PR24

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CLIMATE CHANGE PROCESS ENHANCEMENTS SUPPLEMENTARY INFORMATION

NES24A

1. INTRODUCTION

1. In the draft determination, Ofwat makes a 63% reduction to our costs for **climate change process enhancements** through a deep dive in the PR24-DD-W-Resilience model[1].

2. This challenge was in two parts: firstly, Ofwat removed £31.43m (23%) from our enhancement case as they concluded there was only limited evidence that backwash upgrades were linked to climate change, and that these were base maintenance activities. We acknowledge that we could have provided more evidence on this. In section 2, we provide further evidence to demonstrate more comprehensively that the enhancement funding request is directly linked to climate change. We also challenged ourselves to test if any of this investment should be done as part of base maintenance (for example, if equivalent replacements would have been needed anyway).

3. Secondly, Ofwat removed £32.26m (40%) from our enhancement case, raising minor concerns about the optioneering process and significant concerns about cost efficiency.

4. In our main response, we note that this 40% is applied in a different way to other enhancement cases. Where Ofwat has raised concerns in other areas, they have removed the percentage from the value of the case (i.e. a 40% challenge on costs). Here, Ofwat has removed 23% from the total first and *then* applied a reduction of 40% of the original total. This means that of the remaining £61.8m of the business case that is considered for hypochlorite and slow sand filters, the efficiency challenge actually becomes 52.2% (£32.26m challenge on the residual of £61.80m). There seems to be no reason to treat this differently to other investment areas, and so we think Ofwat has done this inadvertently as their text describes a different treatment.

5. We accept that our enhancement case could have done more to demonstrate and explain the evidence on optioneering and cost efficiency. In sections 3 and 4, we seek to explain the evidence in our case in a better way and provide more evidence.

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[1] PR24-DD-W-Resilience, sheet NES Climate Resilience

2. NEED FOR ENHANCEMENT INVESTMENT

6. We are pleased that Ofwat understood and accepted our evidence for a good correlation between climate change related rising temperatures and their impact on sodium hypochlorite storage and slow sand filter deterioration. However, Ofwat raised some concerns that our backwash upgrades could be entirely base maintenance. They said:

> "The company provides modelling data showing a good correlation between climate change related rising temperatures and their impacts on sodium hypochlorite storage and slow sand filter deterioration.
>
> However, there is only limited evidence provided for the backwash upgrades and why these are not completed via usual base maintenance activities. For backwash upgrades we conclude these activities are entirely base maintenance. All backwash upgrade costs (£31.43m) are excluded out of this enhancement case as base maintenance activity."[2]

7. Our proposed investments for RGF backwash enhancements are not base maintenance activities – because we included only the scope of work which provided resilience to climate change and the impact on rising temperatures in our enhancement case. We specifically excluded other elements that could be considered replacement of existing assets.

8. In Section 2.1, we show why climate change means that greater capacity is required. We refer to our enhancement case, but also provide more explanation and evidence to demonstrate that this is clearly linked to climate change.

9. In Section 2.2, we show how we assessed the elements of this investment that would be base maintenance activities and excluded these from our enhancement case already. We included only the scope of work needed to provide resilience to climate change.

2.1. DEMONSTRATING THAT CLIMATE CHANGE REQUIRES GREATER CAPACITY

10. We provided evidence in Section 2.6 of NES24 to show the impact of climate change on the need for filter backwash capacity.

11. We explained that many of our water treatment works use rapid gravity filters (RGFs) as a key barrier to prevent pathogens and other organisms, suspended matter, and turbidity from entering the treated water. Rapid gravity filters consist of a bed of granular material such as sand or alternative materials such as activated carbon or expanded clays. Flow through them is generally vertical and gravity driven.

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[2] PR24-DD-W-Resilience, NES Climate Resilience worksheet

12. Since this filtering process happens continuously, these filters must be "backwashed" regularly to remove these obstructions. If we do not do this, the filters become clogged, as it becomes clogged the flow that can pass through it is reduced. If multiple filters are in this condition at the same time, the treatment works cannot produce its required output.

13. We can "backwash" a filter by reversing the flow of water through the filter above a "minimum fluidisation velocity". This aims to suspend the filter grains in water, so that the clogging particles can be removed. The minimum fluidisation velocity is specific to the type of filter media used and is the velocity where the up-flow forces just counter the gravity forces. Increasing the velocity beyond this will cause the bed to expand.

14. In order for backwashing to be effective, it requires the "media bed" (that is, the layers of particles which filter out the unwanted pathogens, suspended matter and turbidity) to be effectively expanded by about 10-15% by washing this with water. This is achieved by increasing the velocity of the backwash above the minimum fluidization velocity – flows above this rate cause the expansion.

15. The key issue from climate change is the viscosity of water. Water viscosity reduces as temperature increases. Temperature related climate change is impacting on filter bed washing as the systems were not designed to cope with this reduced viscosity. As raw water temperatures increase, viscosity reduces and more water needs to be used, at higher velocities. This is because greater flow is required to exert sufficient force on the surfaces of the media grains. The increase in temperature is outside of management control and asset enhancements are required to mitigate this climate change induced risk. We describe the relationship between water temperature and density/viscosity in Figures 2 and 3.

16. The head loss (that is, the pressure drop that occurs when clean water flows through a clear filter medium) can be calculated from well-known equations (such as the Kozeny equation). This shows that the head loss is dependent on the viscosity and density of the fluid – which are governed by temperature.

FIGURE 1 – RELATIONSHIP BETWEEN WATER TEMPERATURE AND DENSITY

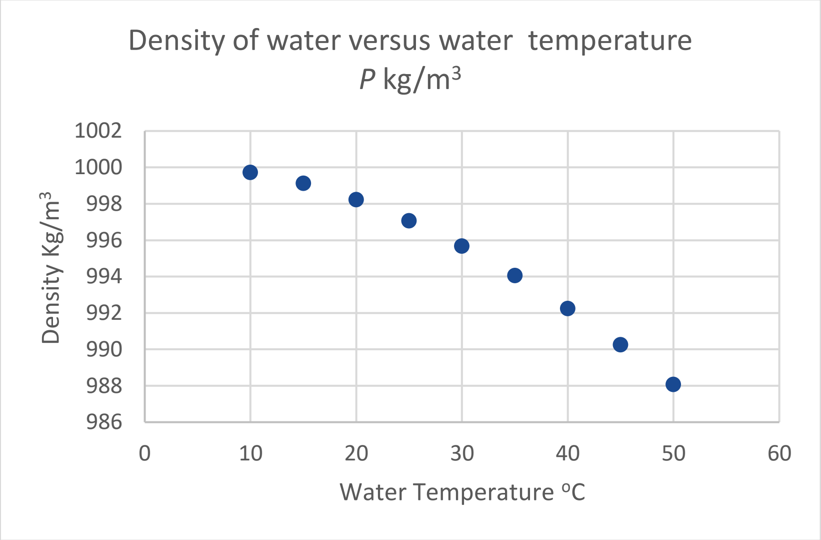
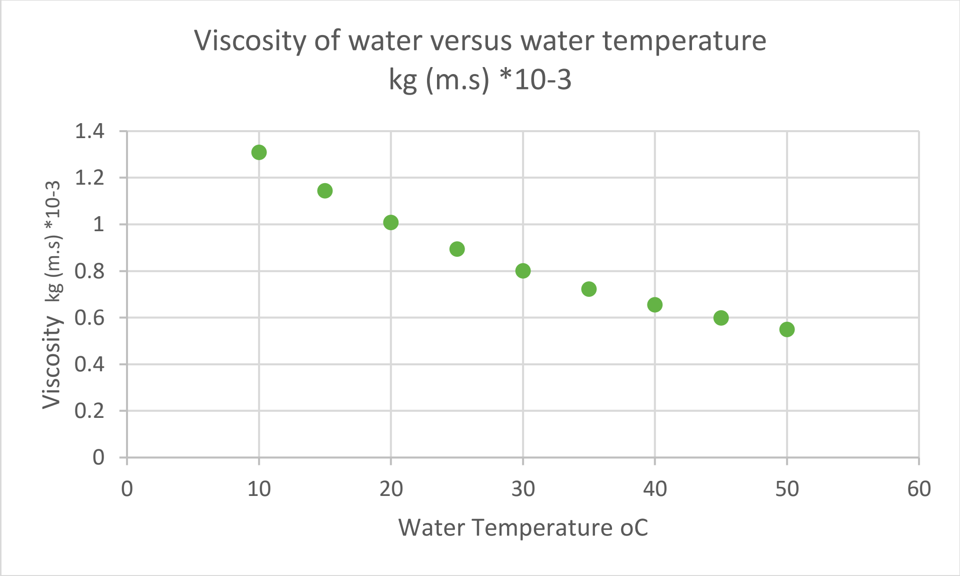


FIGURE 2 - RELATIONSHIP BETWEEN WATER TEMPERATURE AND VISCOSITY



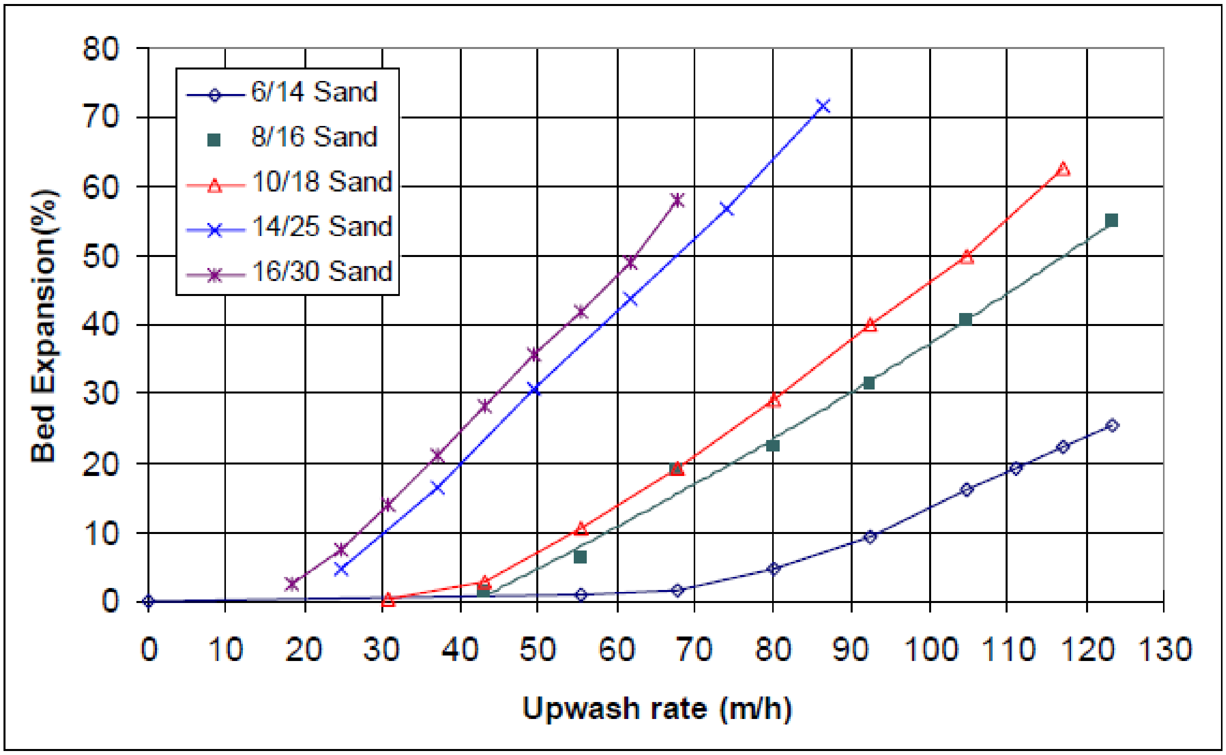
17. If this backwashing is ineffective because the media bed does not expand enough or at all, then dirt is not released from the filter bed. As we set out in NES24, this can lead to, uncertainty in treatment plant output – it is not possible to predict filter run times, it can lead to reduced output – filter starting headloss is higher as the bed is not clean so filter runs are shorter, backwashes are ineffective and are done more frequently, premature breakthrough of pathogens can occur, operations will reduce output due to interventions to run the plant within safe boundaries. This results in a degradation in deployable output and possibly a complete loss of deployable output and can result in reduced resilience to raw water quality events such as algae.

18. We explained the stages of an RGF cycle in NES24.

19. We have established that as water temperature increases, the minimum fluidizing velocity required to achieve bed expansion also increases. So, with climate change and increasing seasonal raw water temperatures, filters with already limited filter wash capability will be unable to cope.

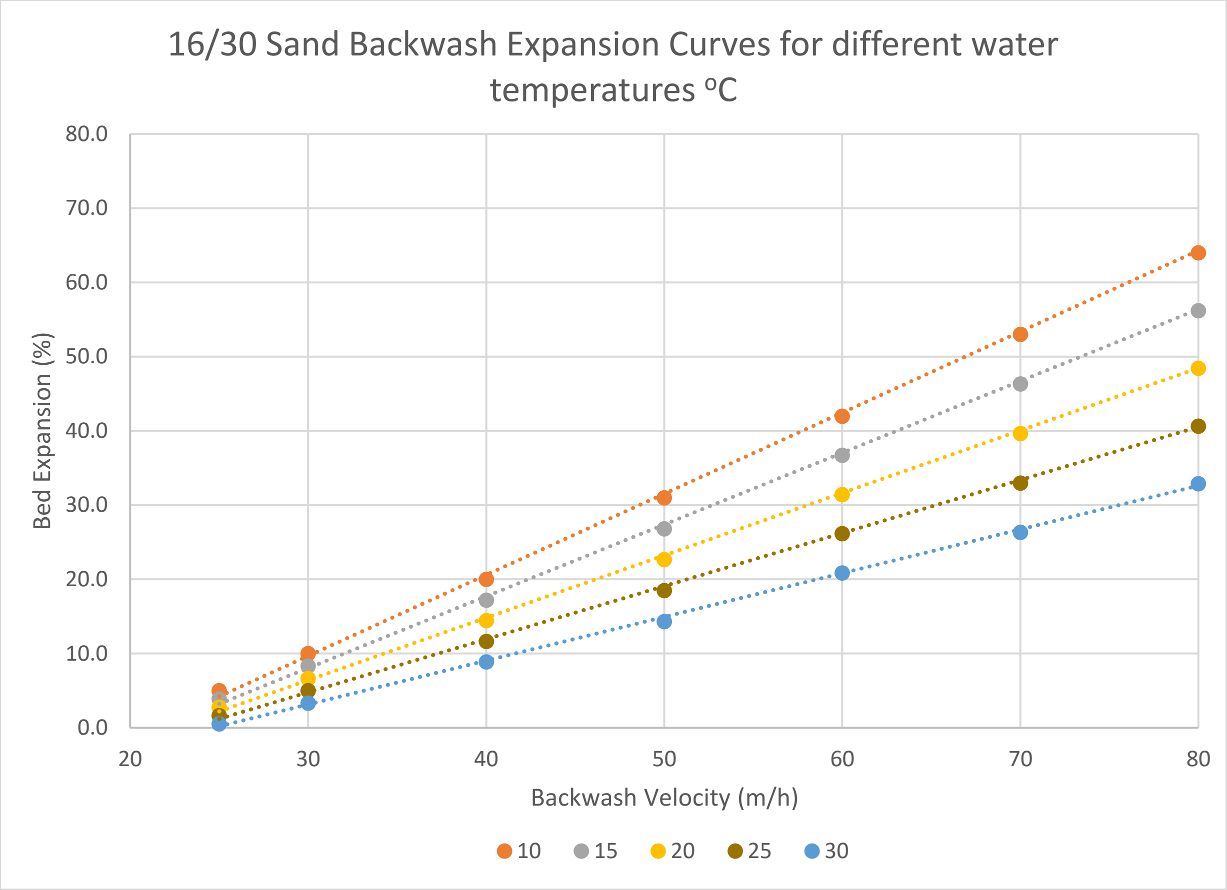
20. We can predict bed expansion from the characteristics of the filter media, but we can also obtain this from manufacturers who derive these from practical testing. For example, Figure 4 shows example curves given by Garside Sands for various media grades at 10°C.

FIGURE 3 - BED EXPANSION VERSUS UPFLOW RATE FOR DIFFERENT MEDIA AT 10°C



21. To achieve the recommended 10% bed expansion at 10°C, we would need completely different backwash rates for different media types. We considered 16/30 sand as an example and created curves for a range of temperatures to help to identify the impact of increasing water temperatures on expansion – see Figure 5.

FIGURE 4 - BED EXPANSION VERSUS BACKWASH VELOCITY FOR 16/30 SAND AT DIFFERENT TEMPERATURES



22. Figure 5 shows that for a 10% media expansion, a change from 20°C to 25°C would require an additional 8.3% backwash flow. We would expect to see similar trends for all media, because this depends on viscosity at different temperatures.

23. This can have a large impact on rapid gravity filters. For example, a system which is designed to maintain an expansion of 10% at a maximum temperature of 20°C would require a backwash velocity of 34.1 m/h. If the temperature were to increase to 25°C, then the expansion would reduce to 7.78%.

24. This can significantly impact on the backwash efficiency. A site that achieved adequate bed expansion year-round may no longer do so. A site that relied on winter cold temperatures to improve the filter media condition may no longer do so.

25. We demonstrated in NES24 that climate change has led to some prolonged periods of hot weather – and this will continue to be increasingly the case in the future. This also means prolonged period of higher temperature water (as discussed in NES24, where we showed the trend data from one of our treatment works – Broken Scar - and in

our resilience appendix alongside the business plan). In turn, this will lead to increasingly worse performance from our existing backwash capacity.

26. All of this means that there is a critical relationship between water temperature and the effectiveness of Rapid Gravity Filter backwashing. As climate change leads to more frequent and prolonged periods of elevated water temperatures, the efficiency of backwashing will be compromised – increasing the risk of filter performance issues.

2.2. HOW DOES OUR ENHANCEMENT CASE MITIGATE THESE ISSUES – AND TAKE BASE EXPENDITURE INTO ACCOUNT?

27. To mitigate these challenges, we developed our enhancement case to provide sufficient backwashing capacity under any of our long-term climate change scenarios. In practice, there would need to be an upgrade to capacity (to at least some extent) under *any* long-term climate change scenarios.

28. In NES24, we explain our selection of priority sites that have material strategic importance, rank highest in our criticality classification, and show an increasing trend in raw water and hence backwash water temperature[3]. We are also monitoring additional sites in detail, and investigations are ongoing to assess filter performance, backwash efficacy, and climate change resilience.

29. For these priority sites, we explained our current performance from filter backwash[4] – including the materials used at each site (we have dual media filters at all of these sites). This analysis showed that these dual media filters designed to use Anthracite grade 2 media are particularly vulnerable to changing water temperature because we need high wash velocities to effectively backwash and achieve regrading of media (that is, making sure this settles back into separate layers). If this media regrading does not occur the filter can lose up to 33% of its ability to filter solids and corresponding filter run times (specific dirt load for dual media filters is approximately 1.2 kg/m2, specific dirt load for mono media or ungraded filters 0.8 kg/m2) We have shown that these rates increase materially in line with water viscosity decreasing as the temperature increases.

30. In our enhancement case, we then assumed the following activities were base and enhancement (this is a more detailed version of Table 17 in NES24):

FIGURE 5 - BASE AND ENHANCEMENT ACTIVITIES

Base	Enhancement
Refurbishment of assets:	New assets/equipment providing a greater level of protection:

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[3] Table 14 of NES24
[4] Table 15 of NES24

Base	Enhancement
No refurbishment of existing assets included in the scope. No upgrades of filter flow control No upgrades to filter water quality monitoring No upgrades to existing air manifolds No upgrades to existing clean water backwash tanks.	RGF backwash enhancements to provide resilience to the impact of rising temperature. Temperature compensated backwash capability Revision of filter shell components to enable appropriate temperature compensated backwash. Washwater treatment for volumes driven by climate change. Factors outside of our control Increasing raw water and ambient temperatures and increased sunlight intensity caused by climate change, accelerating reduction in backwash efficacy in RGFs

31. For each site, we calculated what would be needed for the revised climate change capacity for both clean wash water and dirty wash water systems. Additional assets were not included where increases in capacity required were considered marginal.

32. For example, at Fontburn the clean washwater tank is smaller than required for a single backwash with revised backwash volumes increasing by 40m³. No allowance was included in enhancement as it was considered that this could be achieved by modification of control systems. Similarly for Langford WTW clean backwash water tank.

33. We have included no allowance for filter control valves, filter block flow control, or air manifolds, or instrument changes that we have assumed would be needed under our HazRev programme (and would be funded through base). No costs were included for replacement of aging assets. We also assumed that any costs such as repairs needed when inspecting existing tanks would be met through base maintenance.

34. We split these costs between base and enhancement because climate change trends are outside the control of water and wastewater companies.

35. For three of the six sites there was a need for a material increase in climate change driven backwash water volumes. At these three sites, the costs were based on installation of a larger tank to meet the total volume requirement. We accept this is an area where more should have been allocated to base, and we have therefore calculated an adjustment on the following volumes:

Site	Total volume (Ml)	Existing capacity (Ml)	Enhancement (Ml)
Fontburn	1.87	1.06	0.81
Langford	3.45	1.73	1.72
Mosswood	8.23	4.55	3.69

36. We believe that the above adjustment to take account of existing washwater tank capacity for the three sites where a material increase is required as part of the solution, is the only aspect of our costs that should be allocated to Base. Please see section 4.3 on cost benchmarking to see the cost impact of this change.

3. BEST OPTION FOR CUSTOMERS

37. Ofwat raised some minor concerns about whether the investment is the best option for customers. They said:

> "The company considers a range of alternative options for each of the streams being investigated.
>
> As part of the options selection process the company has determined carbon impact and 30-year Net Present Value. While the company has identified these benefits it is not clear how these have been used to influence option selection. In addition, with regards to hypochlorite storage, consideration of a prioritised phased approach would have been beneficial, looking at upgrading the most at risk sites first.
>
> The company provides a good range of options of each of the investment streams but more information on the options selection methodology would have helped. The cost adjustment (10%) is applied to the residual cost once the base costs are removed as part of the need challenge."[5]

3.1. USING BENEFITS TO INFLUENCE OPTION SELECTION

38. As described in section 3.3.2 of business case NES24, we calculated the carbon impact, monetised this, and factored this directly into the 30-year NPV calculation in our Copperleaf optimisation tool alongside other monetised benefits associated with our value models for Improved Water Aesthetics, CRI Score and Water Quality Compliance. We listed the value measures we used and the value of these in Table 25 of NES24.

39. We calculated this as a single NPV for each option, and we describe the NPV for each option in Table 26 of NES24. This includes both costs and benefits together for each option, over 30 years. We then highlighted which option we had selected in green in Table 26, with the preferred option generally being the highest NPV – because this has the most positive cost-benefit case. In section 3.3.2 of NES24, we explained how we had done this and why we had selected some options which were not the highest NPV.

40. We also explained why these NPV values were negative, and why we had concluded we should still carry out this work.

41. We think this section of our enhancement case NES24 includes all of the evidence to show that we have assessed the benefits and costs (including carbon), calculated NPVs, and used these to select the preferred options. If there are concerns not addressed here, Ofwat should ask more directly and specifically about these concerns – we note that there were no queries about this since the submission of our business plan in October 2023.

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[5] PR24-DD-W-Resilience, NES Climate Resilience worksheet

3.2. PHASING OF HYPOCHLORITE STORAGE

42. Over many years, we have installed the disinfection systems at each site affected after an option selection process. In many cases sodium hypochlorite replaced much older chlorine gas systems to reduce the risks of exposure to chlorine gas to operators and the public. In addition to reduced health and safety risks, sodium hypochlorite is always the cheapest disinfection agent for smaller sites.

43. Once sodium hypochlorite has been selected then operational processes to carefully control stock are put in place to limit the time any one container is stored before use. This system is already in place at all our sites. Beyond that, product strength and ambient temperature control can change the chemical reaction rate at which chlorate is produced and therefore provide opportunities to further minimise chlorate formation.

44. The DWI explains that:

> "Chlorate is a disinfection by–product (DBP) that can arise where sodium hypochlorite, calcium hypochlorite, chlorine dioxide or onsite electrolytic chlorination (OSEC) are used for disinfection. Although there is a legal requirement for water companies to minimise DBP formation, there is no current prescribed concentration or value for chlorate in drinking water in the EU, although a future drinking water standard of 0.25 mg / L has been proposed."[6]

45. It is clear from this research that the DWI regards Chlorate as a disinfection byproduct and as such DWI point out that Regulation 26(2)(c) requires Companies to design and operate disinfection systems in such a manner that the formation of disinfection byproducts is minimised[7].

46. The World Health Organisation take a similar position. In their Chemical Fact Sheet for Chlorate in Drinking Water[8] they state that "Concentrations should be maintained as low as reasonably practical". They also say that a health-based standard of about 0.3mg/l could be derived, but they balance the risk of that against insufficient disinfection that this could create. As the WHO work across all regions of the world, it is reasonable to assume the UK should be in the position to adopt the lower standard they suggest.

47. So, we have a clear existing duty to minimise disinfection byproducts - and chlorate has been defined as such by the DWI. We considered whether a prioritised phased approach for delivery would be appropriate – but we concluded that because of this clear duty, we should not prioritise delivery or further risk asses the sites affected. The unpredictable nature of how and when increasing temperatures will affect our sodium hypochlorite sites means there is a need to deliver the enhancements before climate change worsens. Our existing duty to minimise

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[6] DWI Research on Chlorate in Drinking Water, WT2209
[7] DWI Guidance, Part 08, Section 26.12
[8] Chemical fact sheets: Chlorine dioxide, chlorite and chlorate

disinfection byproducts means we have a need to minimise chlorate formation even before the proposed standard is enacted.

48. We recognise that our enhancement case did not explain this point in detail, but we think it should be clear that a prioritised phased approach is not appropriate for this investment because all sites within the enhancement case have been assessed as having a risk of failure of compliance with the chlorate standard. As this is a health-based standard, we did not think it would be possible to adopt a prioritised phased approach.

3.3. OPTIONS SELECTION METHODOLOGY

49. We have described our options selection methodology in detail on pages 45 to 60 of NES24. This includes describing our optioneering process in detail (Figure 18); how we developed our long list of options (shown in Figures 19 to 21); our options screening (Tables 18 to 24); the approach and values we used for scoring benefits (Table 25); and the details of the cost benefit appraisal we used.

50. This results in the NPVs for all short listed options in Table 26, and so showing explicitly how the preferred options were selected.

51. It is not clear what information was missing from these sections, though our response in 3.1 of this document might support a better understanding of how benefits were used (as we think this is where the concerns might arise).

4. COST EFFICIENCY

52. Ofwat raised some significant concerns about whether the investment is efficient. They said:

> "The company does not provide sufficient and convincing evidence that the proposed costs are efficient.
>
> The company provides limited evidence to demonstrate cost efficiency. The company provides a high-level description of its costing process with costs being developed using its own internal unit cost database. The company provides limited evidence of cost benchmarking (specific to the activities being delivered eg monitoring, run to waste) or third-party assurance. The efficiency against the benchmarks identified is driven by a large gap for one scheme which is not explained which then offsets inefficiencies in the remaining schemes. The cost adjustment (30%) is applied to the residual cost once the base costs are removed as part of the need challenge."[9]

53. In our original benchmarking analysis, we presented a combined sample group of projects covering slow sand filter, rapid gravity filter and hypochlorite storage enhancements. We acknowledge that the benchmarking for the project to provide Hypochlorite storage protection at our Whittle Dene site was driving the overall cost efficiency assessment at the sample group level.

54. We have revisited the analysis and split out the benchmarking assessments for each of the process elements. We also provide below an explanation of the higher cost of hypochlorite storage protection at Whittle Dene WTW and a re-assessment of the hypochlorite benchmarking.

4.1. SLOW SAND FILTER BENCHMARKING

55. Figure 6 below shows the benchmarking analysis for the slow sand filter (SSF) process enhancement projects. Note that the benchmarking sample group covers 50% of the four sites included in our SSF business case. Separating out these sites from the RGF and Hypochlorite cost assessment demonstrates a close correlation between our cost models when compared to industry cost data.

FIGURE 6 - PREFERRED OPTION COST BENCHMARKING – SLOW SAND FILTER

Site	Northumbrian cost	Benchmark cost	25%ile	75%ile	Delta	Delta %
Ormesby	£522,974	£468,963	£368,847	£611,078	£54,011	12%
Layer	£763,665	£833,072	£661,780	£1,090,663	-£69,407	-8%
Total	**£1,286,639**	**£1,302,034**	**£1,030,628**	**£1,701,741**	**-£15,396**	**-1%**

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[9] PR24-DD-W-Resilience, NES Climate Resilience worksheet

4.2. HYPOCHLORITE STORAGE BENCHMARKING

56. Figure 7 below shows the results of our benchmarking for the hypochlorite storage solutions only. As per Ofwat's observation, the results for Whittle Dene are skewing the overall efficiency delta %.

FIGURE 7 - PREFERRED OPTION COST BENCHMARKING – HYPOCHLORITE STORAGE

Site	Northumbrian cost	Benchmark cost	25%ile	75%ile	Delta	Delta %
Abberton RWPS	£44,289	£23,708	£17,391	£30,502	£20,581	87%
Broken Scar	£44,450	£24,163	£17,755	£31,093	£20,287	84%
Peterlee	£5,489	£10,497	£8,618	£12,809	-£5,009	-48%
Wooler	£8,874	£10,686	£8,900	£12,904	-£1,812	-17%
Whittle Dene	£706,332	£1,503,552	£1,202,262	£1,953,636	-£797,220	-53%
Total	**£809,433**	**£1,572,606**	**£1,254,926**	**£2,040,945**	**-£763,173**	**-49%**

57. We agree that Whittle Dene is an outlier, and have therefore re-assessed our benchmarking, removing the influence of Whittle Dene calculated cost efficiency from the hypochlorite sample group. Figure 8 below shows the revised benchmarking data for Hypochlorite storage projects. Our Northumbrian Water iMOD cost estimate is still included, but the benchmark cost has been reduced in line with our much lower estimate to ensure the 53% efficiency calculated by benchmarking against our industry dataset is not skewing the overall result.

FIGURE 8 - PREFERRED OPTION COST BENCHMARKING – HYPOCHLORITE STORAGE

Site	Northumbrian cost	Benchmark cost	25%ile	75%ile	Delta	Delta %
Abberton RWPS	£44,289	£23,708	£17,391	£30,502	£20,581	87%
Broken Scar	£44,450	£24,163	£17,755	£31,093	£20,287	84%
Peterlee	£5,489	£10,497	£8,618	£12,809	-£5,009	-48%
Wooler	£8,874	£10,686	£8,900	£12,904	-£1,812	-17%
Whittle Dene	£706,332	£706,332			-£0	0%
Total	**£809,433**	**£775,386**			**-£34,047**	**4%**

58. Whittle Dene costs remain influential in the analysis, simply because of the higher solution cost. Our sample group of projects includes a range of WTW sites which reflect both the size/capacity of the site and also the range of applications for which hypochlorite is required by the site-specific treatment processes.

59. Costs for Whittle Dene are far higher than for other sites in the sample group for two reasons. Firstly, Whittle Dene WTW is one of our larger sites, with an MLD output of 118. Other sites in the sample group are smaller,

while others are booster pumping stations rather than WTWs. This means that the process requirement for hypochlorite is greater at Whittle Dene and therefore the volume of storage and chilling requirement is also greater.

60. However, the solution for each of our hypochlorite sites is also a function of the specific application of hypochlorite chemical at each site, which depends on the design of the treatment process, raw water quality and other factors such as the presence of invasive non-native species such as mussels. Our solution development and optioneering approach took account of the application(s) of hypochlorite at each site, and the specific chemical dose rate and range associated with each application. As detailed in our business case, the figure below summarises the seven applications of Hypochlorite at our sites, and the specific assumptions for dose rate and range used in our optioneering process.

Use	Dose range mg/l	Potential Maximum Dose mg/l
Primary Disinfection	0.7	2.5 (Depending on raw water demand)
Ammonia removal	1 (1mg / 0.1 ammonia)	
Mussel Dosing	1.5	3
Secondary Chlorination	0.7	2.5 (Depending on raw water demand)
Manganese Removal	1	3
Iron Removal	1	3
Network Booster Chlorination	0.2	0.7

61. Beyond its size and MLD output, the costs for Whittle Dene WTW are also driven by the fact that hypochlorite storage at the site is supporting two separate process applications: Secondary Dosing and Manganese Removal. In addition, Whittle Dene also provides logistical storage of hypochlorite for distribution to smaller WTWs and pumping stations where the chemical is dosed, and storage or access for larger delivery vehicles is limited. Therefore, the solution costs for Whittle Dene include elements to ensure protection against rising temperatures for storage of hypochlorite for multiple applications.

4.3. RGF BENCHMARKING

62. We have reviewed and expanded our approach to cost-benchmarking for the RGF sites to provide greater confidence in our costs. We have adjusted the Fontburn, Langford and Mosswood scopes to ensure any base overlap is removed. We have benchmarked the preferred solution costs for all 6 of the sites to improve the coverage of the analysis. Figure 9 below shows the results of our benchmarking.

FIGURE 9 - COST BENCHMARKING OUTCOMES – DIRECT COSTS

Site	Northumbrian cost	Benchmark cost	25th percentile	75th percentile	Delta %
Broken Scar	£1,411,756	£1,047,652	£943,598	£1,151,706	34.75%
Fontburn	£758,333	£700,667	£609,766	£791,570	8.23%
Hanningfield	£3,834,022	£3,059,687	£2,656,393	£3,462,982	25.31%
Langford	£1,192,149	£1,039,591	£840,837	£1,238,345	14.67%
Layer	£1,133,075	£791,134	£635,829	£946,440	43.22%
Mosswood	£2,538,549	£2,137,335	£1,845,212	£2,429,458	18.77%
Total	**£10,867,888**	**£8,776,069**	**£7,531,636**	**£10,020,502**	**23.84%**

Source: Cost Benchmarking Outputs

63. The variance in this table suggests our costs are materially above the benchmark by 23.84%. Therefore, we accept based on our benchmarking data and removal of base overlap that the efficient cost for the RGF enhancement scheme should be £21,927,341.42 as a total scheme cost including overheads.

64. We received this new benchmarking information too late to reflect this in our business plan tables for DD (which remain unchanged for this enhancement case since the business plan in October 2023). We ask Ofwat to reduce this cost for RGF filters to £21.937m in their model to reflect this challenge (we note that this should not be *in addition* to any residual efficiency challenge from benchmarking). We attach the full benchmarking report as NES24A1.

65. Finally, we commissioned additional third-party cost assurance as part of our draft determination response to address Ofwat’s concerns about this. We attach this to our response as NES24A2.