage.

87. This appendix has set out three specific representations totalling of £13.0m enhancement funding. We are concerned that Ofwat's draft determinations have disallowed £7.1 million of our initially requested investment for leakage reduction, and as such, this appendix makes three key representations:

    (a) Ofwat's unit cost calculation is misleading and requires improvement;

    (b) DMAAH costs need to be funded separately;

    collectively totalling £10.5m of this representation, the value of our original enhancement case submitted as part of the Business Plan, and

    (c) Additional enhancement funding of £2.5 million to complete uFMZ, not included in our original enhancement case for leakage, and now deemed required by virtue of Ofwat's direction provided in its drat determination.

88. We have identified that some of the disallowance arises because the draft determination has inappropriately included our DMAAH costs in the unit cost calculation. These costs should be excluded from the unit cost calculation as, while this intervention provides future benefit to leakage reduction (in AMP9 and beyond), it does not provide leakage benefits in AMP8. Therefore, these costs need to be funded separately, and we have provided evidence for our DMAAH costs.

89. In the alternative, by apportioning an element (50%, by way of example) of our AMP7 DMAAH costs to AMP8 leakage reduction unit costs – even though this does not align with the way Ofwat have currently chosen to calculate leakage unit costs – our AMP8 unit cost would be £2.0m/Ml/d.

90. Even after the removal of our DMAAH costs from the unit cost calculation, we have provided evidence that our leakage enhancement allowances are understated due to an imprecise and understated unit cost calculation performed in Ofwat's benchmarking. Ofwat appears to be "cherry-picking" particular years for its unit cost calculation, ignoring other factors that could influence a company's leakage level, and assuming that investments for reducing leakage will produce immediate and short-lived benefits. In addition, the use of historical data does not recognise that there are diminishing marginal returns to leakage investment, especially for companies already exceeding the SELL, like us.

91. Therefore, we suggest Ofwat considers assessing companies' leakage enhancement costs using forecast data. We have developed two alternative approaches that Ofwat might want to consider:

    (a) Option 1: It requires Ofwat to calculate the leakage enhancement unit costs across the industry using companies' business plan submissions, and select an industry benchmark, similar to its current approach but relying on forward-looking data. We have performed a preliminary analysis using the data available and calculated an industry median unit cost at £3.62m/Ml/d (we have removed DMAAH costs), which is much higher than the current target at £1.11m/Ml/d and provides uplifts in allowances for some of the companies;

    (b) Option 2: Because there is still large variation in unit cost across different companies, a more appropriate solution would be for Ofwat to perform a technical assessment of

leakage enhancement proposals from the companies, and provide allowances based on its assessment of whether the companies' costs are justified.

92. Our DMAAH work is leading-edge and providing benefits across multiple aspects of network resilience, informing both our current and future interventions and proving the capability to help the industry do the same. It is therefore vital that funding is provided for to allow us to continue this work.

93. Finally, we also request an additional enhancement funding of £2.5 million required to complete upstream flow monitoring zones (uFMZ) that was not included in our original enhancement case for leakage as we were not aware of its requirement in order to achieve compliance at the time of submission. Following the publication of the draft determinations, we see clear direction from Ofwat to move towards the use of uFMZs for the quantification of leakage on trunk mains and upstream of DMAs.