REVISED DRAFT WATER RESOURCES MANAGEMENT PLAN 2024

STATEMENT OF RESPONSE: ADDITIONAL INFORMATION REQUESTED BY DEFRA

Jim Barker (Head of Water Resources)
Portsmouth Water Ltd
PO Box 8
West Street
Havant
Hants
PO9 1LG

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INTRODUCTION

In August 2023 we published our Statement of Response (SoR) to the consultation on our 2024 Draft Water Resources Management Plan (dWRMP24). At the same time, we published our Revised Draft Water Resources Management Plan (rdWRMP24).

The Department for Environment Food & Rural Affairs (Defra) has been reviewing our rdWRMP24 and SoR, accompanied by advice from the Environment Agency. Before Defra can refer our plan to the Secretary of State for a decision, we have been asked to provide further information to support our plan.

This document provides the information requested by Defra. It forms part of our SoR prepared under Regulation 4 of the Water Resources Management Plan Regulations 2007 and as such we have published it on our website and sent copies to those that made representations on our dWRMP24.

Within each section of this document we state the issue raised by Defra and then provide our response. For many of the issues we have proposed new information or clarifications for inclusion within our final WRMP24. The proposed inclusions have yellow highlighting within this document.

1 ISSUE 1: SUSTAINABLE ABSTRACTION AND ENVIRONMENTAL DESTINATION

1.1 Defra explanation of Issue 1

Currently, Portsmouth Water's WRMP includes the postponement of sustainability reductions to licences until the 2030's. It is not clear how the company will ensure the Water Framework Directive (WFD) deterioration risk to the environment is low and protected site requirements are met. We expect water companies to be taking action to ensure that their abstractions do not cause deterioration. If these changes are not made voluntarily and if there is a high or medium risk of deterioration, then the Environment Agency would need to change licences through issuing a section 52 notice to limit abstraction. Portsmouth Water has undertaken sensitivity testing around the potential non-renewal of time-limited licence conditions, but not provided any routes to maintaining secure water supplies should this occur.

In addition, the company's plan does not clearly set out how the supply impact of the environmental destination has been derived, with differences between values in the WRMP data tables and information set out in the plan narrative. The company must provide clarity that its abstractions will meet protected sites and WFD no-deterioration requirements. It should provide assurance that all required licence changes including WINEP licence caps and time-limited conditions have been included in the WRMP baseline.

The company should update its narrative on the environmental destination to explain the method and approach taken, including how the supply impact figures have been derived and whether network interconnectivity is exacerbating the overall impact of licence reductions. If this is the case, Portsmouth Water should set out what action it will take to mitigate network constraints as a separate investment driver to the environmental destination. Overall, the plan must set out how customer supplies will be secured including any legal means of deferring licence changes if required where no feasible alternative options are available.

1.2 Our response to Issue 1

1.2.1 Introduction

We take our environmental responsibility very seriously and are undertaking our largest ever environmental investigation programme in the first two years of AMP8 to understand and quantify the risk of deterioration posed by our abstractions. We fully intend to act on the findings of those investigations and propose the requisite mitigation to that risk as an integral element of WRMP29 (and PR29).

1.2.2 Deriving the Environmental Destination

The Defra letter states that "the company's plan does not clearly set out how the supply impact of the environmental destination has been derived, with differences between values in the WRMP data tables and information set out in the plan narrative."

Section 2.2.3 and 2.2.5 of Appendix 5B of our WRMP24 describe how we derived the supply impact of the environmental destination. An example extract is as follows:

> "Revisions to the potential magnitude of sustainability reductions
>
> Since the draft WRMP24 we have updated the environmental destination licence assumptions for the low, medium and high scenarios. In the low scenario we have increased licensed quantities for three groundwater sites and our surface water site because they were incorrectly more constrained than the high scenario. Conversely, we have also reduced licensed quantities for our surface water site in the medium and high scenarios and raised the 'Hands off Flow' condition to better reflect the findings of the AMP7 investigations.

> We shared the revised licence assumptions with local and national Environment Agency staff on 26 January 2023. In a meeting with the Environment Agency on 30 January 2023 there were no objections to the revised assumptions. The Environment Agency used an in-house tool to test our high scenario and the results indicated that it is likely to meet the objectives of its 'BAU+' and 'Enhanced' scenarios.
>
> The licence assumptions were entered into a new joint Southern Water and Portsmouth Water Pywr model to recalculate the deployable output impacts, which were found to range between 39 Ml/d and 144 Ml/d depending on the scenario. Further detail is provided in Section 2.2.6 below. The impacts are greater than those in the draft WRMP24, largely driven by WINEP related adjustments to the licence assumptions for our surface water source."

Following discussion with the Environment Agency, we understand that clarification is needed regarding the relationship between Table 1 and 2 of Appendix 5B and the WRMP24 tables. We propose that the following two paragraphs will be added to Section 2.2.6 of Appendix 5B:

> "Table 2 presents the potential licence changes per individual abstraction source under the low to high environmental destination scenarios by 2050 in mega litres per day (Ml/d). These are the settings that were applied within the joint Southern Water and Portsmouth Water Pywr model to calculate deployable output impacts. These environmental destination licence settings are not requested within the regulator's WRMP24 table template and therefore they do not appear within our WRMP24 tables.
>
> Table 1 presents the deployable output impacts of each environmental destination scenario at a water resource zone level by 2050, derived from Pywr modelling that uses the Table 2 licence settings. The Table 1 value of -122.23 Ml/d in the 'High (1 in 500 year)' row and the 'Possible impact on Portsmouth Water Average DO (Ml/d)' column matches the value in the WRMP24 tables (table 3a, row 7.3BL) for 2049-50. This confirms that our WRMP24 reported pathway follows the high environmental destination."

We will also adjust the title of Section 2.2.6 to "Possible licence and deployable output changes".

The screenshots demonstrating the agreement of values is shown in Figure 1.

Scenario	Current Licence	Possible Licence	Portsmouth Water Average DO, excluding environmental destination (Ml/d) **	Possible Portsmouth Water Average DO, including environmental destination (Ml/d) ***	Possible impact on Portsmouth Water Average DO (Ml/d)
High (Normal year)	321.56	149.42	270.09	126.08	-144.01
High (1 in 500 year)	321.56	149.42	236.29	114.06	-122.23
Medium (Normal year)	321.56	219.10	270.09	187.45	-82.64
Medium (1 in 500 year)	321.56	219.10	236.29	165.88	-70.41
Low (Normal year)	321.56	237.27 *	270.09	208.02	-62.07
Low (1 in 500 year)	321.56	258.37 *	236.29	197.59	-38.70

Table 3a: DYAA - Baseline	Back to top of sheet											
WRMP24 reference	Component	Derivation	Unit	Decimal place	2044-45	2045-46	2046-47	2047-48	2048-49	2049-50	2050-51	
3BL	Potable water imported	Input	Ml/d	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4BL	Raw water exported enter as -ve	Input	Ml/d	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5BL	Potable water exported enter as -ve	Input	Ml/d	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
6BL	Deployable Output before forecast changes	Input	Ml/d	2	213.41	213.41	213.41	213.41	213.41	213.41	213.41	
6.1BL	Deployable Output post forecast changes	6BL + 7BL	Ml/d	2	109.86	104.19	98.52	92.85	87.18	81.51	81.35	
7BL	Baseline forecast changes to Deployable Output	sum (7.1BL:7.6BL)	Ml/d	2	-103.54	-109.21	-114.88	-120.56	-126.23	-131.90	-132.06	
7.1BL	Change in DO due to climate change	Input	Ml/d	2	-8.86	-9.02	-9.18	-9.35	-9.51	-9.67	-9.83	
7.2BL	Total confirmed DO reductions to restore sustainable abstraction enter as -ve	Input	Ml/d	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
7.3BL	Total additional DO reductions for Environmental Destination (excl. any confirmed reductions) enter as -ve	Input	Ml/d	2	-94.68	-100.19	-105.70	-111.21	-116.72	-122.23	-122.23	
	Change in DO from prolonged Outage											

Figure 1 Screenshots demonstrating which value in Appendix 5B Table 1 (top image) is shown in the completed Portsmouth Water WRMP24 Tables (lower image)

1.2.3 'Confirmed' versus 'additional' deployable output reductions to restore sustainable abstraction

The Environment Agency has queried the WRMP24 data row selection within the supporting Annex to our Defra WRMP24 letter. This section provides further clarification.

We do not have any 'confirmed' sustainability reductions i.e. we do not have any confirmed reductions to the amount of groundwater and surface water that we are licensed to abstract from the Chalk aquifer and River Itchen. For this reason, we have not entered any deployable output reductions into row '7.2 BL' of the WRMP tables, in line with regulator guidance on the tables. Instead, our profile of uncertain but potential deployable output reductions associated with our selected environmental destination profile is entered into row '7.3 BL' of the WRMP tables.

Section 2.2.7 of Appendix 5B of our WRMP includes the following:

> "The adaptive planning approach within the revised dWRMP24 explores a range of potential futures with respect to environmental destination. However, as per the draft WRMP24, all profiles begin with sustainability reductions under a low environmental destination scenario, which seeks to address WFD no deterioration risks."

We propose the following addition to this:

> "The low environmental destination scenario represents potential 'licence capping' impacts, which are entered into Row 7.3 BL of our WRMP24 tables. The impacts are not applied within Row 7.2 BL, because at this time we do not have any 'confirmed' deployable output reductions associated with WINEP or time-limited licence conditions. However, data in both 7.3BL and 7.2BL are applied to the WRMP24 baseline and addressed by the WRMP24 preferred plan."

Our understanding of the environmental destination and its links with the Water Industry National Environment Programme (WINEP) has evolved since the preparation of our dWRMP24. As described in Appendix 5B of our rdWRMP24, we have now committed to completing investigations and options appraisals in most water catchments within our supply area during AMP8 (2025-2029). This will improve our understanding of licence capping requirements to ensure the WFD deterioration risk to the environment is low.

We expect the Environment Agency to use the findings of our WINEP investigations and other sources of verifiable data to identify 'confirmed' sustainability reductions in 2027 for inclusion within our next WRMP (WRMP29), once the AMP8 WINEP investigations are sufficiently progressed. The outcomes of the WRMP29 will be reflected within our next business plan (PR29) for implementation during AMP9 (2030-2035).

1.2.4 Environmental destination and network interconnectivity

The Defra letter states that "The company should update its narrative on the environmental destination to explain the method and approach taken, including…..whether network interconnectivity is exacerbating the overall impact of licence reductions. If this is the case, Portsmouth Water should set out what action it will take to mitigate network constraints as a separate investment driver to the environmental destination."

Following discussions with the Environment Agency we propose the following addition to Appendix 5B (Section 2.2.6):

> "We have undertaken initial testing to identify whether network interconnectivity is exacerbating the overall impact of licence reductions. We checked licence utilisation, and where spare licence remained. We then introduced theoretical network connections into the Pywr model to attempt to optimise licence utilisation.
>
> This exercise demonstrated that most of the estimated impact of environmental destination on deployable output (as shown in Table 1) is the result of licence reductions. However, up to 10%

of the impact might be reduced through network improvement schemes. We will explore this further via our comprehensive AMP8 WINEP option appraisal (see Section 3.2.1.3) and WRMP29 water resource zone integrity assessment. If appropriate, we will develop network improvement schemes for inclusion within our next WRMP (WRMP29) and business plan (PR29), to be funded via the appropriate investment driver".

1.2.5 Magnitude of potential sustainability reductions in the revised draft WRMP24 baseline

The Environment Agency has asked for clarification on the reason why the early WRSE modelling of the Enhance Scenario indicated a lower 48 Ml/d reduction, compared with the 122 Ml/d stated in the revised draft WRMP24.

The primary reason for the higher reductions is that we have translated the WRSE calculated licence reductions (and therefore abstraction reductions) into DO reductions. Section 2.2.3 of Appendix 5B to our WRMP24 states that:

> "The impacts are greater than in the WRSE emerging plan because we used our Pywr model to translate the impact of licence reductions into an impact on water resource zone deployable output, which is the appropriate metric for water resources planning."

We propose adding the following text to this existing bullet point to improve the explanation:

> "The Pywr model is able to take into account the Hands Off Flow conditions on the River Itchen, which significantly reduces the availability of water for abstraction during droughts."

A further reason for higher reductions is given in Section 2.2.5 of Appendix 5B. Between the draft and revised draft WRMP24 we also reduced licensed quantities for our River Itchen site in the medium and high scenarios and raised the 'Hands off Flow' condition to better reflect the findings of the AMP7 investigations.

1.2.6 Timing of potential sustainability reductions in the draft and revised draft WRMP24 baseline

The Defra letter states that "Portsmouth Water's WRMP includes the postponement of sustainability reductions to licences until the 2030's". This is referring to differences in the start year of the environmental destination profile between our dWRMP24 (2028-29) and our rdWRMP24 (2030-31).

The increased reliance on Southern Water drought permits and orders is the leading reason why the environmental destination profile commences in 2030-31 within our rdWRMP24, instead of 2028-29 as per our earlier dWRMP24. This is explained further in Section 1.2.8 below. Appendix 5B of our WRMP24 identifies further reasons for the later start to our environmental destination profile:

- The need to sufficiently investigate catchments in AMP8 to confirm WFD No Deterioration risks associated with the WRMP24 growth forecasts.
- Later implementation years for the approved Havant Thicket Reservoir scheme and Southern Water's proposed Hampshire Water Transfer and Water Recycling Project.
- Delivery risks associated with the ambitious smart metering programme and Government-led water efficiency interventions.

We understand the Environment Agency is concerned that commencing sustainability reductions in AMP9 instead of AMP8 could result in WFD deterioration risks. The next sections describe our approach to managing short term risks and the issue of time-limited licence conditions.

1.2.7 Managing Water Framework Directive Risks

Section 3.2.2.1 'Water Framework Directive risks' of WRMP Appendix 5B sets out information on how we are managing 'WFD no deterioration' risks. We propose the following added clarification to this section (yellow highlighting is new text):

> "Our regulators have expressed concern that the phasing of investigations over AMP8 and AMP9 may result in deterioration in Water Framework Directive (WFD) water body status due to growth in abstraction. The key concern is the QRST Group where there is a potential risk of abstraction growth due to an export to Southern Water.
>
> Southern Water confirmed that it does not intend to increase the average amount taken in a normal year via the bulk supply. However, to manage the potential WFD no deterioration risks, we will monitor utilisation of the bulk supply with Southern Water and the Environment Agency via regular technical meetings and our WRMP annual review process. This includes reporting on the level of abstraction relative to the WRMP24 low environmental destination assumptions for the QRST Group. The relevant assumptions are provided in Table 2 of Appendix 5B (section 2.2.6) for both normal year conditions and dry year / drought conditions. The assumptions for the dry year / drought condition will be relevant when we experience dry years and multiple dry years.
>
> **The annual review process, together with the inclusion of a 'low' environmental destination as minimum, ensures that our plan prevents WFD related deterioration of water bodies.** Since the dWRMP24 we have also since committed to undertake the catchment-based investigation into the QRST Group sources in AMP8 (2025-30), rather than AMP9 (2030-35).
>
> We are also implementing significant demand reductions over AMP8 and AMP9 which will reduce abstraction and therefore reduce the risk of WFD deterioration."

We consider that the above provides sufficient information and assurance that we are managing Water Framework Directive risks.

1.2.8 Potential non-renewal of time-limited licence conditions

The Defra letter states that "Portsmouth Water has undertaken sensitivity testing around the potential non-renewal of time-limited licence conditions, but not provided any routes to maintaining secure water supplies should this occur".

The eventual non-renewal of time limited licence conditions is encompassed by the magnitude of the low environmental destination impact as shown in row '7.3.BL' of our WRMP tables for the 2030s. As described above, we do not have any 'confirmed' sustainability reductions and therefore row '7.2 BL' of our WRMP tables does not contain any values. However, the regulator's Water Resources Planning Guideline (WRPG) states:

- "You should consider the risks of non-renewal for time-limited licences that are due to expire during the period covered by the plan. You should review whether these licences are sustainable and that their use does not cause environmental deterioration. If there are risks with renewal you should describe how you will manage these in your plan."

We do not have any time-limited licences, although we do have time-limited licence conditions on some of our abstraction licences. Our WRMP24 recognises these licence conditions and the eventual non-renewal of time limited licence conditions is encompassed by the magnitude of the low environmental destination impact as shown in row '7.3.BL' of our WRMP tables for the 2030s. We also explored the risks of non-renewal at the earlier date of April 2028 through sensitivity testing (see Section 2.2.5 of Appendix 5B to our WRMP) as explained below.

We used the WRSE regional investment model to apply an estimated 17 Ml/d sustainability reduction from 2028-29, associated with the non-renewal of time limited licence variations. This scenario solved

within the investment model (i.e. water could be moved around so that the balance of supply and demand was maintained). However, this was only achieved by decreasing treated water exports to Southern Water with an equivalent increased reliance by Southern Water on their drought permits and orders to take more raw water from the Rivers Itchen and Arun.

In our rdWRMP24 we stated that we do not believe this is a viable solution on environmental grounds. This is because, whilst it would reduce the risk of impact of abstraction on the environment within the water catchments in our supply area, it will increase the risk of impacts within catchments in Southern Water's supply area. We propose the following addition at the end of Section 3.4 of Appendix 5B:

> "We will be investigating the water catchments associated with our time limited licence conditions under our AMP8 WINEP during 2025 and 2026. This will improve our understanding of the environmental impact of the licence conditions and the WFD 'no deterioration' risks. If the WINEP investigations demonstrate there is a risk of water body deterioration, then under Regulation 19 of The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017, we will need to demonstrate that:
>
> - "all practicable steps are taken to mitigate the adverse impact on the status of the body of water".
> - "the reasons for the modifications or alterations, or for the sustainable development activities, are of overriding public interest" and / or "the benefits to the environment and to society of achieving the environmental objectives are outweighed by the benefits of the new modifications or alterations, or of the sustainable development activities, to human health, to the maintenance of human safety, or (in the case of modifications or alterations) to sustainable development."
> - "the beneficial objectives served by the modifications or alterations, or by the sustainable development activities, cannot, for reasons of technical feasibility or disproportionate cost, be achieved by other means which are a significantly better option."
>
> If needing to take a Regulation 19 route to maintain secure supplies of water for Portsmouth Water and Southern Water, we will work closely with Southern Water and the Environment Agency in developing the required documentation."

We also propose the deletion of "We do not believe this is a viable environmental solution" from Section 2.2.5 and replace with:

> "Whilst this would reduce the risk of impact of abstraction on the environment within the water catchments in our supply area, it would increase the risk of impacts within catchments in Southern Water's supply area. We will explore the need for a 'Regulation 19' approach as part of our AMP8 time limited licence investigations and assessments (see Section 3.4 for further information)"

We will revisit this sensitivity test for the Final WRMP24. This action is required following Southern Water's revision of WRSE investment data in response to their Defra WRMP letter.

1.2.9 Flow targets for protected sites under the Habitat Regulations 2017

The Environment Agency has asked for details of how we plan to meet flow targets for protected sites under the Habitats Regulations 2017.

We confirm that we have included protected site requirements within our Environmental Destination. However we will be further investigating these requirements via our AMP8 WINEP programme, which is outlined in Appendix 5B of our WRMP24. We will implement any required sustainability reductions as soon as possible once the protected site requirements are confirmed.

2 ISSUE 2: ENVIRONMENTAL ASSESSMENTS

2.1 Defra explanation of Issue 2

To achieve sustainable abstraction, the company must show how they plan to reduce their reliance on environmentally damaging abstractions. The company should therefore ensure that all outstanding issues raised by NE in relation to compliance with relevant statutory requirements, as set out in Annex 2 to NE's formal consultation response to the draft plans, are fully addressed. As also set out in the Water Resources Planning Guideline (WRPG), this includes ensuring that any previous HRA of options included in your preferred plan remains current and covers any material changes in circumstance. The company should therefore continue to work closely with both NE and EA to resolve outstanding statutory environmental issues before the final plan is published.

In particular, the SEA, HRA and WFD assessments do not adequately cover the Itchen SSSI and potential SACs such as the Meon within the assessments. Furthermore, bulk supply agreements have not been included within the required environmental assessments, without sufficient justification for their omission. There is a lack of evidence demonstrating how the SEA has influenced the plan including in the appraisal of feasible and selected options.

Source O booster is selected in the plan, but it is unclear where the additional supply benefits will come from and whether this is associated with increases in abstraction. Finally, there could be further clarity on study area and the transboundary effects characteristics and assessment in the SEA.

Portsmouth Water should review and update its SEA, HRA and WFD assessments. In doing so it should ensure it has adequately covered all relevant protected sites and given reasons for any exclusion. The study area and transboundary effect characteristics should be clearly defined. Bulk supply agreements should be included or appropriate justification for their omission. The company should clearly present how the SEA has informed options appraisal, strengthening best value decision making evidence. The company should confirm the source of supply for Source O booster and whether there is any abstraction increase associated with this and ensure this has been assessed appropriately. Portsmouth Water should make its HRA publicly accessible online.

2.2 Our response to Issue 2

To support our response, as set out in the sections below, a meeting was held with Natural England on 14th February 2024 to discuss and better inform our understanding of the actions needed to address the issues detailed under Issue 2 of the Defra Response 'Environmental Assessments'. In particular Natural England identified that our plan level (WRMP24) assessments need to sign-post that project level (site / catchment) assessments will be further explored and progressed as part of the AMP8 WINEP. We are committed to working with the Environment Agency and Natural England on project level investigations as part of WINEP to ensure that we address all regulator concerns.

2.2.1 What are the potentially environmentally damaging abstractions?

As set out in Chapter 9 of the rdWRMP24 SEA Report, we recognise that our WRMP is not starting from a 'blank sheet of paper' and Portsmouth Water (as with all water companies) operate a water supply network that has been developed over many decades and is the result of previous Plans and investment decisions made during periods when environmental matters were often not considered as important as they are today.

Portsmouth Water abstract an average of around 175Ml/d to supply approximately 320,000 properties with clean drinking water. This water is abstracted from one group of springs, one river and 19 borehole sites under abstraction licences from the Environment Agency. These abstractions are all from chalk aquifers. We set out our existing/current licences in Table 2 of Appendix 5B 'Investigating and Achieving Sustainable Abstraction', which is adapted in Table 1.

Table 1: Existing abstractions

Source	Current Licence (Ml/D)
Source U	0.00
Source O	8.00
Source P	10.25
Source M	6.39
Source L	20.87
Sources QRST	28.38
Source A	43.61
Source D	1.75
Source C	18.76
Source E	0.45
Sources GFH	18.14
Source J	22.73
Source I	5.59
Source B	98.00
Source N	27.27
Source K	11.37
Total	**321.56**

We recognise the global importance of chalk aquifers and streams within our supply region and are committed to reducing the effects of abstraction on the environment and bringing enhancements where possible. In addition to the priority chalk habitat, our supply region also contains five Special Protection Areas (SPAs); four Special Areas of Conservation (SACs); 32 Sites of Special Scientific Interest (SSSIs); five National Nature Reserves (NNRs) and 26 Local Nature Reserves (LNRs).

Recognising that the current water supply network may be having adverse effects on the environment, our WRMP24 includes commitments to assess the effects of Portsmouth Waters current abstractions and to implement mitigation to protect and enhance the aquatic environment, focusing on the following drivers:

1. Restore the effects of potential over-abstraction from aquifers and rivers;

2. Prevent deterioration in environmental status from growth in abstraction;

3. Prevent future deterioration due to environmental changes i.e. linked to climate change (moving to proactive protection, rather than reactive);

4. Ensure no significant negative effects from proposed options as part of the rdWRMP24;

5. Prevent negative effects from temporary increases in abstraction (i.e. via drought permits); and

6. Ensure our time limited licence variations are sustainable.

These drivers can be mapped to three core workstreams for PR24 which will primarily be delivered via Portsmouth Waters PR24 Water Industry National Environment Programme (WINEP), and other investigations and assessments Portsmouth Water have put forward. These workstreams, set out in Appendix 5B of the rdWRMP24, include:

- Environmental Destination (including Licence Capping) (WINEP Driver 1-4, Section 1.2 of Appendix 5B);
- Drought Permit Options (WINEP Driver 5, Section 1.3 of Appendix 5B); and
- Time Limited Licence Variations (Driver 6, Section 1.4 of Appendix 5B).

To show how we plan to reduce our reliance on any environmentally damaging abstractions identified through the investigations, we propose that Chapter 9 of the SEA Report will be updated to set out our planned WINEP investigations (including scope and programme) linked to potentially environmentally damaging abstractions, as well as further work required, in line with our Environmental Destination, as highlighted in the rest of this section 1.2.1.

Environmental Destination

Environmental improvements driven by Environmental Destination are by far the largest driver for abstraction reduction for us. However, there are significant uncertainties in the assumptions that inform the future predicted flow requirements and the levels of abstraction reduction that may be required. Therefore, there is a need to better quantify these potential reductions based on detailed analysis and data collection.

In WRMP24 this uncertainty was incorporated via three future scenarios: Low, medium (Central) and High Environmental Destination. When used by the investment model, the three Environmental Destination scenarios resulted in a wide range in the scale of supply options selected to meet the supply forecasts. For Portsmouth Water, the Low Environmental Destination scenario generally results in the supply deficit being resolved by demand, drought and conjunctive use options, whilst Medium and High Environmental Destination scenarios result in the need for imports and additional supply schemes, in addition to the demand schemes.

Portsmouth Water's Low Environmental Destination scenario also includes changes in supply driven by 2030s abstraction reductions that may be required to achieve the minimum statutory requirements. This includes several groundwater abstractions identified by the Environment Agency as having a risk of causing deterioration in selected elements under the Water Framework Directive.

Given the significance of the estimated environmentally driven reduction in deployable output, and the scale of the subsequent potential investment in supply schemes, there is an important need to undertake detailed investigations to quantify these reductions and identify potential mitigation measures. The investigations will form part of Portsmouth Water's AMP8 WINEP Programme and include detailed investigation of selected sources as well as catchment and operational area level investigations. These source, catchment and operational level investigations are interdependent. The outcomes of the investigations will ultimately inform the next iteration of the plan (WRMP29) and the development of a best value plan through:

- Confirming the magnitude of abstraction reductions required to meet short-term and longer-term environmental requirements in each catchment alone and across the operational area to inform water resource modelling.
- Reducing uncertainty regarding the potential adaptive pathway that is likely to be adopted.
- Identifying catchment measures that are required (alone or in-combination with abstraction reductions) to inform water resource modelling and regional modelling.
- Confirming the viability/suitability of changing source locations or introducing new sources.
- Identifying the type and location of supply options that may be required (to account for the deployable output deficits) for inclusion in regional modelling.

WINEP

Appendix 5B 'Investigating and Achieving Sustainable Abstraction'[1] (section 2.2) further sets out our possible licence reductions which are detailed in the plan. The abstraction reduction scenarios developed through application of the Environment Agency's Water Resources National Framework document (Environment Agency, 2020), were the Environmental Destination profiles used in WRMP24. It is to be noted that these generic scenarios were not intended to be confirmed final figures for any catchment.

All Portsmouth Water's 21 sources except one, have potential licence changes. The licence profiles have been agreed with the Environment Agency for the purpose of adaptive planning within the revised dWRMP24. These have been set out in Table 2 of Appendix 5B (rdWRMP24) which is replicated in Table 2. Figure 2 further sets out the profiles of potential abstraction reduction (and as a result deployable output losses) over the planning period.

Table 2: Potential Licence changes per source under the low to high environmental destinations by 2050 (Ml/d)

Source	WINEP investigation catchment	Current Licence (Ml/D)	Possible licence (low destination – normal year)	Possible licence (low destination – 1 in 500 year)	Possible Licence (medium destination)	Possible licence (high destination)
Source U	08PW100001	0.00	0.00	0.00	0.00	0.00
Source O	09PW100003	8.00	5.10	6.09	3.00	0.75
Source P	09PW100003	10.25	8.71	8.71	10.25	8.71
Source M	09PW100002	6.39	3.60	4.07	3.40	1.67
Source L	09PW100002	20.87	13.60	15.26	13.02	7.30
Sources QRST	08PW100007	28.38	20.60	27.11	19.41	7.74
Source A	08PW100005	43.61	26.00	32.70	26.00	21.00
Source D	08PW100004	1.75	1.75	1.75	1.75	1.75
Source C	08PW100004	18.76	18.70	18.76	15.00	7.04
Source E	08PW100002	0.45	0.10	0.10	0.00	0.00
Sources G, F & H	08PW100002	18.14	11.20	13.17	10.45	7.94
Source J	08PW100003	22.73	9.60	10.74	9.05	3.07
Source I	08PW100003	5.59	0.84	1.92	1.50	0.84
Source B	09PW100004	98.00	85.00	85.00	85.00	70.23
Source N	08PW100001	27.27	21.10	21.62	9.90	0.00
Source K	09PW100004	11.37	11.37	11.37	11.37	11.37
Total		**321.56**	**237.27**	**258.37**	**219.10**	**149.42**

[1] 5B-rdWRMP24-Appendix-5B-Investigating-and-Achieving-Sustainable-Abstraction-.pdf (portsmouthwater.co.uk)

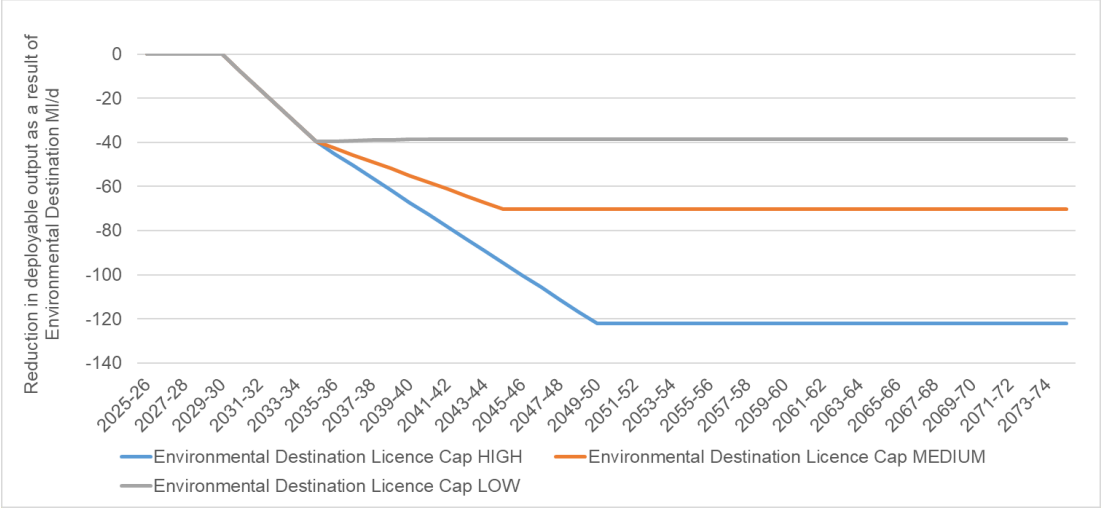


Figure 2 Potential deployable output reduction profiles

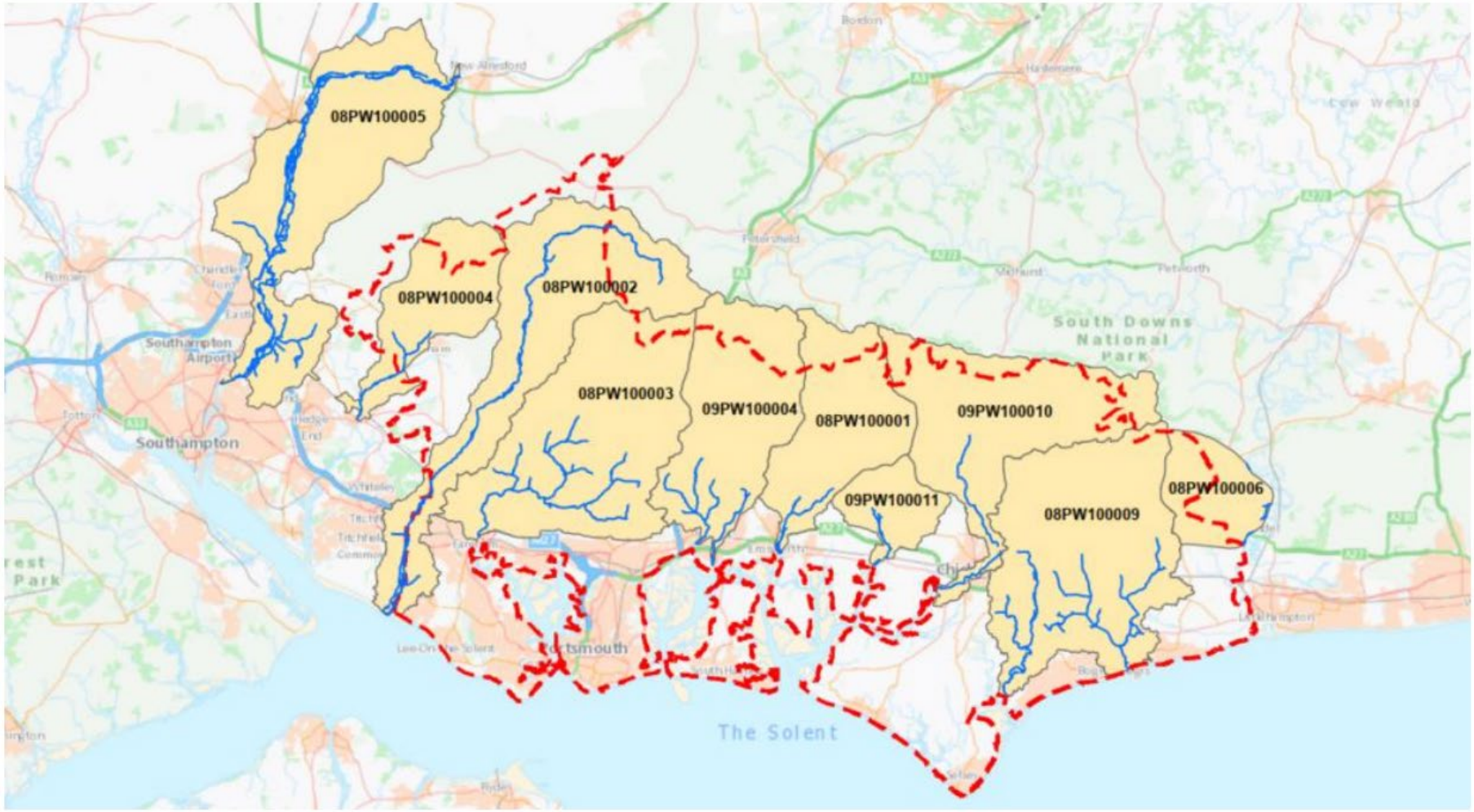
The range in potential reductions is obviously significant and drives very different investment scenarios in the revised rdWRMP24, so it is vital we achieve a higher degree of certainty to allow the necessary detailed planning to occur. That is why in our WINEP submission we are proposing our largest ever round of environmental investigations to get that necessary certainty. In total, there are 11 investigation schemes planned for AMP8, with one investigation scheme planned for AMP9, covering the entire Portsmouth Water operational area. In addition, there is also one implementation scheme planned for AMP8. 11 out of the 12 schemes are linked to water resources. The investigations typically have more than one driver which include Water Framework Directive (WFD), Environmental Destination (ED) and designated site drivers e.g. Habitats Directive (HD), NERC (NERC) and Sites of Special Scientific Interest (SSSI).

A summary of the WINEP investigations are included in Table 3 and presented in Figure 3.

Table 3 Portsmouth Water PR24 and PR29 WINEP Schemes

Main River Catchment	WINEP Action ID	Type	Primary Driver	Secondary Driver	Tertiary Driver	Delivery period	Investigation Type
Arundel SSSI, Swanbourne Lake, Aldingbourne Rife, Lidsey Rife	08PW100009	Water Resource	WFD	ED	-	AMP8	Catchment based investigation and options appraisal
River Ems	08PW100001	Water Resource	WFD	ED	-	AMP8	Catchment based investigation and options appraisal
River Meon	08PW100002	Water Resource	HD	NERC	WFD	AMP8	Catchment based investigation and options appraisal
River Wallington	08PW100003	Water Resource	WFD	ED	WFD	AMP8	Catchment based investigation and options appraisal
River Hamble	08PW100004	Water Resource	WFD	ED	-	AMP8	Catchment based investigation and options appraisal
Lavant	09PW100002	Water Resource	WFD	ED	-	AMP8	Catchment based investigation and options appraisal
Fishbourne	09PW100003	Water Resource	WFD	ED	-	AMP8	Catchment based investigation and options appraisal
Hermitage Stream	09PW100004	Water Resource	WFD	ED	-	AMP9	Catchment based investigation and options appraisal
River Itchen	08PW100005	Water Resource	ED	-	-	AMP8	Options appraisal only
Arundel SSSI, Swanbourne Lake, Aldingbourne Rife, Lidsey Rife	08PW100006	Water Resource	SSSI	-	-	AMP8	Drought permit investigation and mitigation
Regional	08PW100007	Water Resource	EDWRMP	-	-	AMP8	Options Appraisal only
Companywide INNS implementation	08PW100008	Invasive Species	INNS	INNS	-	AMP8	Implementation

Figure 3 Location of the catchment based WINEP investigations proposed



As noted above, a key outcome of the WINEP investigations is confirmation of the abstraction reductions required in addition to a detailed options appraisal to identify the measures required to meet Good Ecological Status in the short-term (under WFD No Deterioration driver), maintain or restore favourable ecological status at a European site (HD driver), as well as the environmental enhancement in the long-term (under ED driver). A range of actions are likely to be considered during this options appraisal process which may include abstraction reductions, catchment or nature-based solutions or a combination of both. The inclusion of catchment-based solutions may allow a reduction in the licence change via the generation of wider ecological benefits.

WINEP Programme

As can be seen in Table 3, the primary driver for the Portsmouth Water WINEP investigations is the WFD Driver, mostly associated with the chalk aquifers in the region. Investigations under this driver are to determine the likelihood that future abstraction will cause WFD status deterioration in any element affecting the ecological status of a waterbody and to identify effective solutions.

A secondary driver, the Regional Environmental Destination Driver has been identified for each of the WINEP investigations. This requires investigations, options appraisals or feasibility studies for actions identified within the WRMP to meet regional planning requirements that do not fit with WFD driver requirements. The inclusion of the Environmental Destination driver in the investigations would reduce uncertainty and see quicker or better delivery of Environmental Destination.

Further to this, the Habitats Directive Driver to investigate existing abstractions that are potentially causing deterioration, alone or in-combination, to a European Site by reference to its qualifying features and conservation objectives will require investigations and potential options appraisal studies.

A key challenge of the WINEP investigations is the restricted programme, with most of the investigations needing to report in December 2026 to confirm the likely licence reductions that may be required, the consequent supply deficit that should be addressed and the scope/scale of the potential options for consideration in the regional modelling and Options Appraisal process, including environmental enhancement measures.

This leaves a limited time to collect robust evidence (e.g. to complete targeted environmental monitoring, update regional groundwater models, complete model runs, etc.) and therefore there may be less certainty of the abstraction reduction requirement and achieving sustainable abstraction. This may leave some uncertainty in the decision-making process with a risk that costly and potentially non-cost beneficial supply options are still being considered in the next planning cycle. In order to mitigate the potential risk, Portsmouth Water has secured early start funding and are also considering investigations on an operational area scale, to reduce uncertainty for WRMP29.

Investigations are being grouped into two workstreams, the first will cover overarching WINEP investigations which cover the Portsmouth Water operational area (catchment scale reviews and In-Combination assessments) and a second which includes individual investigations, as presented in Table 3.

The overarching WINEP investigations will include:

- In-combination groundwater and surface water modelling and assessment;
- In-combination effects on transitional water;
- Catchment scale review of environmental sensitivity; and
- Catchment and operational area scale measures.

The planned investigations in the individual WINEP investigations will adopt a phased approach, aligned with WRMP29 requirements with target dates agreed with the Environment Agency. A draft programme for the phased investigation is set out in Table 4.

Table 4 Summary of phased investigation approach for individual WINEP investigations

Phase	Activities	Target date	Outputs
Initial	• Agree objectives and outcomes for investigations. • Agree actions and methodologies. • Define data and 'early start' monitoring requirements. • Agree priorities for key receptors and sensitive sites. Agree modelling requirements and water resource. scenarios.	April 2024	Agreed Action Specific Forms
1	• Agree set of potential impacts of abstraction (pathways). • Complete initial modelling. • Agree additional monitoring/survey requirements. • Agree additional tools and data required. • Agree approach to detailed impact assessment. • Fill any remaining data gaps. • Prepare models/tools for detailed impact assessment. • Prepare data ready for detailed impact assessment.	Spring 2024*	Phase 2 monitoring plan Detailed scope and approach for Phase 3
2	• Fill any remaining data gaps. • Prepare models/tools for detailed impact assessment. • Prepare data ready for detailed impact assessment.	December 2025	Monitoring reports and data
3	• Model and assess agreed abstraction scenarios. • Define WFD risk and identify additional measures that can contribute to Environmental Destination. • Develop robust evidence to assess mitigation measures, costs and benefits, if required	July 2026	Confirmation of licence reductions Agree mitigation measures
4	• Cost-benefit analysis • Agree implementation timescales • Identify measures for implementation AMP9	December 2026	Confirmation of measures for Regional Modelling

* Given the short timescales, the Phase 1 investigations would need to be completed by Spring 2024 to enable at least one year of monitoring

A total of nine investigations will be required. The outcome of the investigations will indicate any effects of abstraction on the wider environment. If significant effects are identified, then the Phase 4 options appraisal would be undertaken. It is anticipated that the outcomes of such appraisals would likely fall into the following categories:

- The source(s) is subject to a licence reduction.
- A catchment-based solution(s) is implemented to bring wider environmental benefits, whilst retaining abstraction.
- An abstraction source is subject to a smaller licence reduction with potential impacts being offset/ mitigated by catchment-based solution(s).
- An alternative supply option is considered (which may include relocating the source further downstream or a whole new source of water)
- A combination of all the above.

The outcomes of the investigation will, therefore, need to inform the water resources modelling to update the WRMP24 estimates on expected deficits and identify catchment and nature-based solutions that need to be considered. Ultimately the WINEP investigation defines the measures and options that need to be subject to the Option Appraisal to establish the best value plan.

The summary of the draft, phased investigation approach for the individual WINEP investigations (Table 4) shows that some urgent actions are needed with the following recommended target dates:

- Initial phase: agreed ASFs by **April 2024**
- Phase 1: Phase 2 monitoring plan plus detailed scope and approach for Phase 3 by **Spring 2024** (Phase 1 investigations would need to be completed by Spring 2024 to enable at least one year of monitoring)
- Phase 2: Monitoring reports and data by **December 2024**
- Phase 3: Confirmation of licence reductions and agree mitigation measures by **July 2026**
- Phase 4: Confirmation of measures for regional modelling by **December 2026.**

Portsmouth Water are committed to ensuring that that they comply with all relevant statutory requirements and will work closely with Natural England, Environment Agency and any other relevant body on an ongoing basis to ensure a continued iterative approach to resolving uncertainties related to environmental effects of potable water supply and resolve outstanding statutory environmental issues before the final plan is published.

2.2.2 Specific concerns

2.2.2.1 Additional information on Special Areas of Conservation

The DEFRA letter states:

- *As also set out in the Water Resources Planning Guideline (WRPG), this includes ensuring that any **previous HRA of options included in your preferred plan remains current and covers any material changes in circumstance**. The company should therefore continue to work closely with both NE and EA to resolve outstanding statutory environmental issues before the final plan is published**. In particular, the SEA, HRA and WFD assessments do not adequately cover the Itchen (SAC) and potential SACs such as the Meon within the assessments.***

As set out above, Portsmouth Water are committed to an extensive programme of WINEP investigations. At present, only one scheme is being investigated under a Habitats Directive (HD) Driver, as set out in Table 3. We propose the following text for addition to the Habitats Regulations Assessment report for our WRMP.

Portsmouth Water are committed to an extensive programme of WINEP investigations as detailed in our Strategic Environmental Assessment. At present, only one scheme, 08PW100002 (River Meon), is being investigated under a Habitats Directive (HD) Driver, in relation to existing abstractions (Source E, and GFH), as set out in Table 3.

Where identified, the HD WINEP Investigation and/or Options Appraisal will determine the impacts of water company activities, or permit / licence conditions/standards on a European site or Ramsar site or to determine the costs and technical feasibility of meeting targets. Where this is the objective of the investigation, the impacts will need to be considered in view of the latest condition status of the relevant site. For European sites, this will also consider the Conservation Objectives for the site and, where available, the Supplementary Advice on Conservation Objectives (SACO) for that site. Where specific flow and/or water quality targets have not been specified in the SACO, the Common Standards for Monitoring Guidelines (CMSG) will be used to identify the targets to be considered in the assessment of risk to favourable conditions status.

The WINEP investigations will consider Recent Actual (RA), Fully Licenced (FL) and Future Predicted (FP) abstractions. The FP abstraction will be defined by identifying the predicted growth in abstraction. If the WINEP investigation shows that (a) there is an identified risk for affecting the favourable condition status of a of a European/nationally protected site or species or (b) there is an identified risk for preventing attainment of favourable condition status of a European/nationally protected site or species, then a key success measure will be the successful delivery of an Options Appraisal that identifies a preferred solution to be implemented. The possible solutions would largely fall into one of five core categories:

1. An abstraction source is subject to a licence change.
2. Implementing catchment measures e.g. nature-based solution(s) to bring wider environmental benefits, whilst licenced abstraction remains unchanged.

3. An abstraction source is subject to a smaller licence reduction with potential impacts being offset / mitigated by nature-based solution(s).
4. An alternative supply option is considered (which may include relocating the source further downstream or a whole new source of water).
5. A combination of two or more of the above.

In addition to the individual investigations, a catchment scale investigation will also be undertaken to consider the combined effects of Public Water Supply (PWS) and no-PWS abstractions in-combination on groundwater levels and surface flows and the subsequent effects on transitional and marine water bodies that are considered European or Ramsar sites.

The River Meon is not a designated European site, but is being considered as a potential SAC by Defra (although not formally notified as a possible SAC (pSAC) with reference to UK policy[2]). The River Meon is a characteristic chalk stream and likely supports the Habitats Directive Annex I habitat: H3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation and associated Annex II species such as southern damselfly, Atlantic salmon, white-clawed crayfish, lamprey species, bullhead and otter. It is hydrologically linked to the Solent and Southampton Water SPA and Ramsar site; the SPA being designated for breeding common tern, little tern, Mediterranean gull, roseate turn and sandwich turn; non-breeding black-tailed godwit, brent goose, ringed plover and teal; and its waterbird assemblage; whilst the Ramsar site is designated under Criterion 1 (estuarine habitats), Criterion 2 (plant and invertebrate assemblage), Criterion 5 (bird assemblages of international importance) and Criterion 6 (ringed plover, dark-bellied brent goose, teal and black-tailed godwit). The River Meon flows into the designations approximately 2.5 km from the coast at Ordnance Survey National Grid Reference (OSNGR) SU54200462.

Portsmouth Water are also aware that compensatory measures have been developed by Southern Water to address potential adverse effects on the River Itchen SAC from the implementation of two options within Southern Waters Drought Plan; the Candover Augmentation Scheme and Lower Itchen Sources Drought Orders. In accordance with the Habitats Regulations and consideration of the derogations at Stage 3, Southern Water completed a review of all feasible and reasonable alternative solutions to the inclusion of the Candover Augmentation Scheme and the Lower Itchen Sources Drought Orders in the final Drought Plan. This review concluded that there were no alternatives available during the lifetime of the Drought Plan (2022 to 2027).

As a consequence, Southern Water's HRA examined whether inclusion of the Drought Orders could be shown to be required on the grounds of Imperative Reasons of Overriding Public Interest (IROPI). Southern Water's assessment concluded there were substantive grounds for the Secretary of State to be able to agree that IROPI was appropriate in relation to these two Drought Orders in view of the high risk of requiring an Emergency Drought Order to ration water supplies using rota cuts or standpipes if the Drought Orders could not be implemented in a severe drought. It concluded 'the major adverse effects of an Emergency Drought Order on people and businesses in the Hampshire Southampton East Water Resource Zone (WRZ) outweigh the effects on the River Itchen SAC'.

The Environment Agency agreed that Southern Water had a good case that it had no alternatives to its Lower Itchen sources Drought Order and Candover Drought Order scheme in order to maintain public water supplies until the implementation of long-term water resource solutions.

Having determined there was a good case for IROPI, the final stage of the HRA process was to identify appropriate compensation measures. The compensatory measures and associated implementation timetables were agreed with Natural England and the Environment Agency for both the Lower Itchen Sources Drought Order and the Candover Augmentation Scheme Drought Order.

[2] Department for Levelling Up, Housing and Communities (2023) National Planning Policy Framework (NPPF). Paragraph 187.

The compensation measures include a 10-year implementation package of river restoration and catchment management measures, including chalk stream habitat restoration measures and habitat enhancement to help protect and enhance rivers with floating vegetation (often dominated by water crowfoot), southern damselfly, white-clawed crayfish and Atlantic salmon. The River Meon was identified as a candidate for receiving compensation measures for Atlantic Salmon and the chalk stream habitat (in the form of river restoration), but mainly the salmon feature[3] and can, therefore, be considered as a 'site identified, or required, as compensatory measures for adverse effects on habitats sites', with respect to NPPF Paragraph 187c.

With respect to the River Meon and the existing Source E and GFH abstractions (i.e. Source E and Group GFH), the rdWRMP explains that Portsmouth Water are planning to reduce its reliance on these sources in all Environmental Destination scenarios. The potential licence reductions for these sources under Low, Medium and High Environmental Destination scenarios is set out in Table 5 below.

Table 5 Potential licence reductions for Sources E and FGH Group under different Environmental Destination Scenarios

Source	Current	Environmental Destination Scenarios			
		Low destination (normal year)	Low destination (1 in 500 year)	Medium destination	High destination
Source E	0.45 Ml/d	0.10 Ml/d	0.00 Ml/d	0.00 Ml/d	0.00 Ml/d
Group FGH	18.14 Ml/d	11.20 Ml/d	13.17 Ml/d	10.45 Ml/d	7.94 Ml/d

Source: Table 2, Appendix 5b rdWRMP24[4]

Regional investment has shown that Portsmouth Water can solve the supply-demand balance when the deployable output is reduced in the water resource zone largely by demand reduction options and also through future supply options including bulk supplies from Southern Water, water recycling and infrastructure upgrades (e.g. Source O Booster), as set out in the rdWMRP24.

Should the conclusion of the WINEP investigation on the River Meon determine that the existing abstractions result in deterioration of the European Site by reference to its qualifying features and conservation objectives, the HRA will be updated and mitigation measures will be proposed. The scope of the mitigation will be developed in conjunction with Natural England and the Environment Agency. Mitigation would likely comprise a package of adaptive management, river restoration, and water quality improvement schemes. Implementing such measure would also likely result in a number of wider environmental benefits including:

- biodiversity and ecological improvements;
- natural flood management (e.g. slowing the flow);
- improvement in water quality of surface water waterbody (e.g. reducing silt input from agricultural land);
- contribution to overall catchment resilience; and
- supporting improved access, amenity, and engagement.

In addition to the proposed HRA work in relation to the River Meon, it is to be further noted that currently, the company wide WINEP work will provide a greater level of additional clarity on environmental effects related to the water supply/ demand balance. Although not identified as yet, this additional clarity may result in the identification of other potential significant effects on other European sites. If this becomes apparent, Portsmouth Water is committed to discussing these with Natural England and the Environment Agency in order to agree a robust course of further assessment.

[3] https://www.southernwater.co.uk/media/4785/ddp22-annex-8-hra-non-technical-summary.pdf
[4] 5B-rdWRMP24-Appendix-5B-Investigating-and-Achieving-Sustainable-Abstraction-.pdf (portsmouthwater.co.uk)

Portsmouth Water is committed to the delivery of any required mitigation, or should it be required, compensatory measures.

2.2.2.2 Bulk supply agreements

The DEFRA letter states:

- ***Furthermore, bulk supply agreements have not been included within the required environmental assessments, without sufficient justification for their omission. Bulk supply agreements should be included or appropriate justification for their omission.***

Section 9.2 of the SEA Report will be updated to include the following text:

'It should be noted that the Havant Thicket reservoir and the associated 21 Ml/d bulk supply have been excluded from the SEA and HRA as both elements of the project have been subject to planning application which was granted by Havant Borough Council and East Hampshire District Council in 2021. Please see Havant Thicket Reservoir | Havant Borough Council for further details on the environmental assessments undertaken in support of the application'.

2.2.2.3 How the Strategic Environmental Assessment influenced the WRMP

The DEFRA letter states:

- ***There is a lack of evidence demonstrating how the SEA has influenced the plan including in the appraisal of feasible and selected options. The company should clearly present how the SEA has informed options appraisal, strengthening best value decision making evidence.***

As set out in chapter 4.6 of the WRSE Regional Draft plan SEA Report[5] the SEA has been an ongoing and iterative process throughout the development of the Regional Plan Best Value plan (BVP), and as a result the individual water company BVPs. Chapter 11 of the SEA Report will be updated to include text on the key decision-points for influencing the BVP as follows:

- The options-level SEA assessed the positive and negative effects of each option and identified possible mitigation and enhancement measures that were fed back to the option design teams. Options with major or moderate negative effects will need appropriate mitigation in order for them to be taken forward. Opportunities to maximise benefits were also considered. Together with the results of the other environmental assessment a list of 'worse performing' options in terms of the environment was developed and these options were removed from the investment model.
- The environmental metrics (translated from the assessment results) were included in the investment modelling to influence the selection of options within the revised draft Regional Plan (rdRP). They were used as part of the development of the rdRP as one of the 'best value' criteria.
- The cumulative and in-combination effects of the selected options were assessed for the rdRP and will be assessed for the final plan and alternatives. The options which have been assessed at this stage as part of the rdRP and have been flagged in this Environmental Report as having the potential for cumulative and in-combination effects, have been fed back to WRSE to identify solutions through methods such as scaling up nearby alternative options, confirming and costing larger mitigation packages to allow the scheme to be retained, amongst others. Appropriate plan wide mitigation and enhancement opportunities are being developed to support overall environmental net gain.

[5] WRSE Revised Draft Regional Plan (August 2023) V1.0, August 2023

As set out in Chapter 10 of our rdWRMP24 SEA Report, in addition to developing the BVP, and as required by the revised Water Resources Planning Guidelines (WRPG), WRSE completed optimisation runs to benchmark and appraise the Best Value Plan against. All alternative plans were constrained to securing a wholesome supply of water to customers and other sectors (multi-sector plan) over the planning period. WRSE developed two reasonable alternatives for each water company, this included a Least Cost Plan (LCP) and a Best Environmental and Societal Plan (BESP). Table 6 sets out the implementation dates of interventions and options Portsmouth Water need to deliver under each of the alternative plans. The results show that for the majority of the planning period the selection of options is consistent. The plans only deviate post 2052 (which is after the end of the 25-year planning horizon required for statutory WRMPs) where the LCP and BESP select additional options for treatment capacity (at Service Reservoir C). The consistency of the selection of options gives confidence in the option selection process for Portsmouth Water's plan. At a regional level there are however larger differences between the plans.

Table 6 Comparison of options between the BVP and alternative plans

Option Name		LVP	BESP	BVP
'High Plus' demand basket (including demand reductions, leakage and Government led interventions)		2025-26	2025-26	2025-26
Non-essential use bans		2025-26	2025-26	2025-26
Temporary use bans		2025-26	2025-26	2025-26
Drought Permit: Source S		2025-26	2025-26	2025-26
Upgrade Source O Booster to 25Mld		2033-34	2034-35	2039-40
Import from Southern Water: Potable Resource for Otterbourne WSW to Source A (Import of potable water from Southern Water (SWSHSE) to the west of our supply area)		2039-40	2039-40	2039-40
Works A treatment capacity increase to treat and distribute water from Havant Thicket Reservoir	Works A increased treatment capacity and pipeline (phase 1)	2046-47	2046-47	2046-47
	Works A increased treatment capacity (phase 2)	2048-49	2048-49	2048-49
New treatment works at Service Reservoir C to treat and distribute water from Havant Thicket Reservoir	New treatment works at Service Reservoir C and pipelines (Phase 1)	2051-52	2051-52	2051-52
	Additional treatment capacity at Service Reservoir C (phase 2)	2063-64	2061-62	-
	Additional treatment capacity at Service Reservoir C (phase 3)	2069-70	-	-

2.2.3 Source O booster upgrade - benefits

The DEFRA letter states:

- ***Source O booster is selected in the plan, but it is unclear where the additional supply benefits will come from and whether this is associated with increases in abstraction. The company should confirm the source of supply for Source O booster and whether there is any abstraction increase associated with this and ensure this has been assessed appropriately.***

This section provides further information on where the additional supply benefits of Source O booster upgrade will come from and proposes updates to the plan level (WRMP24) assessment. We confirm that further assessment of potential future levels of abstraction will be undertaken at a project level (site / catchment level) via the AMP8 WINEP to inform the next plan level (WRMP29) assessment).

Pywr water resources modelling carried out by AtkinsRéalis has shown that the Source O boosters unlock conjunctive use benefit of the Havant Thicket Reservoir. The proposed upgrade of the boosters

alongside Havant Thicket Reservoir results in a significant increase in Water Resource Zone (WRZ) Deployable Output (DO).

The Source O booster scheme will only be operational once Havant Thicket Reservoir has been built (selected in the plan for 2039-40), improving the conjunctive use benefit of the reservoir in a drought scenario. Portsmouth Water has assumed no DO benefit for the Havant Thicket Reservoir and Source O booster scheme in a 'normal year' (non-drought) scenario, i.e. there will be no abstraction from the reservoir and, therefore, no need to re-distribute water.

In a drought scenario, operation of the Source O booster would result in reduced abstractions at the existing groundwater Sources L, Q, T, S and P (mostly to the east of Source O). This is because the water being transferred to the east by the upgraded Source O booster will replace water from these sources. Consequently, the Source O booster causes increased abstractions at groundwater Sources K, D, G, C, F, N, E, H, R and J. These are generally west of Source O and the increased abstraction will be used to replace water that is being diverted eastwards by the booster.

In summary, the Source O booster causes a redistribution of abstraction along with a net increase of around 10 Ml/d in abstraction relative to a 'without' booster scenario. Of this, around 4 Ml/d is taken from Havant Thicket Reservoir, with the remaining 6M/d representing an increase in groundwater abstraction from the western sources.

Given the above information, it will be necessary to update the rdWRMP24 HRA to include the potential impacts from both increased abstraction at groundwater sources in the west, which affect the River Meon, and decreased abstraction at sources in the east.

The groundwater sources to the west that will be additionally drawn upon include Source E, H, F and G, which are in proximity to the River Meon. As the River Meon is fed almost entirely by springs[6], it is reasonable to assume that increased abstraction from nearby groundwater sources could reduce water levels in the Meon, jeopardise it meeting its Environmental Flow Indicators (EFI) and subsequently result in negative effects on aquatic habitats and species, and fail to achieve or maintain 'good ecological status' under the Water Framework Directive.

Furthermore, there is a risk that cessation of abstraction in the east, which would result in increased levels of groundwater, could lead to localised flooding or the mobilisation of nutrients from re-wetted parts of the aquifer, leading to enrichment with watercourses. The potential for either to occur will need to be investigated.

A high-level screening assessment has been undertaken and will be provided in full in the updated HRA. It should be noted that there will be no development at the groundwater source sites as they are all existing abstractions. Therefore, the assessment will only focus on the potential effects of increasing or decreasing abstraction of groundwater and potential consequences for habitats and species. Where the European site is not sensitive to 'human induced changes in hydraulic conditions' or 'pollution to groundwater', or where there is clearly no potential for hydrological connectivity, no Likely Significant Effects (LSE) will be concluded. European sites at risk of being affected, where pathways need further investigation were screened in as 'LSE uncertain'. Where there is more than one borehole/ abstraction point for a given source location, they have been screened individually.

Eleven additional European sites, excluding the River Meon, were scoped in for assessment for the Source O booster using a precautionary 10 km search area. Six of the European sites already feature in the HRA as they have been scoped in for other options in the WRMP. These additional sites are set out in Table 7 and Table 8 below along with the findings of the assessment. The in-combination assessment will be reviewed and these sites in the updated HRA.

[6] http://www.meonvalleypartnership.org.uk/river

Table 7 European sites in the HRA for other options, but now also for Source O booster

European Site	Stage 1 Screening Assessment
Duncton to Bignor Escarpment SAC	No LSE Habitat on sloping/ elevated terrain and highly unlikely to be sensitive to hydrological change or groundwater pollution
Solent and Dorset Coast SPA	No LSE Dynamic coastal site designated solely for birds. At distance from the abstraction site(s).
Arun Valley SPA	LSE uncertain Sensitive to groundwater pollution and hydraulic change. Potential impact from reduced groundwater abstraction needs to be investigated.
Arun Valley SAC	LSE uncertain Sensitive to hydraulic change. Potential impact from reduced groundwater abstraction needs to be investigated.
Arun Valley Ramsar site	LSE uncertain Sensitive to groundwater pollution and hydraulic change. Potential impact from reduced groundwater abstraction needs to be investigated.
Solent and Isle of Wight Lagoons SAC	LSE uncertain Site 'downstream' in catchment. Habitat features may be affected by reduced surface water flows into estuarine/ coastal habitats.

Table 8 European sites new to the HRA now scoped in for Source O booster

European Site	Stage 1 Screening Assessment
River Itchen SAC	LSE Increased abstraction in proximity to the spring fed chalk watercourse is likely to have a negative effect on river habitat and species through reduced water flow.
Butser Hill SAC	No LSE Habitat not sensitive to hydraulic change. SAC is elevated in the landscape and, therefore, unlikely to be affected by changes to groundwater.
East Hampshire Hangers SAC	No LSE Habitat not sensitive to hydraulic change. Much of the SAC is elevated in the landscape and, therefore, unlikely to be affected by changes to groundwater.
Solent and Southampton Water SPA	LSE uncertain Site 'downstream' in catchment and sensitive to groundwater pollution.
Solent and Southampton Water Ramsar site	LSE uncertain Site 'downstream' in catchment and sensitive to groundwater pollution.

The River Meon, which for the purpose of the HRA is being treated as a pSAC, is also considered in the assessment. The boundary was taken to be the river channel from West Meon (OSNGR SU64042393) to the coast. It was concluded that eight of the proposed sites for increased abstraction within 10 km of the River Meon could have an LSE on river habitats and species due to reduced groundwater availability. These were groundwater Sources K, D, G, C, F, E, H and J.

It will be necessary to revise the Appropriate Assessment (Stage 2) for the WRMP in light of the outcome of the screening assessment to include the additional seven European sites for which there was an 'LSE' or 'LSE uncertain' result, plus the River Meon pSAC, for the Source O booster option.

Therefore, in summary, the changes to the rdWRMP24 HRA will include:

- Section 1 Introduction - Text introducing the reason for the update to the HRA;
- Section 2 Methodology – additional methodology text with respect to including the Source O booster groundwater sources in the assessment;

- Section 3 Portsmouth Water's rdWRMP24 Options – information provided about the sources associated with the Source O booster;
- Section 4 HRA Stage 1 Review – the screening assessment for the Source O booster sources will be provided in an appendix and the results summarised in this section either within Table 4-2 or as a stand-alone supplementary table. The assessment of in-combination effects will be revisited, considering other plans and projects, within-plan effects, and inter-company effects;
- Section 5 Appropriate Assessment – will be updated following detailed review of the screening outcome, both alone and in-combination. Source O boosters already taken through to appropriate assessment;
- Section 6 Conclusions – to be updated in light of the revised assessment;
- Appendix A – additional European site information relevant to the updated assessment will be added;
- Appendix B – new Table B-4 to be added for the Source O booster sources assessment;
- Appendix C In-combination Assessment for the Upgrade Source O Booster to 25 Ml/d - to be updated as required;
- Appendix E Inter-company in-combination effects – to be updated as required;
- Appendix F Appropriate Assessment – Table F-1 to be updated to include any additional sites taken through from screening.

The Portsmouth Water Environmental Destination has evolved in parallel to the development of supply schemes for WRMP24 and has resulted in a highly complex water resource planning problem, for which further work is required to understand how the scheme benefits may vary under different Environmental Destination scenarios.

The drought related abstractions modelled with the Source O booster and Havant Thicket Reservoir have been compared with the Low Environmental Destination licence settings. This demonstrated that abstractions exceed the latest Low Environmental Destination licence settings for Sources A, N, E, F, H, G, L, and P. However, at other sources, there would be spare licence, suggesting that at least some of the abstraction could be rebalanced.

For the next WRMP29 Portsmouth Water will be updating its High, Medium and Low Environmental Destinations to reflect the findings of the AMP8 WINEP programme. Once developed, we will also improve the characterisation of supply scheme yield benefits under these different Environmental Destinations using the Pywr model. This is expected to result in a revision to the characteristics and benefit of the Source O booster, improving the confidence that it is compliant with environmental legislation, i.e. the further assessments will determine which sources increase as a result of the option, enabling an understanding of whether there is potential to affect a European site and further HRA required.

2.2.4 Study area and transboundary effects characteristics and assessment

The DEFRA letter states:

- ***Finally, there could be <u>further clarity on study area and the transboundary effects characteristics</u> and assessment in the SEA.***

The SEA sets out the geographical scope of the WRMP24 in Section 3.1.1 and as Figure 1-1 of the rdWRMP24 SEA Report. This is defined as the Portsmouth Water supply area which is bounded by Southern Water and South East Water supply areas.

Portsmouth Water consider that transboundary effects (both at a company level, regional level i.e. WRSE companies, and at a national level i.e. between Water Resource groups across the nation) have been considered, at the option level, within the in-combination assessments. Section 3.1.1 of the SEA Report, will be updated to include the following text:

'Assessing transboundary effects in an SEA, in line with the Espoo Convention, involves considering the potential impact of a project or development on neighbouring countries or regions. Water companies that would be affected by a proposed scheme in a neighbouring water company plan or region e.g. an SRO, will have been collaboratively involved in the scheme design/development and are already aware of the potential impacts. It is therefore considered that all potential transboundary effects, at a regional or national level, with Portsmouth Water options have been addressed at the option level in-combination assessments as set out within this SEA Report. As such transboundary effects do not need to be considered further within this report.'

As set out in Table 4-2 of the rdWRMP24 SEA Report (extracted below as Table 9), characteristics of effect are qualitatively applied to residual effects through professional judgement to aid appreciation of assessment findings.

Table 9 Characteristics of Effect

Magnitude (size of effect)	Scale (implications of effect)	Duration (length of time over which effect will be present)	Permanence (lasting of effect)	Certainty (that effect will occur)
Large (L) **Medium (M)** Small (S)	Local (L) Regional (R) National (N) Global (G)	Long term (LT) Medium term (MT) Short term (ST)	Temporary (T) Permanent (P)	High (H) Medium (M) Low (L)

In respect of effect duration, for the purposes of the assessment, the "short term" is described as the effects arising generally during the infrastructure construction period typically 2-5 years (different technologies have different construction times); the "medium term" as typically between 5 and 30 years (operational lifetimes vary with the characteristics of different technologies); and the "long term" as beyond 30 years (and including decommissioning where relevant).

In respect of effect magnitude and scale attributes, professional judgement is applied and includes consideration of the level of designation afforded to a receptor and how widespread an effect may be felt, accounting for geographic boundaries including those at a local authority, regional and national level. Certainty is an important attribute used to reflect the level of detail known of an option and then the certainty attributed to any effect arising from the option. Low certainty may reflect those options where design detail is poor or further investigation is required. Certainty also reduces for those options promoted later in the plan period where (unknown/unclear) changes in future baseline give rise to uncertainty in current assessment.

The additional clarification set out above is included in Section 4.3.2.2 of the SEA Report.

The DEFRA letter also states:

- ***Appendix E of the Environment Report provides more detailed assessment tables for each option. Each of the SEA objectives is assessed without mitigation and with mitigation in place. The residual characteristics of effect are also set out. However, it is not clear why this hasn't been undertaken for the pre residual effects.***

We will add the following clarification text under under Section 4.3.2.2 of the SEA Report:

"As set out in the UKWIR 'Environmental Assessment Guidance for Water Resource Management Plans and Drought Plans' options assessment should 'focus on reporting of the residual effects after consideration of mitigation and enhancement measures', which is what has been presented in the SEA".

No further action considered to be needed.

2.2.5 Adequate assessments and exclusions

The DEFRA letter also states:

- ***Portsmouth Water should review and update its SEA, HRA and WFD assessments. In doing so it should ensure it has adequately covered all relevant protected sites and given reasons for any exclusion.***

The supporting Environment Agency annex states that:

- ***The cumulative assessment considers developments/projects within 1km distance of each other. This seems small when some effects have been identified to have a significant 'regional' effect (e.g. 'Drought Permit: Source S' on the Biodiversity objective).***

It is to be noted that the 1km distance was only used to identify potential in-plan construction impacts, as set out in chapter 13.2.1. It is considered that options within an approximate 1km distance of each other and with potentially overlapping construction periods are most likely to give rise to cumulative construction effects. Cumulative effects that will be felt at greater distances are addressed within the HRA and WFD in combination assessments, and also reported in Chapter 13.

The supporting Environment Agency annex also states that:

- ***For the cumulative effects assessment, characteristics of effects and in some cases whether the effect is significant, have not been identified for all receptors (e.g. within Table 13-1).***

The assessment of in-plan cumulative effects (Table 13-1 and 13-2 in the rdWRMP SEA Report) has been clarified and strengthened to include characteristics of effect and effect significance. Inherent in cumulative effect assessment is a higher degree of uncertainty owing to approximate construction and operation timelines, lack of detailed scheme design and uncertainty with respect to future baseline conditions. As such certainty is considered low and further assessment at the project level will be required to identify and (where necessary) mitigate potentially significant adverse effects.

Both Table 13-1 and 13-2 of the SEA Report have been updated to reflect the additional clarification with regards to effect characteristics, as set out in Table 10 and Table 11 below.

Table 10 Potential for In-Plan cumulative effects during construction

Options assessed cumulatively	Likely cumulative effects during construction	Mitigation proposed
Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 1) **And** **Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 2)** **And** **Pipeline associated with Works A treatment capacity increase to distribute water from Havant Thicket Reservoir**	Cumulative effects on Water (quality) due to increased potential for contamination of the water environment during construction activities although it is not anticipated that effects would be significant. Note in respect of the Works A group of options, proposals are within an existing water treatment works and construction therefore limited to within the footprint of the existing site where separated drainage and on site pollution control measures are enacted as standard procedure. Works such as topsoil stripping etc., would be very limited in such a site. In respect of temporal overlap, it is understood that 'Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 2)' is a further expansion to be secured after the first phase and therefore no overlap of construction periods considered likely.	Best practice construction measures to be implemented including provision of CEMP which outlines measures to protect the water environment. For example, this would require the use of spill kits and other measures to be taken in the event of a pollution incident.

(All options intersect within an existing treatment site)	Note that the WFD cumulative assessment identifies that 'Not part of a river WB catchment (216)' waterbody is impacted by these three options but concludes that there would be no adverse effect on the waterbody individually or in combination. As the increased treatment capacity options are within an existing site cumulative effects with the construction of the Pipeline associated with Works A treatment capacity increase to distribute water from Havant Thicket Reservoir are expected to be limited. The HRA did not identify any in-combination effects between these schemes. In summary potential cumulative adverse effects during construction is considered minor adverse (not-significant) where mitigation measures as set out are adopted. Effects are of small magnitude, local scale, short term and temporary to the construction phase.	
New Treatment works at Service Reservoir C to treat water from Havant Thicket Reservoir (Phase 1) **And** **Pipeline associated new treatment works at Service Reservoir C to distribute water from Havant Thicket Reservoir** (Both options intersect at New Treatment works)	Potential for cumulative effects on Water due to increased potential for contamination of the water environment through pollution incidents. Note that WFD assessment identifies that 'Meon' waterbody is impacted by these two schemes but concludes that there would be no adverse effect on it individually or in combination. Construction works associated with the pipeline may be at the location of the proposed new treatment plant works at Service Reservoir C. Should works at the new treatment plant be concurrent with works in support of the pipeline development, increased disruption in respect of noise, air quality and potentially traffic related disruptions may arise however effect are not considered significant. It is also to be noted that construction works associated with the pipeline at the location would be for a short time only. Potential cumulative adverse effects in respect of the above during construction is considered minor adverse (not-significant) where mitigation measures as set out are adopted. Effects are of small magnitude, local scale, short term and temporary to the construction phase. There is an area of ancient woodland and priority habitat within close proximity to the options and therefore there may be indirect cumulative effects such as such as noise and dust (Biodiversity). The HRA did not identify any in-combination effects between these schemes. Potential cumulative adverse effects during construction is therefore considered minor adverse (not-significant) where mitigation measures as set out are adopted. Effects are of small magnitude, local scale, short term and temporary to the construction phase. The options both fall within Grade 3 land which may result in the loss of best and most versatile land. Cumulative effects are anticipated in respect of Soil. Potential cumulative adverse effects during construction is therefore considered minor adverse (not-significant) where mitigation measures as set out are adopted.	Incorporate use of CEMP to ensure best practice techniques are followed and which outlines measures to protect the water environment and minimise the likelihood of a pollution incident occurring, and measures for how to deal with a pollution event should one occur, as well as minimising disturbance effects on habitat. Further surveying to establish presence of BMV land and design accordingly to reduce / minimise loss and reinstate on completion. Best practice mitigation measures implemented during construction including Dust management plan and implementation of noise barriers, however minor and temporary impacts on air quality may remain. Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction.

	Effects are of small magnitude, local scale, short term and temporary to the construction phase. Both options are in proximity to residential properties along Wickham Road/Hoads Hill and therefore cumulative effects arising from construction activities (air quality/dust, noise and traffic related disruptions) may be anticipated (Air quality and Population and human health). Potential cumulative adverse effects during construction is therefore considered minor adverse (not-significant) where mitigation measures as set out are adopted. Effects are of small magnitude, local scale, short term and temporary to the construction phase. There is potential for effects on local roads including the Wickham Road/Hoads Hill as a result of construction traffic and therefore cumulative effects are anticipated in respect of Material Assets. Potential cumulative adverse effects during construction is therefore considered minor adverse (not-significant) where mitigation measures as set out are adopted. Effects are of small magnitude, local scale, short term and temporary to the construction phase.	

Table 11 Potential for In-Plan cumulative effects during operation

Options within 1km of each other	Likely cumulative effects during operation	Mitigation proposed
Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 1) **And** **Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 2)** **And** Pipeline associated with Works A treatment capacity increase to distribute water from Havant Thicket Reservoir	There are potential beneficial cumulative effects as a result of the increased water supply (quantity) associated with these options (Water). Potential cumulative adverse effects during operation is considered moderate beneficial (significant). Effects are of medium magnitude, regional scale, long term / permanent. Note that WFD assessment identifies that 'Not part of a river WB catchment (216)' waterbody is impacted by these three schemes but concludes that there would be no adverse effect on it individually or in combination. Cumulative adverse effects are anticipated with respect to operational carbon emissions (Greenhouse Gas Emissions) associated with each scheme. It is anticipated that as the energy grid becomes decarbonised in line with actions to achieve net zero, effects would be reduced. Potential cumulative adverse effects are then considered minor adverse (not-significant). Effects are of small magnitude, regional scale and long term / permanent. The HRA did not identify any in-combination effects between these schemes.	Investigate use of renewable energy sources during operation for energy supply.
New Treatment works at Service Reservoir C to treat water from Havant Thicket Reservoir (Phase 1) **And**	Cumulative adverse effects are anticipated with respect to operational carbon emissions (Greenhouse Gas Emissions) associated with each scheme. It is anticipated that as the energy grid becomes decarbonised in line with actions to achieve net zero, effects would be	Investigate use of renewable energy sources during operation for energy supply.

Pipeline associated new treatment works at Service Reservoir C to distribute water from Havant Thicket Reservoir	reduced. Potential cumulative adverse effects are then considered minor adverse (not-significant). Effects are of small magnitude, regional scale and long term / permanent. Note that WFD assessment identifies that 'Meon' waterbody is impacted by these two schemes but concludes that there would be no adverse effect on it individually or in combination. Depending on the location of the pumping station there may be cumulative adverse effects on landscape and population and human health however cumulative adverse effects are considered minor adverse (not-significant) where mitigation is adopted. Effects are of small magnitude, local scale and long term / permanent. The HRA did not identify any in-combination effects between these schemes.	Further consideration to be made at planning and design stage of potential for effects on landscape and population health – appropriate mitigation to be developed at that time, in light of precise scheme details.

2.2.6 Publishing

The DEFRA letter also states:

- ***Portsmouth Water should make its HRA publicly accessible online.***

Once the updates described in the sections above have been implemented, Portsmouth Water will need to complete security checks ('SEMD') on the plan level (WRMP24) HRA document. Once completed and given permission to publish our final WRMP24 by Defra, Portsmouth Water will then make its HRA publicly available online.

Portsmouth Water further confirms that project level assessments completed via the AMP8 WINEP will be used to update the plan level HRA document for the next plan (WRMP29).

3 ISSUE 3: BEST VALUE PLANNING AND ALTERNATIVE OPTIONS

3.1 Defra explanation of Issue 3

The company's planning problem has substantially evolved from pre-consultation to the revised draft plan, particularly as the company has a greater understanding of impacts of environmental destination. This has meant that the company's initial options work was not in the context of the present deficits faced. Although Portsmouth Water has considered smaller alternative options through its WRMP24, there is limited justification of why they have not been selected as part of the best value plan. The company has improved how it presents its best value approach, but further justification and information is needed on exactly how the best value plan has been derived from option level and programme level assessments to ensure this is transparent for all interested parties.

Before finalising its WRMP24, Portsmouth Water should provide further evidence setting out how its company level best value plan has been derived and decided upon. This should include clear information on how best value metrics have been applied at a feasible option level, and how this assessment has been integrated at a programme level and been used in its decision making to select the best value plan. Portsmouth Water should reflect the role of professional judgement in the selection of the best value plan, alongside the optimisation and investment modelling applied (including Pareto modelling). It should be clear how the outcomes of environmental assessments have informed option selection. Where feasible options have not been taken forward, Portsmouth Water should clearly demonstrate why this is the case with best value metrics clearly evidencing the decision to include the Hampshire Water Transfer and Water Recycling Project instead. The company should also reflect how sensitivity tests have informed selection of its best value plan, providing results of this testing.

3.2 Our response to Issue 3

3.2.1 Introduction

Defra issue 3 is concerned with the evolution of our planning challenge and the availability of smaller options that might provide an alternative to the larger water recycling related options currently selected within our WRMP24 preferred plan. Furthermore Defra identify the need to provide additional information on best value metrics and how these were used to derive and decide upon a best value plan.

Our response below explains that most of our available WRMP24 feasible options are already selected in our preferred best value plan and therefore we do not currently have a significant smaller options set that might provide an alternative to water recycling related options. As most of our feasible options are already selected, we also recognise that best value metrics are not driving any material changes from the least cost plan within our supply area.

Now that the scale of the proposed environmental destination scenarios (potential sustainability reductions to our licensed abstractions) is better understood, our key focus for WRMP29 will be on the development of new options that can provide more choice in how we might meet the challenges and provide real alternatives to the large scheme options that are selected for the 2040s and beyond in our current plan. Further details are provided in the sections below and we propose that the text with yellow highlighting is added as an upfront note to Appendix 8A or 8B of our WRMP24, with reference to this note in Section 8.7 of the main WRMP24 document.

3.2.2 Selection of water recycling related options and the availability of smaller alternative options

The Environmental Destination, which identifies potential reductions to the quantities we are licensed to abstract by 2050, has evolved in parallel to the development of supply schemes and the compilation of our Water Resources Management Plan 2024 (WRMP24). As recognised by Defra, the scale of possible reductions has resulted in a highly complex water resource planning problem that

our initial options work was not designed to solve. Further information on our Environmental Destination is provided in Appendix 5B to our published WRMP24.

The scale of the challenges posed by the Environment Destination means most of the feasible options we put forward into the regional investment model have been selected to be part of our preferred plan. This includes treatment works related options to utilise water from Southern Water's Hampshire Water Transfer and Water Recycling Project (HWTWRP) in the 2040s and beyond.

The feasible options that remain unselected comprise:

- Different variants of the water recycling related options to those already selected in our preferred plan.
- Options that represent alternative assumptions for Government Led water efficiency savings. However, we note our preferred plan already assumes an ambitious level of water efficiency savings.
- Alternative Portsmouth Water demand management options that represent reduced activity ('medium demand management basket') relative to our preferred 'High Plus demand management basket' that includes universal smart metering.

Within Table 45 of our published WRMP24 we identify that the Havant Thicket water recycling related treatment capacity options are selected in the least cost plan in addition to the best value plan. This demonstrates that best value metrics are not unambiguously driving the selection of these options.

Furthermore, the sensitivity testing described within Appendix 9A of our published WRMP24 demonstrates that some of the stress tests resulted in deficits within our supply demand balance that cannot be resolved. Where additional or alternative options were selected, they are different variants of the water recycling related options. The presence of residual deficits is evidence that the WRSE investment model is selecting all available options that can be used to meet the future challenges i.e. there are no additional smaller options available.

Now that we have agreed assumptions in place with the Environment Agency around the realistic potential magnitude of license changes, and have confirmed there are deficits in certain sensitivity tests, we fully recognise the need to develop new and innovative options for WRMP29. Our initial aim will be to develop a set of new options that can provide the investment plan with alternative options in order to mitigate a scenario where the Strategic Regional Options (SROs) that we are dependent on within the WRMP24, are delayed or are not able to proceed.

As described in our monitoring plan (Appendix 10A to our WRMP24) (please see our response to Defra issue 5 for the updated version), our key focus will be on a WRMP29 and WINEP linked options appraisal, including options that can be implemented within 10 years.

The types of options we are investigating for their feasibility include: a change to our Levels of Service for demand side drought orders, managed aquifer recharge, aquifer storage and recovery, movement of existing abstraction locations downstream (catchment first approach), and further winter water storage schemes.

We will also continue to work with Southern Water via regular meetings and workshops to explore the potential for new water recycling, desalination, and transfer options, possibly towards the east boundary of our supply zone.

Whilst the clarifications above demonstrate that the selection of water recycling related options in our WRMP24 is not unambiguously selected by best value metrics, we have set out further information on the use of these metrics in deriving the wider regional best value plan within the sections below.

3.2.3 Best value plan and best value metrics

Previous Water Resource Management Plans (WRMPs) were derived by considering costs that included the economic cost of delivering and operating a scheme, plus a carbon cost. Through deriving a 'best value plan', we can now consider a wider set of criteria.

The Water Resources South East (WRSE) regional plan is a best value plan that delivers wider benefits to society. It considers a range of factors alongside economic cost in the identification of the preferred water resource programme that will form the basis of the plan. The development of a best value plan is promoted by the Environment Agency, Ofwat and Natural Resources Wales in the Water Resources Planning Guideline.

WRSE must ensure the regional plan meets several legal and regulatory requirements and policy expectations at the most efficient cost possible; however, through engagement with customers and stakeholders, the WRSE group has identified a range of areas where it could go further. This means that the water resource programme that forms the basis of the WRSE regional plan might not be lowest cost, but it will deliver additional value in the areas that matter most to the people of the region.

The Water Resources Planning Guideline (WRPG) sets out the requirements for companies to follow in producing their WRMPs. The supporting Environment Agency National Framework gives details of the indicative scale of challenge facing future water resource provision in England and requires water companies to work together in regional groups to meet the challenge and develop a cohesive set of water resource plans. As shown in Figure 4 a best value plan therefore builds from a cost-efficient plan but ensures it delivers regulatory and government policies.

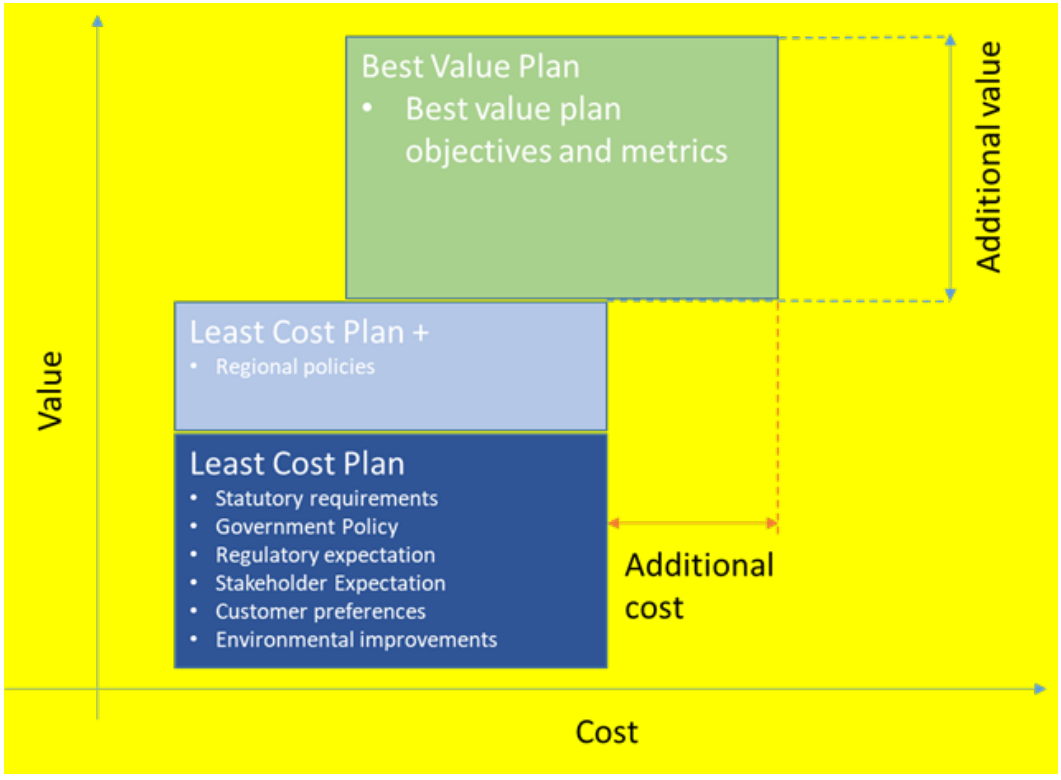


Figure 4 Building on the least cost plan to derive a best value plan

WRSE developed the best value plan objectives, criteria, and metrics through a consultation process in 2021, before the regional plan was developed. These metrics were developed based on the UKWIR guidance, the National Framework, and the WRPG, to ensure the regional plan meets legal, regulatory and policy expectations through a consultation process.

There are eight broad metrics used to develop the WRSE regional best value plan:

- Environmental:
  - Strategic Environmental Assessment (SEA) – positive
  - SEA – negative
  - Natural Capital
  - Biodiversity Net Gain
- Resilience:
  - Reliability
  - Evolvability
  - Adaptability
- Customer:
  - Customer option preferences

As the WRSE objectives are high-level, they are turned into measurable indices on which we can assess best value. Each objective is represented by a set of value criteria which, in turn, have an associated metric that measures the additional value it delivers. WRSE used the criteria and metrics to assess the different water resource programmes that are produced through investment modelling. WRSE also use them to compare the shortlisted good value programmes and explain the differences between them and the additional value each delivers.

Each programme comprises a series of options and each option has a series of metrics associated with it. Further information on how the best value programme of options is derived is provided below.

3.2.4 Deriving the WRSE best value plan programme level assessments

3.2.4.1 Summary of process

The overarching process for deriving the best value plan (a best value programme of options) was as follows:

1. The individual water companies and teams working on Strategic Regional Options (SROs) uploaded their option information to the WRSE central data landing platform, which contains over 2,000 options. WRSE did not undertake any further screening on these options.
2. All options that were uploaded into the WRSE Data Landing Platform (DLP) were assessed at an option level for environmental (including Natural Capital) and resilience metric evaluation.
3. The investment model obtained these option level scores from the DLP, along with the deployable output benefits and costs information.
4. The WRSE investment model then constructed adaptive programmes to meet the challenges based on this information.
5. These candidate programmes were appraised and discussed with customers and stakeholders to gain their views before a regional WRSE adaptive plan was selected for reconciling with the other regions.
6. Following reconciliation, which ensures consistency between regional plans, the WRSE regional plan was then consulted on, and where appropriate, updated.

When each candidate regional plan was determined by the investment model, a value for each objective was calculated by aggregating the scores from individual options selected in the plan for each adaptive planning 'situation' through the duration of the plan (see Section 2 of our WRMP24 for further information on adaptive planning) (or refer to our response to Defra issue 5). Therefore, each situation in a regional plan has its own best value plan score, albeit that the first part of the plan contains common options.

Further information on how the metrics were aggregated is provided below.

3.2.4.2 Aggregating option metrics to a situation and plan level

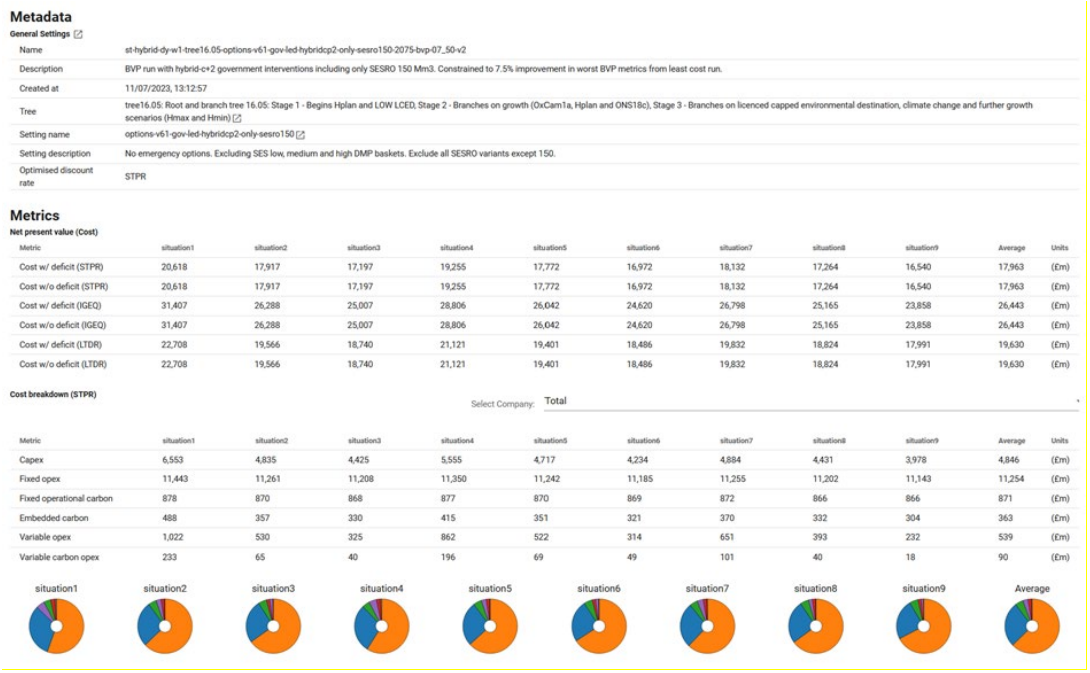
Each investment model run derived a series of indices that described a candidate regional plan. Firstly, it set out if the plan had a deficit in any of the planning years. If it did, then the plan was considered non-compliant with regulator guidance and therefore it was not a viable plan. Secondly, it identified the associated set of costs and other metrics. Illustrations of these metrics are shown in Figure 5 and Figure 6, which show the raw metric value per situation in the plan over the fifty-year planning period.

The best value metric scores were calculated by summing up each individual best value plan metric, considering the number of years each scheme was selected for. Given that many of the metrics are in different units and their assessed values have different orders of magnitude, WRSE normalised the scores to allow summations and averages to be calculated. This ensured that the scale of one metric did not dominate the decision-making process for the entire plan.

The normalisation process converted each metric raw score into a score between 0 and 100, where the minimum score for a specific metric and situation was zero, and the maximum score was set to one hundred. The raw value of the metric was then used to derive a score between 0 and 100. The calculation for each situation and metric was therefore:

$$Normalised\ value = \frac{(Metric\ value - minimum\ Metric\ value)}{(Maximum\ metric\ value - minimum\ metic\ value)}$$

This calculation was undertaken for each metric in each situation of a candidate regional plan.



Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-sesro150-2075-bvp-07_50-v2
Description	BVP run with hybrid-c+2 government interventions including only SESRO 150 Mm3. Constrained to 7.5% improvement in worst BVP metrics from least cost run.
Created at	11/07/2023, 13:12:57
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-only-sesro150
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all SESRO variants except 150.
Optimised discount rate	STPR

Metrics

Net present value (Cost)

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Average	Units
Cost w/ deficit (STPR)	20,618	17,917	17,197	19,255	17,772	16,972	18,132	17,264	16,540	17,963	(£m)
Cost w/o deficit (STPR)	20,618	17,917	17,197	19,255	17,772	16,972	18,132	17,264	16,540	17,963	(£m)
Cost w/ deficit (IGEQ)	31,407	26,288	25,007	28,806	26,042	24,620	26,798	25,165	23,858	26,443	(£m)
Cost w/o deficit (IGEQ)	31,407	26,288	25,007	28,806	26,042	24,620	26,798	25,165	23,858	26,443	(£m)
Cost w/ deficit (LTDR)	22,708	19,566	18,740	21,121	19,401	18,486	19,832	18,824	17,991	19,630	(£m)
Cost w/o deficit (LTDR)	22,708	19,566	18,740	21,121	19,401	18,486	19,832	18,824	17,991	19,630	(£m)

Cost breakdown (STPR)

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Average	Units
Capex	6,553	4,835	4,425	5,555	4,717	4,234	4,884	4,431	3,978	4,846	(£m)
Fixed opex	11,443	11,261	11,208	11,350	11,242	11,185	11,255	11,202	11,143	11,254	(£m)
Fixed operational carbon	878	870	868	877	870	869	872	866	866	871	(£m)
Embedded carbon	488	357	330	415	351	321	370	332	304	363	(£m)
Variable opex	1,022	530	325	862	522	314	651	393	232	539	(£m)
Variable carbon opex	233	65	40	196	69	49	101	40	18	90	(£m)

Figure 5 Illustration of metrics data for a candidate regional plan (economic cost)

Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Average	Units
SEA environmental benefit	66,691.00	65,338.00	65,338.00	67,933.00	65,340.00	65,338.00	66,722.00	65,338.00	65,338.00	65,930.67	
SEA environmental disbenefit	104,955.00	77,782.00	72,756.00	97,446.00	78,090.00	71,933.00	83,773.00	70,130.00	61,721.00	79,842.89	
Natural capital	82,030,355.69	81,052,068.42	81,238,835.65	81,015,364.28	81,188,620.53	81,479,508.50	81,609,503.08	81,352,662.92	81,731,503.21	81,410,935.81	
Bio-diversity net gain	−202,722.00	−144,618.00	−126,255.00	−199,827.00	−150,321.00	−121,902.00	−150,989.00	−127,691.00	−99,097.00	−147,046.89	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Average	Units
Customer preference	36,704.00	35,098.00	34,819.00	36,555.00	35,130.00	34,696.00	35,269.00	34,496.00	33,967.00	35,192.67	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Average	Units
Reliability	29.53	29.83	32.49	29.24	29.88	32.68	31.20	34.63	38.61	32.01	
R1: Uncertainty of option supply/ demand benefit	6.04	5.60	6.03	5.83	5.57	6.07	5.94	6.48	7.21	6.08	
R3: Risk of service failure due to other physical hazards	7.00	7.40	8.24	7.03	7.42	8.29	7.71	8.76	10.01	7.98	
R4: Availability of additional headroom	6.62	6.96	7.16	6.69	6.98	7.19	7.30	7.66	7.90	7.16	
R5: Catchment/raw water quality risks (incl. climate change)	4.07	4.19	4.72	3.81	4.21	4.74	4.33	5.00	5.78	4.54	
R6: Capacity of catchment services	0.31	0.00	0.01	0.31	0.00	0.01	0.00	0.01	0.01	0.07	
R7: Risk of service failure to other exceptional events	5.37	5.67	6.34	5.46	5.70	6.38	5.92	6.73	7.71	6.14	
R8: Soil health	0.11	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.03	

Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Average	Units
Adaptability	14.33	15.72	17.57	14.39	15.72	17.27	16.15	18.40	20.93	16.72	
A3: Operational complexity and flexibility	6.53	7.10	7.96	6.69	7.15	8.04	7.39	8.49	9.76	7.68	
A4: WRZ connectivity	7.68	8.59	9.59	7.56	8.55	9.20	8.73	9.88	11.14	8.99	
A7: Customer relations support engagement with demand management	0.12	0.03	0.03	0.13	0.03	0.03	0.03	0.03	0.03	0.05	

Evolvability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Average	Units
Evolvability	19.65	20.16	22.13	19.63	20.22	22.24	20.81	23.62	26.79	21.70	
E1: Scaleability and modularity of proposed changes	8.77	9.42	10.43	8.78	9.46	10.54	9.72	11.15	12.71	10.11	
E2: Intervention lead times	4.22	4.24	4.50	4.18	4.25	4.44	4.34	4.78	5.33	4.48	
E3: Reliance on external bodies to deliver changes	6.20	6.49	7.19	6.21	6.51	7.25	6.75	7.68	8.75	7.00	
E5: Collaborative land management	0.46	0.01	0.01	0.46	0.00	0.01	0.00	0.01	0.01	0.11	

Figure 6 Illustration of metrics data for a candidate regional plan (best value plan metrics)

3.2.4.3 Enabling the comparison of candidate plans

Each investment model run produced one set of scores for each metric and each situation. The model runs were grouped together (a 'Run Group') according to the input data set used in the investment modelling. Typically, the investment model was run numerous times to derive different candidate plans based on the same input data sets defining the challenges and the same options for solving these, unless an option was excluded for a scenario test (e.g. excluding a Strategic Regional Option) or a sensitivity test. This means that the situations and data used to generate the investment plan were consistent and comparable with each other.

The raw scores for each model run, from a particular Run Group data set, were normalised based on the process already outlined above. The average score for a metric, across all the situations was calculated as either the average raw metric score or the average normalised score.

The normalising of scores allowed average normalised scores to be determined per situation and per plan. The average situation score was calculated as follows:

$$Avg\ Normalised\ BVP\ per\ situation = \frac{(N\ Nat\ Cap + N\ BNG + N\ SEA{+}'ve + N\ SEA{-}'ve + N\ Cust\ Pref + N\ Evol + N\ Rel + N\ Adapt)}{8}$$

The average plan score was calculated as follows:

$$Avg\ N\ Plan\ score = \sum_{1}^{9} Avg\ Normalised\ BVP\ per\ situation\ /9$$

WRSE calculated a single normalised best value plan score for a situation or the plan by averaging the normalised scores. The average score for a plan is not weighted per situation, therefore better performing plans will have higher average scores than poorer performing plans.

The regional plan scores for the Least Cost Plan (LCP), Best Social and Environmental Plan (BSEP) and Best Value Plan (BVP) are presented in Table 46 of our published WRMP24.

The next section, including Figure 7, demonstrates how the wider set of candidate plans were appraised to select the best value plan.

3.2.5 Role of sensitivity tests and professional judgement in determining the best value plan

It is important to recognise that the initial environmental assessments for the 'screening' stage of our WRMP24 option appraisal helped to shape the feasible option data set that was offered to the WRSE investment model. For example, numerous unconstrained options associated with increased groundwater and surface water abstraction were ruled out ('rejected') due to environmental concerns. Therefore a degree of professional judgement, informed by regulator and stakeholder engagement, was applied at an early stage of the options appraisal and prior to the investment modelling that determines the least cost and best value plans. It means that the residual feasible list of options used in the investment modelling is already expected to provide 'better value'.

Our published WRMP24, Table 45, demonstrates that there is minimal difference between the least cost plan and the best value plan for Portsmouth Water, and in part this reflects the effectiveness of the initial options screening work. However, as described above in Section 3.2.2, this is also potentially caused by a lack of alternative feasible options and we are committed to developing a wider feasible option set for the next plan, WRMP29. This will allow the best value metrics of our WRMP29 options to have a clearer influence on determining the best value plan. In the meantime our key focus will be on progressing the approved Havant Thicket Reservoir scheme, and the roll out of smart metering, which will improve our supply demand balance and move us towards the interim targets in the Defra Environmental Improvement Plan.

We have completed numerous sensitivity tests as reported in WRMP24 Appendix 9A and we have used these to test the robustness of the best value plan. This has led to further development of our monitoring plan WRMP24 Appendix 10A, which sets out reviews, monitoring, decision points and mitigation. The process has allowed us to build confidence in our best value plan.

At the regional scale there is a more significant difference between the least cost and best value plans. The role of sensitivity tests and the use of professional judgement to determine the best value plan is described within the WRSE revised draft regional plan. This detail is important because, whilst the options in the least cost and best value plan are similar at the Portsmouth Water level, decision making at the regional scale can influence the utilisation patterns for our options and potentially the source of the water that reaches our water resource zone. Key text from the WRSE revised draft regional plan has been reproduced and adapted below.

The scatter plot in Figure 7 below shows the range of different tests that WRSE completed throughout the revised draft regional plan programme appraisal process. The axes on the plot show cost versus the average best value plan metric score. The plot demonstrates the impacts that certain policy changes have on the regional plan. Each dot represents a 9-branch adaptive plan; the outputs from an investment model run. As the points on the plot move to the right, the costs of the plans increase. As the points on the plot move up the y-axis, the average best value metric scores of the plans increase. Therefore, points which are in the upper left quadrant of the graph represent better value plans compared to those in the lower right quadrant of the plot.

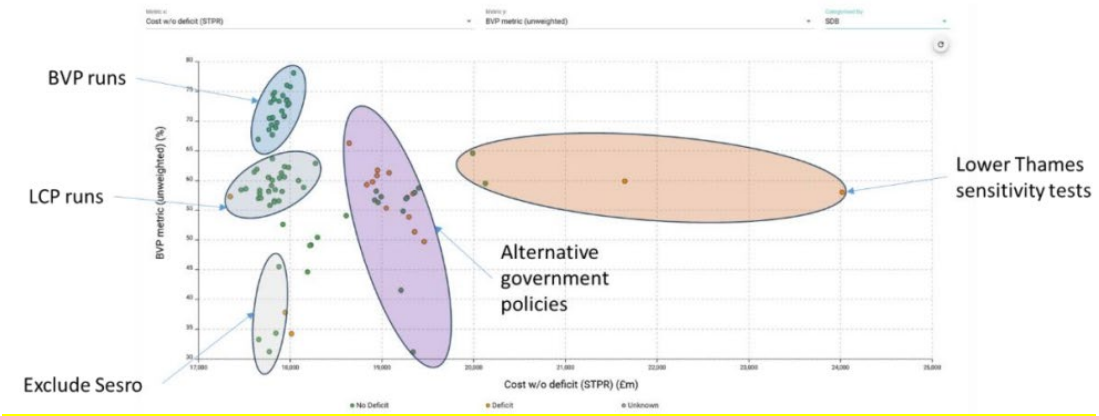


Figure 7 Scatter plot showing the sensitivity runs undertaken for the least cost plans and best value plans

The key areas tested through the process were the impacts of Government demand management savings, the success of company demand management savings, the impact on the lower Thames from flood alleviation schemes, and the exclusion of key solutions such as Teddington direct river abstraction (DRA) and the South East Strategic Reservoir Option (SESRO). The testing also included looking at the delayed delivery dates for the Southern Water schemes; fixing the size of certain schemes to see how well the resultant plans performed and also explored how we could improve the value of the plan by increasing certain metrics.

The sensitivity testing, inclusive of the Government savings (Gov-led C+) sensitivities, confirmed that a regional plan with the SESRO reservoir included as part of the solution provides a more cost efficient and better value plan, as defined by the BVP metrics, compared with plans which exclude the reservoir. This is clearly shown in the plot above.

Least cost plan model runs were used as the baseline from which to test performance against the best value plan metrics to find candidate best value plans for the revised draft plan. When we moved from least cost plan to best value plan, there was very little difference in the selection of the Strategic Regional Options (SROs) in the reported pathway. This is because the metrics performed well in the least cost plan, so when we asked the investment modelling to find a solution which improved their performance, there was not much improvement to find.

The main difference between the least cost plan and the best value plan is that the best value plan selected significantly more catchment management schemes, albeit that they were introduced at the end of the planning horizon. As explained within our response to Defra issue 11, Portsmouth Water is committed to investigating catchment management schemes further to see if they could add additional value to the next regional plan at an earlier point in the planning horizon.

The best value plan process for the revised draft regional plan confirmed that, as for the draft regional plan, regional plans which select SESRO are cheaper and achieve better overall scores against the best value plan metrics. For the draft regional plan, plans with the 100 Mm^3 and 150 Mm^3 size variants were extremely close in terms of their performance against best value metrics, however the plan with the 100 Mm^3 reservoir was considered to be slightly better value. For the revised draft regional plan, it has been demonstrated that the plan with the SESRO at 150 Mm^3 provides better overall best value plan scores compared to plans with the 100 Mm^3 and 125Mm^3 size variants.

Furthermore, plans with the larger SESRO size variant can support more water resources zones with the delivery of their sustainability reductions, provide water to five of the six companies in the South East (including Portsmouth Water), add additional flexibility across the network, continue to support the delivery of sustainability reductions across a number of water resource zones, and help to off-set the need for larger scale desalination and water recycling schemes in London in different future scenarios.

The larger SESRO size variant is also more adaptable to manage risks relating to underperformance of the demand management strategies, including the Government interventions, and provides time for the region to develop alternative solutions should key policies fail to be delivered.

4 ISSUE 4: SENSITIVITY TESTING FOR HAVANT THICKET RESERVOIR, HAMPSHIRE WATER TRANSFER AND WATER RECYCLING PROJECT DELIVERY AND SOURCE S DROUGHT PERMIT

4.1 Defra explanation of Issue 4

Portsmouth Water has updated its plan to reflect the latest 2031/32 delivery date for Havant Thicket reservoir which is critical to the company's resilience. This follows delays and challenges to the delivery of the scheme. The company's longer term strategy relies upon timely and effective delivery of the Hampshire Water Transfer and Water Recycling Project. Finally, the company includes benefits from Source S drought permit and has tested the risks of a lower benefit, but has not outlined how the deficits resulting from this would be mitigated. The company has indicated that no key alternatives are required for its WRMP24 and we are concerned that the company has not undertaken sensitivity testing to cater for further delays to the timelines of these schemes.

The company should ensure it reflects the latest Havant Thicket reservoir expected delivery date and undertake a sensitivity test covering delays to the reservoir availability for each year up to 2034/35. It should also undertake sensitivity tests on the delivery timing of the Hampshire Water Transfer and Water Recycling Project each year up to 2040. The company should also outline how it would mitigate Source S drought permit having a reduced yield or no availability, considering the deficit risk identified in the testing already undertaken. The company should set out the steps it would pursue in response to these scenarios, to provide assurance that it can maintain secure and sustainable supplies to its customers. This should include what feasible options it would progress or accelerate if required and any additional options appraisal work it would undertake. The timing of decisions points around these need to be provided, linked to issue 5 below.

4.2 Our response to Issue 4

4.2.1 Introduction

Defra issue 4 is concerning the sensitivity testing of delayed delivery for our Havant Thicket Reservoir scheme (up to 2034/35) and Southern Water's Hampshire Water Transfer and Water Recycling Project (HWTWRP) (up to 2039/40). It also requests further information on how we would mitigate the loss of yield from our Source S drought permit option. The sections below provide further information and next steps.

4.2.2 Delayed Havant Thicket reservoir delivery year and next steps

Havant Thicket Reservoir provides a resilient resource which maintains its output during low flows and droughts, when Southern Water need it the most. That means we can provide Southern Water with a drought resilient bulk supply of water, allowing them to reduce abstractions in the River Itchen catchment at sensitive times in order to protect and conserve that chalk stream environment. This bulk supply is treated as an option within the WRSE investment model.

Our Revised Draft WRMP24 (rdWRMP24) confirms that Havant Thicket Reservoir has received planning permission and construction has commenced. Therefore its output is included as part of our supply baseline from 2031/32 onwards, when it is programmed to have been fully commissioned. This represents a small delay in implementation compared to our Draft WRMP24 (dWRMP24).

As stated in our rdWRMP24, the delay is the result of an opportunity to future proof the pipeline tunnel in the approved scheme. The pipelines put inside the single tunnel would only initially be used by Portsmouth Water to fill the reservoir with spring water and take water out again. They would not be used for recycled water unless, and until, the HWTWRP has received the official go ahead to proceed and has been constructed.

Our rdWRMP24 states that there is no risk to our own supply demand balance due to this delay as the water from the scheme is intended for Southern Water. Appendix 1C to our rdWRMP24 provides further detail on sources of water and how that water moves between the Portsmouth Water and Southern Water resource zones during the 50 year plan.

The utilisation of the Havant Thicket reservoir approved scheme and the associated 21 Ml/d bulk export to Southern Water is presented within Appendix 1C and reproduced below in Figure 8 and Figure 9. Key points are as follows:

- The WRSE investment model assumes that the bulk export can only take place once the resource from the Havant Thicket reservoir approved scheme is available. This is reflected in Figure 8 and Figure 9 where the first year of use is the same for both options.
- In a normal / typical year, we do not take water from the reservoir. However, we do provide Southern Water with a 1 Ml/d 'sweetening' flow (bulk export) for water quality reasons. **Delaying the implementation year of the reservoir and associated bulk supply up to 2034/35 would improve our normal year supply demand balance by 1 Ml/d.**
- In a severe 1-in-100-year drought the reservoir increases our deployable output by around 12 Ml/d. We can also enhance the conjunctive use benefits to about 16 Ml/d via implementation of the Source O booster upgrade. The WRSE investment model applies the booster upgrade in 2038-39, although it can be implemented in the same year as the Havant Thicket reservoir approved scheme if required. Our updated monitoring plan (please see response to Defra issue 5) identifies the need to make a decision on funding requirements for the PR29 business plan to allow earlier implementation of this scheme.
- In a severe 1-in-100-year drought our plan assumes that we provide Southern Water with a 21 Ml/d bulk supply, which is around 9 Ml/d higher than the deployable output that we receive from the Havant Thicket reservoir. This means that **delaying the implementation year of the reservoir and associated bulk supply up to 2034/35 would improve our 1-in-100 year supply demand balance by around 9 Ml/d.**
- In an extreme 1-in-500-year drought the reservoir increases our deployable output by around 20 Ml/d. We can also enhance the conjunctive use benefits to about 24 Ml/d via implementation of the Source O booster upgrade. The WRSE investment model applies the booster upgrade in 2038-39.
- In an extreme 1-in-500-year drought our plan assumes that we provide Southern Water with a 21 Ml/d bulk supply, which is around 1 Ml/d higher than the deployable output that we receive from the Havant Thicket reservoir prior to 2038-39. This indicates that **delaying the implementation year of the reservoir and associated bulk supply up to 2034/35 would improve our 1-in-500 year supply demand balance by around 1 Ml/d.**

In summary, Appendix 1C to our rdWRMP24 provides information to demonstrate that our own plan is not at risk if Havant Thicket reservoir is delayed further. Any delays have the potential to improve our supply and demand balance. Therefore, whilst a sensitivity test with a 2034/35 delayed delivery date would improve confidence in our plan, we consider it unnecessary to complete tests that explore delayed delivery to 2032/33 and 2033/34.

An updated WRSE regional investment model is being developed to support Southern Water's re-consultation on its WRMP24. The results, including sensitivity tests, are expected to be available by the end of April 2024. We commit to updating our sensitivity testing appendix (9A) and common understanding / bulk supply appendix (1C) for our final WRMP24 in light of this run.

This update will include the presentation of results for a sensitivity test where delivery of Havant Thicket Reservoir is delayed until 2034/35. In the same style as the other sensitivity tests in WRMP Appendix 9A we will:

- Introduce the scenario test: delayed delivery of Havant Thicket Reservoir with implementation in 2034/35, but with all other option and supply demand balance data reflecting that used to derive the best value plan.

- Summarise the results of the test: identify whether the model solved and if the timing and selection of options was impacted by the test.
- Outcomes and response: identify how we are responding to the sensitivity test e.g. recognition of the need for review, monitor and make decisions via the WRMP24 monitoring plan.

The results and response will be referred to again in WRMP24 Appendix 1C, which is a joint appendix for the Portsmouth Water and Southern Water WRMP24's, demonstrating that both companies are aware of any risks and associated mitigation / solution.

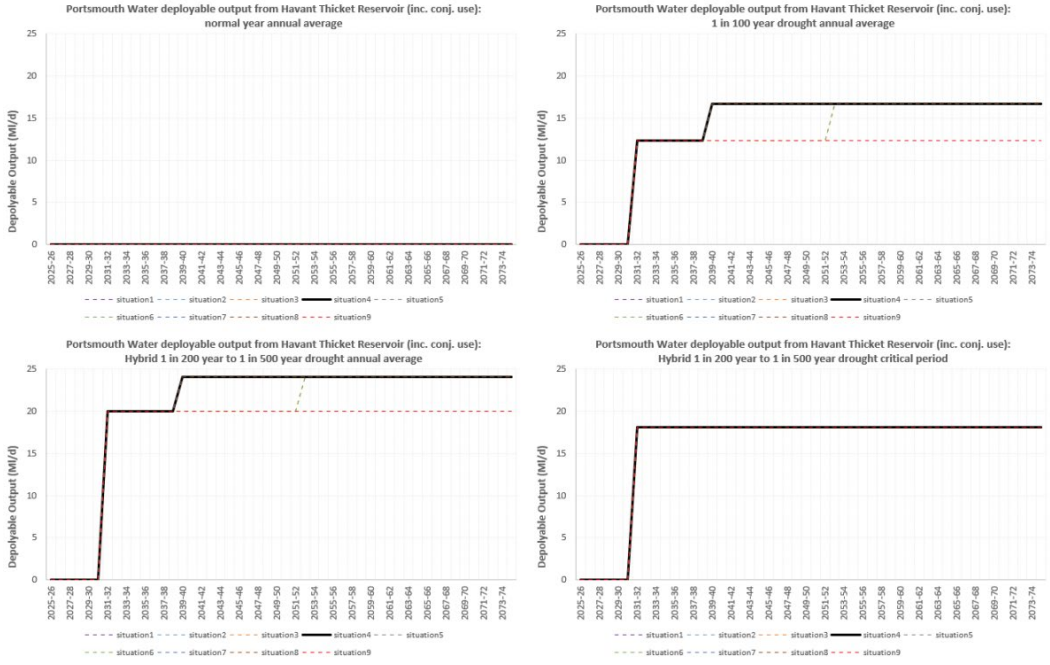


Figure 8 Portsmouth Water deployable output linked to Havant Thicket Reservoir Approved Scheme

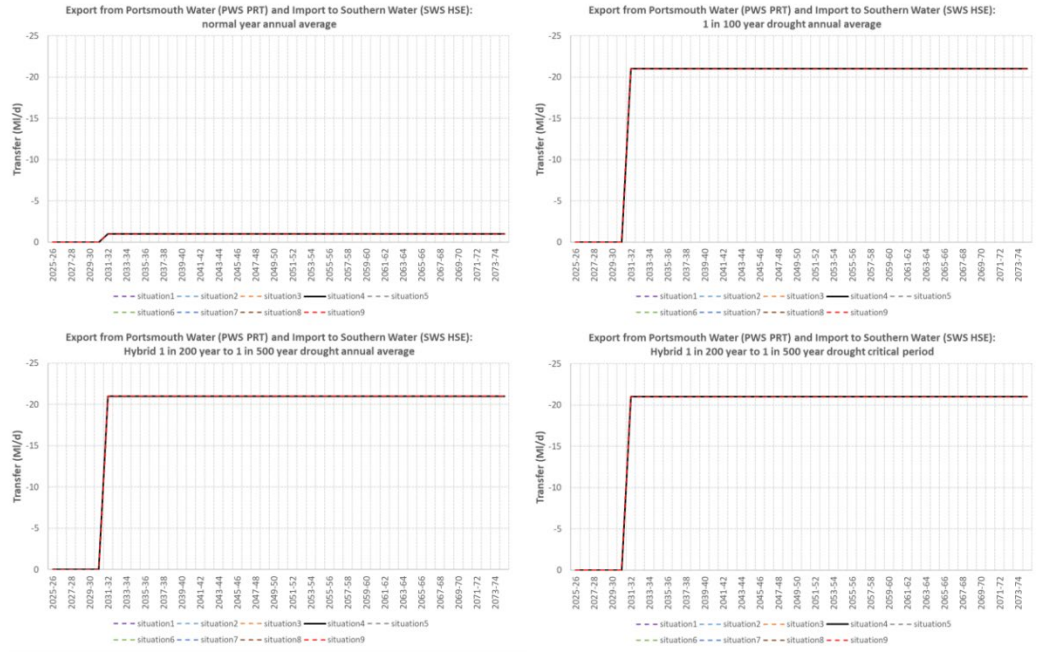


Figure 9 Modelled utilisation of the 21 Ml/d capacity export from Portsmouth Water to Southern Water's HSE WRZ, associated with the Havant Thicket Reservoir Approved Scheme

4.2.3 Delayed Hampshire Water Transfer and Water Recycling Project delivery year and next steps

The HWTWRP scheme would recycle water from Southern Water's Budds Farm wastewater treatment works into the Havant Thicket Reservoir where it would mix with water from Source B. This blended water would then feed a transfer pipeline to a Southern Water treatment works and our own water treatment works.

Appendix 7F to our rdWRMP24 (Section 1.2) details the key changes between the dWRMP24 and rdWRMP24 and how the option influences Portsmouth Water customers. In addition, Section 10 details how the HWTWRP option interlinks the rdWRMP24 Preferred Plan.

Appendix 1C to our rdWRMP24 provides further detail on sources of water and how that water moves between the Portsmouth Water and Southern Water resource zones during the 50 year plan. We can benefit from the development of the HWTWRP and associated deployable output in 2034/35 via three different routes:

1. **Indirect route:** As described in Appendix 1C, our plan includes a new import of water from Southern water starting in **2039/40** (see Figure 10). This is enabled by the implementation of two key WRSE regional schemes, Southern Water's HWTWRP and Thames Water's South East Strategic Reservoir Option (SESRO).
2. **Havant Thicket to Treatment Works A:** Our plan includes an upgrade to Treatment Works A to allow additional water to be taken from Havant Thicket reservoir, above and beyond that taken for the Havant Thicket approved scheme. This route is first used in **2046/47** (see Figure 11).
3. **Havant Thicket to a new Treatment Works C:** Our plan includes the development of a new Treatment Works C that will receive water from a spur off the Havant Thicket to Otterbourne transfer pipeline. This route is first used in **2050/51** (see Figure 12).

In summary, Appendix 1C to our rdWRMP24 provides sufficient information to demonstrate that our plan is not at risk if Southern Water's HWTWRP does not provide deployable output until 2039/40. Therefore, whilst a sensitivity test with implementation in 2039/40 would improve confidence in our plan, we consider it unnecessary to complete tests that explore delayed delivery to 2035/36, 2036/37 and 2038/39.

An updated WRSE regional investment model is being developed to support Southern Water's re-consultation on its WRMP24. The results, including sensitivity tests, are expected to be available by the end of April 2024. We commit to updating our sensitivity testing appendix (9A) and common understanding / bulk supply appendix (1C) for our final WRMP24.

This update will include the presentation of results for a sensitivity test where HWTWRP benefits are not available until 2039/40. The test will be reported in the same style as the other sensitivity tests in WRMP Appendix 9A and Appendix 1C, as described in the previous section.

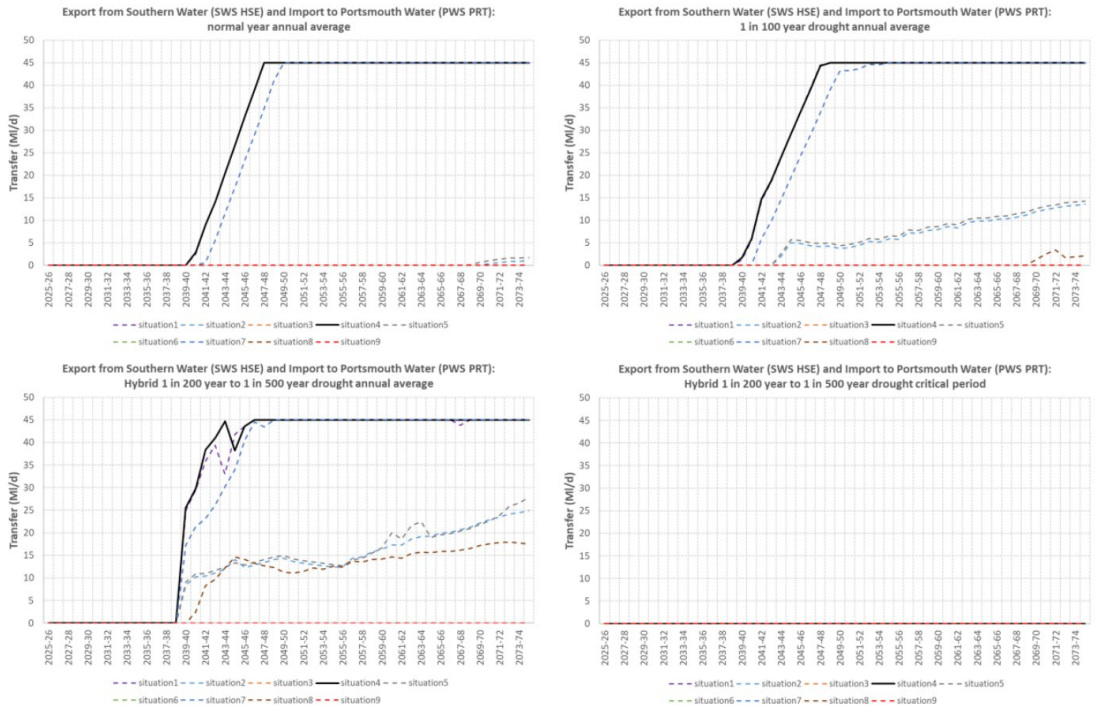


Figure 10 Modelled utilisation of the export from Southern Water's HSE WRZ to Portsmouth Water's supply area

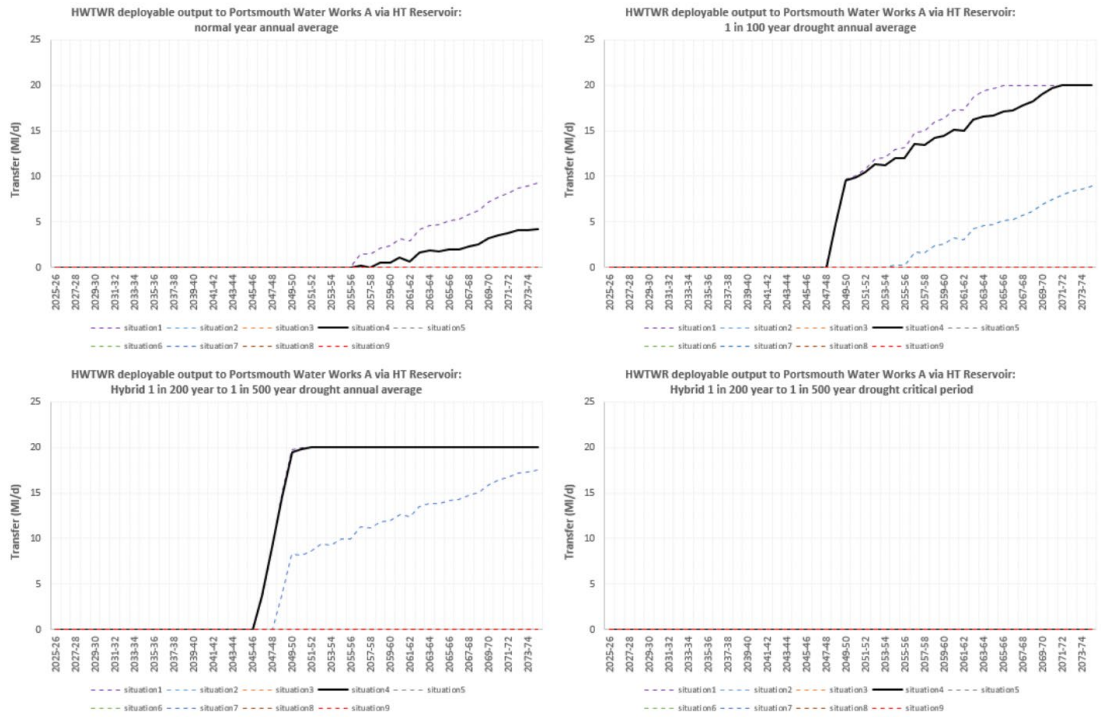


Figure 11 Modelled utilisation of the transfer of raw water from HWTWRP to Portsmouth Water Treatment Works A via Havant Thicket Reservoir

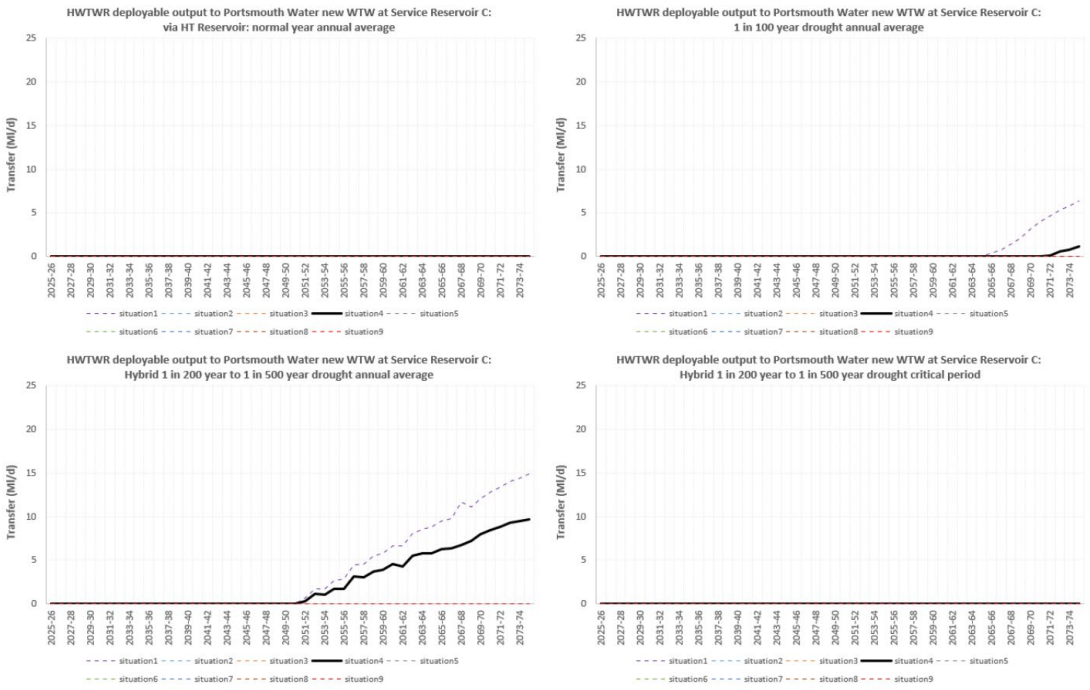


Figure 12 Modelled utilisation of the transfer of raw water from HWTWRP to Portsmouth Water Treatment at the site of Reservoir C via Havant Thicket Reservoir

4.2.4 Mitigation for delays to Havant Thicket and the HWTWRP schemes

Defra has requested that we set out the steps we would pursue in response to the Havant Thicket approved scheme and HWTWRP being delayed, to provide assurance that we can maintain secure and sustainable supplies to our customers.

The previous sections have identified that we can maintain our supply demand balance if the Havant Thicket approved scheme is delayed. However, delay of the HWTWRP beyond 2039/40 has the potential to impact the security of our supplies.

As explained in Section 7.1 of our rdWRMP24, since the dWRMP24 we have a greater understanding of the Environmental Destination impacts and what future supply options need to be explored, for example, options to capture and store excess winter flows. Therefore, we expect for WRMP29 we will have a greater number of supply options considered. This will be supported via our WINEP investigations and options appraisals which are detailed in Section 3.2 of Appendix 5B.

In summary, the key mitigation for long delays to Southern Water's HWTWRP will be an enhanced options appraisal for our next WRMP (WRMP29). We will work with WRSE, Southern Water and the Environment Agency to ensure we improve the number of options available and the total potential benefit they provide, relative to the WRMP24 data set. There will be a focus on options that can be implemented within a 10 year period, so they can be funded via our next business plans (PR29 and PR34) in time for 2039/40.

4.2.5 Mitigation for Source S drought permit and lost yield

The sensitivity testing Appendix 9A to our rdWRMP24 provides information on two tests where the benefit of our Source S drought permit was reduced. The first test reduced the benefit to 50% and the second test fully excluded the drought permit option from the WRSE regional investment model.

In both sensitivity tests the model failed to solve, demonstrating our reliance upon this option at the start of the WRMP24 planning horizon to maintain resilience to extreme drought. A single year (2025/26) with a deficit appeared in both the '50%' benefit and 'exclude' runs, with a magnitude of 1.2 Ml/d and 2.9 Ml/d, respectively. Defra has requested that we outline how we would mitigate the loss of benefit in 2025/26. We propose the addition of the following text within Appendix 9A in support of our final WRMP24:

> "Our 2022 Drought Plan sets out the actions we would take to ensure that the balance of supply and demand is maintained in a drought. These actions begin with enhanced customer communications, leakage control and pressure management, and then escalate to Temporary Use Bans, Non-Essential Use Bans, Source S drought permit and 'More Before 4' actions (in order of implementation). The aim of the 'More Before 4' actions is to delay the implementation of our Emergency Plan (a Level 4 drought action).
>
> To mitigate losing part or all the Source S drought permit benefit, we would seek immediate implementation of 'More Before 4' actions to ensure that our levels of service remain as planned. It is expected these will have been explored at a national and regional level as a severe drought develops, and may include national campaigns, potable water tankering and the use of temporary containerised desalination plants. However Section 3.4 of our 2022 Drought Plan identifies three local actions that we could consider in more detail as drought escalates:
>
> - Option A- Recommissioning of Source U (2.2 Ml/d)
> - Option B- Recommissioning unused private boreholes (uncertain benefit)
> - Option C- Increasing pump capacity and lowering pump levels at sources Q and R (up to 8 Ml/d)
>
> We will investigate these options further in the development of our next drought plan, which we expect to consult on in late 2025 or early 2026. We will also consider these options f if our drought plan is forecast to be triggered in 2025/26 and discuss them with the Environment Agency to help identify any barriers and the environmental assessment requirements. This potential action is included within our WRMP24 monitoring plan in Appendix 10A. Of the three options, Options A and C are considered the most feasible, and if the full benefit of the Source S drought permit cannot be realised, then Option C is favoured as a 'like for like' replacement."

The decision point associated with Source S drought permit and More Before 4 actions is described within our updated monitoring plan. Please see our response to Defra Issue 5 in the next section of this document.

5 ISSUE 5: MONITORING PLAN AND DEMAND MANAGEMENT UNCERTAINTY

5.1 Defra explanation of Issue 5

We recognise that Portsmouth Water has now included a monitoring plan however this needs to be further developed for the final plan. We would expect the monitoring plan to include thresholds, triggers and then what potential actions would be taken to manage key risks, including those identified through sensitivity testing. We expect the steps and timeline required to deliver these options to be clearly presented. Stakeholders and regulators need to be able to see how key risks are being managed within the planning cycle and what alternative action could be taken and when. We recommend Portsmouth Water ensures its monitoring plan covers the points set out the adaptive planning supplementary guidance.

This is especially important for the demand management strategies given the reliance in the early years of the plan on the savings from demand management to ensure security of supply. The monitoring plan should also account for the risks identified through sensitivity testing as set out in issue 3. Portsmouth Water should also explain the feedback mechanism from the company level monitoring into the regional plan. We would recommend working with WRSE so that there is consistency between the regional and company level monitoring plans.

5.2 Our response to Issue 5

This Defra issue is concerned with our monitoring plan and the need to include thresholds, triggers, actions and timelines to manage key risks. In the next section we have provided an updated monitoring plan that will supersede the existing content within Appendix 10A to our Revised Draft 2024 Water Resource Management Plan (rdWRMP24). The new text for inclusion in Appendix 10A is highlighted in yellow within this response.

The updated plan incorporates the latest monitoring plan text developed by Water Resources South East (WRSE) and provides the thresholds, triggers, actions and timelines that apply at our company level.

As explained in our responses to Defra Issue 4 and 9, an updated WRSE regional investment model is being developed to support Southern Water's re-consultation on its WRMP24. The results, including sensitivity tests, are expected to be available by the end of April 2024. We commit to updating our sensitivity testing appendix (9A) and common understanding / bulk supply appendix (1C), in addition to our monitoring plan appendix (10A) for our final WRMP24.

5.3 Updated monitoring Plan

5.3.1 Introduction

This Appendix details our Monitoring Plan which is used to track which adaptive planning pathway turns out to be the most accurate and to inform our decisions based on this understanding as we progress through the planning period.

This appendix provides a high-level overview of the regionally consistent approach to adaptive planning before identifying the monitoring that will take place at a regional and water company level. We have also set-out the thresholds, triggers, actions and timelines that apply at our company level.

5.3.2 What is adaptive planning?

Adaptive planning is an approach to developing flexible long-term delivery strategies in an uncertain future, by setting out investment options for a wide range of plausible future scenarios or alternative pathways (Figure 1).

The purpose of adaptive planning is to identify flexible low-regret options based on the comparison of optimal solutions for each plausible pathway. Adaptive planning has decision points (where you decide whether to switch paths) and trigger points (where the investment programme shifts to another pathway).

Figure 1 provides a conceptual diagram demonstrating the approach to adaptive planning but please refer to Section 2 of the rdWRMP24 main statutory document for further information.

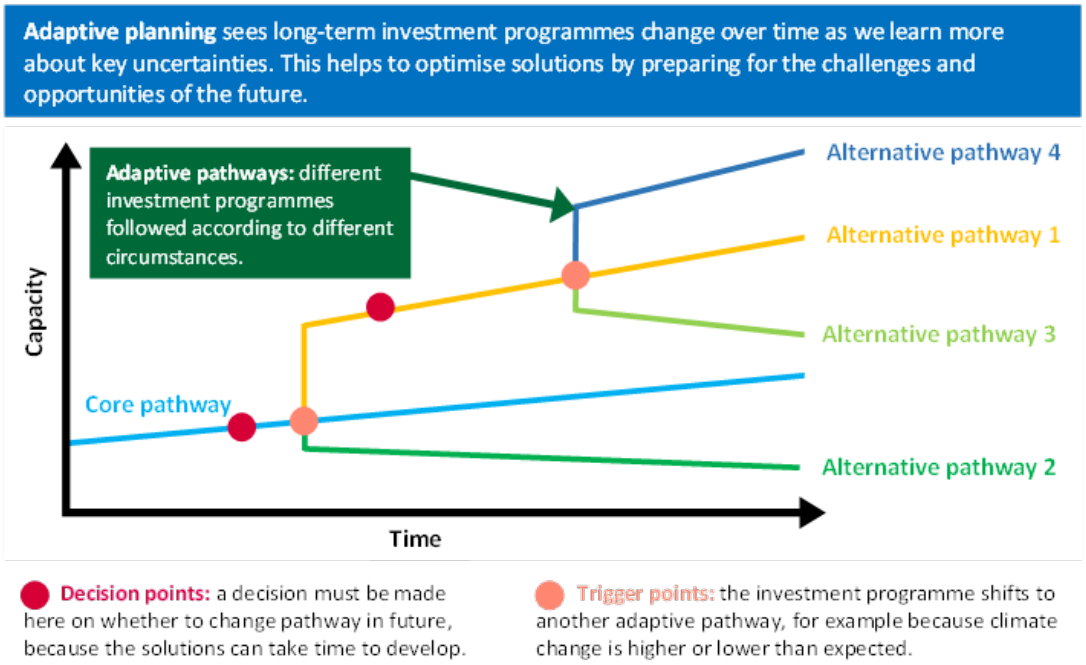


Figure 13: Conceptual diagram demonstrating the approach to adaptive planning and definitions for key concepts of adaptive pathways, decision points and trigger points. Adapted from sources: Ofwat, May 2022; Ofwat, April 2022.

5.3.3 WRSE adaptive planning pathways for South East England

WRSE have set out a regional best value adaptive plan which schedules a set of investments to meet a range of future challenges across the region. There are nine pathways in the WRSE adaptive plan (see Figure 14). Each represents one discrete combination of deterministic forecasts for growth, climate change and environmental destination (abstraction reduction). The combination of these forecasts estimates the likely deficit in water that would occur in each future scenario.

The Adaptive Plan comprises:

- **Stage 1: The root branch (2025/26 to 2034/35)** the first five years of the plan have a common set of forecasts comprising housing growth that reflects local planning authority housing plans, medium climate change and current statutory environmental requirements (i.e. modifications to abstraction licence volumes that are already identified).

- **Stage 2: The next three branches (2035/36 to 2039/40)** include the same environmental ambition and climate change projections but cover a wider range of potential population and household growth scenarios.

  Uncertainty within the predictions of future economic and demographic futures presents a challenge for water resource management. The UK government has stated aspirations to accelerate the rate of house building to 300,000 new homes per year. However, the UK's exit of the European Union and the global restrictions on migration presented by the Coronavirus

pandemic means that the UK is facing a unique period of uncertainty politically, economically and demographically. The need for robust evidence on future housing growth and demographic change are key requirements to the rdWRMP24.

- **Stage 3: The final set of branches (2040/41 to 2074/75)** focus on how alternative environmental ambition scenarios and climate change forecasts could continue to impact on the future availability of water.

  Sustainably abstracted water bodies are more resilient to climate change and drought (EA, March 2020). There is rising awareness that the water bodies in our supply area are under increasing pressure with the assumption that the abstraction of water for public water supply is a component of that pressure. In close consultation with the Environment Agency, we have sought to understand the possible range of reductions in abstraction we might foresee in the future to raise the resilience of water bodies in our area. Exact site by site reduction levels have yet to be established, but to allow this plan to account for this significant pressure, we have modelled the possible impact of reductions as 'environmental destinations'.

  In the future, the climate will change. We are facing hotter, drier summers, and warmer wetter winters, bringing new challenges to delivering and securing resilience of water resources. Scenarios based on high, medium and low climate change future scenarios have been considered.

Whilst there are nine different futures scenarios reflected in the adaptive pathways, one 'reported' pathway is used to describe the investment plan required for South East England. This is situation 4, which is based on housing plan growth projections, high environmental protection, and high climate change (see Figure 14). This pathway aligns most closely with the requirements of the Water Resources Planning Guideline. The other pathways serve to articulate the sensitivity of this plan to alternative drivers.

The WRMPs of the six WRSE member companies all reflect the nine adaptive pathways of the regional plan. The investment programme derived from the 'reported' pathway has been included in water company business plans for 2025 to 2030.

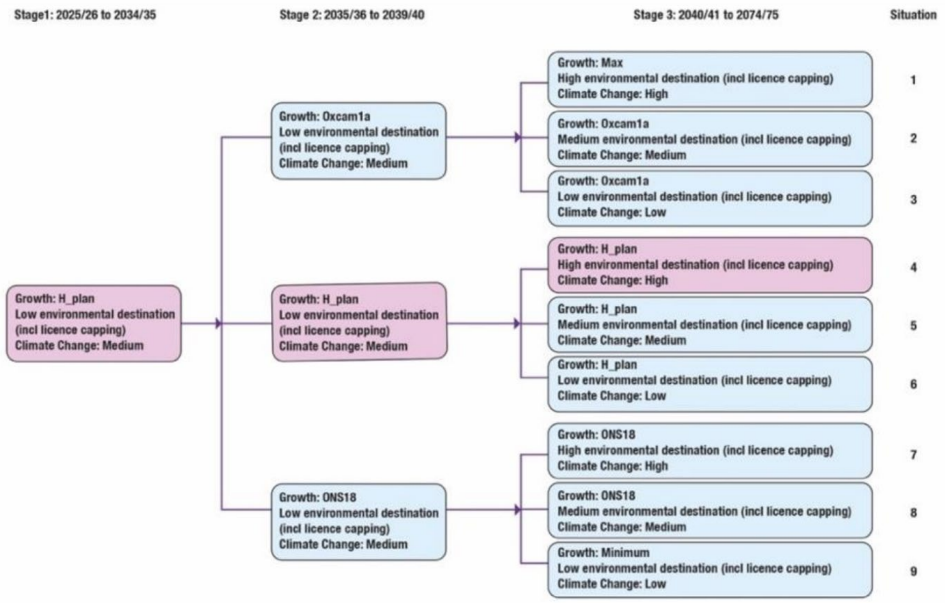


Figure 14: WRSE and Portsmouth Water Adaptive Planning branches with the reported pathway highlighted.

5.3.4 WRSE core and adaptive options

The regional plan identifies a set of "core" and "adaptive" options that secure water supplies in each of the nine future scenarios. "Core" options are needed in **all** future scenarios, appearing in all nine pathways and so must be progressed. The majority of these options are identified in the first 15 years of the plan.

"Adaptive" options are schemes that have been identified in some but not all of the pathways. These adaptive options could be needed in **different** future scenarios, helping us to manage the uncertainty around the future challenges we face.

At a regional scale WRSE has compared the options identified in situation / pathway 4 with those in the other pathways, illustrated in Figure 15 below. Each situation is represented by a grey line and the different coloured dots on each pathway represents a scheme. The distribution or recurrence of dots across the pathways show us the core schemes as well as which adaptive schemes may be required or which adaptive schemes might no longer be required, depending on how the future unfolds.

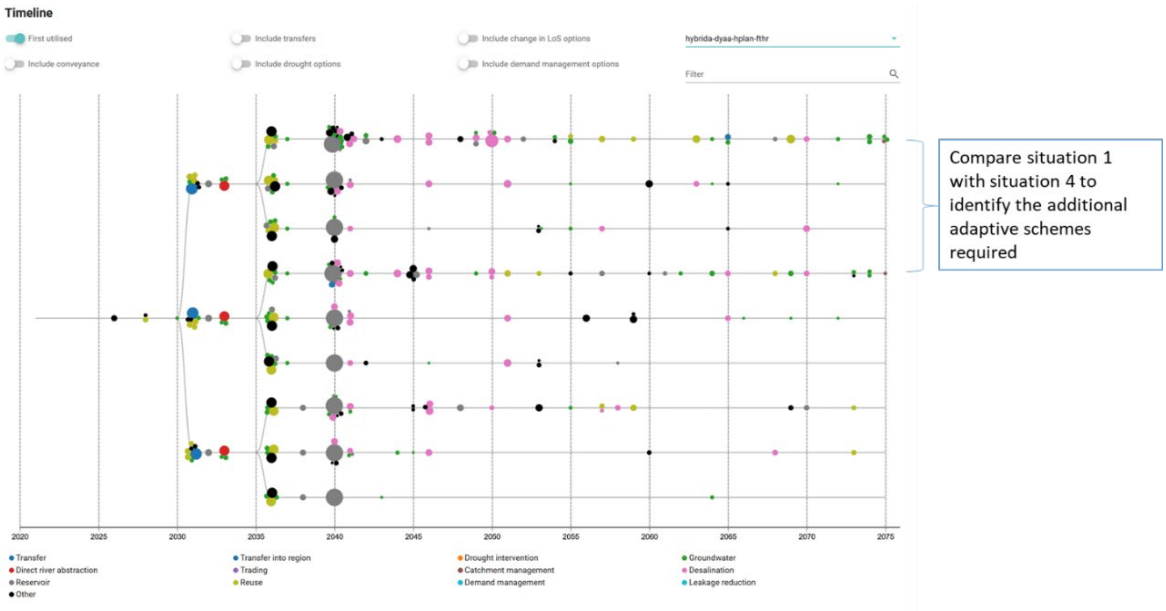


Figure 15 WRSE Core and adaptive options

There are also further options available to the investment model, which are not currently selected in any of the 9 scenarios, but which could be used should the selected adaptive options prove to be less effective than anticipated or to be undeliverable. These are referred to as "what-if scenarios". WRSE has compared the results of different investment model runs and sensitivity testing, which show which adaptive options are identified if others are not included, enabling us to show how the regional plan would have to change to include these "what-ifs" in these circumstances.

5.3.5 Portsmouth Water core and adaptive options

Our core and adaptive options are shown on Figure 16. The **core** options selected within all adaptive pathways, including the WRMP reported pathway Situation 4 are:

- **Demand management options:** Both our 'High plus' demand management basket with universal smart metering and the Government initiative led savings.
- **Drought plan options:** Source S drought permit and demand side drought orders (Temporary Use Bans and Non-Essential Use Bans).
- **Havant Thicket Reservoir approved scheme:** Construction of the reservoir, filling with spring water and the provision of a 21 Ml/d bulk supply to Southern Water.

For us there are no differences in the investments identified for Stage 1 and Stage 2 resulting from the adaptive pathways and therefore the key adaptive trigger point for Portsmouth Water is 2039/40. Our first adaptive options in 2039/40 comprise:

- **Source O Booster Upgrade:** This is utilised in eight of the nine adaptive planning pathways, including the WRMP24 reported pathway Situation 4. Therefore it has a high probability of being required and is close to being a core option.
- **New import from Southern Water:** This is utilised in six of the nine adaptive planning pathways, including the WRMP24 reported pathway Situation 4. Therefore is has a relatively high probability of being required.

Our second set of adaptive options are first utilised after the mid-2040s and they comprise:

- **Additional treatment capacity at existing Works A WTW to receive additional water from Havant Thicket Reservoir, supported by water recycling:** This is utilised in three of the nine adaptive planning pathways, including the WRMP24 reported pathway Situation 4. These pathways are associated with a future where we implement our 'High' environmental destination.
- **New WTW at the location of service Reservoir C:** This is utilised in two of the nine adaptive planning pathways, including the WRMP24 reported pathway Situation 4. These pathways are associated with a future where we implement our 'High' environmental destination and where there is higher population growth.

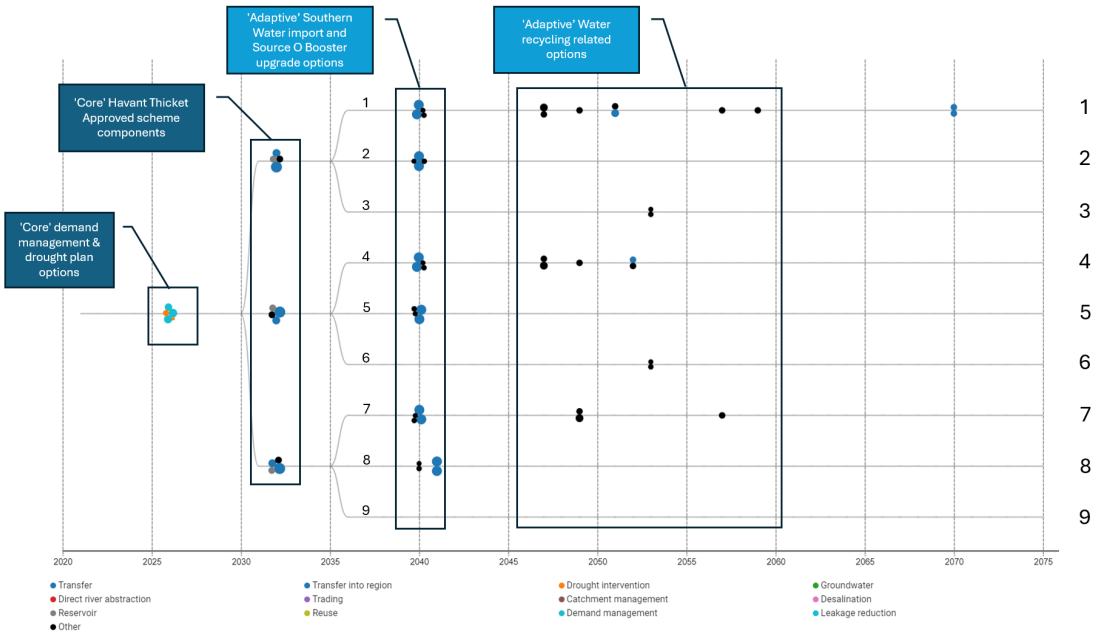


Figure 16 Portsmouth Water core and adaptive options

WRSE has referred to "what if scenarios" to identify further adaptive options in the case that certain schemes cannot be delivered or if they do not achieve their expected benefit. Our "what if scenarios", or sensitivity tests, are described in Appendix 9A of our WRMP24.

None of the sensitivity tests resulted in the selection of additional Portsmouth Water WRMP options. This means that to some degree, the options already identified in our WRMP24 adaptive planning pathways can flex as necessary to meet the challenges posed by the sensitivity tests. Utilisation of certain options can be increased, or the start date of an option can be brought forward. A few of the sensitivity tests required the Source O Booster Upgrade to be implemented in an earlier year, the most extreme being 2032/33 instead of 2039/40 as shown in Figure 17. Additionally, the sensitivity

testing of reduced demand management activity indicated the need for a larger capacity 'Thames to Southern Transfer' (200 Ml/d) and 'Otterbourne WSW to Source A transfer' (95 Ml/d).

Despite the above, certain sensitivity tests led to a deficit in the supply demand balance. Where these occurred towards the end of the 50 year plan, the sensitivity testing demonstrates that we need to develop additional options for the next WRMP (WRMP29) to meet the increased challenges from population growth, climate change, and in particular, our environmental destination, which we have undertaken to do for WRMP29.

Sensitivity testing around the benefit from our Source S drought permit identified a near-term deficit in 2025/26 and therefore demonstrated our reliance upon this option at the very start of the WRMP24 planning horizon to maintain resilience to extreme drought. To mitigate losing part or all the Source S drought permit benefit, we would seek immediate implementation of the 'More Before 4' actions as described within our Drought Plan.

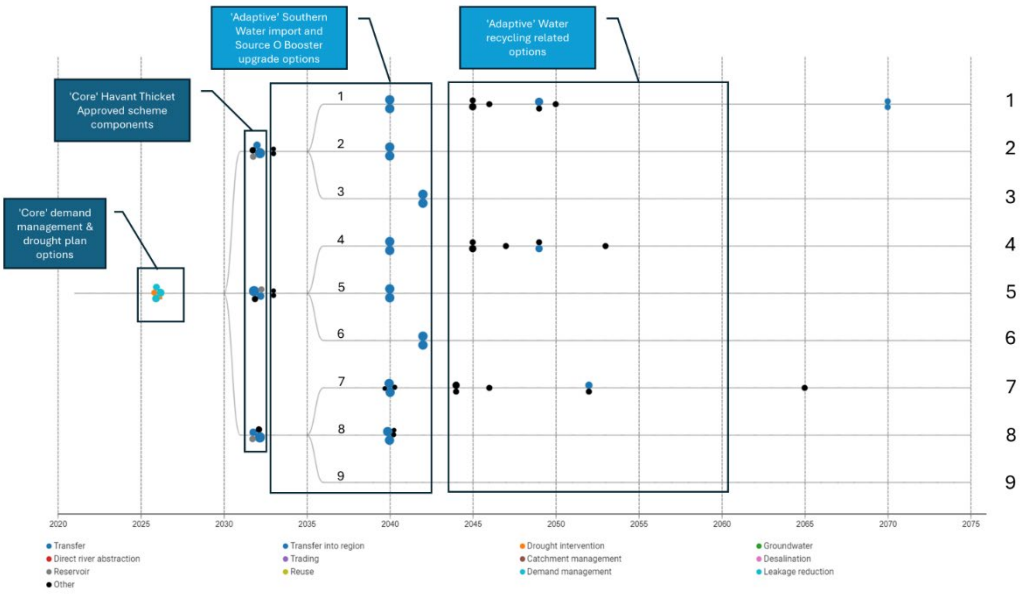


Figure 17 Sensitivity test 3: Reduced demand reduction from drought interventions

The sections above have described the identification of core and alternative adaptive options. In the next sections we describe the WRSE and company monitoring plans to ensure we trigger alternative options in good time if necessary.

5.3.6 The WRSE monitoring plan for South East England

The purpose of the WRSE monitoring plan is to track key indicators and decide when alternative, adaptive solutions need to be triggered in the WRSE region.

Given the range of different future scenarios it is important to track where we are against the assumptions and forecasts. If we begin to experience a future scenario which is better reflected by one of the alternative pathways in our adaptive plan than our reported one, we will move to the new pathway and deliver its respective investment programme.

In addition, WRSE will monitor the progress in delivering the investment programme in pathway 4. This includes the delivery of new water resource schemes, demand and leakage reduction. If progress is behind projections and will no longer address the projected deficit, then we would identify the alternative option or options that would need to be progressed instead. For example, if the

government water efficiency policies do not deliver the savings that are assumed within pathway 4, then we would need to progress further supply options.

Table 12 sets out the areas that WRSE will monitor and the method of monitoring them.

WRSE will ensure that it prepares and publishes an Annual Monitoring Report, building upon the content of the company WRMP Annual Reviews (normally published in June of each year).

Table 12 Areas and methods of monitoring

Area of monitoring	Method of monitoring
Population growth	Water company annual reports. WRSE will track these updates every year and commission new regional forecasts in 2027, using any new Census information and ONS data published. These updates will be compared with the forecasts in the regional plan at a water resource zone level.
Housing growth	Water company annual reports and collected through inspection of the local housing plan growth forecasts. We will track how these forecasts compare with those in the regional plan. We will also be monitoring the Oxford Cambridge growth forecasts.
Per Capita Consumption (PCC)	Water company annual returns and will take into account any Government announcements that are made regarding water efficiency commitments from the Government's Environment Improvement Plan.
Non-household demand	Water company annual reports
Smart metering	Water company annual reports
Government water efficiency interventions	WRSE have tested several different Government water efficiency policies. Government Policy C+ brings the region to 110 l/p/d by 2050 in a dry year, but this puts a lot of onus on Government to deliver a significant component of the plan. This will require careful monitoring as the plan progresses to review Government commitments.
Leakage	Water company annual reports. WRSE will also track the outturn leakage numbers each year at each water resource zones to see how well the zones are tracking against their expected outturns.
Distribution input	Water company annual returns.
Environmental ambition and sustainability investigations	WRSE has worked with the EA and Natural England to develop the existing environmental ambition profiles, and to incorporate licence capping. The profiles will need to be reviewed to ensure they meet policy expectations, particularly regarding licence capping and the results of ongoing WINEP and environmental investigations.
Abstraction reduction delivery	Water company annual reports
Water resource scheme delivery	Water company annual returns
Supply forecasts	Supply forecasts will be updated by WRSE in 2026 and reviewed in 2027. The supply forecast will be updated to take account of the reductions to existing abstraction licences, new schemes coming online and any new information on drought resilience standards. They will also take on board any updates to approaches for generating future droughts.
Climate change	The climate change projections are unlikely to be updated until 2027. In the interim WRSE will use the Met Office annual "state of the climate" reports and Copernicus information to track how global temperatures are comparing to the 28 climate change scenarios WRSE modelled for the regional plan. This temperature proxy will be used to indicate which of the climate change scenarios we are tracking against.
Government policy	Government policy might / could change in the future. WRSE will continue to update the plan where necessary to compare with the known policies in the current plan. This includes levels of drought resilience, the use of demand side drought options (Temporary Use Bans and Non-Essential Use Bans) and future environmental policies.

WRSE will also ensure that it provides a regular update to its commentary on the factors that could change the regional plan, as summarised in Table 13 below. These factors and issues will be monitored with member companies and regulators, and will also take stakeholder and customer feedback into account where possible.

Table 13 Factors which could change the regional plan and key issues which will be monitored by WRSE

Factors which could change the regional plan	Key issues to be monitored and resolved where possible
Environmental ambition	WRSE has worked with the EA and Natural England to develop the existing environmental ambition profiles, and to incorporate licence capping. The profiles will need to be reviewed to ensure they meet policy expectations, particularly regarding licence capping and the results of ongoing WINEP and environmental investigations.
Quantifying environmental benefits	WRSE will continue to work with our member companies, regulators and catchment partners to better understand schemes and ecological benefits from environmental ambition.
Demand side options	TUBs and NEUBs have been included in the regional plan as one of the measures to meet the challenges ahead. The default regional position is that this will remain the case unless there is feedback to change this policy position. WRSE have tested several different Government water efficiency policies. Government Policy C+ brings the region to 110 l/p/d by 2050 in a dry year, but this puts a lot of onus on Government to deliver a significant component of the plan. This will require careful monitoring as the plan progresses to review Government commitments.
Supply side options	Uncertainties relating to supply side schemes will be monitored and resolved where possible. Key schemes to monitor include SESRO, GUC, Hampshire Water Transfer and Water Recycling, and Teddington DRA. Drought orders and permits continue to be selected in the regional plan until 2040, however WRSE will monitor regulatory positioning on the continued use of drought orders and permits and adjust our approach accordingly. WRSE has investigated accelerated cessation of the use of drought orders and permits (2035) as well as delayed cessation (2045 and 2050). WRSE will continue to work with the All Company Working Group (ACWG) and the National Advisory Unit (NAU) to look at emerging substances relating to reuse and water recycling schemes and compliance with the Water Framework Directive.
Carbon reduction	We will monitor the cost of carbon and mitigation options.
Future environmental policies	WRSE will continue to work with Government and regulators throughout the regional planning process to inform and support resolution of outstanding environmental policy uncertainties.
Regional reconciliation	There will need to be further regional reconciliation to ensure consistency is maintained between the regions in future.
Multi-sector options	WRSE will continue to engage with stakeholders and multi-sector groups to improve our understanding of non-public water supply demand forecasts, potential multi-sector options, and impacts on non-public water supply sources from droughts and licence capping.
Drought resilience	We have tested several different implementation timescales for 1:500 year drought resilience timing. Unless there is a strong consultation response or regulatory direction, the default WRSE position is 2040 for achieving 1:500 year drought resilience.

The purpose of the WRSE monitoring plan is to ensure that the companies can meet their supply duty by ensuring sufficient schemes and interventions are delivered to meet their future supply demand challenges.

This means understanding if the interventions and forecasts set out for the reported pathway in the regional plan are on track, but more importantly the forecast security of supply is not compromised. Given how long some infrastructure schemes take to deliver it is necessary to continue with their development in parallel with some preferred options.

The metric used to monitor this is "headroom", which is the amount of water a company has over the forecast supply demand balance position for each water resource zone (WRZ). Each company must maintain a headroom in each of its supply zones and this should be always be above a certain threshold, referred to as "target headroom". The plan has been derived to ensure that companies can meet their target headroom position across all the zones giving a level of resilience for each of the zones.

Target headroom is a composite measure that brings together the supply and demand forecasts coupled with the program delivery of schemes. When schemes are delivered, they either improve the supply forecast (water recycling, reservoirs, transfers, etc) or decrease the demand (water efficiency and leakage schemes). Outperformance of some schemes can be countered with late delivery of other schemes. Likewise, if population growth does not increase at the forecast rates used in situation 4 this could be countered by an increase in climate change impacts. Therefore, this composite measure better reflects the actual position companies are in for ensuring security of water to their customers on an annual basis.

If the actual headroom in a zone falls below target headroom, then action is required to improve the situation. If actual headroom is higher than target headroom, then no immediate action is required but companies should continue to monitor the situation. This is shown in the schematic diagram below in Figure 18.

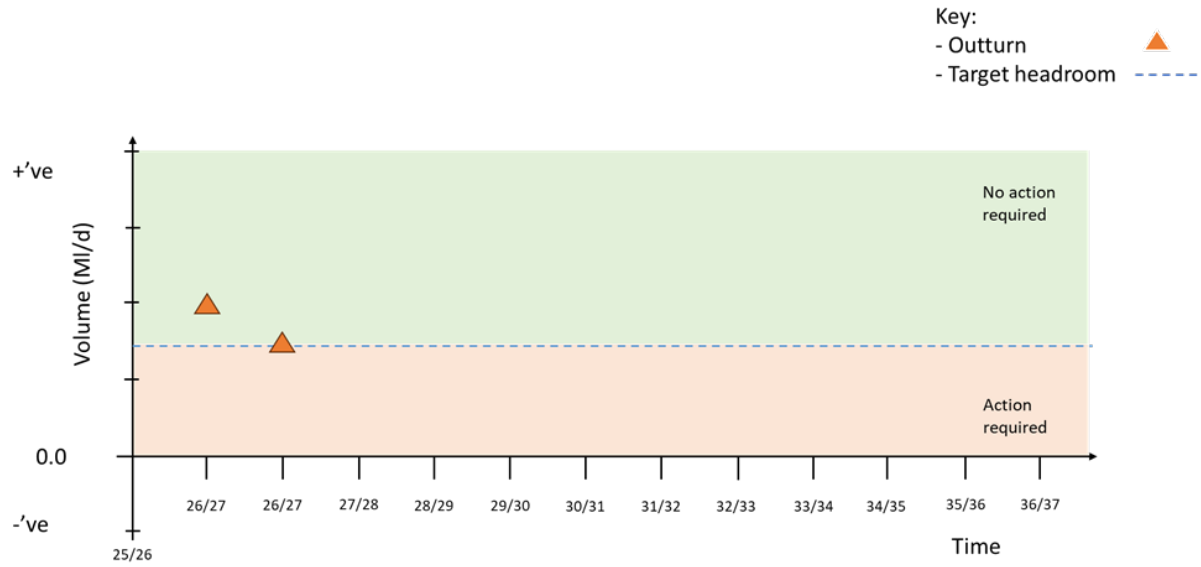


Figure 18 Monitoring of outturn / actual headroom against WRMP target headroom

Looking at annual return data is helpful but the underlying indicators also provide an insight into the future position and therefore WRSE will use the outturn data coupled with the forecast information to estimate future headroom capacity for each of the zones, as illustrated below in Figure 19.

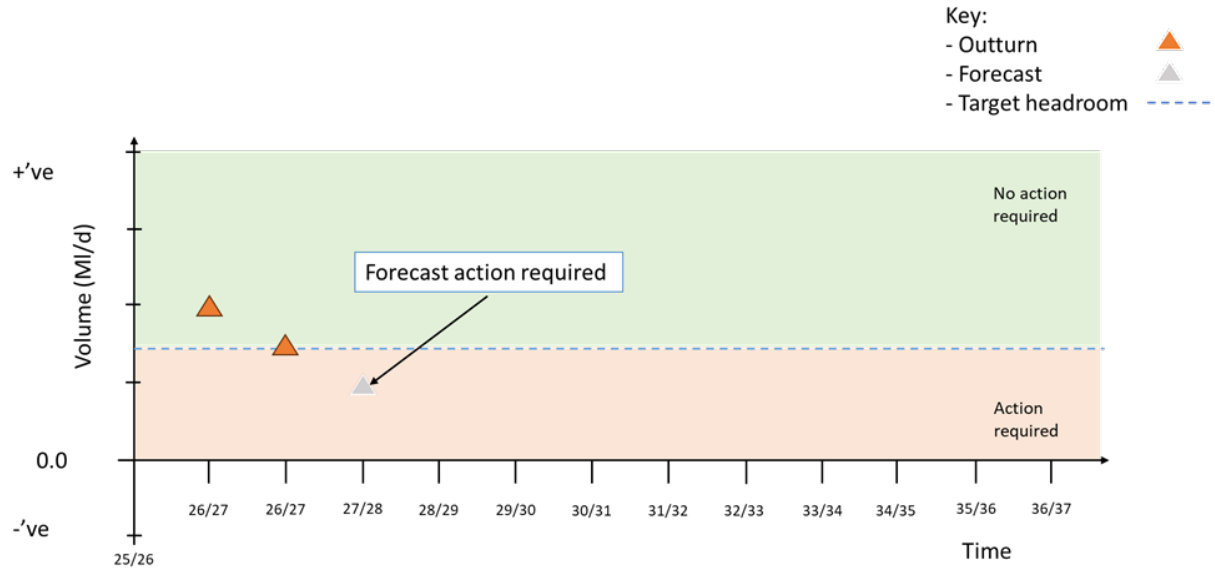


Figure 19 Forecast of headroom against WRMP target headroom

The forecast headroom position is calculated by dividing (hybrid Deployable Output profile + resource schemes) by the (Demand forecast adjusted by the Dry Year Distribution Input). Where the Dry Year Distribution Input is the annual Distribution Input uplifted for a dry year.

The annual water balance provides an insight into the amount of water put into supply each year (distribution input) and is broken down into the various components such as consumption, leakage, non-household consumption, etc. A schematic of an illustrative water balance is shown in Figure 20 below.

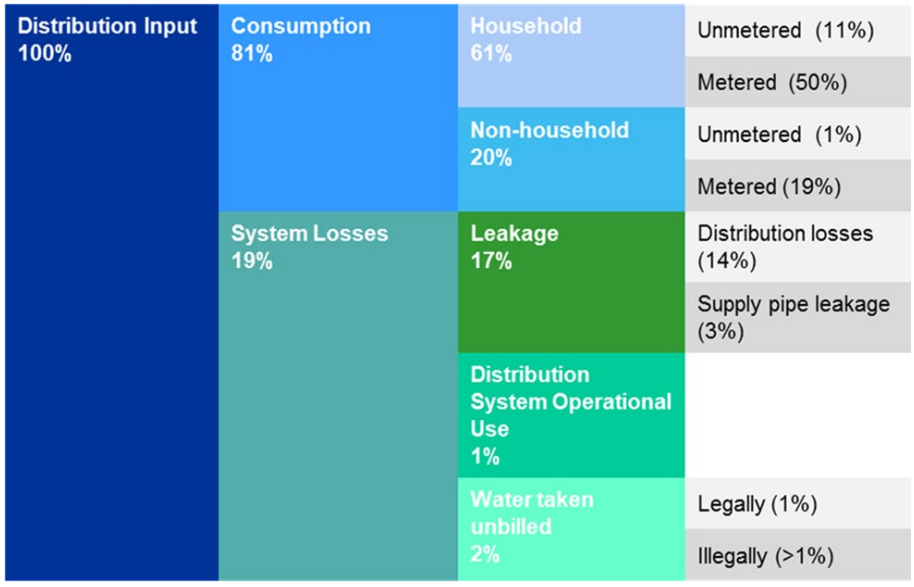


Figure 20 Schematic of a water balance

The schematic in Figure 20 shows how the overall amount of water put into supply (distribution input) is made up of many different components. The percentage breakdowns in the table are illustrative only but show this approach clearly identifies where water entering supply ends up. Comparing these annual values with those set out in a water company's water resource planning tables provides WRSE with a useful indication as to which areas of demand are in line with the expected performance and the areas which are falling behind.

This water balance is completed each year by the individual water companies. Other information included in the annual return includes the progress of deliverying any WRMP schemes, both for supply or demand benefit. Therefore the annual return information provides key insights on:

- The supply demand balance position in each zone through the actual headroom assessment
- Progression on company schemes and government policies; and
- Progression of the adaptive options and the decision points

WRSE will ensure that it prepares and publishes an Annual Monitoring Report, building upon the content of the individual company WRMP Annual Reviews (normally published in June of each year). Based on the headroom trigger level we will indicate to companies which of their WRZ's are at risk. As WRSE is not a delivery organisation it will rely on the companies and government to undertake any remedial actions required.

5.3.7 Portsmouth Water monitoring plan

This section sets out Portsmouth Water's WRMP24 Monitoring Plan, which has been informed by:

- adaptive plan pathways and trigger points set out in Section 2 of the rdWRMP24 main statutory document (i.e., population growth, environmental destination, and climate change),
- WRMP preferred and alternative options set out in Section 10 of the rdWRMP24 main statutory document, and
- Sensitivity testing set out in Section 9 of the rdWRMP24 main statutory document (i.e. demand benefits not arriving).
- the WRSE regional monitoring plan

Table 14 contains details of the components and frequency of monitoring. The Monitoring Plan would be reported annually via the WRMP Annual Review. This will be reported to Regulators and published on our website. The reason for this frequency of monitoring is to accurately and efficiently share the updated position with regulators and stakeholders.

The monitoring plan and supply demand balance would be reviewed in its entirety each year to ensure the balance of components are assessed in the round. Therefore, a key focus of our monitoring plan reporting will be on identifying how our outturn headroom compares with the WRMP target headroom, mirroring Figure 18 within the WRSE monitoring plan. This will confirm the overarching health of our supply and demand balance and the potential need for corrective actions.

The longevity of changes to the supply demand balance should be considered when reviewing an adaptive plan pathway. An operational event may look like a significant change in the short term but lose its significance when looked at as part of the annual picture. Therefore, a second key focus of our monitoring plan reporting will be on identifying how our forecast headroom compares with the WRMP target headroom, mirroring Figure 17 within the WRSE monitoring plan. This will help to confirm the need for corrective actions. If our forecast headroom is lower than our target headroom we will describe corrective actions within our annual review (e.g. a leakage recovery plan or a smart meter installation recovery plan).

If actual annual reported outturn figures indicate that the supply demand balance is outside the range that has been considered in the plan or for the preferred pathway, we will flag how the investment strategies might need to be updated (as detailed in the adaptive pathway). In most cases it is anticipated that updated investment strategies can be developed, and decisions made, via the usual 5-year WRMP and business planning cycles as summarised on Figure 21. This includes:

- the potential funding of the Source O Booster Upgrade option via the PR29 business plan instead of the PR34 business plan, to allow for an earlier implementation year (a potential need that is demonstrated by our WRMP sensitivity testing).
- decision making around a larger capacity 'Thames to Southern Transfer' and 'Otterbourne WSW to Source A transfer' (a potential need that is demonstrated by our demand management sensitivity test).

An example of a key decision that might need to be made prior to the development of the next WRMP (WRMP29), is the need to potentially trigger 'More Before 4' drought plan actions in 2025/26 in the event of a severe drought. Sensitivity testing around the benefit from our Source S drought permit has identified the risk of a near-term deficit in 2025/26, should a severe drought develop. If groundwater level forecasting in the winter of 2024/25 identifies a risk of breaching our Level 3 drought plan trigger and needing to implement our Source S drought permit later in 2025, this will trigger the need for us to work with our regulators on the 'More Before 4 Options' in our drought plan to ensure that we can maintain the levels of service identified in our drought plan.

A further decision that needs to be made prior to the development of the next WRMP (WRMP29), is regarding the need to update our final WRMP24 to ensure consistency with Southern Water's final WRMP24. If it is concluded that there are material differences between the plans (e.g. bulk transfer assumptions), then we commit to updating our final WRMP24, as necessary and agreed with the Environment Agency, via the annual review process in 2025.

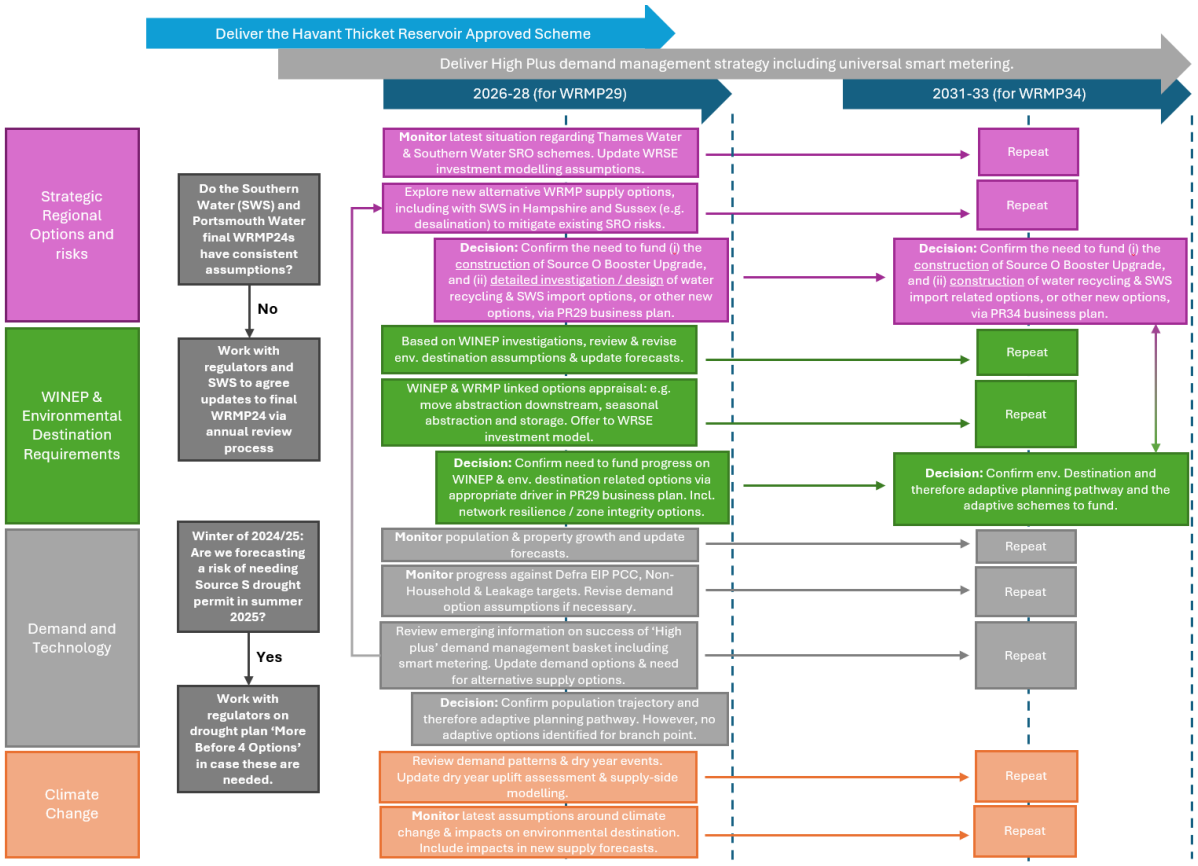


Figure 21 Portsmouth Water Monitoring Plan: Reviews, monitoring, and decisions.

Beyond our own monitoring, and as identified in the WRSE monitoring plan above, we will provide WRSE with the outputs of our WRMP annual review. These will typically be available in July of each year. We will support WRSE on the development of each regional Annual Monitoring Report to help identify progress on our WRMP schemes and the status of our available headroom versus target headroom.

Table 14: Portsmouth Water WRMP24 Monitoring Plan

Component and metrics	Metrics	Why monitor?	Annual Review*	WRMP planning cycles**
Supply Demand Balance (including imports and exports)	**Ml/d deficit or surplus relative to target headroom.**	**Key metric to trigger the development of corrective action plans and/or a shift to an alternative WRMP24 adaptive planning pathway.**	**The WRMP Annual Review reports a supply demand balance which would be updated in line with components detailed in this table. The reports will also provide a forecast of the supply demand balance in the next year. This would support in informing risks of a supply demand balance and the corrective actions that might be required e.g. a leakage recovery plan including increased resourcing levels.** **We will also review the imports and exports, linked to potential WFD risks detailed in Appendix 5B.**	**Supply and demand forecasts will be produced for WRMP29 and WRMP34 based on latest available information and guidance.** **Impact on WRMP24 adaptive planning pathway to be identified.**
Measured and forecast population growth and consequential supply-demand impact of changes to distribution input (in Ml/d). This includes property numbers and our customer population.	• Measured volume to households and non-households, • property counts, and • population	Supporting metric to improve our understanding of underperformance or overperformance relative to the WRMP24 reported pathway.	This component will be reviewed annually via the annual water balance and regulatory reporting. Actual reported figures will be compared to WRMP forecasted figures to determine which adaptive pathway is emerging as closer to reality as it unfolds.	Our forecasted assumptions will be reviewed via the 5-year updates based on ONS and local planning updates as part of the WRMP development.

Component and metrics	Metrics	Why monitor?	Annual Review*	WRMP planning cycles**
Climate change impact on deployable output	Percentage impact on deployable output	To provide the best view of future impacts when developing the next WRMPs.	N/A	Review demand patterns & dry year events. Update dry year uplift assessment. Forecast impacts of climate change on deployable output (in Ml/d) as updated for WRMP29 and WRMP34 consistent with the latest UK climate projections at the time of forecast.
Environmental Policy (including licence capping) with respect to the timing and prioritisation of the long-term Environmental Destination which in turn will affect forecast impacts to deployable output after the 2035 decision point.	Total Ml/d loss of licence reduction and deployable output loss based on investigation outputs	To provide the best view of future impacts when developing the next WRMPs.	This can be monitored through the AMP8 and AMP9 Water Industry National Environment Programme (WINEP) investigations and options appraisal programme and use this reporting mechanism. The WINEP outputs will detail the scale of the abstraction licence reductions required which in turn informs which of the post 2035 adaptive pathways is the most appropriate.	The AMP8 and AMP9 WINEP investigations will inform future WRMP planning cycles based on sustainability reductions implemented and those which may be required. Future WRMP planning scenarios would also need to consider emerging regulations which may inform future forecasts.

Component and metrics	Metrics	Why monitor?	Annual Review*	WRMP planning cycles**
Source S Drought Permit – yield and assessments	Ml/d of yield in a 1-in-500 drought	A key component of our drought plan, and sensitivity testing has indicated we would be particularly reliant upon this permit in an extreme drought event near the start of the WRMP24 period.	In the lead up to the 2025 annual review (winter of 2024/25)we will identify the likelihood of Level 3 drought plan restrictions and work with regulators on 'more before 4' actions as necessary. Our 2022 Drought Plan identifies three local 'more before 4' actions that we could consider in more detail as drought escalates: Option A- Recommissioning of Source U; Option B- Recommissioning unused private boreholes; Option C- Increasing pump capacity and lowering pump levels at sources Q and R.	WINEP investigations will inform WRMP29 onwards.
Time limited licence variations (currently assumed to be renewed in the baseline)	Ml/d of deployable output change	Non-renewal of the licence conditions has the potential to impact our supply demand balance and therefore the amount of water we can export to Southern Water.	Assessments will be undertaken in AMP8. Progress will be reported in the WRMP Annual Return	The outcome will be known ahead of WRMP29.

Component and metrics	Metrics	Why monitor?	Annual Review*	WRMP planning cycles**
Progress with demand side options (e.g. we are proposing universal smart metering, leakage). This will also include a review of Southern Water progress with demand reductions which link to the future import of water.	Ml/d demand savings delivered from various interventions This will include the demand savings per actions (i.e. metering, water efficiency etc) which allows us to understand areas of under or over performance and forecast forward based on planned interventions.	Supporting metric to improve our understanding of underperformance or overperformance relative to the WRMP24 reported pathway. Track progress against Defra Environmental Improvement Plan targets.	The annual water balance would establish performance with demand reductions. This would be reported via the Annual Review. This would confirm if proposed actions are translating into reduced demand (Ml/d) and PCC in line with target profiles. In line with the Annual Performance Review we would report metering, leakage and water efficiency demand reductions separately to ensure we can determine performance of each measure separately. Whilst not part of the monitoring plan our Water Efficiency Strategy (Appendix 10B, Section 6) and our Leakage Strategy (Appendix 10C, Section 7), detail the in-year monitoring of our strategies to ensure we are on track.	We would review future demand reductions against learning achieved in AMP8. This would inform future demand options and what other interventions are needed. Sensitivity testing has indicated we would review the need for a larger capacity 'Thames to Southern Transfer' and 'Otterbourne WSW to Source A transfer' via the WRMP29, to mitigate a significant reduction in the assumed effectiveness of demand management activities.

Component and metrics	Metrics	Why monitor?	Annual Review*	WRMP planning cycles**
Drought resilience with respect to progress on supply schemes and how delivery is impacting the supply-demand balance (Ml/d). Our key supply side scheme for AMP8 is Havant Thicket Reservoir. This will also include collaboration with Southern Water due to the interlinked nature of our plans.	Delivery dates Expected Ml/d benefits This will include a review of the key stages of the project programme (i.e. design, construction etc). We will also review the project risk register to inform of potential future risks.	Delayed delivery date will negatively impact Southern Water's supply demand balance.	Our annual WRMP review will also confirm drought plan assumptions and if there is any new data to improve assumptions around the efficacy of TUBs, NEUBs, Emergency Drought Order and supply side permits/orders.	The annual reviews would inform future planning assumptions.
Level of outage	Ml/d outage	Supporting metric to improve our understanding of underperformance or overperformance relative to the WRMP24 reported pathway.	In year outage would be reviewed via Planned and Unplanned Outage metrics which are reported as part of the Annual Performance Review	Outage assumptions would be refreshed for WRMP29 and WRMP34. This would be informed via previous outage reporting.

Component and metrics	Metrics	Why monitor?	Annual Review*	WRMP planning cycles**
Consistency with Southern Water WRMP	Bulk transfer agreements and utilisation (year and Ml/d) Implementation year. Strategic Regional Options and utilisation (year and Ml/d)	To ensure that the regional plan assumptions are being consistently applied at a WRMP level.	We are committed to reviewing Southern Water's final WRMP24 prior to it being published. It is anticipated that our final WRMP24 will already be published. We will draw attention to, and discuss, any discrepancies between the plans with Southern Water and the Environment Agency. If it is concluded that there are material differences between the plans (e.g. bulk transfer assumptions), then we commit to updating our final WRMP24, as necessary and agreed with the Environment Agency, via the annual review process in 2025.	Continue to work closely with Southern Water and WRSE during the development of future WRMPs to ensure consistency between plans when presenting information.

Component and metrics	Metrics	Why monitor?	Annual Review*	WRMP planning cycles**
Progress on Strategic Regional Options and new alternative options	Strategic Regional Options and forecast delivery year and capacity. Thames Water South East Strategic Reservoir Option (SESRO) (Ml/d and year). Thames to Southern Transfer (T2ST) SRO (Ml/d and year). Hampshire Water Transfer and Water Recycling Project (HWTWRP) SRO (Ml/d and year).	If Southern Water or Thames Water are unable to progress SROs, or if there are delays to the SROs, Southern Water will not be able to provide the bulk supply to Portsmouth Water from 2039-40. This is likely to delay progress towards our environmental destination.	Progress on schemes will be monitored via WRMP annual reviews and as part of the company and WRSE regional monitoring plans.	As new WRMPs are developed, Southern Water and Thames Water will update the WRSE regional investment model to reflect the latest data on the SROs. To actively manage the risk of SRO delays or reduced capacity, and provide mitigation, Portsmouth Water's key focus will be on a WRMP29 and WINEP linked options appraisal, including options that can be implemented within 10 years. These options will include a change to our Levels of Service for demand side drought orders, managed aquifer recharge, aquifer storage and recovery, movement of existing abstractions downstream, and winter water storage schemes. Portsmouth Water and Southern Water will also work together via regular meetings and workshops to explore the potential for new water recycling, desalination and transfer options.
	*Annual review related to the annual reporting of key metrics and data to the Environment Agency. Each year of the planning period will provide more data about how the supply and demand WRMP24 forecasts compare with actual data and which adaptive pathway may be emerging. **WRMP planning cycles relate to the 5-yearly Asset Management Planning periods. To produce WRMPs, the datasets contributing to supply and demand forecasts will be refreshed.			

6 ISSUE 6: DEMAND FORECASTING APPROACH

6.1 Defra explanation of Issue 6

There are number of issues surrounding Portsmouth Water's demand forecasting. Firstly, the company's Per Capita Consumption is higher in 2025/26 than its current reported level in 2022/23 by 9.1 litres per person per day, or 5.6%. This raises concern that the forecast starting position for PCC may not be appropriate and/or the company may not be delivering appropriate water efficiency activity prior to the planning period. On the contrary, comparing the company's 2022/23 reported leakage and non-household consumption data to its 2025/26 WRMP24 starting position, dry year total leakage is forecast to be 10.2 Ml/d or 46.3% lower and non-household consumption is forecast to be 2.7 Ml/d or 9.1% lower. These significant gaps reduce our confidence in the company achieving the forecast starting position in 2025/26 for these metrics. There is also insufficient evidence provided to explain the calculations used to derive the company's dry year annual average base year demand and the factors applied to the PCC forecast.

Before the final plan is published, Portsmouth Water should:

- review the starting position for PCC, leakage, non-household consumption and overall distribution input.
- provide clear evidence through a detailed action plan on how the company will achieve the significant reductions to leakage and non-household consumption by 2025/26 and closely monitor the progress on delivery.
- justify why forecast PCC is so much higher than PCC levels reported in 2022/23 and the level of ambition by the end of AMP8. Include in an action plan how it will continue to focus on reducing PCC over AMP7. This action plan should include the company's metering recovery programme.
- provide additional evidence to explain the calculations used to derive its base year demand and PCC forecast.

6.2 Our response to Issue 6

6.2.1 Starting position for WRMP24 and action plans

6.2.1.1 Introduction

Our rdWRMP24 was submitted at the end of August 2023. However, the data behind the WRSE Regional Plan, and therefore our WRMP24, needed to be 'locked-down' in spring 2023 to allow us sufficient time to update the contents of our WRMP and to complete our assurance and Governance processes. The 2022/23 data was not available and published until after the WRSE data lock down. This is a key reason why our WRMP24 builds upon 2021/22 outturn data rather than 2022/23 data.

It is inevitable for outturn data to differ from forecast data. Such discrepancies are the focus of our WRMP annual review. However, given the timing of the WRMP24 submission and the variable weather during 2022/23, we recognise there is a need to provide further information within this response.

The sections below compare the forecast and outturn data for PCC, leakage, non-household consumption and distribution input, and where relevant, provide action plans that target the correct 2025/26 WRMP24 starting position. We have also provided additional information on our calculations for deriving base year demand and PCC forecast.

Given the uncertainty from the abnormal weather and social & economic conditions in the last 2 years, we continue to believe that 2021/22 represents the most prudent starting point (base year) for our WRMP24 and the subsequent distribution input, PCC and non-household consumption forecasts coming from that assumption for 2025/26 are the best available at this time. Should further adverse conditions arise during our plan period, the inclusion of a headroom allowance provides some

insurance in our supply demand balance and therefore ensures the security in supply to our customers. This allowance is 4.98 Ml/d in 2025/26.

6.2.1.2 PCC WRMP24 starting position and action plans

Impact of Covid, weather conditions and cost of living crisis on PCC

As described above, 2021/22 was the most recent data available for development of the rdWRMP24. It also represented a 'new normal' following the Covid pandemic, with more home working and therefore higher PCC than observed prior to the pandemic in 2019/20.

PCC has proved to be unusually challenging to forecast in a post-Covid pandemic world, compounded by unusual weather conditions and the cost of living crisis over the last two years. We believe that PCC was artificially suppressed in 2022/23, impacted by drought communications in summer, and high energy prices over the winter. Whilst PCC in 2023/24 may be close to that in 2022/23, we believe that PCC has been supressed again by unusually high rainfall and the continued cost of living impact. Given the uncertainty and abnormal conditions in the last 2 years, we continue to believe that 2021/22 represents the most prudent starting point for PCC and the forecast for 2025/26 is the best available at this time. Further information is provided in the sections below.

Comparison of outturn and forecast PCC data

Our forecast and outturn data for annual average PCC is provided in Table 15. This demonstrates that our forecast PCC in 2025/26 is higher than our outturn PCC in 2022/23, as highlighted by Defra. The sections below provide a commentary on recent outturn data and address the Defra concerns regarding our level of ambition in the remainder of AMP7 and into AMP8.

Table 15 Annual average Per Capita Consumption: outturn and forecast data (litres/person/day)

PCC data	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
Outturn PCC data	149.9 Pre-Pandemic	170.5 Pandemic lock down Dry weather	160.3 Dry weather Cost of living crisis	152.5 Wet summer Cost of living crisis	-	-	-
Normal year PCC forecast		-	160.8	160.5	158.3	157.0	155.5
Dry year PCC forecast		-	167.2	166.8	164.6	163.1	161.6

Note: WRMP24 table 2a has an outturn value for 2022-23 rather than the WRMP normal year forecast as requested by Ofwat.

2022/23 outturn data

Based on the evidence currently available to us, we believe that the 2022/23 outturn data reflects an unusual year for Portsmouth Water, where PCC was suppressed even though as a company we did not introduce mandatory use restrictions via temporary use bans.

On the 17th August 2022 our groundwater levels marginally crossed our Level 1 Trigger as we officially entered a 'developing drought' status and we formally enacted our Drought Plan. This required us to deliver an enhanced programme of communication with customers in our supply region, requesting they voluntarily reduced their water use, due to the prevailing weather conditions. However, groundwater levels did not drop low enough to cross our Level 2 Trigger, which meant that the developing drought did not progress to become an official 'drought'. Therefore, there was no need to introduce mandatory use restrictions for customers.

Based on our own water resources situation in 2022/23, we would have expected an outturn PCC that was somewhere between the normal year and dry year annual average PCC i.e. between 160.5 l/p/d

and 166.8 l/p/d based on Table 15. This is because the dry year annual average condition should reflect the level of demand immediately prior to the implementation of mandatory use restrictions for customers.

Whilst our enhanced spring and summer communications will have contributed to suppressed demand for water and therefore lower PCC, direct contact we received from customers through this period made it clear that our customers also reacted to the mandatory use restrictions implemented elsewhere in Hampshire by Southern Water on 5th August 2022, and to the wide national and regional press coverage of the drought. We recorded a spike in customer queries, predominantly because of the announcement of the Southern Water hosepipe ban (WRMP24 Appendix 1H).

Due to the specific characteristics of the 2022 event, a further five companies, including Thames Water and South East Water in the WRSE region, implemented mandatory use restrictions within August 2022 when we did not. The implementation of Temporary Use Bans was observed to reduce distribution input consistently in all six company areas where these interventions were applied, as reported within UKWIR 23/WR/02/17 "Review of 2022 Drought Demand Management Measures". The UKWIR analysis of household consumption at the company level was inconclusive. However, modelling of property-level water use in a selection of case study water resource zones estimated that Temporary Use Bans reduced household demand by 6.62% with a standard deviation of 1.17%.

The implementation of restrictions in our neighbouring supply areas and the significant local and national media attention the measures prompted will have contributed to the drop in PCC observed in August and September 2022 for our company area (see blue line on Figure 22).

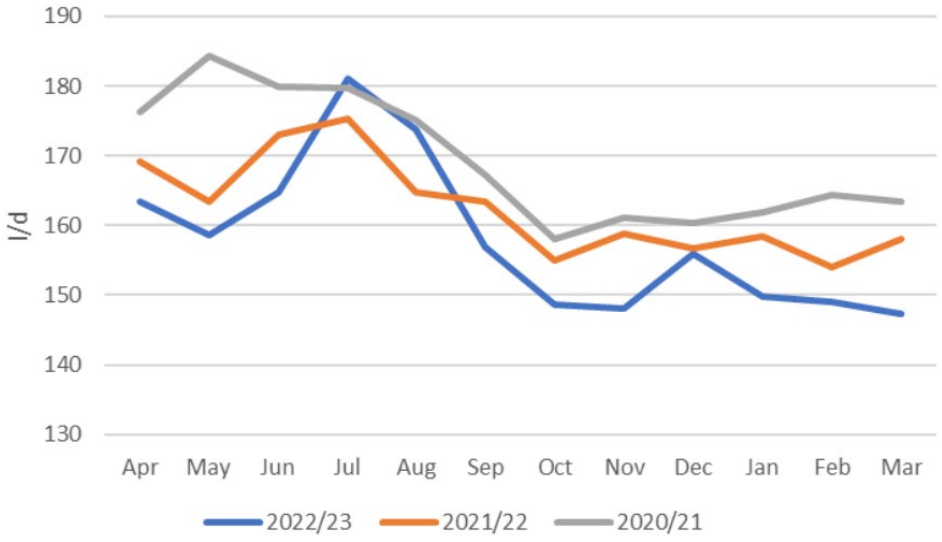


Figure 22 Average PCC (household and non-household) over the last 3 years (Reproduced from WRMP24 Appendix 1H)

During October and into November 2022, significant rainfall led to a rapid increase in groundwater levels. The Southern Water mandatory use restrictions were lifted on 4 November 2022. However, PCC continued to be supressed and this coincided with high energy costs over the winter of 2022/23 (see Ofgem's domestic energy price cap in Figure 23), which probably influenced water consumption e.g. less time spent in hot water showers.

Emerging information from an Artesia led study into 'Water use shock event effects and regulatory treatment' indicates that the cost of living (including high energy costs) in England and Wales may have reduced PCC by around 3% in 2022/23 and 1% in 2021/22. For Portsmouth Water this would imply that PCC in 2022/23 would be around 3 l/person/d lower than in 2021/22.

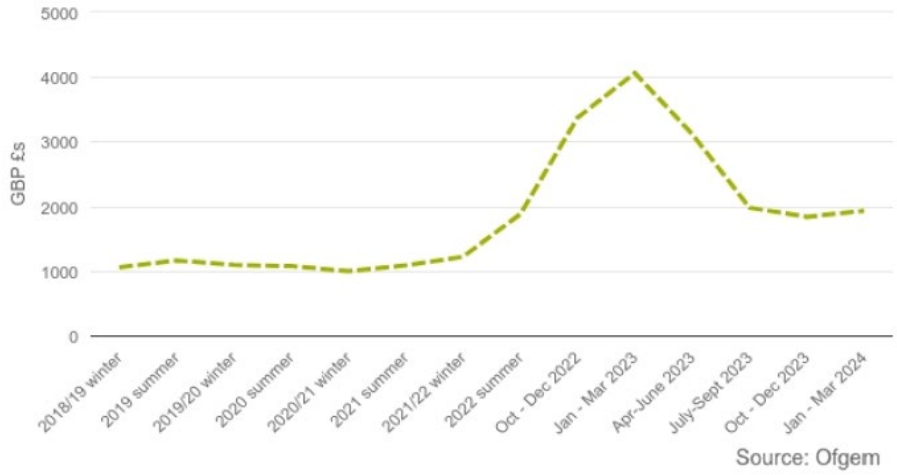


Figure 23 Ofgem's domestic energy price cap

In summary, it is considered that drought related messaging in spring and summer 2022 and high energy costs in the winter led to the lower outturn PCC of 152.5 l/person/d for 2022/23.

2023/24 emerging outturn data

Emerging outturn data is indicating that our outturn PCC for 2023/24 is expected to be similar to 2022/23. This probably reflects the relatively high rainfall experienced during 2023 (April to August inclusive, as shown in Figure 24) combined with on-going higher energy costs (see Figure 23) i.e. it does not reflect a normal year.

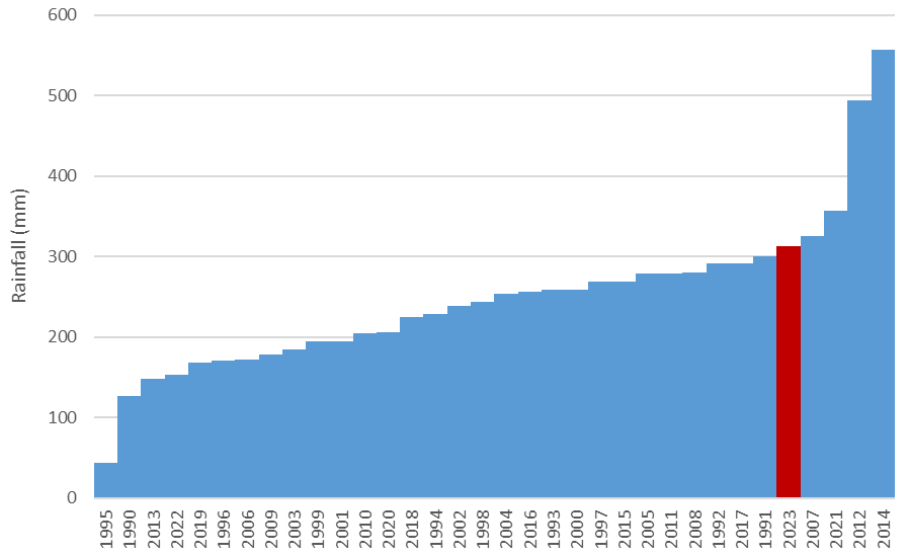


Figure 24 Ranked total Havant rainfall (April to August inclusive)

Given the uncertainty and abnormal conditions in the last 2 years, we continue to believe that 2021/22 represents the most prudent starting point for PCC and the forecast for 2025/26 is the best available at this time.

Metering programme

We confirm that we are not reducing planned levels of water efficiency activity in response to lower-than-expected PCC in 2022/23 and 2023/24, because we know they do not represent normal

conditions. Whilst we continue to promote water efficiency via seasonal broadcast messages and through customer challenges on the Get Water Fit platform[7], we believe that metering has the greatest potential to impact PCC. Our action plan is as follows:

- Continuing to deliver 'Optant' and 'Change of Occupier' metering as the opportunities arise during the remainder of AMP7.
- Convert over 20,000 not-for-revenue meters to 'in-charge' meters (see Table 16) by the start of AMP8. We are currently designing the customer journey to convert these meters. The principles will be as follows:
  - Meter reads to understand benefits to individual customers.
  - Contact with customers who will financially benefit to encourage voluntary transfer.
  - Offers of water efficient devices and support to those with high water use.
  - Movement of all customers to metered tariff with suitable transition tariffs in early April 25.
- The customer journey will be supported by the extra functionality in Kraken, our new Customer Relationship Management (CRM) and Billing engine.
- The foundations of this customer journey will provide key learning for the universal Smart Metering programme that follows in AMP8. For example, via the 'Water Lab' initiative with are commencing a joint experiment in January 2024 with some Portsmouth water customers that are also smart-metered Octopus Energy customers. The aim is to install a logger on their water meter to begin to understand how water and energy usage are working together.
- Assuming we are fully funded to roll out Universal Smart Metering via the Ofwat determination on our business plan, we will implement this programme to achieve further PCC reductions in AMP8 and beyond.

Table 16 Projected new meter totals for AMP 7 (reproduced from Appendix 10B of our WRMP24)

Year	Optants	Not for revenue	Change of occupier	Voids	Total meter installations	Meter penetration (incl. voids)
2020-21 actual	1,343	0	0	0	1,343	32.5
2021-22 actual	1,493	0	746	0	2,239	33.2
2022-23 actual	1,625	8,138	2,490	75	12,328	35.0
2023-24 forecast	1,494	12,557	2,302	0	16,353	36.9
2024-25 forecast	1,494	0	2,302	0	3,796	**38.9**
AMP7 total	7,449	**20,695**	**7,840**	**75**	**36,059**	-

Note: the meter penetration data in the final column do not reflect the not-for-revenue meters as it is assumed these are not 'in-charge' until the start of AMP8.

The WRMP Appendix 10B data in Table 16 is split into actual and forecast rows, with 2023-24 representing a forecast. With 11.5 months of 2023-24 complete, we are now able to provide an update on progress against this forecast (see Table 17).

[7] The Get Water Fit platform incentivises customers to take part in water-saving challenges and order water-saving gadgets in exchange for rewards that would help good causes in their communities (through virtual gold coins). Customers can choose to donate to one of three charities on the site over a 6-month period who compete to finish top of a leaderboard. At the end of the period, we award the charities with cash donations proportionate to their final position on the leaderboard. The charities help us promote Get Water Fit on their social media pages and newsletters to their supporters to boost their overall coins.

Table 17 Metering installed in 2023-24 relative to the WRMP forecast installations

2023/24 data	Optants	Not for revenue	Change of occupier	Voids	Total meter installations
Outturn (after 11.5 months)	1,364	13,177	1,771	33	16,345
Forecast	1,494	12,557	2,302	0	16,353
% progress	91%	105%	77%	>100%	**99.9%**

The data in Table 17 demonstrate that we have installed fewer Change of Occupier meters than forecast. A key reason for this shortfall is the reduced number of opportunities to install Change of Occupier meters (see Figure 25). There has been a clear decline in house moves this year compared to previous years, due to the cost of living and less favourable stamp duty policies.

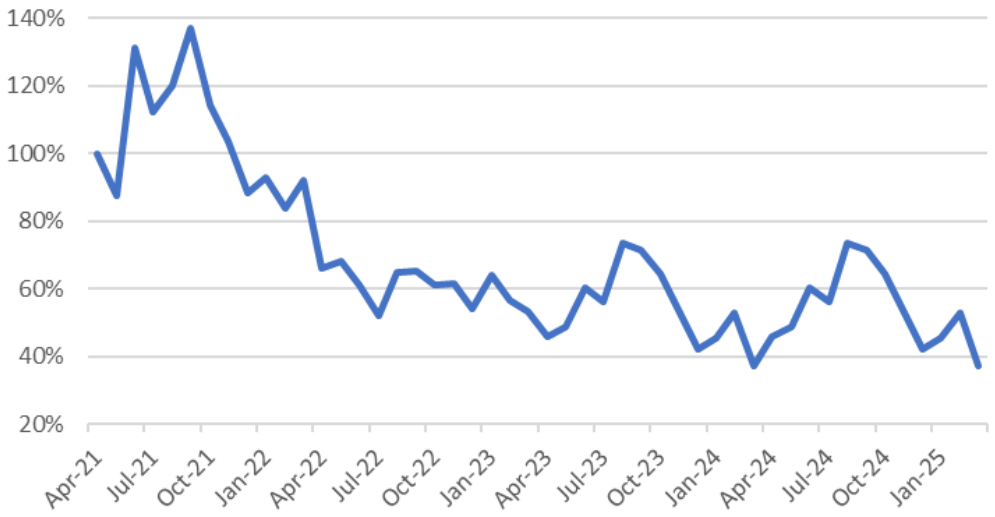


Figure 25 Change of Occupier opportunities during AMP7 as a percentage of opportunities in April 2021

Whilst we are behind on forecast Change of Occupier metering for the reasons given above, we have mitigated this by exceeding our not-for-revenue and voids installation forecasts. We are pleased to confirm we are on target to meet our WRMP24 meter installation target for 2023/24.

Furthermore, as described earlier, we will be moving all customers with a not-for-revenue meter to a metered tariff with suitable transition tariffs in early April 25 i.e. they will become in-charge meters. This will result in a meter penetration in early AMP8 that is higher than that within our Water Resources Management Plan 2019 (WRMP19) at around 45% (including voids). It is also comparable with the 47% (including voids) that is quoted in our Revised WRMP29, with the discrepancy resulting from an updated base year.

6.2.1.3 Leakage WRMP24 starting position and action plans

Impact of adverse weather events on leakage and our response

Our annual average leakage performance in 2020/21 was delivering the target level forecasted for 2024/25. However, this performance was impacted by a series of adverse weather conditions throughout 2021/22 and 2022/23, which led to significant break out events. Our leakage performance has subsequently taken time to recover from these events.

In an effort to recover our performance quicker, we have increased the level of resource detecting and repairing leaks and invested in some new technologies and techniques. This investment has resulted in higher detection rates and decreasing levels of outstanding jobs awaiting repair. We are now seeing the benefits. We are expecting to report a lower leakage value for 2023/24 compared to 2022/23 and we also predict that the rate of reduction will accelerate as we maintain higher detection resource levels. This will mean we are positioned to meet the AMP8 year 1 target (2025/26).

Further information is provided in the sections below.

Comparison of outturn and forecast leakage data

Our forecast and outturn data for annual average leakage is provided in Table 18. This demonstrates that our outturn value for 2022/23 increased relative to 2021/22 and is higher than forecast for 2022/23, which is the reason for Defra raising its concern that the forecast starting position for leakage may not be appropriate. The sections below address these concerns by providing narrative on recent outturn data and details of our action plan to meet the AMP8 year 1 target.

Table 18 Annual average Leakage: outturn and forecast data (Ml/d)

Leakage data	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
Outturn leakage data	24.36	23.55	26.93	32.19	-	-	-
Normal & dry year leakage forecast		-	26.93	30.71	26.00	24.00	22.00

Note: WRMP24 table 2a has an outturn value for 2022-23 rather than the WRMP normal year forecast as requested by Ofwat.

Recovery from the 2020/21 and 2022/23 adverse weather conditions

As detailed within Appendix 10C of our rdWRMP24, managing leakage is a constant battle with the Natural Rate of Rise (NRR) of leakage, as well as weather and temperature related seasonal impacts on pipes. Our NRR in a normal year is 7.2 Ml/d, which is the amount of extra leakage there would be at the end of the year if we deployed no active leakage detection and only fixed bursts (reactive intervention).

We were delivering the 2024/25 target level of leakage in 2020/21. However the winter of 2021/22 and the following summer of 2022 (in 2022/23) were not normal weather years, but instead classified as 'severe' years. We had freeze/thaw conditions in the winter, and in the summer, we had ground movement caused by dry conditions associated with the emerging drought. This caused 'breakouts', significantly increasing leakage, which we had to address.

To recover from the previous 2021/22 and 2022/23 weather events, we launched an enhanced recovery plan, increasing resourcing and the capability to deploy wider resources earlier in the event of future breakout events. As a result, breakout response planning has improved significantly. Despite this we recognise the need to continuously refine our recovery action plan, as we are expecting to report a leakage outturn value for 2023/24 that is higher than the forecast 2023/24 value (but lower than the 2022/23 outturn value).

The current refinement of our leakage recovery action plan includes the following:

- Continued use our upgraded acoustic fixed network fleet.
- Continued use of Satellite Leak Detection, AI Enabled correlating devices and Hydrophone Sweeps, alongside traditional ALC Practices.
- A greater focus on Customer Side Leakage (CSL), with a number of trials in place to further quantify, detect and locate customer side leaks and plumbing losses.
- Proactive approach to meter reads on the 20,000 not-for-revenue-meters that have been installed this year.

- Detecting more CSL's through the Electronic Listening Stick Service.
- Involvement in the Managing Background Leakage Club Project.
- Refreshing our CSL policy, ahead of the introduction of Smart Metering in AMP8.

Using our dedicated additional resources for reducing leakage:

- By the end of the AMP we will have invested nearly £1m more than our AMP7 plan to recover our leakage performance.
- We have increased permanent leakage detection resource from 8 Full Time Employees (FTE) to 15 FTE, through a mixture of internal and external resource.
- We have further additional external resource providing an Electronic Listening Stick Service. We have purchased four Electronic Listening Sticks for our own use.
- Our employees from around the business have been performing regular out of hours work, using technology requiring no technical knowledge, such as the Electronic Listening Sticks and AI Enabled Acoustics, to produce further Points of Interest (POI) for the skilled Leakage Technicians to investigate.
- Our number of Repair Crews have been increased from 6 Crews to 8 Crews, with a greater ability to flex resource between Leak Repairs and Mains Renewal works.
- We have completed a number of WIP (Works in Progress) Reduction sprints which have seen a 9 day blitz on leak repairs from 10+ crews (spanning over one week and two weekends). This has resulted in our WIP moving from around 200 down to about 60 jobs.
- Enhanced meter reading and follow ups are being completed by our Network Team, which further frees up our Leakage Technicians for Network Leakage based activities.
- We have hired an additional Leakage Analyst, responsible for leakage targeting and fixed network analysis.
- We have had an external review of our use of Pressure Reducing Valves (PRV) completed, which we will utilise to achieve a calmer network through Pressure Optimisation schemes in 2024/25.

We are still recovering from the latest breakout events over the winter of 2022/23; however, we remain confident that the response plan will reduce leakage to those levels required by the WRMP24 in 2025-26. The year on year increase in our performance identifying network leaks and repairs can be seen in Figure 26, demonstrating the roll out of our leakage recovery plan.

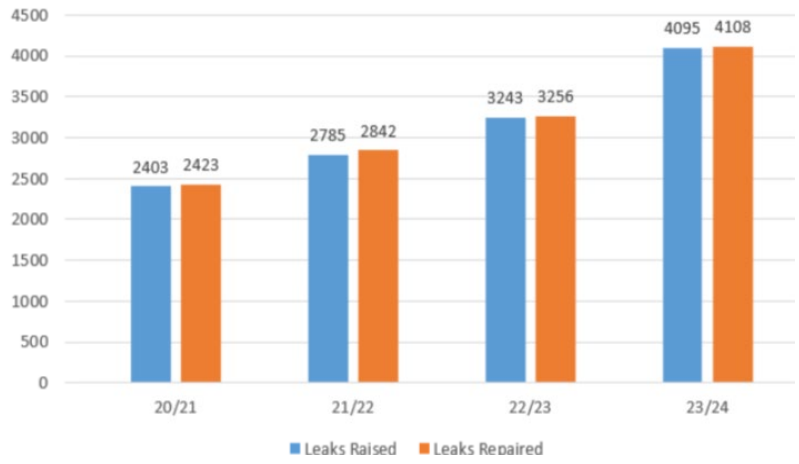


Figure 26 Network leaks detected and repaired by financial year

The model we used to predict leakage performance through AMP7 uses a points system that has been designed to assign a weighted value to different leak types, to emphasise the benefit of finding leaks on distribution mains over household stopcock, for instance. We use the points to evaluate our leak

and repair performance each week, rather than just using a flat number of leaks. This drives the behaviour toward detection and repair of bigger leaks rather than just a numerical target. The model assumes that 20 points is roughly equivalent to a leak of 1 litre per second.

The Points assigned to each type of leak are:

- Mains/Ferrule: 20 points
- Communication Pipe/Supply Pipe: 8 points
- Mains Fitting (SV, FH, AV): 4 points
- Stopcock-/Meter: 2 points

We appreciate that our values will not be exact, but they are an interpretation of the average leak volume for each type of leak. We note that a mains leak is generally more than 10 times a stop-tap leak, however whilst the points weighting was designed to prioritise bigger mains leak repairs, the weighting on stop-taps has not been minimised to such a degree that they are not repaired. We feel that the balance in weighting has worked well for us since implementation in 2019/20, and provides a fair balance between maintaining a low WIP (Works in Progress), and fixing bigger leaks faster to minimise water loss.

We are monitoring progress on delivery with a Weekly Operational Meeting, a Weekly Tactical Meeting, and a Monthly Strategic Meeting. We have weekly targets on detection and repair with Red Amber Green (RAG) Status's that are tracked and monitored at each meeting, with a strong focus on WIP Reduction, which has been a huge success in recent months. We are revamping our Microsoft BI Dashboards to achieve a greater understanding of performance and tracking of lead indicators.

6.2.1.4 Non-household consumption WRMP24 starting position and action plans

Our forecast and outturn data for annual average non-household consumption is provided in Table 19Table 18. This demonstrates that our outturn value for 2022/23 increased relative to 2021/22 and is higher than forecast, which is the reason for Defra raising its concern that the forecast starting position for non-household consumption may not be appropriate. This section addresses these concerns by providing narrative on recent outturn data and our actions to reduce non-household consumption.

Reduced non-household consumption in 2020/21 (relative to 2019/20) was undoubtedly caused by the periods of lock-down associated with the Covid pandemic. Whilst consumption rebounded following the lifting of restrictions, the 'new normal' of generally more people working from home for periods of the week maintained a lower non-household demand in the WRMP24 base year (2021/22) relative to the pre-Covid year 2019/20.

The outturn data for 2022/23 was not available for the development of the rdWRMP24. However, it demonstrates an increase in non-household consumption relative to 2021/22. A possible explanation for this is the cost of living crisis.

As explained earlier, emerging information from an Artesia led study into 'Water use shock event effects and regulatory treatment' indicates that the cost of living (including high energy costs) has supressed PCC in households. The same study has also identified a small increase in non-household consumption, implying some level of relocation of household use to non-households. Our current view is that the cost of living elevated the 2022/23 non-household demand above forecast levels.

The emerging outturn data for 2023/24 suggests that a cost of living effect may still be occurring. However, we are expecting the gap between the outturn and forecast to reduce. Given the uncertainty and abnormal conditions in the last 2 years, we continue to believe that 2021/22 represents the most prudent starting point for non-household demand and the forecast for 2025/26 is the best available at this time.

Table 19 Annual average total non-household consumption: outturn and forecast data (Ml/d)

NHH consumption data	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
Outturn data	33.15	27.67	29.66	32.25	-	-	-
Normal & dry year forecast	-	-	29.66	28.82	30.02	29.79	29.58

Our non-household demand action plan for the remainder of AMP7 involves enhanced levels of engagement with owners of non-household connections and retailers so that we meet our 2025/26 WRMP24 starting point. Two key case studies are provided below, one was implemented in 2023 and the other is being progressed in 2024. Beyond AMP7 the roll out of smart metering in AMP8 will deliver further reductions in demand.

North Harbour case study

In August 2023 we supported a water efficiency initiative between H2Oiq and Lakeside North Harbour. The purpose of the project was to survey the sites to gain an understanding of where water savings could be made and then carry out the necessary improvements. The estimated water saving was around 36%, however this initiative resulted in a 50% reduction in water use.

The installation of aerated flow restrictors for wash hand basins and eco boosters dual flow outlets for kitchen sinks has reduced water consumption from an average of 7.3 litres per minute to 3.5 litres per minute. The air gap valves also feature a delayed filling mechanism that ensures only the required amount of water is used for each flush and has proven to save nearly 3 litres per flush, contributing to water conservation.

This project saw a significant reduction in daily average water usage from 24,850 litres (0.025 Ml/d) to 12,370 litres (0.012 Ml/d) since its installation in August 2023.

Whitbread

Following the success of the North Harbour project, we are now supporting a further initiative with Whitbread owned Premier Inns.

In January 2024 H2Oiq surveyed 12 Premier Inn hotels in our supply area to determine how much water they could save by carrying out similar water efficiency activity to that completed at the North Harbour sites. The plan is to install aerated flow restrictors to the wash basins and shower heads as well as air gap valves in the toilet cisterns in the 890 rooms over the 12 hotels.

The combined annual water use of these hotels has been calculated at 62,618 m^3 (0.17 Ml/d) with an estimated minimum saving of 28% reduction in water use once the installations have been completed. This will take the annual water use down to 45,085 m^3 (0.12 Ml/d) however, the total savings could exceed this number based on the higher-than-expected savings at the North Harbour sites.

6.2.1.5 Overall Distribution Input WRMP24 starting position

The Defra WRMP24 letter has requested that we review our WRMP24 starting position for overall distribution Input. WRMP24 forecast and outturn data are provided in Table 20 below, indicating that distribution input was slightly lower than the forecast value.

As previously indicated in Section 6.2.1.2, the outturn PCC was lower than the WRMP24 forecast value for 2022/23. This demonstrates that household consumption was lower than forecast, influenced by drought related messaging and cost of living (high energy costs). The impact of this on

distribution input has the effect of cancelling out the impact of higher than expected leakage (see Section 6.2.1.3) and non-household demand (see Section 6.2.1.4).

We are predicting a distribution input for 2023/24 that will be lower than the outturn in 2022/23, but higher than the normal year forecast in the WRMP24. However, our action plans for non-household consumption and leakage reduction, outlined in the previous sections, are such that we expect to meet the forecast WRMP24 distribution input in 2025/26.

Given the uncertainty and abnormal conditions in the last 2 years, we continue to believe that 2021/22 represents the most prudent starting point for distribution input and the forecast for 2025/26 is the best available at this time.

If adverse conditions were to arise, our plan also includes a headroom allowance to accommodate the risks and to protect the security of supplying water to our customers. This allowance is 4.98 Ml/d in 2025/26.

Table 20 Annual average Distribution Input: outturn and forecast data (Ml/d)

DI data	2021-22	2022-23	2023-24	2024-25	2025-26
Outturn DI data	177.18	179.64	-	-	-
Normal year DI forecast	177.00	180.21	176.28	174.43	172.36
Dry year DI forecast	181.64	184.83	180.88	179.03	176.99

Note: WRMP24 table 2a has an outturn value for 2022-23 rather than the WRMP normal year forecast as requested by Ofwat.

6.2.2 Calculations for deriving base year demand and PCC forecast

The Defra letter on our WRMP24 requests additional evidence to explain the calculations used to derive our base year demand and PCC forecast. Existing methodology and evidence are provided in Appendix 4A to our rdWRMP24 and within Section 4 of the main WRMP24 report. The additional evidence requested by the Environment Agency is presented below.

Improvements to the description of the methodology in Appendix 4A

To improve the description of the methodology we describe a number of adjustments to Appendix 4A, below.

We propose the following replacement text for Section 1:

> "The Water Resources Planning Guideline (WRPG) requires demand forecasts to be produced for the three planning scenarios defined below:
>
> • Normal Year Annual Average Demand (NYAA): The annual average daily value of demand under 'normal' weather conditions. The base year must be assessed as to whether it is a normal year, and if it is found not to be, its demand must be normalised to take account of factors such as weather.
>
> • Dry Year Annual Average Demand (DYAA): The annual average value of demand under dry conditions without any drought demand restrictions in place. This demand is presented against the Average Demand Deployable Output (ADO) supply forecast.
>
> • Dry Year Critical Period Demand (DYCP): The rolling 7-day average peak week that occurs during the dry year. This demand scenario is presented against the Peak Deployable Output (PDO) supply forecast.

The Normal Year Critical Period (NYCP), the 7-day average peak week that occurs during 'normal' weather conditions has also been reported for completeness. The agreed Portsmouth Water Dry Year definition is that "dry year" scenarios are classed as 1-in-20 year events.

We have developed a new WRMP24 demand model for calculating forecasts linked to each of the planning scenarios described above. All the separate components of the demand model are controlled in a single spreadsheet.

The spreadsheet model has been improved over time, incorporating feedback from internal reviews and external assurance processes associated with the submission of datasets towards the development of the Water Resources South East (WRSE) emerging, draft and revised draft regional plans. Model version '217' was used for the emerging plan, '222' for the draft plan and '230' for the revised draft plan.

The spreadsheet model is used to determine the base year component outputs for a given scenario, returning the forecasted components out to 2074/75. Fiscal year 2021/22, has been chosen as the base year for the rdWRMP24 to provide the most up-to-date view of demand possible (at the time of the demand forecast). Moreover, 2021/22 has been selected as the base year since 2020/21 was impacted by both Covid-19 and a hot dry summer.

Further detail of the methodologies followed are referred to within subsequent sections of this document.

The spreadsheet model consists of the following core tabs:"

We propose the following replacement text for Sections 2 and 3:

"As described above, the base year for the demand forecast is 2021/22. Accordingly, the output components from the 2021/22 Water Balance 'Maximum Likelihood Estimation' (MLE) are used as a starting point within our WRMP24 demand model. Notably, the base year uses the updated methodologies for calculating PCC and leakage. This differs from the WRMP19 submission, which uses only 'new' methodology leakage. These methodology changes can impact the calculated total leakage and household consumption by up to 1 Ml/d.

The level of demand for water is not fully controlled by factors under the influence of a water company. Whilst demand does vary year to year because of ongoing trends, leakage reduction, water efficiency, metering and changes to properties and population, it is also dominated by the weather, with hot dry weather causing the demand for water to rise significantly.

Demand normalisation seeks to separate the effects of our ongoing interventions on leakage from the effects of weather, so that an estimate can be made of the demand that would have occurred in the base year had 'normal' or 'dry' conditions been experienced.

In order to achieve this, a weather demand model (Dynamic Demand Modelling for WRSE, Water Research Centre Limited, 2020), consistent with WRMP19 Methods – Household Consumption Forecasting (UKWIR, 2016) guidance, was developed. It allows historical and stochastically generated weather data to be run through the base year to determine how base year demand (both annual average and critical period) would change if the weather in year 'X' occurred again in 2021/22. Historical data is used to produce an estimate of the normal year, which is well understood, as this type of year occurs most frequently.

To get a best view of NYAA and NYCP demand in 2021/22, Distribution Input (DI) was de-trended using a Seasonal and Trend Loss decomposition. The data was then annualised and ranked, and the 50th percentile used to represent the Normal Year. Figure 27 shows the normalised result from the weather demand model. The blue line represents historic outturn DI, whilst the orange line represents the normalised DI data simulated by the regression

model. The simulated DI data provides an estimate of what DI would be if that year's weather happened again with the current customer base and behaviours.

The weekly distribution data used in this analysis is the best available data set. Over the years, reporting methodologies for the components of distribution input have changed. Furthermore, the availability of data and our understanding of the water balance has improved over time. For example, during AMP4, Portsmouth Water completed the installation of 'Strategic Meter Areas' (SMAs). These strategic meter areas are permanently set up and data is logged and transferred by telemetry for analysis centrally.

The lower distribution input between 2012 and 2016 is believed to, in part, reflect increased expenditure in leakage reduction as a mitigation measure for drought risk and to meet Ofwat related targets. The decrease is also attributed to a fall in commercial demand since 2010, in addition to pressure management and improvements in household water efficiency. Outside of the 2012 to 2016 period, the detrended data is similar to the observed data. The increase in the observed distribution input between 2019/20 and 2020/21 is largely attributed to the impacts of the Covid-19 pandemic.

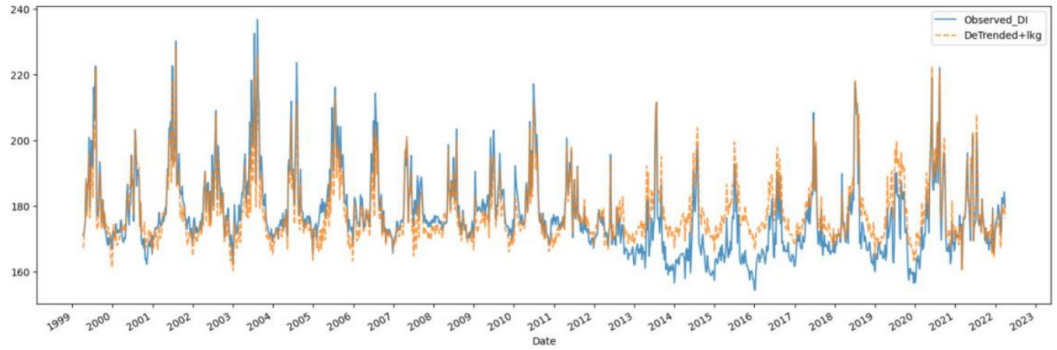


Figure 27 Calculating the NYAA by detrending the historic series. The NYAA is the medial annual average and annual maximum week

Following the calculation of the NYAA and NYCP DI, stochastic DI data is then used to explore rarer events, which are limited in the historic 20 year record. Raw simulated DI is first normalised to the median DI across all years and stochastic runs converted to factors. These factors can then be used as multipliers to the already derived NYAA and NYCP to generate DI annual averages (AA) and annual weekly maximums (CP) for different return periods, including the 1-in-20 year DYAA and DYCP.

WRc with the Artesia have produced two sets of output stochastic DI reflecting two types 'Series 2' and 'Series 3'. For Portsmouth Water, both models perform well against the historical series though Series 3 is both recommended by Artesia, and, closely fits the historic series to within about 1 Ml/d[8] as can be seen in Figure 28. Therefore we have used Series 3.

[8] Deviations might be expected between the observed and modelled data at higher return periods, e.g. 1 in 20, as the observed record is not sufficiently long to characterise these events.

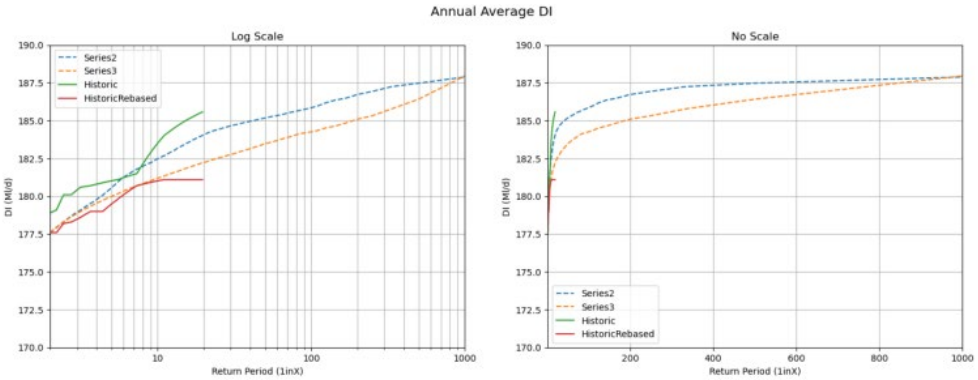


Figure 28 Stochastic DI against the historic record. Note that the 'HistoricRebased' is the de-trended DI series

To adjust the outturn (observed) base year DI to the 'target' DI for a specific climatic scenario, factors are applied to household consumption (a component of DI). The difference between the target and outturn DI, referred to as the 'residual' DI in the model, is allocated using an MLE type process using (Volume * Uplift).

Weather factors of 0.2 (20 %) and 0.3 (30 %) are used for the metered and unmetered household groups, respectively. These factors are based on outputs of the 'Water demand insights from summer 2018' club project, delivered by Artesia (see Figure 29).

The base year rebasing calculations can be seen in Figure 30. The weather factors in column H are applied to the outturn volumes to calculate the volume uplift in column I. Then the 'weather allocation %' in column J compares this uplift with the total volume uplift (e.g. 6.4 / (6.4 + 25.7) = 20%. Finally, the 'weather allocation %' is applied to the 'residual' DI to calculate the 'Weather Allocation #' in column K, which is then added to the outturn value to provide a rebased value in column L.

The 'Uplift Factor' in column M reflects the rebased value in column L divided by the outturn value in column E.

The total rebased DI in Cell L12 is calculated by summing the rebased component values in column L and it can be seen that this matches the 'target DI' in cell B5. It is the rebased component values for a selected climate scenario for 2021-22 that are subsequently used to develop the forecasts to 2074-75 (not the observed / outturn data).

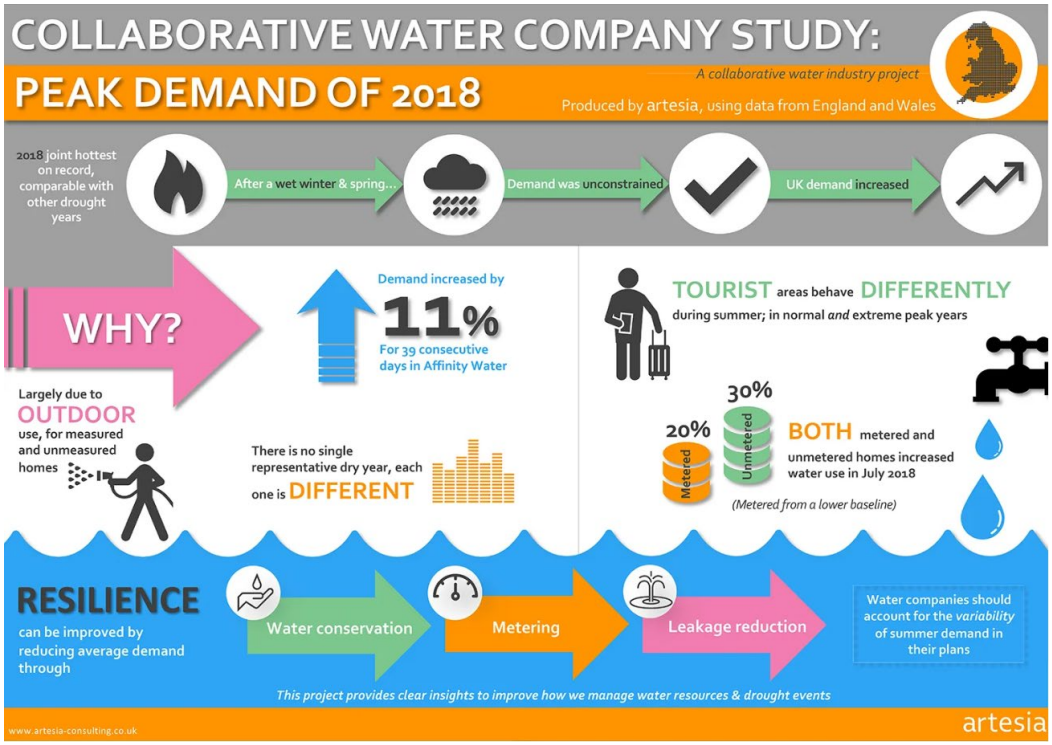


Figure 29 Peak demand of summer 2018 infographic (reproduced from Artesia)

baseYearCalc

Takes the base year sub-components of demand and converts these values

Selected Scenario	DYAA (1 in 20)	<- Adjust using modelParameter Sheet
Target DI	182.24	
Outturn DI	177.2	
Residual	5.1	

Base Year: 2021-22

	DEMAND				Outturn	Leakage Adj	Lkg Adj Outturn	Weather Factors	Weather Factor Adj	Weather Allocation %	Weather Allocation #	Rebased Balance	Uplift Factor
12	11_{AR}	Distribution input (in reporting year)	Ml/d	2dp	177.18		177.18					182.24	
13		**Consumption**											
14	23_{AR}	Measured non household - consumption	Ml/d	2dp	29.05		29.05	0	0.0	0%	0	29.05	
15	24_{AR}	Unmeasured non household - consumption	Ml/d	2dp	0.61		0.61	0	0.0	0%	0	0.61	
16	25_{AR}	Measured household - consumption	Ml/d	2dp	31.95		31.95	0.2	6.4	20%	1.01	32.96	**1.032**
17	26_{AR}	Unmeasured household - consumption	Ml/d	2dp	85.50		85.50	0.3	25.7	80%	4.05	89.55	**1.047**
18	29_{AR}	Measured household - pcc	l/h/d	0dp	144.61		144.61					149.20	
19	30_{AR}	Unmeasured household - pcc	l/h/d	0dp	167.02		167.02					174.92	
20	31_{AR}	Average household - pcc	l/h/d	0dp	160.30		160.30					167.17	
21	32_{AR}	Water taken unbilled	Ml/d	2dp	2.62		2.62	0	0.0	0%	0	2.62	
22	33_{AR}	Distribution system operational use	Ml/d	2dp	0.52		0.52	0	0.0	0%	0	0.52	
23		**Leakage**											
24	34_{AR}	Measured non household - uspl	Ml/d	2dp	0.60		0.60	0	0.0	0%	0	0.60	
25	35_{AR}	Unmeasured non-household - uspl	Ml/d	2dp	0.05		0.05	0	0.0	0%	0	0.05	
26	36_{AR}	Measured household - uspl	Ml/d	2dp	5.07		5.07	0	0.0	0%	0	5.07	
27	37_{AR}	Unmeasured household - uspl	Ml/d	2dp	7.11		7.11	0	0.0	0%	0	7.11	
28	38_{AR}	Void properties - uspl	Ml/d	2dp	0.40		0.40	0	0.0	0%	0	0.40	
29	39_{AR}	Distribution Losses	Ml/d	2dp	13.70		13.70	0	0.0	0%	0	13.70	
30	40_{AR}	Total leakage	Ml/d	2dp	26.93		26.93	0	0.0	0%	0	26.93	

Figure 30 Screenshot demonstrating the calculation of rebased demand for use in the WRMP24 forecast

We propose the following replacement text for Section 5.5:

> "The rdWRMP24 has used a 'Variable Flow' (VF) method proposed in the 'WRMP19 Methods – Household Consumption Forecasting' guidance. This was a new approach developed for the final WRMP19. The VF method involves explicit exploration of the factors impacting demand and the uncertainty surrounding the model assumptions. The variable flow method uses historical data to define variables, but also requires expert judgement and the application of assumptions. The term 'variable flow' refers to how factors modify fixed future assumptions on 'flows' of water into supply. For this rdWRMP24, the method has been applied again with updated assumptions.

The core drivers of volume in the VF model are population, properties and climate change. The model also includes impacts for baseline options implemented for metering, leakage and water efficiency for the period leading up to 2024–25. These are consistent with the medium scenario provided as part of regional planning for the WRSE options submission.

The household demand splits the household customer base into three groups: unmeasured properties, new properties and meter optants. New properties are those customers with properties built after 2006 while meter optants are properties that have historically opted for a meter. Typically, in water resource planning, new volumes associated with growth are assigned to either new properties or new persons. One weakness of this approach is that it does not fully recognise the impact of occupancy on consumption, i.e. if average occupancy increases, then homes become more efficient and vice versa. The VF model attempts to capture occupancy impacts by assigning volumes to both properties and persons. Customer movements can then drive volume factors according to the outputs of the properties and population model.

In order to derive the volume factors, a linear regression model was developed using company-specific data. The model uses customer type and occupancy to predict Per Household Consumption (PHC) volumes. It uses per property meter reads for all household properties over two years, 2017/18 (Normal) and 2018/19 (Dry). The output of the model is provided in the Appendix, which indicates an R^2 value of 0.53 and therefore a reasonable model fit.

The output is coefficients that split the PHC volume impacts for persons and households ('Intercept', 'c(buildStatus)[T.Property>2006]', 'c(buildStatus)[T.Property>2006]:Occupancy' and 'c(meterStatus)[T.Unmetered]: Occupancy') (see the Appendix). The aggregated coefficients are presented below in Figure 31. Note that only new properties have an aggregated property coefficient, as the measured and unmeasured properties already exist.

As an illustration for the PHC calculation, a single new property with an average occupancy of 2.2 would lead to an increased volume of 91.2 + (72.4 * 2.2) = 250.5 l/d. Likewise, the availability of new housing would cause a reduction in the unmeasured population and a relative increase in the New Property group. For each person, this would have an overall volume impact of (+72.4) +(-94.4) = -18.8 l/d.

Pop & Prop	Properties (l/prop/d)	Population (l/pers/d)
New Property	91.2	72.4
Measured (Meter Optant)	N/A	85.9
Unmeasured	N/A	94.4

Figure 31 Aggregated coefficients for population and property movements

7 ISSUE 7: INSUFFICIENT BREAKDOWN OF LEAKAGE OPTIONS AND ASSOCIATED COSTS

7.1 Defra explanation of Issue 7

Portsmouth Water has an ambitious leakage programme therefore this detail is important to provide assurance that it is deliverable and ensure progress is monitored appropriately. The company's plan has insufficient breakdown of leakage options and associated costs. The company should confirm in the final WRMP narrative which leakage options are selected in the demand strategy and provide additional evidence to support this selection. It should include further breakdown of leakage options and associated costs. The company must demonstrate disaggregated costs and unit costs by option in the final WRMP and business plan.

7.2 Our response to Issue 7

7.2.1 Confirmation of which leakage options are selected in the demand strategy

Our leakage strategy is outlined in Appendix 10C of our published rdWRMP24. It sets out our current leakage programme, identifies the challenges ahead of us, and the feasible options that can help us to meet these challenges. The Appendix then confirms the preferred plan and summarises the benefits and costs of the activities within the plan. Section 9 of the Appendix states that:

> "The majority of the activities shown in Table 6 are rolled up and the combined enhancement they provide is included within the higher level rdWRMP24 option '**Leakage reduction - Active Leakage Control - Company - High+**'. These are the activities that will reduce leakage within our network.
>
> Customer-side leakage reductions achieved through smart metering of households are included within rdWRMP24 option '**Metering CSL - Company - High+**'. Leakage reductions in non-households are represented within option '**Leakage reduction - Customer engagement / education / incentives - Non-Household - Company - High+**'."

This provides the link to the relevant options listed in the WRMP24 tables. However, to improve clarity we intend to add a new 'WRMP24 option' column to Table 6 of WRMP24 Appendix 10C, as detailed below:

WRMP24 option	Activity (Ml/d)
Leakage reduction - Active Leakage Control - Company - High+	New Sounding Techniques
	Comm Permanent
	Comm ZoneScan
	Enigma Sweeps
	HyQ Sweeps
	Fixed sensor plastic network
	AI Enabled sound loggers
	Digital sounding sticks
	trunk main correlations
	satellite imagery
	Mains replacement
Metering CSL - Company - High+	Smart metering households
Leakage reduction - Customer engagement / education / incentives - Non-Household - Company - High+	Non-households
	TOTAL

We understand that Ofwat requires a more detailed breakdown of the Active Leakage Control (ALC) activities within our leakage strategy for WRMP24, as we aggregated these activities into a single option within our WRMP24 tables (as shown in the table above).

Ofwat has asked us for further clarification on how the ALC benefits in Table 6 of Appendix 10C relate to those stated in the WRMP24 tables. Ofwat has also asked us how the activities translate into our business plan e.g. the costs within tables CW.3.49 and CW19. Further clarification is set out in the next section below and we propose that these sections (including the tables) are added as a new section within Appendix 10C for the final WMRP24.

7.2.2 Breakdown of Active Leakage Control options and associated benefits

The cumulative benefits in Mega Litres per Day (Ml/d) of the WRMP24 leakage strategy are provided in Table 6 of Appendix 10C. The benefits are the reductions required to overcome the natural rate of rise and achieve the target leakage profile in our rdWRMP24. Therefore, the benefits within Table 6 of Appendix 10C are not directly comparable to the benefits stated within the WRMP24 tables for the '**Leakage reduction - Active Leakage Control - Company - High+**' option.

Our leakage model uses the following equation to calculate the net benefit level our ALC activities are required to achieve in any given year:

> ('Start of Year Leakage' – 'WRMP Target for In Year Leakage') + 'Weather Impact' + 'Natural Rate of Rise' + 'Benefits from mains renewal and customer supply pipe renewals / repairs'

The weather impact assumes a repeating pattern of two benign years with zero impact, followed by an adverse year with a 3 Ml/d impact. We have calculated that our Natural Rate of Rise is 7.2 Ml/d. The customer supply pipe renewals / repairs element reflects the benefits we expect to realise through the delivery of our Smart metering programme of households and non-households.

We have presented the net ALC activity requirement alongside the planned level of ALC activity in Figure 32. The planned activity is always higher than the net requirement, which is explained further below.

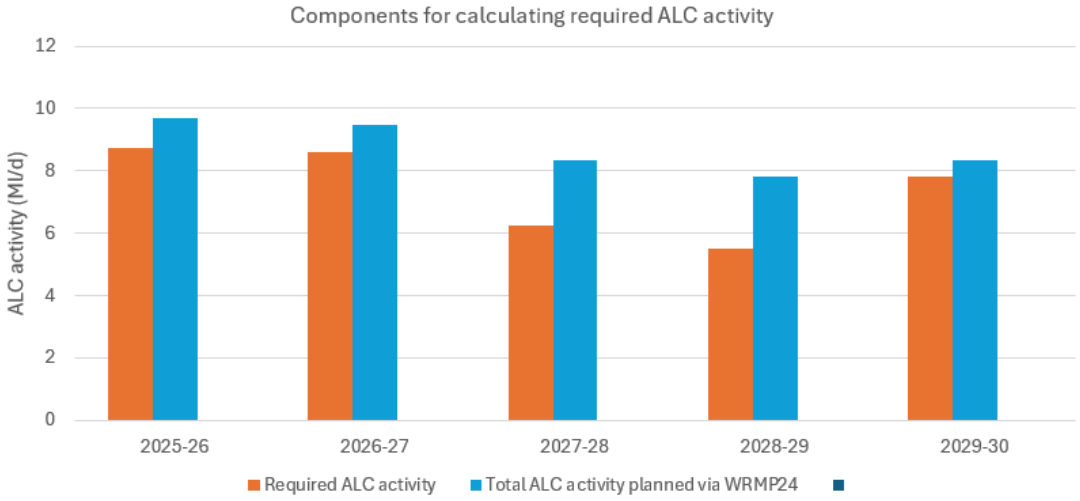


Figure 32 Net Active Leakage Control activity requirement and planned level of activity.

In Figure 33 below we have presented an illustration of how our planned ALC activity overcomes the natural rate of rise and weather impact to meet the target level of leakage within our WRMP24 tables. This illustration uses 2025-26, the first year of WRMP24.

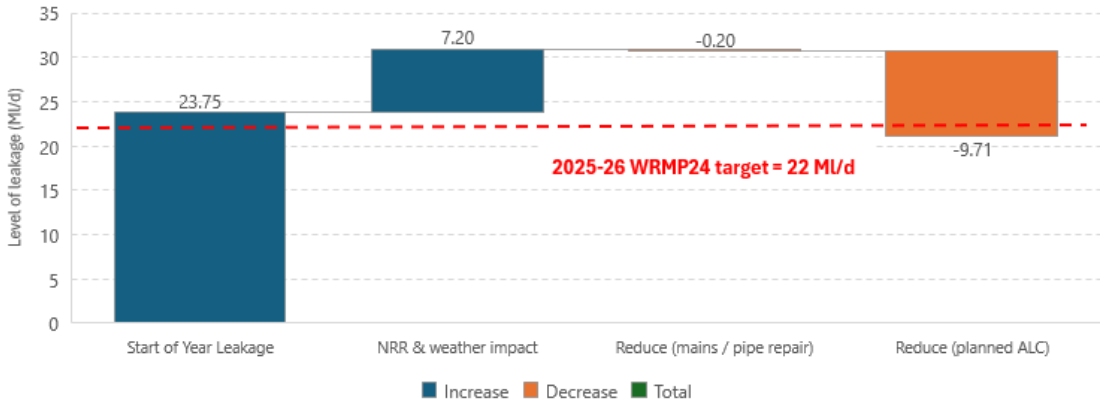


Figure 33 Illustration of how ALC activity overcomes NRR to meet the WRMP24 target

A full breakdown of AMP8 year by activity is set out below in Table 21 to Table 25, showing the variability of Active Leakage Control to mitigate against adverse winters and the ranking of activity by cost per Ml/d. The cost per Ml/d is based on an assessment when leakage is at 28 Ml/d.

In each of the tables below the following applies:

- The top green row provides the target annual average leakage Ml/d stated within our WRMP24 tables.
- The yellow set of rows identify the starting level of leakage, the impact of the natural rate of rise and the adverse weather impacts that we must overcome.
- Non-ALC benefits associated with mains replacement and smart metering are in white rows.
- The set of purple rows gives the benefits from activities associated with the ALC option.
- The resulting modelled in-year leakage value is provided below these rows, and it should always be compliant (lower) than the WRMP24 target in the top green row.
- The final dark green rows provide the assumed benefit of the ALC option within the WRMP24 tables and the additional calculated benefit of the ALC activities from the leakage model.

The modelled ALC activities always provide an additional benefit relative to that stated for the ALC option in the WRMP24 due to the 'blocky' nature of some of the activity benefits e.g. where we need to ensure steady levels of skilled leakage resources are retained across multiple years. A benefit of this is slight mitigation it provides in the case that the natural rate of rise varies from the assumption in the leakage model.

It is important that the planned level of activity can achieve the WRMP24 target leakage profile, to maintain the balance of supply and demand and reduce the risk of supply interruptions for our customers.

Table 21 Breakdown of leakage activity in 2025/26

Leakage Activity 2025/26	Cost / Benefit (£ / Ml/d)	Leakage Increase / Reduction (Ml/d)	Leakage Value (Ml/d)	Notes
WRMP24 in-year target	-	-	**22.00**	The target identified in our WRMP24 tables for 2025/26.
Start of Year Leakage	-	-	23.75	This matches the modelled final leakage from the previous year (2024/25)
Natural Rate of Rise	-	+7.20	30.95	Based on most recent assessment of NRR, as set out in Appendix 10C.
Adverse Weather Impact	-	+0.00	30.95	Adverse weather impacts in one of every 3 years, as set out in Appendix 10C.
Mains Renewal	0	-0.20	30.75	Mains renewal programme based on stable bursts. Results in 1 Ml/d of leakage reduction benefit over 5 years without additional cost. Further mains renewal for leakage benefit included in activity assessment but deemed to not be as cost effective as ALC solutions chosen at £224.9k / Ml/d
Enigma Sweeps	95.14	-0.88	29.87	Enigma sweeps are assessed as most cost effective ALC method. Based on Table 7 of Appendix 10C.
Comm PermaNet	108.27	-3.06	26.81	
HyQ Sweeps	113.90	-0.55	26.26	
Trunk Main Correlations	114.47	-0.66	25.60	
Comm ZoneScan	125.99	-2.86	22.74	
AI Enabled Sound Loggers	168.01	-0.55	22.19	
Satellite Imagery	185.96	-1.17	21.02	Cannot scale down. Therefore, results in overachievement in year compared to WRMP target of 22 Ml/d.
Final modelled Leakage in Year	-	-	**21.04**	Difference due to benefits rounded to 2 decimal places across activities. The final leakage is lower than the WRMP24 target.
WRMP24 assumed reduction from ALC	-	**-2.00**	-	From the WRMP24 tables (tab 5. option benefits)
Additional Leakage model benefit from ALC	-	**-0.98**	-	(Start of year leakage – WRMP24 in-year target) + ALC (purple rows) + NRR & adverse weather impact (yellow rows) + other leakage options (white rows)

Table 22 Breakdown of leakage activity in 2026/27

Leakage Activity 2026/27	Cost / Benefit (£ / Ml/d)	Leakage Increase / Reduction (Ml/d)	Leakage Value (Ml/d)	Notes
WRMP24 target	-	-	**22.40**	The target identified in our WRMP24 tables for 2026/27.
Start of Year Leakage	-	-	21.04	This matches the modelled final leakage from the previous year (2025/26)
Natural Rate of Rise	-	+7.20	28.24	
Adverse Weather Impact	-	+3.00	31.24	Adverse weather impacts in one of every 3 years, as set out in Appendix 10C.
Mains Renewal	0	-0.20	31.04	
Customer Side Leakage	0	-0.04	31.00	Benefit from smart metering programme. Costs included within the smart metering enhancement case for PR24 and therefore not included in leakage.
Enigma Sweeps	95.14	-0.80	30.20	Lower leakage detected on ALC due to lower starting leakage levels.
Fixed Sensor Plastic Network	103.34	-0.55	29.65	New innovative technology expected to be ready for deployment in 2026-27.
Comm PermaNet	108.27	-2.77	26.88	
HyQ Sweeps	113.90	-0.50	26.38	
Trunk Main Correlations	114.47	-0.59	25.79	
Comm ZoneScan	125.99	-2.59	23.20	
AI Enabled Sound Loggers	168.01	-0.50	22.70	
Satellite Imagery	185.96	-1.17	21.53	
Final modelled Leakage in Year	-	-	**21.54**	Difference due to benefits rounded to 2 decimal places across activities. The final leakage is lower than the WRMP24 target.
WRMP24 assumed reduction from ALC	-	**-1.57**	-	From the WRMP24 tables (tab 5. option benefits)
Additional Leakage model benefit from ALC	-	**-0.87**	-	(Start of year leakage – WRMP24 in-year target) + ALC (purple rows) + NRR & adverse weather impact (yellow rows) + other leakage options (white rows)

Table 23 Breakdown of leakage activity in 2027/28

Leakage Activity 2027/28	Cost / Benefit (£ / Ml/d)	Leakage Increase / Reduction (Ml/d)	Leakage Value (Ml/d)	Notes
WRMP24 target	-	-	**22.04**	The target identified in our WRMP24 tables for 2027/28.
Start of Year Leakage	-	-	21.54	This matches the modelled final leakage from the previous year (2026/27)
Natural Rate of Rise	-	+7.20	28.74	
Adverse Weather Impact	-	+0.00	28.74	
Mains Renewal	0	-0.20	28.54	
Customer Side Leakage	0	-0.26	28.28	
Enigma Sweeps	95.14	-0.85	27.43	
Fixed Sensor Plastic Network	103.34	-0.59	26.84	
Comm PermaNet	108.27	-2.96	23.88	
HyQ Sweeps	113.90	-0.53	23.35	
Trunk Main Correlations	114.47	-0.63	22.72	
Comm ZoneScan	125.99	-2.76	19.96	
Final modelled Leakage in Year	-	-	**19.95**	Difference due to benefits rounded to 2 decimal places across activities. The final leakage is lower than the WRMP24 target.
WRMP24 assumed reduction from ALC	-	**-1.66**	-	From the WRMP24 tables (tab 5. option benefits)
Additional Leakage model benefit from ALC	-	**-2.08**	-	(Start of year leakage – WRMP24 in-year target) + ALC (purple rows) + NRR & adverse weather impact (yellow rows) + other leakage options (white rows)

Table 24 Breakdown of leakage activity in 2028/29

Leakage Activity 2028/29	Cost / Benefit (£ / Ml/d)	Leakage Increase / Reduction (Ml/d)	Leakage Value (Ml/d)	Notes
WRMP24 target	-	-	**21.00**	The target identified in our WRMP24 tables for 2028/29.
Start of Year Leakage	-	-	19.95	This matches the modelled final leakage from the previous year (2027/28)
Natural Rate of Rise	-	+7.20	27.15	
Adverse Weather Impact	-	+0.00	27.15	
Mains Renewal	0	-0.20	26.95	
Customer Side Leakage	0	-0.45	26.50	
Enigma Sweeps	95.14	-0.80	25.70	
Fixed Sensor Plastic Network	103.34	-0.55	25.15	
Comm PermaNet	108.27	-2.77	22.38	
HyQ Sweeps	113.90	-0.50	21.88	
Trunk Main Correlations	114.47	-0.59	21.29	
Comm ZoneScan	125.99	-2.59	18.70	Maintaining activity to reduce leakage ahead of expected adverse winter in following year.
Final modelled Leakage in Year	-	-	**18.70**	The final leakage is lower than the WRMP24 target.
WRMP24 assumed reduction from ALC	-	**-2.25**	-	From the WRMP24 tables (tab 5. option benefits)
Additional Leakage model benefit from ALC	-	**-2.30**	-	(Start of year leakage – WRMP24 in-year target) + ALC (purple rows) + NRR & adverse weather impact (yellow rows) + other leakage options (white rows)

Table 25 Breakdown of leakage activity in 2029/30

Leakage Activity	Cost / Benefit (£ / Ml/d)	Leakage Increase / Reduction (Ml/d)	Leakage Value (Ml/d)	Notes
WRMP24 target	-	-	**20.25**	The target identified in our WRMP24 tables for 2029/30.
Start of Year Leakage	-	-	18.70	This matches the modelled final leakage from the previous year (2028/29)
Natural Rate of Rise	-	+7.20	25.90	
Adverse Weather Impact	-	+3.00	28.90	
Mains Renewal	0	-0.20	28.70	
Customer Side Leakage	0	-0.63	28.07	
Enigma Sweeps	95.14	-0.75	27.32	Lower leakage detected on ALC due to lower starting leakage levels.
Fixed Sensor Plastic Network	103.34	-1.04	26.28	Increase in reduction as new innovative technology rolled out to additional areas after comm improvements expected to be made.
Comm PermaNet	108.27	-2.61	23.67	
HyQ Sweeps	113.90	-0.47	23.20	
Trunk Main Correlations	114.47	-0.56	22.64	
Comm ZoneScan	125.99	-2.44	20.20	
AI Enabled Sound Loggers	168.01	-0.47	19.73	Restarted due to adverse winter.
Final modelled Leakage in Year	-	-	**19.74**	Difference due to benefits rounded to 2 d.p across activities. Increase on previous year but still below WRMP target.
WRMP24 assumed reduction from ALC	-	**-2.37**	-	From the WRMP24 tables (tab 5. option benefits)
Additional Leakage model benefit from ALC	-	**-0.52**	-	(Start of year leakage – WRMP24 in-year target) + ALC (purple rows) + NRR & adverse weather impact (yellow rows) + other leakage options (white rows)

7.2.3 Breakdown of Active Leakage Control options and associated costs

Ofwat has asked us how the WRMP24 ALC option translates into our business plan e.g. the costs within tables CW.3.49 and CW19. Further information is provided below.

The costs of the ALC option '**Leakage reduction - Active Leakage Control - Company - High+**' used to inform our WRMP24 tables is provided in Table 26.

The costs of ALC are presented in the business plan tables (CW19.1 and CW19.2) and these are reproduced in Table 27, split into costs associated with 'maintaining' the level of leakage and costs associated with 'reducing' the level of leakage.

Costs related to existing ALC activities are classified as 'maintain', whilst costs associated with new innovative ALC activities are classified as 'reduce'. This includes enabling work to improve efficiency, such as the creation of a Digital Twin and the installation of new DMAs.

ALC costs are broken down by ALC activity in Table 28 and align back to Table 21 to Table 25.

The sum of the costs in the business plan (CW19) and WRMP24 are compared in Table 27 and this demonstrates a discrepancy of around £3m per year. Table 9 shows the breakdown of costs included in CW19, with the mains renewal and repairs adding up to this discrepancy.

The mains renewal costs were not included in the WRMP24 costs, as leakage reduction was not the primary driver for the expenditure, but a secondary benefit. As stated in Table 21, as an option on its own, it would not be cost beneficial compared to ALC activities.

ALC repair costs were also not included in the WRMP24. They were still being revised at the time of the rdWRMP24 data freeze and therefore only feature in the business plan tables. However, we

confirm the exclusion of these costs has not impacted option selection within the WRSE investment model and therefore has not influenced the Best Value Plan and our WRMP24.

All ALC costs represent 'base' expenditure rather than 'enhancement' expenditure and for this reason there are no ALC costs within our business plan table row CW3.49. Costs associated with supply pipe repairs from installing smart meters are included within the smart metering enhancement business case, with just the leakage reduction benefit recorded in the WRMP and business plan tables to ensure no double counting.

Table 26 Active Leakage Control Capex and Opex costs assumed for the WRMP24 (2022-23 cost base)

Option ID	Cost	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34	2034-35
PRT_PRT_EF-LKR_ALL_ALL_leakage_alc high+	Capex (£m)	0.921	0.926	0.914	1.066	1.075	1.216	1.066	1.082	1.012	1.012
	Opex (£m)	1.389	1.480	1.266	1.266	1.380	1.322	1.264	1.534	1.264	1.264
	Total (£m)	**2.310**	**2.407**	**2.180**	**2.332**	**2.456**	**2.538**	**2.330**	**2.617**	**2.276**	**2.276**

Table 27 'Maintain' and 'Reduce' costs in business plan table CW19.1 and CW19.2

Expenditure Type	2025-26	2026-27	2027-28	2028-29	2029-30
Maintain (£m)	3.741	3.912	3.713	3.787	3.909
Reduce (£m)	1.717	1.698	1.549	1.495	1.541
Total (£m)	**5.458**	**5.610**	**5.262**	**5.282**	**5.450**
Difference from WRMP (£m) *	**3.148**	**3.203**	**3.082**	**2.950**	**2.994**

* Difference between the Total rows in Table 26 and Table 27, which aligns to mains renewals + leak repairs in Table 29.

Table 28 Cost breakdown for ALC options by year (detection costs only)

Expenditure Type	2025-26	2026-27	2027-28	2028-29	2029-30	
Enigma Sweeps	£0.053m	£0.053m	£0.053m	£0.053m	£0.053m	Maintain
Fixed Sensor Plastic Network	£0.000m	£0.081m	£0.081m	£0.081m	£0.127m	Reduce
Fixed Sensor Plastic Network	£0.000m	£0.206m	£0.206m	£0.412m	£0.412m	Maintain
Comm PermaNet	£0.311m	£0.311m	£0.311m	£0.311m	£0.311m	Maintain
HyQ Sweeps	£0.050m	£0.050m	£0.050m	£0.050m	£0.050m	Maintain
Trunk Main Correlations	£0.054m	£0.054m	£0.054m	£0.054m	£0.054m	Maintain
Comm ZoneScan	£0.385m	£0.385m	£0.385m	£0.385m	£0.385m	Maintain
AI Enabled Sound Loggers	£0.058m	£0.058m	£0.000m	£0.000m	£0.058m	Maintain
Satellite Imagery	£0.149m	£0.149m	£0.000m	£0.000m	£0.000m	Reduce
TOTAL ALC costs (detection only)	**£1.060m**	**£1.347m**	**£1.140m**	**£1.346m**	**£1.454m**	

Table 29 Cost breakdown for leakage options by year

Expenditure Type	2025-26	2026-27	2027-28	2028-29	2029-30	
ALC Detection Costs	£0.911m	£1.117m	£1.059m	£1.265m	£1.323m	Maintain - Locate
ALC Detection Costs	£0.149m	£0.230m	£0.081m	£0.081m	£0.127m	Reduce - Locate
Additional Costs (Management, Analysis, Consultancy, Reporting, Software, Training, Vehicles, Data Logging, Misc)	£0.471m	£0.471m	£0.471m	£0.471m	£0.471m	Maintain - Locate
Additional Costs (New Loggers)	£0.108m	£0.008m	£0.008m	£0.008m	£0.008m	Maintain - Aware
Additional Costs (Innovation)	£0.020m	£0.020m	£0.020m	£0.020m	£0.020m	Reduce - Locate
Leak Repairs (both ALC and Reactive)	£2.130m	£2.185m	£2.064m	£1.932m	£1.976m	Maintain - Mend
New and Upgrade of Existing DMAs	£0.296m	£0.296m	£0.296m	£0.242m	£0.242m	Reduce – Aware
Digital Twin	£0.234m	£0.134m	£0.134m	£0.134m	£0.134m	Reduce - Prevent (Calm Networks)
Mains Renewals	£1.018m	£1.018m	£1.018m	£1.018m	£1.018m	Reduce – Prevent (Rehab)
Contingency	£0.121m	£0.131m	£0.111m	£0.111m	£0.131m	Maintain - Locate
TOTAL Leakage Costs – CW19.3	**£5.458m**	**£5.610m**	**£5.262m**	**£5.282m**	**£5.450m**	

8 ISSUE 8: UNAVAILABLE SURPLUS OF WATER INCLUDED IN SDB

8.1 Defra explanation of Issue 8

There is a large surplus of water from 2035 included in Portsmouth's tables when the Hampshire Water Transfer and Water Recycling Project is online. This reflects raw water being initially discharged into Havant Thicket Reservoir in 2035 and Southern Water gradually increasing the abstraction from the reservoir for treatment into the early 2040's.

This water is not actually available to use due to limitations on treatment work capacity, and therefore is a misrepresentation of the company's surplus during this period. We advise that the company should review how the benefits of the Hampshire Water Transfer and Water Recycling Project have been presented in the data tables to ensure that it reflects the water it has available for use, considering the capacity constraints on treating and distributing water.

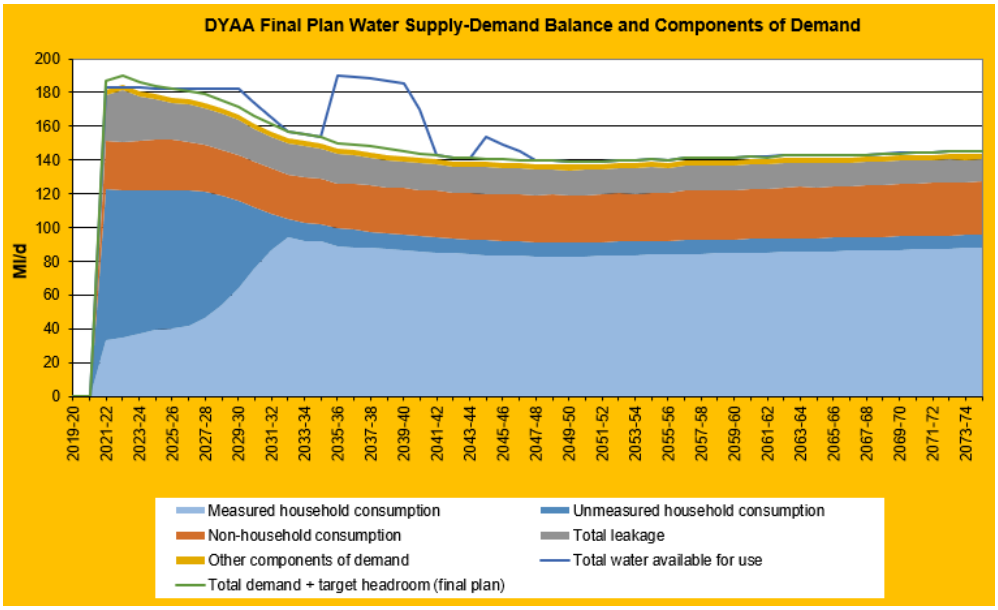
8.2 Our response to Issue 8

Thank you for drawing this to our attention, we agree that the surplus represents water, seen in the 'Total water available for use' line in Figure 30 below, cannot be used in our water resource zone, due to limitations on treatment work capacity.

The representation of this 'surplus' came about from the allocation by the Water Resources South East (WRSE) regional investment model flowing through into our WRMP24 tables. We have discussed the issue with WRSE and in future runs the model will reallocate surplus water into neighbouring water resources zones that do have the capacity to treat the water. Such re-allocation of water will follow the bulk transfer opportunities set out in the draft revised regional plan.

The latest WRSE regional investment model run is being developed to support Southern Water's re-consultation on its WRMP24. We therefore commit to update our final WRMP24 tables on completion of this run, with the correct representation of the surplus. We will involve WRSE, Southern Water and the Environment Agency in this process to ensure that the WRMP tables reflect the water resource zones that the recycled water can be utilised in and by which route. We will ensure that any surplus shown in our final WRMP24 tables is a true reflection of the water available to us.

Figure 34 Portsmouth Water DYAA Final Water Supply-Demand Balance and Components of Demand



9 ISSUE 9: HWTWRP AND SOUTHERN WATER'S WRMP24

9.1 Defra explanation of Issue 9

Portsmouth Water's WRMP24 has significant dependencies on Southern Water final WRMP and the outcomes of the RAPID process. Southern Water is currently expected to be reconsulting on a revised draft WRMP in Spring 2024. Portsmouth Water has not set out what risks of impacts there are to its own plan from its dependencies, or how these will be mitigated or managed. Given the dependencies, Portsmouth Water must engage with Southern Water up to Southern publishing its final WRMP, to ensure that there is no impact to Portsmouth Water's WRMP. This should include work to ensure consistent assumptions around bulk transfers. The company must set out the risks associated its links to Southern Water's plan and how these will be managed and mitigated. This should include assurance that Portsmouth Water will review Southern Water's revised draft and final WRMPs, and where necessary, update its final WRMP through the Annual Review process.

9.2 Our response to Issue 9

9.2.1 Introduction

Southern Water is currently expected to be re-consulting on a revised draft WRMP in Summer 2024. Their plan will be based on updated information from a different Water Resources South East (WRSE) investment model run from the one used by Portsmouth Water in our rdWRMP24 (and that of the other WRSE companies too). The new Southern Water run contains some updated data that was not available at the time our plan was submitted.

There is a possibility that Southern Water will need further updates to its plan once the consultation has finished and prior to publishing its final WRMP24.

Our response below sets out our commitment to ensure that should there be any dependencies arising from this situation between the Southern Water and Portsmouth Water WRMP24s, they are recognised and managed.

9.2.2 Aligning with Southern Water's WRMP24 re-consultation

Southern Water is currently expected to be re-consulting on a revised draft WRMP in Summer 2024.

The water resources planning teams of Southern Water and Portsmouth Water have been meeting on an approximate weekly basis since 16th February 2024. These meetings have included discussions linked to our response to the Defra WRMP letter and Southern Water's preparations for the re-consultation on its WRMP24.

On Thursday 28th March 2024 we were informed by Southern Water that whilst the new WRSE investment model run[9] and associated WRMP strategy is yet to be formally signed-off by the Southern Water board, they are now working to finalise an updated plan based on that run.

Given the timescale that presented us with, it has not been possible for us to review and update our WRMP24 main report, appendices, and data tables to reflect this new investment model run in time for this response to our Defra WRMP letter. Equally, the task also risks being abortive work, should Southern Water need to make amendments to their plan following their consultation exercise.

However, we commit to working closely with Southern Water and WRSE between now and the close of Southern Water's consultation to ensure our plans are fully aligned.

[9] jet-20240206-190500/st-hybrid-dy-w1-tree16.05-options-v67-gov-led-hybridcp2-ppp5-pwh15-har2-twd14-no-force-kni-no-force-less-2075-fix-bvp

The areas we have identified for most scrutiny are:

- The timing and usage of the water recycling schemes,
- The timing and scale of various changes to bulk supply agreements,
- The assumptions made on the usage of the River Itchen as a source of water.

In addition to updating our main report and data tables, we will review and update our 'common understanding' Appendix 1C, 'sensitivity testing' Appendix 9A and 'monitoring plan' Appendix 10A to ensure they reflect the new WRSE model run and associated sensitivity tests. This includes:

- reporting on the new sensitivity tests associated with delays to Havant Thicket Reservoir approved scheme and Southern Water's Hampshire Water Transfer and Water Recycling Project (HWTWRP) (see response to Defra Issue 4).
- updating information on the utilisation of options and bulk transfers between our companies. This will ensure we have consistent assumptions around bulk transfers as requested by Defra.

Our initial analysis of the new model run has suggested there are no changes to our plan prior to 2033/34. This means there is no impact on our PR24 business plan submission (spend between 2025 and 2030). However, it does indicate there is a small change to our final WRMP24 with an earlier implementation year for the Source O Booster Upgrade option. The model suggests the booster will now be required in 2033/34 as a core option, instead of potentially being used in 2039/40 as an additional adaptive planning option. However, we note that earlier implementation of the Source O Booster Upgrade option is already considered by the new monitoring plan content in our response to Defra Issue 5.

9.2.3 Aligning with Southern Water's final WRMP24

We commit to reviewing and providing a formal representation on Southern Water's re-consultation version of its WRMP later this Summer. This will focus on ensuring that we are presenting consistent information within our individual WRMPs, including on bulk transfers.

We commit to continuing regular meetings with Southern Water during the re-consultation period and up until Southern Water has developed a final WRMP. These meetings will allow us to flag and address any issues that might arise from the re-consultation, and to mitigate any inconsistency between our WRMPs.

As a final consistency check, we also commit to reviewing Southern Water's final WRMP24 prior to it being published. It is anticipated that our final WRMP24 will have already been published by this time. We will draw attention to, and discuss, any discrepancies between the plans with Southern Water and the Environment Agency. If it is concluded that there are material differences between the plans (e.g. bulk transfer assumptions), then we commit to updating our final WRMP24, as necessary and agreed with the Environment Agency, via the annual review process in 2025.

9.2.4 Interdependencies with Southern Water's plan, risks, management, and mitigation

Our response to Defra Issue 5 has identified new content for our monitoring plan. This includes confirmation of core and additional adaptive options within our WRMP and how we will monitor the need for the additional adaptive options. It also includes the need to ensure consistency between the Southern Water and Portsmouth Water final WRMP24s, as described in the previous sections.

The core options within our rdWRMP24 are the 'must do' options which are selected in all 9 pathways of the adaptive plan. These options are:

- Demand management activity, including universal smart metering,
- Source O drought plan related options,
- the approved Havant Thicket Reservoir scheme.

The new investment model run has identified Source O Booster Upgrade as an additional core option, but not required until 2033. It is worth noting that none of these core options have dependencies on the outcome of Southern Water's final WRMP or on the outcomes of the gated RAPID process. Therefore the risk of any discrepancies between our plan and Southern Water's plan may not be significant in the business plan cycle of WRMP24.

Our additional adaptive options do have dependencies on the Southern Water final WRMP. However the timing of these schemes means that they may need funding in subsequent planning rounds via the WRMP29 / PR29 and WRMP34 / PR34 business plan. This provides ample time for clarity to be established (and much more insight to be gained via the adaptive plan) should our plans contain discrepancies. The first of these adaptive options is the potential need for a new potable import from Southern Water commencing in 2039/40, enabled by the delivery of the Thames Water South East Strategic Reservoir Option (SESRO), the Thames to Southern Transfer (T2ST) SRO and the Hampshire Water Transfer and Water Recycling Project (HWTWRP) SRO.

Our response to Defra Issue 5 identifies that we will monitor the latest situation regarding these SROs. However, as the new WRMP29 is developed, Southern Water and Thames Water will be updating the WRSE regional investment model to reflect the latest data on the SROs. The removal of an SRO or a delay to its delivery has the potential to impact our WRMP24, because Southern Water may not have sufficient water to provide us with a bulk supply starting in 2039/40.

As shown in the updated monitoring plan within our response to Defra Issue 5, we will explore new alternative WRMP supply options with Southern Water as mitigation for these SRO risks. The new options will be offered to the WRSE investment model and may become part of our WRMP29 adaptive plan. If taken forward, then their development and construction would be funded via our PR29 and PR34 business plans so they can be implemented by 2039/40.

10 ISSUE 10: CLIMATE CHANGE IMPACT UNCERTAINTY

10.1 Defra explanation of Issue 10

We understand that uncertainty of climate change impacts on source yield has been removed from target headroom profile for the final set of branches from 2039-40 and these branches branch out based on the median, upper quartile and lower quartile climate change scenarios. This avoids double counting. However, this means that climate change uncertainty is not presented in the planning tables from 2040 onwards, and the sizes and profiles of climate change impact from 2040 other than for the reported pathway are not available for assessment for the company's water resource zones.

To provide further clarity on the climate change uncertainty, the company should:

- Provide the climate change impact on source yield as time series profiles for each water resource zone, for all climate change scenarios used in the adaptive branches from 2040 onwards in the final WRMP24.
- Work with the Environment Agency to improve data presentation and provision for climate change impact and uncertainty for WRMP29.

10.2 Our response to Issue 10

We are committed to working with WRSE and the Environment Agency to improve data presentation and provision for climate change impact and uncertainty for this plan with the text below, but also looking forward to our next plan, WRMP29.

Our WRMP24 provides information on the climate change Deployable Output (DO) assessment within Section 5.5.1. This states that three sets of climate change impacts were used to feed into the supply demand balances that comprise the pathways for the adaptive planning process.

The climate change impact on source yield is provided in Figure 30 below, as time series profiles for the wider Water Resources South East (WRSE) region. Only a selection of the 28 UKCIP19 climate change scenarios are presented for clarity.

The time series data on Figure 30 show that the CC06 profile ('6' on the graph legend) approximately follows the calculated upper quartile impact for the WRSE region ('175' on the graph legend) and that the CC07 profile ('7' on the graph legend) approximately follows the lower quartile impact for the WRSE region ('125' on the graph legend). The CC03 and CC23 profiles ('3' and '23') are provided to demonstrate the full range of impacts across the 28 UKCP19 climate change scenarios.

The climate change impact on source yield is provided in Figure 36 below as time series profiles for our Portsmouth Water resource zone. The profiles used within the regional adaptive planning branches are CC06 ('6' on the graph legend), CC07 ('7' on the graph legend) and the median ('150' on the graph legend). As per Figure 30, the CC03 and CC23 profiles ('3' and '23') are provided to demonstrate the full range of impacts across the 28 UKCP19 climate change scenarios.

WRSE has shared the spreadsheet tool with the Environment Agency that was used to develop Figure 30 and Figure 36. This includes the time series data and this can be shared with Defra if required.

We propose the following narrative, with tables 32 and 33, to replace the content in Section 5.5.1 of our WRMP24:

> "The climate change DO impacts are linearly scaled from 1990 to 2070 and extrapolated beyond 2070 to provide a profile of climate change across the planning period.

Up to 2040, the median value of the 28 climate change DO impacts, in Ml/d, was included as the best estimate of climate change impacts in the baseline supply forecast. These are the 12 regional projections, the 3 global projections from the Hadley Model which were not run through the regional climate model, and the 13 global projections from the CMIP5 ensemble.

Up to 2040, the uncertainty in the climate change impact is incorporated within our target headroom profile. As described in our headroom assessment (Appendix 6A), for the 'S8' headroom component the uncertainty range was defined as a triangular distribution, with the minimum and maximum parameters being defined by the difference of the minimum and maximum values of the 28 climate change DO impacts, from the median value.

Beyond 2040 the uncertainty in the climate change impacts has been removed from our target headroom profile. Instead, the uncertainty is explored via the adaptive planning branches in the WRSE investment model (see Figure 34: 'Portsmouth Water's Adaptive Planning branches with the core pathway highlighted').

Three sets of climate change impacts were applied across the nine adaptive planning pathways beyond 2040. These represent plausible high, median and low climate change DO impacts. The impacts for the 2070s across a range of return periods are presented in Table 30. The scaled profiles of annual climate change impacts from 2040 for the 1-in-500 year return period are presented in Table 31.

The 'CC06' data represents the upper quartile of 28 UKCP18 climate change scenarios, resulting in a more challenging 'high' impact to the supply demand balance. The 'CC07' data represents the lower quartile of 28 UKCP18 climate change scenarios, resulting in a less challenging 'low' impact to the supply demand balance.

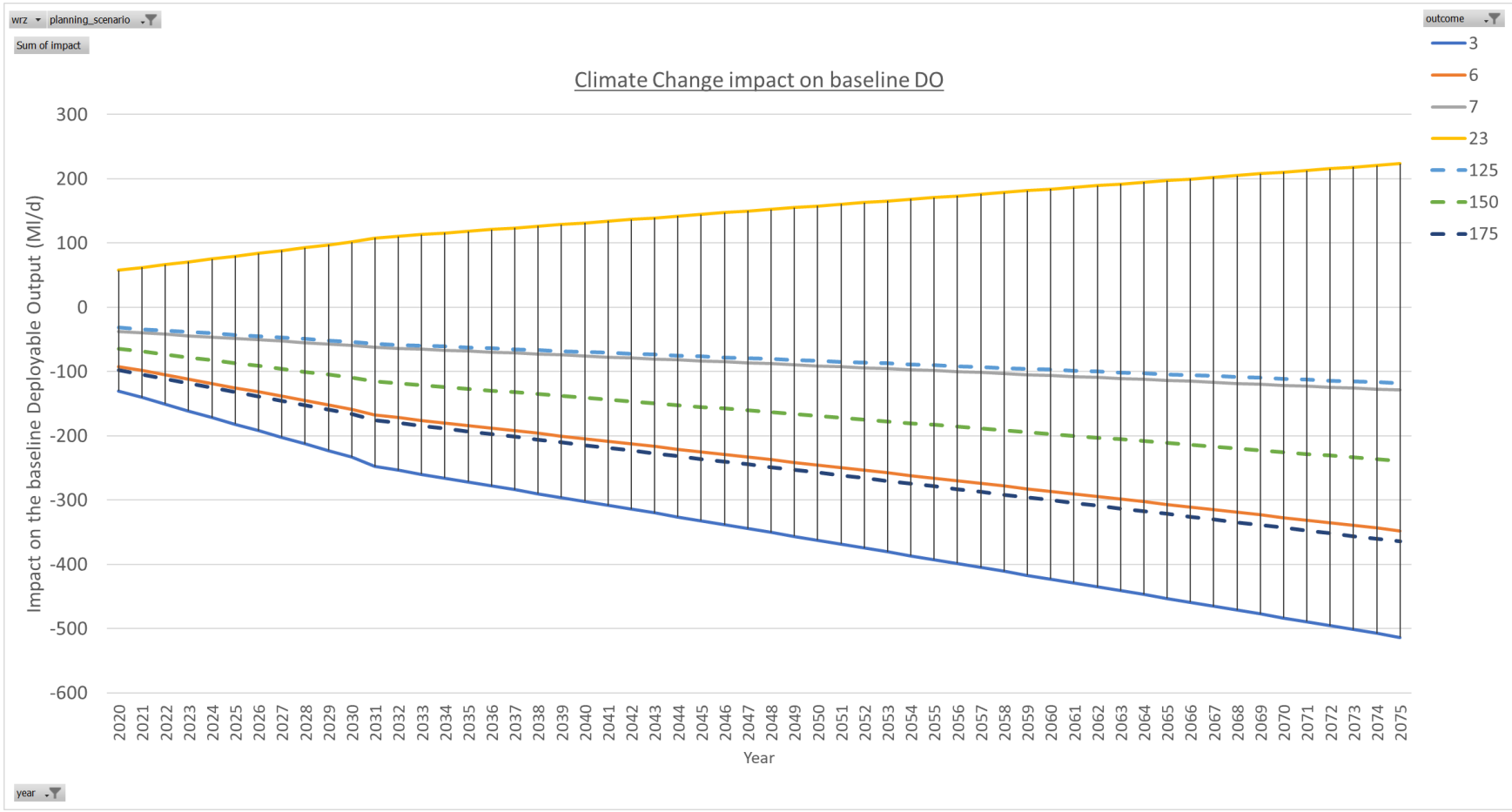
Table 30: Climate change impacts (2070s) for the three climate change scenarios used in adaptive pathways

Return Period	DYAA DO (Ml/d) Median impact	DYCP DO (Ml/d) Median impact	CC06 DYAA (Ml/d) High impact	CC06 DYCP (Ml/d) High impact	CC07 DYAA (Ml/d) Low impact	CC07 DYCP (Ml/d) Low impact
2	−0.9	−0.6	−1.9	−1.3	−1.9	−0.1
100	−12.05	−11.0	−17.2	−15.2	−14.4	−7.0
200	−7.4	−6.05	−14.4	−11.2	−6.2	−2.1
500	−6.05	−2.6	−12.9	−5.0	−1.7	−0.1

Table 31: Scaled climate change impacts for the three climate change scenarios used in adaptive pathways (1 in 500 year return period).

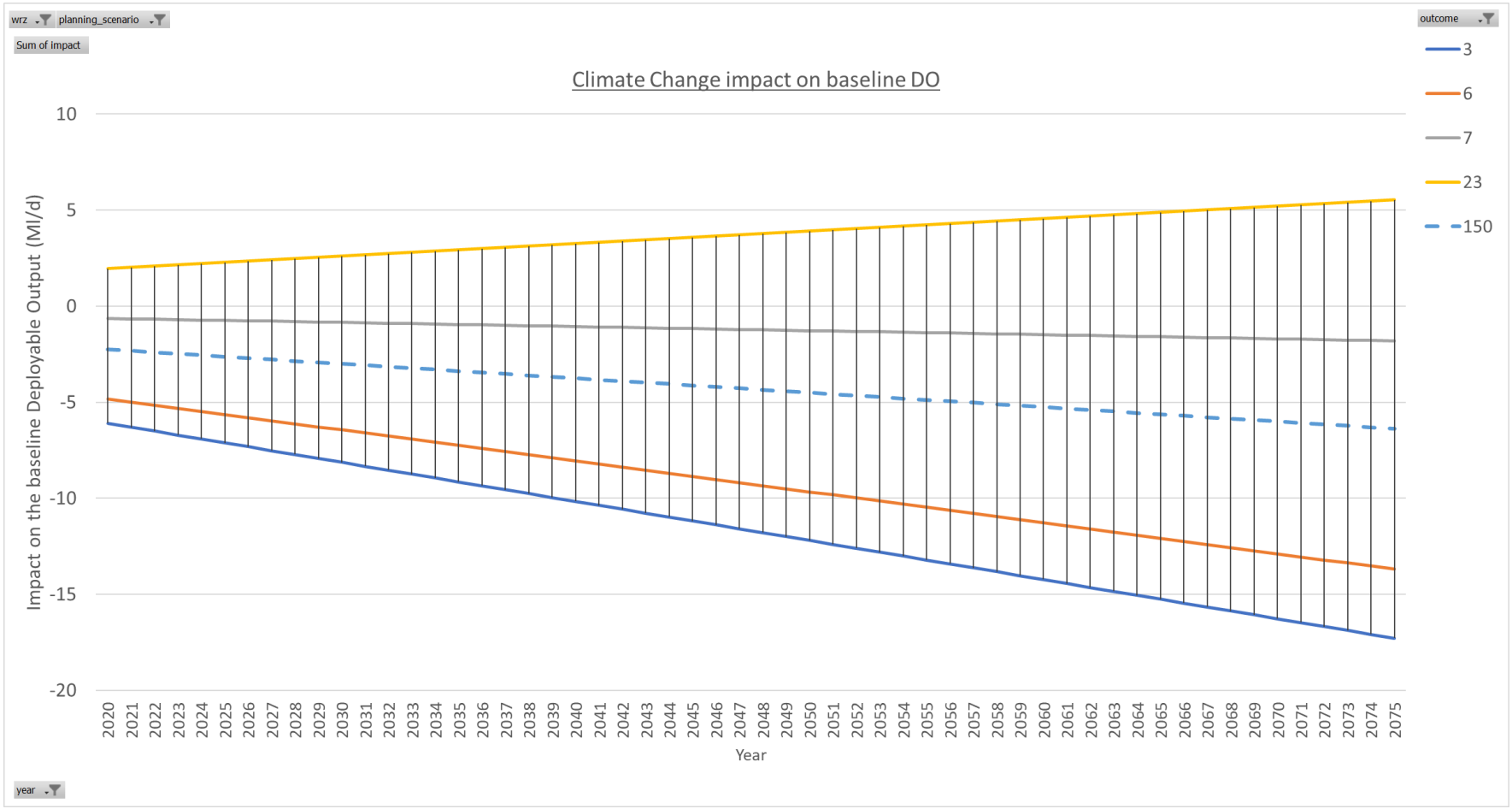
Year	DYAA DO (Ml/d) Median impact	DYCP DO (Ml/d) Median impact	CC06 DYAA (Ml/d) High impact	CC06 DYCP (Ml/d) High impact	CC07 DYAA (Ml/d) Low impact	CC07 DYCP (Ml/d) Low impact	Uncertainty DYAA (Ml/d) High – Low Impact	Uncertainty DYCP (Ml/d) High – Low Impact
2039-40	-3.75	-1.62	-8.06	-3.11	-1.06	-0.06	7.00	3.05
2040-41	-3.83	-1.65	-8.22	-3.17	-1.08	-0.06	7.14	3.11
2041-42	-3.90	-1.68	-8.38	-3.23	-1.11	-0.06	7.27	3.17
2042-43	-3.98	-1.71	-8.54	-3.29	-1.13	-0.07	7.41	3.22
2043-44	-4.05	-1.74	-8.70	-3.35	-1.15	-0.07	7.55	3.28
2044-45	-4.13	-1.78	-8.86	-3.42	-1.17	-0.07	7.69	3.35
2045-46	-4.20	-1.81	-9.02	-3.48	-1.19	-0.07	7.83	3.41
2046-47	-4.28	-1.84	-9.18	-3.54	-1.21	-0.07	7.97	3.47
2047-48	-4.35	-1.87	-9.35	-3.60	-1.23	-0.07	8.12	3.53
2048-49	-4.43	-1.91	-9.51	-3.67	-1.25	-0.07	8.26	3.60
2049-50	-4.50	-1.94	-9.67	-3.73	-1.28	-0.08	8.39	3.65
2050-51	-4.58	-1.97	-9.83	-3.79	-1.30	-0.08	8.53	3.71
2051-52	-4.65	-2.00	-9.99	-3.85	-1.32	-0.08	8.67	3.77
2052-53	-4.73	-2.04	-10.15	-3.91	-1.34	-0.08	8.81	3.83
2053-54	-4.80	-2.07	-10.31	-3.98	-1.36	-0.08	8.95	3.90
2054-55	-4.88	-2.10	-10.47	-4.04	-1.38	-0.08	9.09	3.96
2055-56	-4.95	-2.13	-10.63	-4.10	-1.40	-0.08	9.23	4.02
2056-57	-5.03	-2.16	-10.80	-4.16	-1.42	-0.08	9.38	4.08
2057-58	-5.10	-2.20	-10.96	-4.22	-1.45	-0.09	9.51	4.13
2058-59	-5.18	-2.23	-11.12	-4.29	-1.47	-0.09	9.65	4.20
2059-60	-5.25	-2.26	-11.28	-4.35	-1.49	-0.09	9.79	4.26
2060-61	-5.33	-2.29	-11.44	-4.41	-1.51	-0.09	9.93	4.32
2061-62	-5.40	-2.33	-11.60	-4.47	-1.53	-0.09	10.07	4.38
2062-63	-5.48	-2.36	-11.76	-4.54	-1.55	-0.09	10.21	4.45
2063-64	-5.55	-2.39	-11.92	-4.60	-1.57	-0.09	10.35	4.51
2064-65	-5.63	-2.42	-12.08	-4.66	-1.59	-0.09	10.49	4.57
2065-66	-5.70	-2.46	-12.25	-4.72	-1.62	-0.10	10.63	4.62
2066-67	-5.78	-2.49	-12.41	-4.78	-1.64	-0.10	10.77	4.68
2067-68	-5.85	-2.52	-12.57	-4.85	-1.66	-0.10	10.91	4.75
2068-69	-5.93	-2.55	-12.73	-4.91	-1.68	-0.10	11.05	4.81
2069-70	-6.01	-2.59	-12.89	-4.97	-1.70	-0.10	11.19	4.87
2070-71	-6.08	-2.62	-13.05	-5.03	-1.72	-0.10	11.33	4.93
2071-72	-6.16	-2.65	-13.21	-5.09	-1.74	-0.10	11.47	4.99
2072-73	-6.23	-2.68	-13.37	-5.16	-1.76	-0.10	11.61	5.06
2073-74	-6.31	-2.71	-13.53	-5.22	-1.79	-0.11	11.74	5.11
2074-75	-6.38	-2.75	-13.70	-5.28	-1.81	-0.11	11.89	5.17

Figure 35 Climate change impact on the WRSE region baseline 1 in 500 year Deployable Output (DO)



Note on legend: The '3', '6', '7' and '23' profiles represent the impacts from a selection of the 28 UKCP19 climate change scenarios. The '125' profile represents the lower quartile impact and the '175' profile represents the upper quartile impact. The '150' profile represents the median impact.

Figure 36 Climate change impact on Portsmouth Water baseline 1 in 500 year Deployable Output (DO)



11 ISSUE 11: INCLUSION OF CATCHMENT SCHEMES

11.1 Defra explanation of Issue 11

Through the Water Resources South East (WRSE) regional plan, it is positive to see Portsmouth Water is selecting catchment schemes in the Arun and Western Streams, and East Hampshire. The company has not reflected these clearly in its own plan, and the funding route for these schemes is unclear. Portsmouth Water should include details of preferred catchment options in its plan, in line with the latest Water Resources Planning Guideline. The company should ensure consistency with the regional plan and confirm the funding route expected for these schemes. The company's planning table 4 and 5 should be updated as appropriate.

Developing a better understanding of these schemes and their benefits will be important to inform future planning rounds. We would advise that Portsmouth Water continues to work with WRSE to further investigate and develop the understanding of these types of schemes during the next round of planning and consider further catchment schemes during WRMP29 development.

11.2 Our response to Issue 11

In the context of water resource planning our understanding of best value catchment schemes (options) is insufficient to identify the most appropriate holistic solutions and to quantify the resulting DO benefits. For this reason, we excluded the WRSE catchment schemes from our revised draft WRMP.

Our ambitious Water Industry National Environment Programme (WINEP) investigations and options appraisals programme for AMP8 will lead to that improved understanding and characterisation of catchment schemes. These schemes will then be considered as options in our next WRMP (WRMP29). Therefore, we confirm that the AMP8 WINEP set out in our PR24 business plan provides the funding route for on-going development of catchment schemes.

This does not mean we will not be completing any catchment work in AMP8. Stepping outside the direct water resource planning context, our company Vision summaries our approach;

"Our future is one where we're investing in nature and catchments rather than concrete as a priority – putting the natural environment at the heart of our decision making. Solutions will be co-created, co-funded and co-delivered with stakeholders like farmers, landowners and community groups – bringing benefits to local environments, biodiversity and water quality."

(PW-Vision-Brochure-Interactive.v2.pdf (portsmouthwater.co.uk))

To that end will be working with landowners, on land we own and with partner organisations to deliver interventions in our catchments that have clear water quality and/or biodiversity benefits as opportunities and funding allows.

To address the lack of consistency between the WRMP24 and regional plan, which we understand to be at the heart of Issue 11 within our Defra letter, we will reinstate the WRSE catchment schemes within table 4 and 5 of our WRMP tables.

Additionally we propose the addition of a new section at the start of Section 3 within our WRMP24 Appendix 5B, titled '3.2 The Regional Plan and Catchment schemes':

> "Catchment schemes for the Arun and Western Streams and East Hampshire were developed in line with the Water Resources South East (WRSE) methodology for the Emerging Regional Plan. However, they were excluded from the subsequent Draft Regional Plan and our draft WRMP24 on the grounds that they do not provide a deployable output benefit, in line with the regulator's Water Resource Planning Guideline (WRPG).

The guidance in the WRPG has been updated since the draft regional plan was published, and catchment schemes can now be included within regional plans and statutory WRMPs even if there is no deployable output benefit, so long as they improve best value metrics. The schemes selected in the WRSE Regional Plan and included within our WRMP24 tables are as follows:

- Portfolio 1 (Standard): Arun and Western Streams: This portfolio consists of 19 individual options. This includes 1 flow augmentation and licensing options, 2 knowledge exchange, education and agricultural activity options, 3 natural water retention measures (including NFM and wetland creation) options, 9 nutrient and sediment reduction options, 1 river restoration option and 3 terrestrial habitat creation/management options.
- Portfolio 1 (Standard): East Hampshire: This portfolio consists of 15 individual options. This includes 1 flow augmentation and licensing option, 5 nutrient and sediment reduction options, 7 river restoration options and 2 terrestrial habitat creation/management options.

The catchment schemes are only selected at the end of the Regional Plan (in 2075) because, at present, there is no deployable output benefit associated with them. However, we recognise that their selection advises that catchment schemes can form part of the next Best Value Plan and WRMP29. We will continue to work with WRSE to improve the characterisation of catchment schemes (including deployable output benefits) via the AMP8 WINEP described in this 'Investigations and Assessments' section.

The draft WINEP option appraisal outputs for catchment options will be available by March 2027 for inclusion within the WRSE investment modelling towards the next regional plan and WRMP29. If required, these options will be refined following the consultation on our WRMP29 and updated prior to finalisation of our WRMP29.

Whilst the implementation of WRSE catchment options is not funded in our PR24 Business Plan, this will not prevent us from contributing towards catchment work during AMP8. We will continue to seek opportunities to support 'no regrets' catchment work. For example, we are part of the Arun and Western Streams Catchment partnership (A&WSCP) on the River Ems to create and develop the River Ems Chalk Restoration Scheme. This work will evaluate opportunities and design catchment-based schemes where possible. With A&WSCP, we will work with land owners to develop catchment and river restoration proposals and seek funding streams that are available for delivery that supports water resource improvements.

Catchment Schemes to improve chalk streams across the East Hampshire Catchment will also be undertaken with the East Hampshire Catchment Partnership."