Final Water Resources Management Plan 2024

Appendix 1D – Strategic Environmental Assessment

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AtkinsRéalis

Final Water Resource Management Plan 2024

Strategic Environmental Assessment

Portsmouth Water

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Glossary

AONB	Area of Outstanding Beauty
ACWG	All Company Working Group
AQMA	Air Quality Management Areas
BNG	Biodiversity Net Gain
CAMS	Catchment Abstraction Management Strategy
CFMP	Catchment Flood Management Plans
CPRE	Campaign for Rural England
CROW	Countryside and Rights Way
CO_2	Carbon Dioxide
DO	Deployable Output
DCLG	Department for Communities and Local Government
Defra	Department for Environment, Food and Rural Affairs
dWRMP	Draft Water Resources Management Plan
DYAA	Dry Year Annual Average
DYCP	Dry year Critical Period
EAAP	Ecosystems Approach Action Plan
EIP	Environmental Improvement Plan
EU	European Union
FRA	Flood Risk Area
fWRMP24	Final WMRP24
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIS	Geographic Information System
HER	Historic Environment Record
HRA	Habitats Regulations Assessment
ICA	In Combination Assessment
IMD	Index of Multiple Deprivation
INNS	Invasive Non-Native Species
JNCC	Joint Nature Conservation Committee
km	Kilometres
$ktCO_2$	Kilo Tonnes of Carbon Dioxide
LNR	Local Nature Reserve
LSOA	Lower Super Output Area
LWS	Local Wildlife Sites
LULUCF	Land Use, Land-use Change, and Forestry
MCZ	Marine Conservation Zone
Ml/d	Megalitres per day

MPZ	Marine Protection Zone
NCA	National Character Area
NERC	Natural Environment and Rural Communities
NGO	Non Government organisation
NFM	Natural Flood Management
NNR	National Nature Reserve
NO_2	Nitrogen Dioxide
NPPF	National Planning Policy Framework
NSIP	Nationally Significant Infrastructure Project
NYAA	Normal Year Annual Average
ONS	Office for National Statistics
PM	Particulate Matter
PW	Portsmouth Water
RAG	Red-Amber-Green
RCP	Representative Concentration Pathway
RBMP	River Basin Management Plan
rdWRMP	Revised Draft Water Resources Management Plan
SAC	Special Areas of Conservation
SEA	Strategic Environmental Assessment
SEW	South East Water
SMP	Shoreline Management Plans
SPA	Special Protection Area
SRO	Strategic Resource option
SSSI	Sites of Special Scientific Interest
SRO	Strategic Resource Option
SPA	Special Protection Area
UK	United Kingdom
UKCP18	UK Climate Projections 2018
UKWIR	United Kingdom Water Industry Research
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
WAFU	Water Available For Use
WFD	Water Framework Directive
WINEP	Water Industry Improvement Program
WRMP	Water Resource Management Plan
WRPG	Water Resource Planning Guideline
WRZ	Water Resource Zone
WRSE	Water Resource South East

1. Introduction

1.1. Purpose of this document

This is the Strategic Environmental Assessment (SEA) Report of the Portsmouth Water final Water Resource Management Plan 2024 (fWRMP24), which has been prepared by AtkinsRéalis.

On 15th November 2022 Portsmouth Water published their draft Water Resource Management Plan 2024 (dWRMP24) and associated SEA Environmental Report for consultation. The public consultation ran for a 12-week period and closed on 20th February 2023. Portsmouth Water's Statement of Response (SoR), revised draft WRMP24 (rdWRMP24) and revised SEA Environmental Report was issued to Defra on 31st August 2023, which took on board the comments received from the draft plan consultation exercise, in addition to updated outputs and data from the Water Resources South East (WRSE) regional modelling in relation to:

- Population and growth forecasts to reflect updated data not available previously;
- Demand forecasts to reflect the above, and updating the base year for forecasts;
- Data and information on individual options, including option timing, costs and best value metrics, and option availability;
- Demand management options, including commitments to leakage and PCC targets considering Government policy expectations, including in the Government's Environmental Improvement Plan; and
- Other data updates to reflect new data availability.

This fWRMP24 SEA Environmental Report further takes on board comments received from Defra[1] which required further information to inform the Secretary of States decision on next steps for Portsmouth Water's plan. Additional information to support the SoR was issued to Defra on 15th April 2024 for review, prior to their formal approval to publish which was received on 21st August 2024.

This SEA has been informed by seven other environmental assessments, namely Habitats Regulations Assessment (HRA), Water Framework Directive (WFD) Assessment, Biodiversity Net Gain (BNG) Assessment, Natural Capital (NC) Assessment, Invasive Non-Native Species (INNS) Assessment, as well as an assessment on the potential for effects on Sites of Special Scientific Interest and Heritage Impact Assessment (HIA). Notes on these assessments have been included as Appendices to this Report, excluding the HRA which has been published as a standalone report.

This SEA Report identifies the likely environmental effects of implementing fWRMP24, with an overview of the Water Resource Plan presented in the following section.

1.2. Portsmouth Water

Portsmouth Water was established in 1857 and is one of 21 regulated water supply companies in England and Wales. Portsmouth Water supplies an area of 868km^2 with a population of over 740,000 in nearly 320,000 properties across West Sussex and Hampshire as shown in Figure 1-1. Portsmouth Water has an important role in the South East region, with support given to neighbouring water company, Southern Water, with bulk supplies of treated water so that they can reduce their abstractions on world renowned chalk rivers. Additionally, Portsmouth Water are developing Havant Thicket winter storage reservoir in collaboration with Southern Water, which is due for completion early 2031-32, to enable a further bulk supply into their Hampshire zone.

[1] The Environment Agency and Natural England are statutory consultee for WRMPs. At the statement of response stage, their role changes and they become technical advisors to Defra and the Secretary of State

Figure 1-1 – The Portsmouth Water Supply Area

Portsmouth Water are a “water only” company. That means they only supply drinking water to their customers. Southern Water provide the wastewater service to their customers.

Key facts about the Portsmouth Water Supply area:

- 100 per cent of their water comes from chalk-based sources – Approximately 60 per cent of the water comes from boreholes and wells, 30 per cent from groundwater springs and 10 per cent from the River Itchen.
- Their abstractions influence flows in the Itchen, Meon, Ems and Lavant chalk streams and rivers.
- Their customers each use an average of around 153 litres per day. This is 5 per cent higher than the national average of 145 litres.
- The area they serve has significant differences in population density, with a contrast from central Portsmouth to the villages of the South Downs.
- Portsmouth Water generate 10 per cent of their energy from solar panels and are trialling electric and zero emissions vehicles.
- Their average bill is £117 a year. This is the lowest in the industry and significantly below the UK average of £215. Portsmouth Water have been identified as one of the most efficient water companies in the UK.
- The Portsmouth Water area contains areas of the South Downs National Park, protected marine harbours and numerous Sites of Special Scientific Interest. The chalk geology across their supply area supports them in providing excellent quality drinking water as well as the important and beautiful habitat we enjoy.

Portsmouth Waters vision ‘Excellence in Water. Always’[2] sets out their ambitious vision for the next 25 years, operating against the backdrop of climate change, population growth and a changing world. It outlines their commitment to provide an ‘affordable, reliable, and sustainable supply of high-quality water’ for their customers.

1.3. The background and need for a WRMP

It is a regulatory requirement under sections 37A to 37D of the Water Industry Act 1991 for water companies to produce a Water Resources Management Plan (WRMP) every five years to help ensure customers and communities have adequate water supplies available. A WRMP should provide details on how the company will provide and develop an affordable and efficient water supply for its customers, whilst also protecting the environment, effectively improving the resilience of water supplies to droughts and other future challenges. Water Companies in England are currently developing their WRMP for the next 50-year period from 2025 to 2075, known as WRMP24.

A significant influence on water company plans has been the Environment Agency’s National Framework for Water Resources (launched in March 2020). The Framework sets out a national aspiration to ‘*leave the*

[2] Our Business Plan 2025 to 2030 | Portsmouth Water

environment in a better condition than we found it, while improving resilience to drought and minimising interruptions to water supplies'.

1.3.1. Regional Planning

At a national level, water companies across England are developing their own regional plans to give a complete picture of the nation's water resources for the first time. This ensures that the regional plans, when combined, can meet the national need in a dynamic yet flexible way. This more 'joined up' approach marks a step-change in water resource planning. There are five regional groups:

- Water Resources North;
- Water Resources West;
- Water Resources East,
- Water Resources West Country; and
- Water Resources South East.

The Portsmouth Water WRMP24 is being produced alongside the Water Resources South East (WRSE) regional Plan. The south-east faces the greatest pressures on public water supplies as a designated area of 'serious water stress' by the Environment Agency. This means that current or future household demand for water is a high proportion of the effective rainfall available which is, or is likely to be, available to meet that demand. It has been estimated that over 1 billion additional litres of water will be required per day by 2050 and nearly 1.7 billion litres per day by 2100[3].

Via a collaborative approach, Portsmouth Water are working with five other companies under the banner of WRSE (see Figure 1-2) to deliver the National Framework for water resources and help safeguard continued supplies of water to this part of the country. Alongside Portsmouth Water, the other companies within WRSE are:

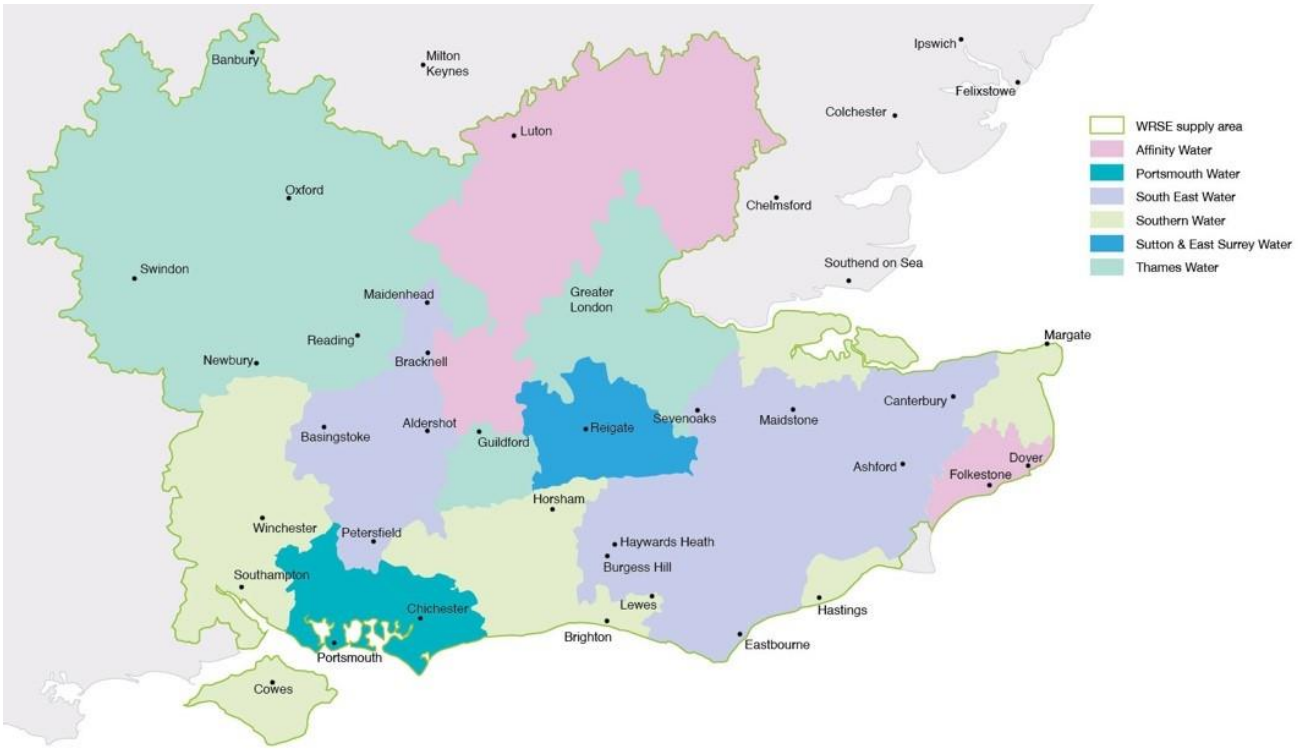
- Affinity Water;
- Sutton & East Surrey Water;
- Southern Water;
- South East Water; and
- Thames Water.

By aligning with the South East regional multi-sector plan for water resources, Portsmouth Waters WRMP24 aims to balance national, regional, and local interests – reflecting the best value for their customers as well as the best value regional plan and the investment and environmental ambitions of the regulators, customers and stakeholders.

Through WRSE, the companies of the South East have developed common methodologies, shared data sets and a regional adaptive planning approach to meet future water resource challenges. This ambitious multi-sector regional plan uses new, sophisticated modelling and forecasting methods which are then reflected in the Portsmouth Water plan, to align with the wider region.

[3] WRSE Draft Regional Plan SEA Environmental Report, September 2022

Figure 1-2 – The supply areas of the six water companies who form the Water Resources South East (WRSE) alliance



The WRSE regional plan aims to take a long-term view to water resource planning across the region to 2100 in order to secure a sustainable and resilient water supply. It covers investment in new infrastructure, leakage reduction measures and water efficiency programmes. In addition, it also includes catchment management solutions which seek to provide more sustainable land management practices that will protect and enhance the quality of the water at source. This will reduce water treatment costs in future, enhance the biodiversity of rivers and streams and increase the overall resilience of the water environment. The Regional Plan seeks to:

- Ensure there is enough water for a **growing population** and to support economic growth;
- **Improve the environment** by leaving more water in the region's rivers, streams and underground sources;
- Increase the region's resilience to **severe drought** and other extreme shocks and stresses; and
- Address the impacts of **climate change** on demand for water and how much is available.

Best Value objectives set out by the regional plan include the requirement to:

- Deliver a secure and wholesome supply of water to customers and other sectors to 2075;
- Deliver environmental improvement and social benefit;
- Increase the resilience of the region's water systems (public water supply system, environmental system and the non-public water supply systems used by other sectors); and
- Be deliverable at a cost that is acceptable to customers.

In order to fully identify and assess effects at both the regional and local levels, the regional plan and the local Portsmouth Water WRMP24 iteratively informed each other.

1.4. Portsmouth Water's WRMP24 objectives

Portsmouth Water's WRMP24 is their most ambitious and collaborative plan yet. It outlines how the water company has considered the implications of climate change, sustainable abstractions, future population, and housing growth, in addition to other factors that affect long term future uncertainty. The Plan sets out the overall

approach and recommended options to reduce any predicted deficits and how to maintain secure supplies to its customers, for the 50-year period from 2025-26 to 2074-75. A 50-year planning horizon has been selected to ensure that any large strategic schemes required beyond 2050 are identified. These large strategic schemes can require a significant lead in time and therefore assessment beyond 2050 can help to identify potential future investment needs for Portsmouth Water.

As noted in section 1.3, the Portsmouth Water WRMP24 aligns with the National Framework for Water Resources. The framework sets out core planning objectives for all company plans. These National Framework, and thus Portsmouth Waters WRMP24 objectives are:

- To reduce the average amount of water individuals use to 110 litres of water per person per day by 2050,
- To facilitate a reduction in water use across all customer sectors,
- To halve leakage rates by 2050 (based on a baseline of 2017–18) and
- To reduce the use of drought measures that have an impact on the environment.

There were a number of challenges in developing a WRMP for the Portsmouth area, with implications for both future water supplies and customer demand. The key issues that have helped to inform the considerations during development of the fWRMP24 include:

- **Portsmouth is an area of serious water stress.** This classification allows Portsmouth Water to target water efficiency measures in those areas of greatest need and greatest potential benefit through universal, compulsory, metering of household customers if it is shown to be both supported by customers and cost beneficial.
- **A need to reduce reliance on chalk aquifers.** This has been a key consideration within the development of the WRMP and a significant driver of proposed new Options and investment required.
- **An opportunity to contribute to a protected and enhanced environment**. Close alignment was made with the Water Industry Improvement Program (WINEP). This SEA and that undertaken by WRSE forms a key element of this alignment by ensuring evaluation of environmental effects of Options considered.
- **Uncertainty around population increase and the 'new normal' for water use**. This element includes the continued outworking of the Covid-19 pandemic, the continued outworking of the 'Brexit' process and its implications for population forecasts, along with general uncertainty related to population forecasts.
- **A changing climate**. Climate change is leading to hotter drier summers and milder wetter winters, and more frequent extreme weather events, beyond what we have seen historically. As the climate continues to change this will mean increasing demand for water and reduced ability to supply from existing sources.
- **Planning for normal conditions as well as dry years, critical peaks and droughts**. Planning needs to allow for ensuring reliable supplies over the whole of a dry year, as well as for shorter 'peak' periods which can put strains on the system such as summer heatwaves, or freeze-thaw events.
- **Increase resilience**. The Plan aims to increase resilience to a 1 in 500-year drought event by 2039. This is in keeping with Government requirements. This is a more demanding level of resilience than considered in previous WRMPs in the Portsmouth area.
- **Adaptive planning provides an opportunity to develop a plan able to accommodate uncertainty**. An adaptive planning approach has been developed to ensure the Portsmouth Water area is prepared now for a wide variety of future scenarios. The challenge of planning for the future in an uncertain year is not a new one, but the range of uncertainty has grown with the increasing extremes made more likely as the climate changes.

In the broadest terms, the components of the WRMP24 can be grouped into three of the following purposes:

- Defining the scale of the water resources challenge;
- Determining what feasible Options are available; and
- Taking steps to develop the preferred Plan.

These elements relied to a large extent on work undertaken by WRSE at the regional level, which helped inform development of the Portsmouth Water WRMP24.

1.4.1. Adaptive planning

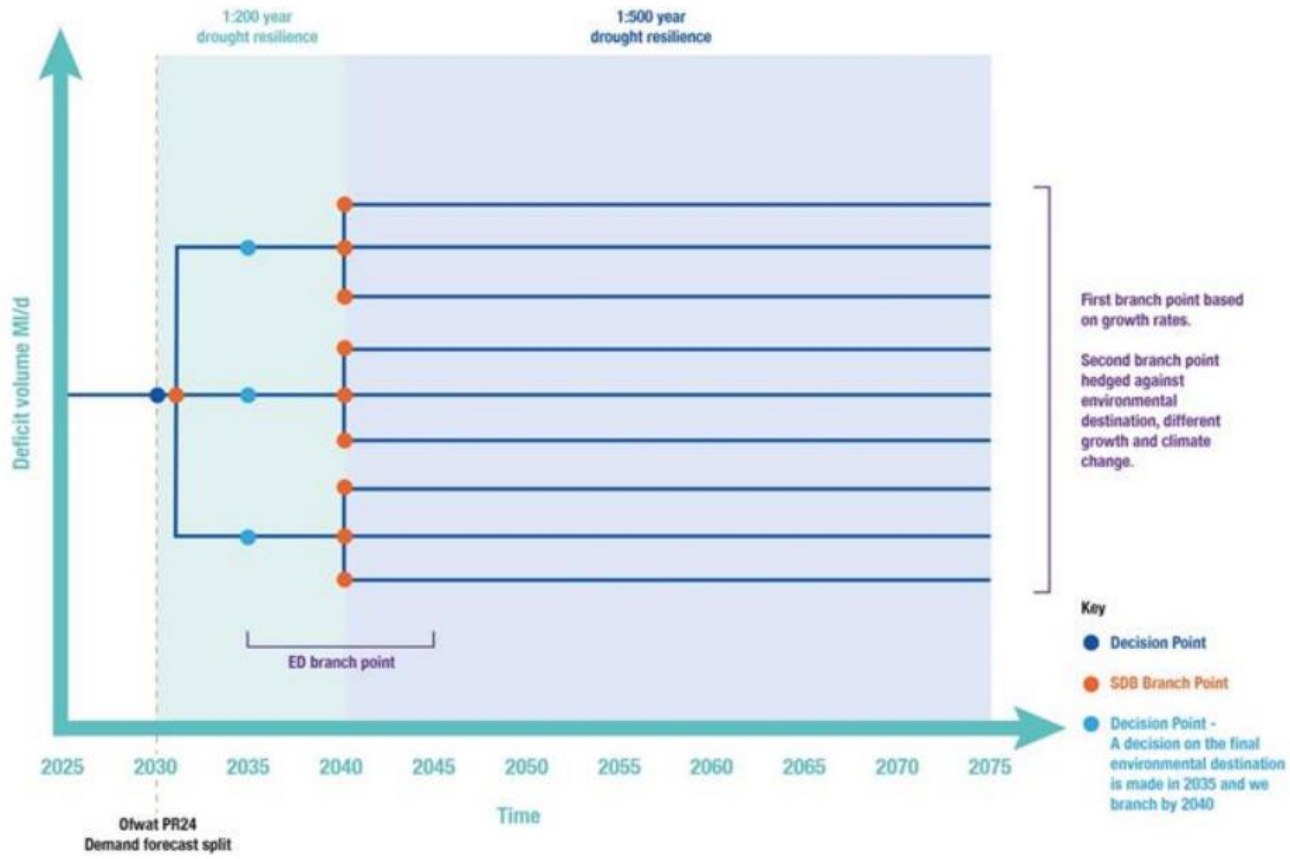
1.4.1.1. Regional multi-sector planning approach

There is considerable uncertainty to planning many years in advance as it requires planning for different scenarios using various supply and demand projections. However, the regional planning process has been specifically designed to help water companies adopt a forward-looking approach to uncertain requirements through adaptive planning. This allows companies to plan for schemes that may be required from 2025 and beyond.

In order to do this, WRSE developed a 'root and branch' adaptive tree as the base for forecast for its regional plan investment modelling. This includes the most likely set of future challenges and uncertainties facing the south east region over the next 50 years. There are nine different pathways ('situations') spanning from low challenge benign futures to high challenge adverse futures, as shown in Figure 1-3, with different combinations of:

- **Population growth**: According to the Office for National Statistics (ONS) the south east region could grow between two (minimum growth) and 33 per cent (maximum growth) over the next 50 years;
- **Climate change impacts**: Using the Met Offices most recent climate change predictions the model reflects a low climate change forecast up to a high climate change scenario; and
- **Levels of environmental ambition**: There needs to be a reduction on the amount of water taken from rivers, streams and underground sources, all which have impacts on the environment. The model reflects a range of abstraction reduction scenarios from low to high.

Figure 1-3 – WRSEs Adaptive Planning Pathways[4]



[4] Portsmouth Water fWRMP24 Figure 9: 'Adaptive planning branches used to develop our fWRMP24'

Analysis of these pathways have identified two key time periods:

2025–2035 Priority 'least regrets' plan: This period includes the schemes that water companies must progress. These schemes are required in all the future pathways and are considered 'least regret' options. This period will also include preparatory work necessary to assess the feasibility and effectiveness of options that could be needed in later years.

2035–2075 The adaptive plan: This period is more uncertain and so includes a strategy to deal with different futures through nine representative alternative pathways. Each pathway represents a different combination of population growth, environmental destination and climate change scenarios and includes the schemes needed under each. Collectively the nine pathways encompass a full range of impacts from 580 identified possible futures identified initially. The plan will adapt depending on which future scenario occurs.

Adaptive planning pathway 4 ('situation 4') is the reported pathway for the revised draft regional plan, informed by an update from regulators setting out their preference for pathway 4. Pathway 4 meets the regulatory guidance. It uses growth scenarios that are compliant with regulatory guidance, incorporates climate change impacts and an environmental destination preferred by Natural England and the Environment Agency. Critically, it includes all activities that need to be undertaken to be ready for all plausible future scenarios. The eight alternative pathways cover the full range of scenarios between 2025 and 2075, including the Ofwat core pathway ('Situation 8'). Each pathway is equally as likely.

1.4.1.2. Portsmouth Water Planning Scenarios

Portsmouth Water have adopted the adaptive planning pathways and scenarios developed by WRSE. These have been produced in accordance with Ofwat's guidance to plan for future uncertainties and comply with the Water Resource Planning Guidance (WRPG). Where required, the adaptive scenarios have however been localised to account for nuances in the Portsmouth Plan area. For example, several of the WRSE pathways are heavily impacted by the possible 'Oxcam'[5] and 'hplan' developments, which significantly increase population growth scenarios. Because the Portsmouth area will not be directly impacted by these developments these pathways do not impact their demand and supply assumptions.

In line with WRSE, Portsmouth Waters long-term adaptive planning strategy consists of a reported pathway ('Situation 4') which is consistent with best practice techniques and encompasses the 'low regrets' investments that are identified as necessary in all plausible future scenarios.

Portsmouth Water have produced a new company level monitoring plan which sets out how they will monitor and track which situation or alternative future is emerging. The monitoring plan details what metrics they will monitor to inform which adaptive pathway / alternative future is emerging and what interventions are needed. Portsmouth Water will use this to track and monitor progress over the next five years, as they build towards WRMP29, to give regulators and stakeholders visibility of their progress. For full details please refer to Appendix 10A of the fWRMP24.

1.4.2. The preferred Best Value Plan

To determine, for any given adaptive pathway, the optimum set of options, Portsmouth Water have, through the WRSE regional planning group, assessed the **Best Value Plan** (BVP). The WRPG describes a best value plan as:

"*one that considers factors alongside economic cost and seeks to achieve an outcome that the overall benefit to customers, the wider environment and overall society*".

The adaptive BVP resolves the supply demand deficit identified in Portsmouth Waters baseline supply demand deficit using a selection of the feasible options identified. Their BVP provides a solution for all nine branches following an iterative process as described in the WRSE Method Statement (Appendix 8A).

Portsmouth Waters best value plan consists of the following components:

- **Starting in 2025-26**: Implementation of the 'High Plus' basket of demand management measures which aims to reduce leakage by 50 per cent by 2040 and overall customer demand for water by around 26 per cent by 2050 compared to 2021-22 levels. This basket of measures includes universal household and non-household 'smart' metering over 10 years starting in 2025-26. Existing 'dumb' meters will also be either upgraded or replaced with smart meters, ensuring by 2035 every household meter will be smart. By 2034-35 Portsmouth Water expect that 94.7 per cent of the households they

[5] The Oxford-Cambridge Arc: The Oxford to Cambridge (OxCam) Arc is the name given to a cross-government initiative that supports planning for the future of the five ceremonial counties of Oxfordshire, Bedfordshire, Buckinghamshire, Cambridgeshire and Northamptonshire up until 2050. The area covers 26 Local Authority Districts extending between Oxford, Milton Keynes and Cambridge.

serve will have a meter, compared with 34 per cent in 2021-22. Installing 'smart' meters will deliver additional benefits to reducing water demand, the data from the meters will help reduce leakage inside and outside properties and improve the quality of Portsmouth Water customer engagement. These demand reductions are profiled to aim to meet the EIP targets for demand reductions for leakage, households and non-households.

To optimise the effectiveness of their water efficiency efforts, Portsmouth Water's BVP assumes that the Government will introduce mandatory water labelling for white goods and strengthen water regulations standards to improve water efficiency in homes. This assumption has been applied consistently across the WRSE regional planning area and discussed with regulators.

- **From 2025-26 and 2038-39**: Portsmouth Water's levels of service for Emergency Drought Orders (i.e. rota cuts) will remain at 1-in-200 during this period, increasing to 1-in-500 from 2039 onwards. This increases the deployable output available to Portsmouth Water during this period.
- **From 2025-26 until 2040-41**: When required in extreme events, the continued use of existing drought schemes in accordance with Portsmouth Water's drought plan (Temporary Use Bans, Non-Essential Use Bans and supply-side Source S drought permit). Beyond 2040-41 the Source S drought permit is no longer used, although the implementation of Temporary Use Bans and Non-Essential Use Bans is continued.
- **From 2025-26**: Continued provision of existing and planned bulk supplies to Southern Water, including from Havant Thicket Reservoir. This involves providing up to a 15 Ml/d transfer to Southern Water at Portsmouth Water's eastern border and providing up to a 15 Ml/d transfer to Southern Water at their western boundary from 2029, rising to a 51 Ml/d capacity transfer by 2031/32 (once Havant Thicket Reservoir becomes online). The actual transfer rates vary throughout the planning horizon depending on the amount of water Portsmouth Water have available for transfer and the needs of Southern Water. Since the dWRMP24 Portsmouth Water have agreed with Southern Water to minimise exports in a normal (non-drought year) in order to minimise abstraction from their chalk aquifers to reduce the risk of Water Framework Directive related deterioration in water body status.
- **By 2034:** A network enhancement to improve the way we can move water resources around our supply area (unlocking conjunctive use benefits associated with Havant Thicket Reservoir, once operational). This option was also selected in the dWRMP24.
- **By 2040:** A bulk import of potable water from Southern Water to the west of our supply area. This represents a reversal of flow in the existing and planned bulk supplies to Southern Water. Once Southern Water has more water in Hampshire through the delivery of a supply development detailed within the WRSE revised draft regional plan and Southern Water's WRMP24, we would be able to start receiving supplies from Southern Water to support our own supplies in future. This option was also selected in the dWRMP24 but is now selected around 8 years earlier.

  The South East Strategic Reservoir Option (Sesro) provides water to Thames, Southern and Affinity in the WRSE regional best value plan during different conditions. We also get an indirect benefit from Sesro in the preferred plan, as we become a net importer of water from Southern, who in turn get their water from a combination of Sesro (via the Thames to Southern transfer) and the Hampshire Water Transfer and Water Recycling Project (HWTWRP).
- **From 2047 onwards:** Further into the planning period there is a need for further interconnectivity and treatment capacity to transfer and treat water across our supply area to utilise the water most effectively from Havant Thicket Reservoir. In the dWRMP24 these options were not selected in the preferred pathway but now feature in the preferred plan due to the need to find additional water resulting from higher sustainability reductions.

  The plan suggests the scale of this need would require up to 20 Ml/d of additional treatment works capacity at Works A WTW from the mid to late 2040s and a new 10 Ml/d WTW at the location of service Reservoir C from the early 2050s. These options are predicated on the prior construction of the proposed HWTWRP scheme for Southern Water.

  To support this extra demand the plan suggests the reservoir could need additional recycled water to be added, meaning the water taken would be blended reservoir water (i.e. with contributions from rainfall, recycled water and spring water). Portsmouth Water will seek to remove this dependency in the next water resources management plan (WRMP29) via the consideration of new options (for reasons set out in the next paragraphs), although the need for recycled water in a drought is expected to remain.

Portsmouth Waters fWRMP24 plan is reliant on Southern Water's forecast demand reductions and the development of their HWTWRP, which would allow Portsmouth Water to receive a bulk supply from Southern Water and also to abstract and treat more water from Havant Thicket Reservoir in the future.

It is important to note, the options in Portsmouth Waters reported Pathway 4 remain largely unchanged across the variety of adaptive planning situations considered. The implementation dates of interventions and options Portsmouth Water need to deliver under the nine adaptive planning branches are shown in Table 1-1. The lack of variation of dates shows that for Portsmouth Water, the branches do not make a significant difference to their investment needs and that their investment, particularly in the first 15 years is no regret.

Table 1-1 – A comparison of when options are triggered to resolve each of the nine adaptive planning situations

	WRSE Adaptive Planning Situations (DYAA)								
Option	**S1**	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**
Portsmouth Water Demand Basket 'High Plus'	2026	2026	2026	2026	2026	2026	2026	2026	2026
Network upgrade: Source O Booster	2034	2034	2034	2034	2034	2034	2034	2034	2034
Bulk import of potable water from Southern Water (Otterbourne to Source A)	2040	2040	-	2040	2040	-	2042	2063	-
Levels of service for Emergency Drought Orders (i.e. rota cuts)	2026	2026	2026	2026	2026	2026	2026	2026	2026
Drought Permit: Source S	2026	2026	2026	2026	2026	2026	2026	2026	2026
Non-Essential Use Ban (NEUB)	2026	2026	2026	2026	2026	2026	2026	2026	2026
Temporary Use Ban (TUB)	2026	2026	2026	2026	2026	2026	2026	2026	2026
Works A treatment upgrade and transfer capacity enhancement	2047	-	-	2047	-	-	2040	2044	-
Service Reservoir C treatment works and transfer capacity enhancements	2050	-	-	2050	-	-	-	-	-

Portsmouth Water fWRMP24 Table 51

Further detail on the selection of Options proposed within the fWRMP24 and their associated assessment are presented in Chapter 11. Note that not all Options contained within the fWRMP24 have been subject to SEA for a range of reasons including they are baseline options such as existing bulk supplies and previously approved bulk supplies, or are options associated with the Havant Thicket Reservoir that has already received Planning permission. These are discussed further in Chapter 9.

1.4.3. Alternative Plans

As noted in section 1.4.2, WRMP24 is a 'best value plan'[6] which describes the optimum set of options that are compliant with the WRPG - planning for growth in line with Local Authority housing plans, reflective of the

[6] WRSE, December 2022 wrse-best-value-planning-method-statement-december-2022.pdf

expectations of the regulators for a level of abstraction reduction that will deliver the required environmental improvement expected in the future and achieves the 1 in 500 year level of drought resilience from 2025 – 2075. Although one plan has been put forward as the 'Best Value Plan', there are alternative plans i.e. alternative approaches to meet the deficit.

In addition to developing the BVP, and as required by the revised Water Resources Planning Guidelines (WRPG), WRSE completed further optimisation runs, from the same suite of feasible options as that of the BVP, to benchmark and appraise the BVP 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. All the options considered therefore went through the same level of environmental assessment as those in the BVP and were free to be selected by the WRSE investment model. Full details of how the alternative plans were derived is set out in the 'SoR: additional information to inform Defra' document (section 3.2.4)[7]

WRSE developed two reasonable alternatives for each water company, this included a Least Cost Plan (LCP) and a Best Environmental and Societal Plan (BESP):

- **Least Cost Plan**: The model was run in adaptive mode, solving all the future branches and design drought conditions simultaneously, but optimising to minimise cost only (i.e., no other objectives are optimised). The outputs from various runs of the least cost plan helped to identify the options that are selected most frequently, and the potential tipping points along the adaptive pathways. This helped to inform decision-making around best value.
- **Best Environmental and Societal Plan**: This programme is not optimised on cost, but the programme that Portsmouth Water consider delivers best overall environment and society value outcomes. This takes into account overall performance across the SEA, Natural Capital and Biodiversity Net Gain metrics, and through engagement with stakeholders.

Portsmouth Water considered the modelling outputs of the two strategic alternatives to consider what the plan would look like if it was optimised on Least Cost, or on producing the best environmental and social metrics. Table 1-2 sets out implementation dates of interventions and options Portsmouth Water need to deliver under each of the alternative plans. The results show that across the entire planning period the selection of options are consistent across each of the plans. This largely results from the requirement of demand reductions to meet Environmental Improvement Plan (EIP) targets (see section 2.2 for details). The consistency of the selection of options gives confidence in the option selection process for Portsmouth Waters plan.

Whilst the options remain consistent, the dates for two options selected deviate where the LCP and/or BESP select slightly differing times to implement the options for upgrading the existing Source O pumping station and increasing treatment capacity at Service Reservoir C. Source O Booster is selected in the BVP and LCP in 2033-34, whilst in the BESP it is selected one year later in 2034-35. Phase 2 of the additional treatment capacity at Reservoir sees the option implemented in the BESP in 2061-62, the LCP in 2063-64 and finally in the BVP in 2069-70.

Discussion on the assessment of these alternative plans is presented in Chapter 10 of this Report.

Table 1-2 – Comparison between options selected between Least Cost Plan (LCP), Best Environmental and Societal Plan (BESP) and Best Value Plan (BVP)

Option Name	LCP	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	2033-34
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

[7] PRT-WRMP24-Defra-Letter-Response_final.pdf (portsmouthwater.co.uk)

Option Name		LCP	BESP	BVP
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)	2049-50	2051-52	2049-50
	Additional treatment capacity at Service Reservoir C (phase 2)	2063-64	2061-62	2069-70

Portsmouth Water's fWRMP24 Table 45

For full technical detail of how the fWRMP24 was arrived at, please see both the WRSE regional plan and the Portsmouth Water fWRMP24 and supporting appendices.

2. 25-year Environment Plan

2.1. Environmental destination

Environmental destination is a new term that was introduced through the Environment Agency's Water Resources National Framework document, published in March 2020. The term refers to the consideration of actions to build environmental resilience to future challenges, for example, to drought, flooding, raw water quality decline, impact from invasive non-native species, land use change, and impacts from run off. This information is important to understand to ensure we meet the objective of leaving the environment in a better place for future generations.

This objective is also reflected in the Government's 25 Year Environment Plan[8], which also pledges to improve resilience to drought and minimise interruption to water supplies. The 25-year plan also includes a commitment to work with the water industry to set an ambitious personal consumption target. More widely, the 25-year plan embeds an 'environmental net gain' principle for development and sets out ten environmental goals:

1. Clean air;
2. Clean and plentiful water;
3. Thriving plants and wildlife;
4. A reduced risk of harm from environmental hazards such as flooding and drought;
5. Using resources from nature more sustainably and efficiently;
6. Enhanced beauty, heritage and engagement with the natural environment;
7. Mitigating and adapting to climate change;
8. Minimising waste;
9. Managing exposure to chemicals; and
10. Enhancing biosecurity.

Understanding how much water can be abstracted from the environment in a sustainable way now and in the future is important when developing a regional resilience multi-sector plan and individual water companies' water resources management plans within a given region.

The WRSE regional plan has sought to address this by incorporating an environmental forecast which sets out potential futures, looking at the potential water quality and availability requirements of the environment. The WRSE environmental assessments, including the SEA, will support the environmental destination by assessing and informing the long-term resilience of the regional plan and aiming to achieve a plan that provides environmental net gain.

WRSE has developed an environmental assessment process (see Figure 2-1) to be applied in the development of the regional plan. Portsmouth Water adopted the same approach as far as possible for the environmental assessment of WRMP24. It is noted that the environmental assessment process includes six different assessments:

- Strategic Environmental Assessment (SEA);
- Habitats Regulations Assessment (HRA);
- Water Framework Directive (WFD) Assessment;
- Biodiversity Net Gain (BNG) Assessment;
- Natural Capital (NC) Assessment; and
- Invasive Non-Native Species (INNS) Assessment.

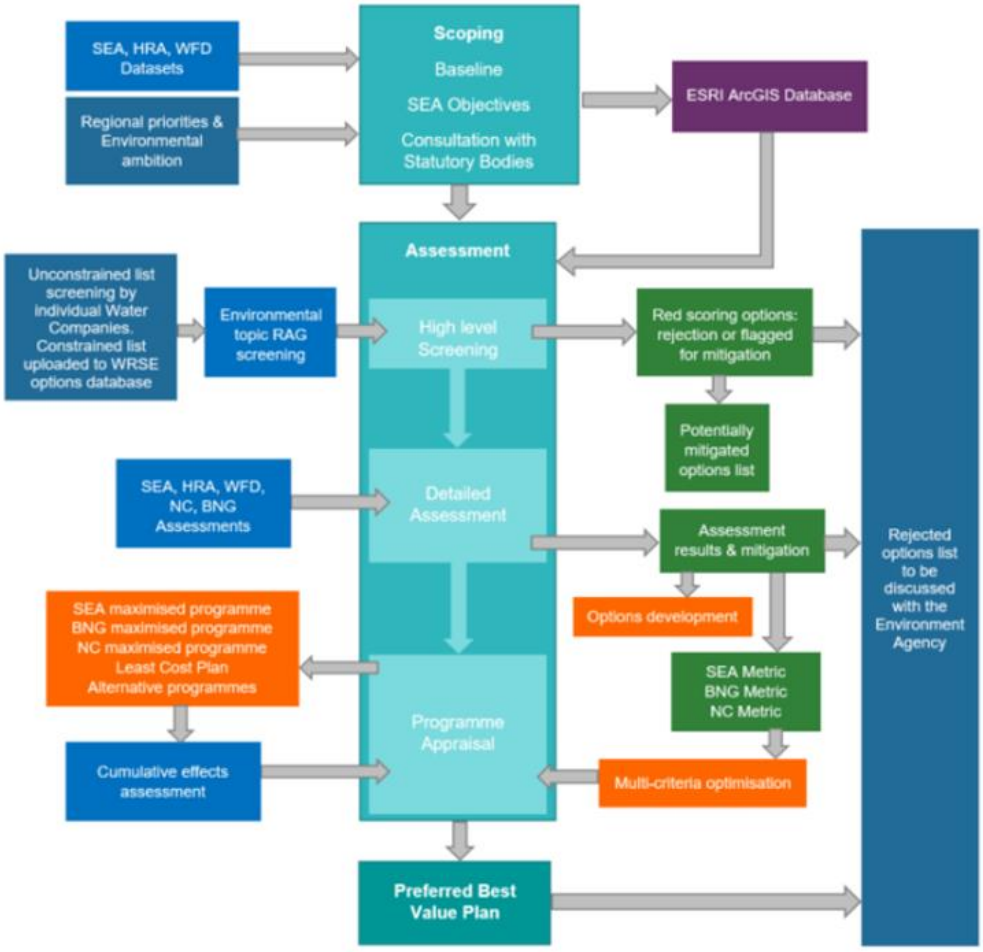
As such, Portsmouth Water have conducted an environmental assessment process grounded on using the SEA process as the umbrella process under which the parallel environmental assessments listed above will take place as advised in the UKWIR and WRSE environmental assessment guidance (see Figure 2-1).

WRSE have prepared and consulted upon a SEA Scoping Report for the Regional Plan with the statutory consultation bodies in 2020. WRSE have subsequently carried out (2021) a high level screening (for all six assessments mentioned above) of all feasible options provided by Portsmouth Water using a methodology as set out in the WRSE 'Method Statement: Environmental Assessment' guidance document. These assessments were fed into Portsmouth Water's WRMP24 environmental assessment as the starting point for the identification of further mitigation for the Plan Options. It is also important to note that these six assessments

[8] 25 Year Environment Plan - GOV.UK (www.gov.uk)

were also informed by further assessment of discrete elements such as the potential for effects on Sites of Special Scientific Interest and also heritage features.

Figure 2-1 – WRSE Environmental method integration with Options decision making and plan development



2.2. Environmental Improvement Plan

In January 2023 the Government published its Environmental Improvement Plan[9]. This is the first revision of the 25-year Environment Plan. One of the ten Goals presented in this plan was, 'Goal 3: Clean and plentiful water'. The following three targets and commitments found on page 99 of the EIP have therefore directly influenced Portsmouth Waters fWRMP24:

- Reduce the use of public water supply in England per head of population by 20% from the 2019 to 2020 baseline reporting figures, by 31 March 2038, with interim targets of 9% by 31 March 2027 and 14% by 31 March 2032, and to reduce leakage by 20% by 31 March 2027 and 30% by 31 March 2032.
- Water companies to cut leaks by 50% by 2050. We will reduce leakage by 20% by 31 March 2027 and 30% by March 2032.
- Target a level of resilience to drought so that emergency measures are needed only once in 500-years.

To support delivery of the EIP the Government committed to rolling out a new water efficiency labelling programme and delivering the ten actions set out in the Roadmap to Water Efficiency in new developments.

[9] Environmental Improvement Plan 2023 - GOV.UK (www.gov.uk)

Portsmouth Water's ability to meet the challenging per capita requirements is reliant on successful and timely roll-out of these government initiatives.

Since the dWRMP24 the demand options have been reviewed and combined into a single 'High Plus' demand basket option. This is because the other demand baskets did not meet the demand reductions required under the EIP. These targets are more challenging than those proposed for the dWRMP24 and as a result there are a limited number of demand options available to meet these expected reductions. Therefore, the EIP targets for demand reductions were a driving factor in the selection of the demand reduction options for the fWRMP24.

3. Approach to the SEA

3.1. Introduction to SEA

Due to the various options contained in the fWRMP24, as detailed in Chapter 11, and their potential for these to have significant effects on the environment, it has been decided that SEA is undertaken under the European Directive 2001/42/EC 'on the assessment of certain plans and programmes on the environment' (the 'SEA Directive'). This Directive came into force in the UK on 20 July 2004 through the Environmental Assessment of Plans and Programmes Regulations 2004. The Directive applies to a variety of plans and programmes including water resource planning and planning for droughts. While the United Kingdom has now left the EU, these SEA Regulations still apply to a wide range of plans and programmes, including water resource management plans, and modifications to them.

These SEA Regulations still reflect the overarching objective of the SEA Directive which is:

"*To provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans…with a view to promoting sustainable development, by ensuring that, in accordance with this Directive, an environmental assessment is carried out of certain plans…which are likely to have significant effects on the environment*." (Article 1)

The main requirements introduced by the SEA Regulations are that:

- the findings of the SEA are published in an Environmental Report (ER), which sets out the significant effects of the draft plan;
- consultation is undertaken on the plan and the ER;
- the results of consultation are taken into account in decision-making relating to the adoption of the plan; and
- information on how the results of the SEA have been taken into account is made available to the public.

As noted by WRSE, the WRSE regional plan environmental assessments including the SEA has been used as a framework for the WRSE member water companies when undertaking their WRMP24 statutory environmental assessments. A large amount of the supporting information required for WRMP24 has been produced as part of the regional plan environmental assessments which were made available for use by the individual water companies[10]. This SEA has utilised this information upon which to build upon this more detailed assessment of 'local' effects in the Portsmouth area.

3.1.1. Geographical and temporal scope of the WRMP24

Portsmouth Water supply area is shown in Figure 1-1 and is the area to which WRMP24 applies.

Portsmouth Water supply area operates as a single Water Resource Zone. The area supplied by the company extends through Hampshire and West Sussex from the River Meon in the West to the River Arun in the East, encompassing 868km^2. The distribution system includes significant strategic treated water storage spread across a series of large, treated water storage reservoirs and is based around a spine main that runs East to West across the Plan area. This system ensures that all customers in the supply area shown in Figure 1-1 experience the same level of service and the same overall risk of supply failure.

The Portsmouth WRMP24 presents the supply-demand balance throughout the next 50-year planning period (2025–26 to 2074–75).

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.

[10] See Section 4.7 of WRSE Draft Regional Plan SEA Environmental Report

3.1.2. Technical scope of the SEA

The SEA Directive and the SEA regulations require that the likely significant effects on the environment are assessed, considering the following factors and interrelationship between them:

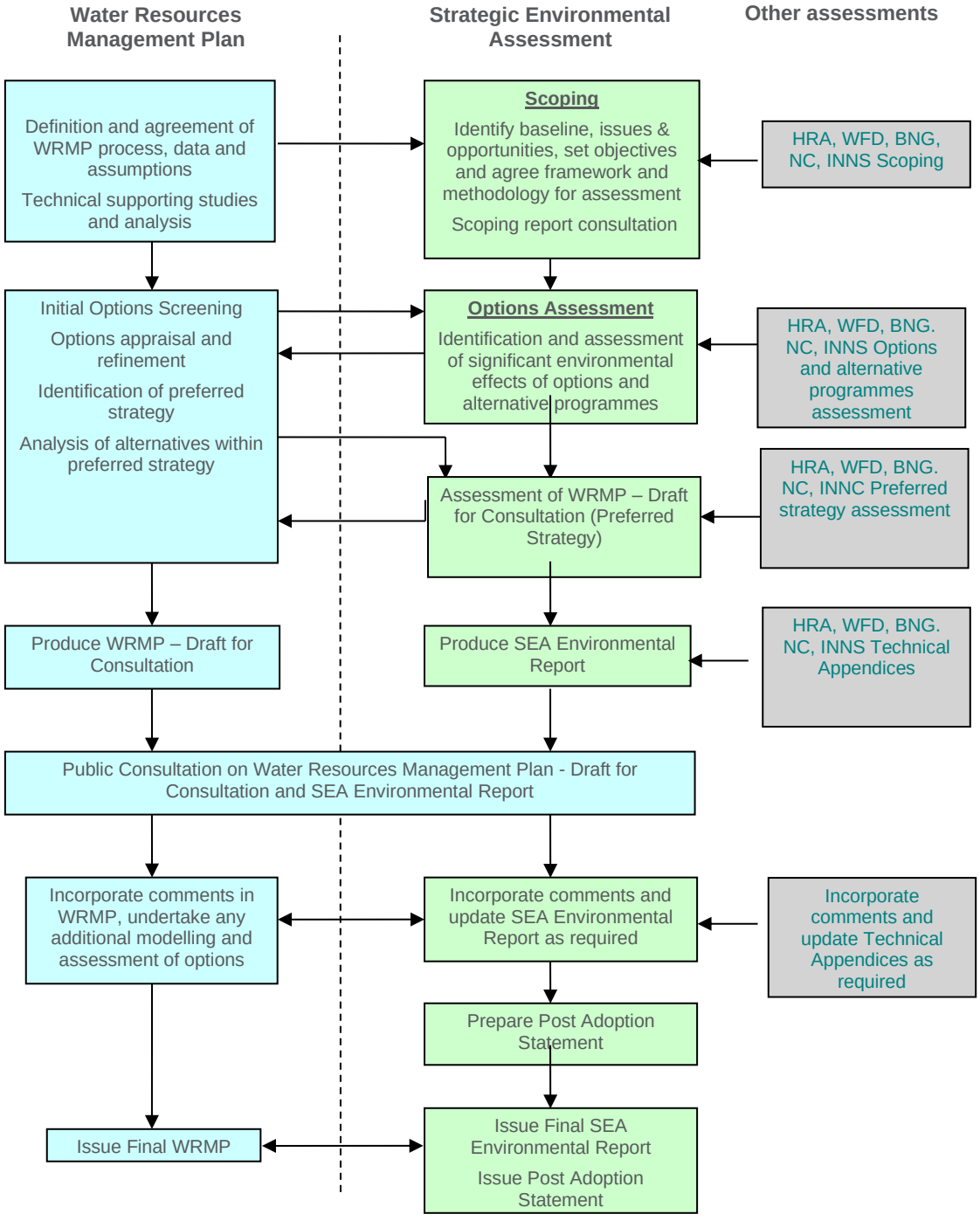
- Biodiversity;
- Population;
- Human health (covering noise issues among other effects on local communities and public health);
- Fauna and flora;
- Soil;
- Water;
- Air;
- Noise;
- Climatic factors;
- Material assets (covering infrastructure, waste and other assets);
- Cultural heritage including architectural and archaeological heritage; and
- Landscape.

In addition to consideration of the above factors within the SEA, more detailed assessment of particular elements has been made and have been used to help inform the SEA. These elements are:

- Habitats Regulations Assessment (HRA);
- Water Framework Directive (WFD) Assessment;
- Biodiversity Net Gain (BNG) Assessment;
- Natural Capital (NC) Assessment;
- Invasive Non-Native Species (INNS) Assessment;
- Heritage Impact Assessment (HIA): and
- Assessment of potential for effects on Sites of Special Scientific Interest.

Figure 3-1 shows the relationship between these assessments and the SEA. Note in reference to the HIA and assessment of effects on SSSI, these reflect additional considerations arising from consultation feedback on the dWRMP SEA.

Figure 3-1 – Relationship between WRMP24, SEA and other environmental assessment processes



An introduction to each of these other assessments is presented in turn as follows.

3.2. Introduction to Habitats Regulation Assessment

Habitats Regulation Assessment (HRA) is required by the Conservation of Habitats and Species Regulations 2017 (SI No. 2017/1012, as amended by The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (SI 2019/579)) for all plans and projects which may have likely significant effects on a European site and are not directly connected with or necessary to the management of the European site. The WRMP24 itself is not directly connected with, or necessary to, the nature conservation management of any European sites.

European sites include Special Areas of Conservation (SAC) and Special Protection Areas (SPA). As a matter of UK Government policy, potential SPAs (pSPA), possible SACs (pSAC), listed or proposed Wetlands of international importance (Ramsar sites) and sites identified, or required, as compensatory measures for adverse effects on European sites, pSPA, pSAC, and listed or proposed Ramsar sites, are included for the purposes of considering plans and projects which may affect them. Hereafter all of the above designated nature conservation sites are referred to as 'European sites'.

There are four stages to the HRA process. These are summarised below:

- **Stage 1** – Screening: To test whether a plan or project either alone or in combination with other plans and projects is likely to have a significant effect on a European site;
- **Stage 2** – Appropriate Assessment: To determine whether, in view of a European site's conservation objectives, the plan (either alone or in combination with other projects and plans) would have an adverse effect on the integrity of the site with respect to the site structure, function and conservation objectives. If adverse impacts are anticipated, potential mitigation measures to alleviate impacts should be proposed and assessed;
- **Stage 3** – Assessment of alternative solutions: Where a plan is assessed as having an adverse impact (or risk of this) on the integrity of a European site, there should be an examination of alternatives (e.g. alternative locations and designs of development); and
- **Stage 4** – Assessment where no alternative solutions remain and where adverse impacts remain: In exceptional circumstances where no alternative solutions remain and where adverse impacts remain (e.g. where there are imperative reasons of overriding public interest). Compensatory measures would usually be required to offset negative impacts.

As part of the regional level work, WRSE completed the Stage 1 'screening' assessments on all the options selected in Portsmouth Water's Preferred Plan. Where a scheme was assessed as having likely significant effects on a European site, either alone or in-combination, Atkins completed a Stage 2 'Appropriate Assessment'. The results of the Stage 2 assessments were reported back to WRSE, as part of the iterative process, and fed into the modelling and the option selection process. Please refer to the HRA report.

All the international sites within the WRMP24 area and up to 30km from its boundaries (in respect of bats) have been identified and are reported in Appendix D, as well as the HRA report).

3.3. Introduction to Water Framework Directive

The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 require all natural water bodies to achieve both Good Chemical Status (GCS) and Good Ecological Status (GES) which, collectively, result in a water body classification of good status. The River Basin Management Plans (RBMP) outline the actions required to enable natural water bodies to achieve good status. Artificial and Heavily Modified Water Bodies (A/HMWB) may be prevented from reaching GES due to the modifications necessary to maintain their function, or 'human use'. They are, however, required to achieve Good Ecological Potential (GEP).

New activities and schemes that affect the water environment may adversely impact biological, hydromorphological, physico-chemical and/or chemical quality elements (WFD quality elements), leading to a deterioration in the baseline water body status. They may also render proposed improvement measures ineffective, precluding the ability of the water body to meet its WFD objectives for GES/GEP. Under the WFD Regulations, and to attain WFD 'compliance', activities and schemes must not cause deterioration in water body status or prevent a water body from meeting GES/GEP by invalidating improvement measures.

The overall ecological status of a water body is primarily based on consideration of its biological quality elements and is determined by the lowest scoring of these elements. These biological elements are, however, supported by the physico-chemical and hydromorphological quality elements. Assessment of hydromorphological quality is not explicitly required for a water body to achieve GES or lower. However, for a water body to be classed as high status hydromorphological quality must be considered to be at near reference conditions within the classification assessment.

In addition, to achieve the overall WFD aim of GES, a water body must pass a separate chemical status assessment to reach Good Chemical Status, relating to pass/fail checks on the concentrations of various identified priority/dangerous substances.

There are two key objectives against which the impacts of proposed works on a water body need to be assessed and met to determine compliance and to avoid infraction of the WFD Regulations:

- The scheme will not cause a deterioration in any element of water body classification.

- The scheme will not prevent the WFD status objectives from being reached within the water body or other downstream water bodies.

A third objective that is central to the Environment Agency's implementation of the WFD is:

- The scheme will contribute to the delivery of the relevant WFD objectives. In this case, it will be what contribution the scheme can make towards the water body reaching its objective GES, or GEP directly via planned RBMP mitigation measures.

If a WFD assessment[11] concludes that a scheme is likely to cause deterioration in water body status or prevent a water body from meeting its ecological objectives, then an assessment is required against the conditions listed in Article 4.7 of the WFD. Article 4.7 can be invoked if; 'new modifications' (relating only to new physical modification and/or changes in groundwater levels) are of overriding public interest and/or the environmental and social benefits of achieving the WFD objectives are outweighed by the benefits of the new modifications to human health, safety and sustainable development; there are no significantly better environmental options that are technically feasible or not disproportionately costly; and, all practicable steps for mitigation have been taken.

'The All Company Working Group (ACWG) (the group of Water Companies involved in developing Strategic Resource Options for the future, as required by Ofwat) developed a consistent framework for undertaking WFD assessments for Strategic Resource Options (SROs) to demonstrate where options would or would not cause deterioration in status of any WFD water bodies. The assessment considers mitigation that would need to be put in place to protect water body status. The assessment also considers WFD future objectives. This methodology is also being used in the development of WRMP's and has been followed for this assessment.

Two stages of assessment are completed under the ACWG WFD approach, an initial Level 1 basic screening and a Level 2 detailed impact screening. These are conducted/reported using a spreadsheet assessment tool which is automated based on option information for Level 1 and expert judgment for Level 2. The Level 1 assessment broadly aligns to the Screening and Scoping stages of the PINS guidance and the Level 2 assessment the Impact assessment.

The Level 1 WFD assessment was completed by WRSE as part of the Emerging Regional Plan. Where water bodies and option impacts were 'screened in', Atkins have taken forward the assessment to Level 2, and the results of this work has been fed back to WRSE, as part of the iterative process, and fed into the modelling and the option selection process. Please see Appendix H for the full WFD report which outlines the detailed methodology and results.

The River Basin District (RBD) which makes up the plan area is the South East RBD. There are three surface water management catchments in the South East RBD and 282 surface water bodies in the South East RBD. See Figures in Appendix D, as well as the WFD Appendix H).

3.4. Introduction to Biodiversity Net Gain and Natural Capital Assessment

Biodiversity Net Gain (BNG) is an approach that aims to leave the natural environment in a measurably better state than beforehand. Natural England have produced a Biodiversity Metric that provides a way of measuring and accounting for biodiversity losses and gains resulting from development or land management change.

Natural capital is defined in the 25 Year Environment Plan (England) as "the elements of nature that either directly or indirectly provide value to people". As a new and emerging approach, natural capital incorporates methodologies and approaches (such as ecosystem services) to understand the value that natural assets provide. For the water industry, these can be substantial. The Water Resource Planning Guidelines (WRPG) (England and Wales) states that WRMPs should "use natural capital in decision-making", "use a proportionate natural capital approach", "deliver environmental net gain", and provide cost information on monetised ecosystem service costs and benefits where monetisation is used.

WRSE conducted both of these assessments in full for the options that required assessing according to the WRSE scoping criteria and exclusion rules for NCA and BNG. The findings of these assessments are reported in this SEA. As documented in WRSE's Regional Plan – Natural capital and Biodiversity Net Gain Report (2022) WRSE decided to use the most appropriate methodology for assessing and quantifying NCA and BNG

[11] Note in 2021 the UK Government sought to drop reference to any European legislation post BREXIT and thus has started to call the previously named WFD assessments as Water Environment Regulations (WER) assessments. However, as the terminology needs to be consistent across several ongoing assessments across the UK, WFD terminology has been retained for this assessment.

and therefore based assessments on Defra's "Enabling and Natural Capital Approach" ENCA and Defra's BNG assessment methodology. It was important to ensure there was no double counting of benefits or disbenefits when assessing the effects of the options. Therefore, the assessment of those services that would be included in other metrics such as those for water quality, which were included in WFD assessments have been excluded from NCA.

Please refer to Appendix I and J for full reports.

3.5. Introduction to Invasive Non-Native Species

As part of the WRMP24 SEA, water companies may be required to undertake invasive non-native species (INNS) investigations to determine the threat of spreading INNS throughout their asset network and specific resource options and assess ways of mitigating this spread. The INNS investigation may be activated in the case that the selected options require it, or otherwise used at a high level to inform any significant environmental constraints for options assessment. During the first stages of the investigation, screening criteria were developed by WRSE to determine which of the WRMP24 options required an INNS assessment. This was based on the frequency in which transfers would be operational and the severity of their impact. These criteria formed the screening matrix for assessment in which only schemes scoring 'low', 'medium' or 'high' were to be taken forward for a Level 2 (L2) assessment. WRSE concluded that no options in Portsmouth Water's fWRMP required L2 assessment.

The INNS investigation would be completed in accordance with the Environment Agency SRO Aquatic INNS Risk Assessment Tool (SAI-RAT) which has been developed based on working principles within the well-established Wessex Water and Northumbrian Water tools.

The results of these INNS investigations will form part of the SEA process for the biodiversity and water objectives. INNS dispersal can occur through a range of recreational and operational (water company) 'pathways', which may include water or land-based recreation and sports, and water company operations, such as ground maintenance and the operation of raw water transfers (RWTs).

Considering the potential for INNS dispersal and the requirement to assess this risk and mitigate where appropriate, the INNS process can be split into three distinct phases, including:

- Data gathering and water network understanding, including;
- Understanding the source, pathways and receptors of each resource option;
- Identify INNS present at key assets, and at the source, pathway and receptor of RWTs;
- Identify presence of INNS dispersal pathways and the frequency in which they occur;
- Risk assessment of each resource option; and
- Options appraisal of mitigation measures for higher-risk options.

A more detailed methodology statement is provided in Appendix K and outlines the approach to Invasive Non-Native Species assessment with respect to the Portsmouth Water WRMP24.

3.6. Introduction to Heritage Impact Assessment

This Heritage Impact Assessment provides high-level heritage impact assessments for all options that feature in either Portsmouth Waters BVP, or one of their alternative plans (LCP or BESP), up to 2035. This includes the Upgrade Source O Booster to 25Ml/d and Drought permit: Source S options.

Consultation with Historic England (February 2023) identified the need for heritage impact assessment (HIA) to be undertaken during preparation of the WRMP24 to inform site selection. In their response, Historic England highlighted that 'it is important that a degree of heritage impact assessment is undertaken at plan-making stage' and the need to 'ensure that there is sufficient heritage impact assessment and an appropriate evidence base to inform the site selections including the selection of broad locations'.

Due to the uncertainty over which options will be progressed from 2035 under the adaptive planning approach and the limited location and design information for these options, HIA was agreed to be undertaken for those options which are being progressed in the short term (from 2025 to 2035) which Portsmouth Water are confident are right for the future.

Expected potential impacts to the historic environment through changes to the water environment caused by increased abstraction, would include:

- An acceleration in the deterioration of in situ waterlogged remains through changes to soil moisture content; pH; reduction-oxidation status; waterlogging, caused by alterations in surface or sub-surface flow.
- An impact on the significance of aspects of the built environment, where significance is integrally linked with the water environment, i.e. Water Mills and Pump Houses.

The results of HIA have formed part of the SEA option assessment through integration with SEA Objective 9 'To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains.

Please refer to Appendix F for full report.

3.7. Introduction to assessment for potential effects on Sites of Special Scientific Interest

Portsmouth Water, in its capacity as a 'Statutory Undertaker' must take reasonable steps to conserve and enhance the special features of SSSIs. Through the WRMP24, a range of options for potable water supply have the potential to impact on the condition of SSSIs in, or adjacent to, the Plan area. Impacts on the condition of SSSIs could be through impact of activities related to the construction of the required water supply infrastructure, or through its operation. It is therefore considered pragmatic and proportionate to undertake and collate a separate assessment of potential effects on SSSIs that can be used to inform the SEA.

The assessment for potential effects on SSSI's identifies those SSSIs that may be impacted owing to the proximity and nature of WRMP24 options. A GIS based screening exercise was first undertaken to derive a list of potentially impacted SSSIs. For each option with the WRMP BVP and Alternative Plans, a 5km search radius was employed to identify potentially relevant SSSIs. This was supplemented with the SSSI Impact Risk Zone tool, derived by NE, which has been used to inform rapid initial assessment of the potential risks to SSSIs posed by development. This exercise resulted in the identification of 20 no. SSSIs. A SSSI proforma citing the SSSI description, pressures, summary feature condition and operations likely to damage the special interest (ORNECs) has been collated for each of those SSSIs and provided in the SSSI Assessment Report (attached to this SEA as Appendix G).

It is acknowledged that greater certainty is attributed to those options to be developed prior to 2035. It is also recognised that in respect of the identified SSSIs, summary feature condition and pressures will continue to change. Therefore, those options <2035 have been selected for further assessment. The assessment considers the potential for impact on the SSSIs identified in light of relevant ORNECs. Where relevant, mitigation has been recommended and the requirement for further assessment and discussion with Natural England set out. Please see the assessment for potential effects on SSSI's attached to the SEA as Appendix G for further information.

3.8. Reporting and Consultation

Key consultation requirements are those set in the SEA Regulations which identify three organisations (in England) to act as statutory consultation authorities in the SEA process: Environment Agency, Natural England and Historic England.

Two consultation periods involving the statutory consultation authorities and, in the latter period, the public are also set in the SEA Regulations. The consultation periods relate to:

- **Scoping**: The responsible authority is required to send details of the plan or programme to each consultation authority so that they may form a view on the scope, level of detail and appropriate consultation period of the Environmental Report. The consultation authorities are required to give their views within five weeks. On 14th March 2022 Portsmouth Water published their SEA Scoping Report for a 12 week period.
- **The Environmental Report**: The responsible authority is required to invite the consultation authorities and the public to express their opinions on the Environmental Report and the plan or programme to which it relates. On 15th November 2022 Portsmouth Water published their draft Water Resource Management Plan 2024 (dWRMP24) SEA for consultation. The public consultation ran for a 14-week period and closed on 20th February 2023. On 31st August 2023, Portsmouth Water submitted their revised draft WRMP24 (rdWRMP24) to Defra alongside their response to feedback received during the draft regional plan consultation (SoR) and revised SEA Environmental Report to ensure it adequately reflected and took account of the representations and feedback received during the public consultation on the dWRMP24. Defra's response was received 5th February 2024. Finally, a revised SoR, providing

additional information to Defra, including details on required updates to the SEA, was issued to Defra on 15th April 2024. It is to be noted that the rdWRMP24 SEA was published for information only, and not for a further period of public consultation.

Listed below are the key stakeholders that were consulted on the Scoping Report and dWRMP SEA. The responses from both consultation exercises have been used to inform the SEA and have helped refine the fWRMP24. The comments received, together with how these comments have been addressed in the preparation of this SEA Report, are set out in Appendix A to this report.

Statutory Consultees:

- Environment Agency;
- Historic England; and
- Natural England.

Key reporting requirements are those set by the SEA Directive and SEA Regulations:

'An Environmental Report shall be prepared in which the likely significant effects on the environment of implementing the plan or programme, and reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme, are identified, described and evaluated.'

Table 3-1 below sets out the way specific SEA requirements have been met in this report.

Table 3-1 – Schedule of SEA Regulations

	Information to be included in the Environmental Report under the SEA Regulations (Regulation 12 and Schedule 2)	**Where covered in this report**
1	An outline of the contents, main objectives of the plan, and of its relationship with other relevant plans and programmes	Chapter 1 and Chapter 5 and Appendix B.
2	The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan;	Chapter 6 and Appendix C and D.
3	The environmental characteristics of areas likely to be significantly affected	Chapter 6 and Appendix C and D
4	Any existing environmental problems which are relevant to the plan including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC;	Chapter 6 and Appendix C and D
5	The environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan and the way those objectives and any environmental considerations have been taken into account during its preparation	Chapter 5 and Appendix B.
6	The likely significant effects on the environment, including short, medium and long-term effects, permanent and temporary effects, positive and negative effects, and secondary, cumulative and synergistic effects, on issues such as: biodiversity; population; human health; fauna; flora; soil; water; air; climatic factors; material assets; cultural heritage including architectural and archaeological heritage; landscape; the interrelationship between the above factors	Chapter 11 and Appendix E.
7	The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan	Chapter 12 and Appendix E.
8	An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information	Chapter 10 – see also WRSE SEA draft Environmental Report.
9	A description of measures envisaged concerning monitoring in accordance with Regulation 17	Chapter 14.

The SEA Report is thus an important consultation document and likely to be of interest to a wide variety of readers including decision makers, other plan/programme practitioners, statutory consultees, Non-Government Organisations (NGOs) and members of the public.

4. SEA Methodology

4.1. Introduction

This Chapter describes the approach taken to complete the SEA and the wider environmental assessments undertaken and reported under its 'umbrella'.

4.2. Assessment methodology

The approach to SEA was based on a range of guidance documents, including of note, the following:

- Department for Communities and Local Government (2005). A Practical Guide to the Strategic Environmental Assessment Directive.
- Environment Agency, Natural Resources Wales, The Water Services Regulation Authority (published 2021, updated 2023) Water Resources Planning Guideline.
- Environmental Assessments for Water Resources Planning, UKWIR, 2021.

It is also important to note that a number of other assessments (as outlined in Chapter 3) where used to inform the SEA. Consideration of these assessments is set out in Appendix F – K and the HRA report, which has been published separately. These assessments were:

- Habitats Regulations Assessment (HRA);
- Water Framework Directive (WFD) Assessment;
- Biodiversity Net Gain (BNG) Assessment;
- Natural Capital (NC) Assessment;
- Invasive Non-Native Species (INNS) Assessment;
- Heritage Impact Assessment; and
- Assessment of potential for effects on Sites of Special Scientific Interest.

4.3. Strategic Environmental Assessment

4.3.1. Stage A – Setting the context and establishing the baseline

4.3.1.1. Other relevant legislation, plans and programmes

The WRMP24 will both influence and be influenced by other plans, policies and programmes (PPPs) produced by local and combined authorities, by statutory agencies and other bodies with plan making responsibilities. Legislation is a further driver that sets the framework for WRMP24, both directly and indirectly. Relevant legislation, plans and programmes have been identified and considered to inform the preparation of this Environmental Report (see Chapter 5 and Appendix B).

4.3.1.2. Baseline information and key issues

To predict accurately how WRMP24 proposals will affect the current baseline, it is first important to understand its current state and then examine the likely evolution of the environment without the implementation of the plan. Baseline information provides the basis for understanding existing local environmental, economic and social issues, and alternative ways of dealing with them; formulating objectives to address these issues and predicting and monitoring effects.

Key environmental issues, across the Portsmouth Water area have been identified as a result of the analysis of the baseline data and the review of other plans and programmes. The identification of these issues helped focus the SEA processes on the aspects that really matter. Implications to WRMP24 development and opportunities for how the WRMP24 could assist in addressing these issues were also identified.

Information on key baseline and issues is presented in Chapter 6 of this report.

It is important to note that no issues were Scoped out at the Scoping stage of this assessment.

4.3.1.3. Developing the SEA Framework

A set of SEA Objectives has been developed, against which the policies and proposals in the WRMP24 could be assessed.

For each objective, assessment aid questions were set out to form the SEA framework. The assessment aid questions provided a clarification of the intended interpretation of each objective to support direction of change sought through the implementation of the WRMP24. The questions have guided the WRMP24 assessment process.

The SEA Objectives and assessment aid questions were refined through the consultation on the Scoping Report and are presented in Chapter 7 of this report.

4.3.2. Stage B – Developing alternatives

4.3.2.1. Developing, refining and appraising strategic alternatives

As set out in Section 1.4.3, Portsmouth Water have considered a variety of optimisations to consider both what the plan would look like if it was optimised on least cost, or on producing the best environmental and social metrics. These two alternative plans are required through guidance in the WRPG and were developed by the regional Investment Model (IVM).

The LCP is the plan which the WRSE investment modelling determines is the least overall cost. The investment model was run to select a least cost plan by only using the cost information to optimise the solution and does not optimise on the best value metrics.

The BESP is the plan which the WRSE investment modelling determined has the highest metric score when optimised on the environmental and customer preference metrics. It therefore does not try to improve the resilience metric scores in the plans.

As is the case for the BVP, the alternatives presented are from the same pathway, Situation 4, as it includes the growth scenario and environmental destination scenario (business as usual (BAU)+ plus local commitments) that satisfies guidance. The comparison of options between plans is summarised in Table 1-2.

The results show that across the entire planning period the selection of options are consistent across each of the plans. This largely results from the requirement of demand reductions to meet Environmental Improvement Plan (EIP) targets (see section 2.2 for details).

Whilst the options remain consistent, the dates for two options selected deviate where the LCP and/or BESP select slightly differing times to implement the options for upgrading the existing Source O pumping station and increasing treatment capacity at Service Reservoir C. Source O Booster is selected in the BVP and LCP in 2033-34, whilst in the BESP it is selected one year later in 2034-35. Phase 2 of the additional treatment capacity at Reservoir C sees the option implemented in the BESP in 2061-62, the LCP in 2063-64 and finally in the BVP in 2069-70.

The consistency of the selection of options gives confidence in the option selection process for Portsmouth Water's plan. Further information on the assessment of alternatives is provided in Chapter 10.

4.3.2.2. Assessing the effects of WRMP24

Assessing the significance of predicted effects is essentially a matter of judgement. There are a number of factors that will determine the significance of an effect, e.g. its scale and permanence and the nature and sensitivity of the receptor. It is very important that judgements of significance are systematically documented, in terms of the characteristics of the effect which are deemed to make it significant and whether and what uncertainty and assumptions are associated with the judgement. The assessment of significance also includes information on how the effect may be avoided or its severity reduced.

In the current practice of SEA, the prediction and evaluation of effects can be often based on a qualitative seven point scale in easily understood terms. In general, this assessment has adopted the scale shown in Table 4-1 to assess the significance of effects of the Options in WRMP24. Note that this scale is aligned with that utilised by WRSE at the regional level assessment. In addition, Table 4-2 sets out the characteristics of effect: magnitude, scale, duration, permanence and certainty.

Table 4-1 – Assessment scale

Assessment Scale	Assessment Category	Significance of Effect
+++	Major beneficial	Significant
++	Moderate beneficial	
+	Slight beneficial	Not Significant
0	Neutral or no obvious effect	
-	Slight adverse	
--	Moderate adverse	Significant
---	Major adverse	

Table 4-2 – 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)

Moderate and strong beneficial and adverse effects (and combination of this type of effect) have been considered of significance, whereas no effect and slight beneficial and adverse effects (and combination of this type of effect) have been considered non-significant.

For the purposes of the assessment, the “short term” has been defined 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.

Assessments have been undertaken for proposals contained in the fWRMP24. The results are discussed in Chapter 11.

As part of the assessment of WRMP24, a number of mitigation measures (recommendations) are set out in Chapter 12 and also within Appendix E. Portsmouth Water has given careful consideration to these recommendations and has addressed these as appropriate in the preparation of the fWRMP24.

The term mitigation encompasses any approach that is aimed at preventing, reducing or offsetting significant adverse environmental effects that have been identified. A range of measures applying one or more of these approaches has been considered in mitigating any significant adverse effects predicted as a result of implementing WRMP24. In addition, measures aimed at enhancing positive effects have also been considered. All such measures are generally referred to as mitigation measures.

However, the emphasis of the assessments has been in the first instance on proactive avoidance of adverse effects. Only once alternative options or approaches to avoiding an effect have been examined, then ways of reducing the scale/importance of the effect have been examined and proposed.

Mitigation can take a wide range of forms, including:

- Refining intervention measures in order to improve the likelihood of positive effects and to minimise adverse effects;
- Technical measures (such as setting guidelines) to be applied during the implementation stage;

- Identifying issues to be addressed in project environmental impact assessments for certain projects or types of projects; and
- Proposals for changing other plans and programmes.

The assessment also considered cumulative, indirect (secondary) and synergistic effects of WRMP24 as outlined in the following section.

It should be noted that whilst the assessment tables (provided in Appendix E) provide effect scores pre and post mitigation, characteristics of effect are only presented for residual effects. This is in line with the UKWIR 'Environmental Assessment Guidance for Water Resource Management Plans and Drought Plans' that states options assessment should 'focus on reporting of the residual effects after consideration of mitigation and enhancement measures', which is what has been presented in this SEA Environmental Report.

4.3.2.3. Secondary and Cumulative effects assessment

The SEA Regulations require that the assessment of effects include secondary, cumulative and synergistic effects.

Secondary or indirect effects are effects that are not a direct result of the plan but occur away from the original effect or as a result of the complex pathway e.g. a development that changes a water table and thus affects the ecology of a nearby wetland. These effects are not cumulative and have been identified and assessed primarily through the examination of the relationship between various objectives during the Assessment of Effects.

Cumulative effects arise where several proposals individually may or may not have a significant effect, but in-combination have a significant effect due to spatial crowding or temporal overlap between plans, proposals and actions and repeated removal or addition of resources due to proposals and actions. Cumulative effects can be:

- Additive - the simple sum of all the effects;
- Neutralising - where effects counteract each other to reduce the overall effect; or
- Synergistic – where the effect of two or more effects acting together is greater than the simple sum of the effects when acting alone. For instance, a wildlife habitat can become progressively fragmented with limited effects on a particular species until the last fragmentation makes the areas too small to support the species at all.

Many environmental problems result from cumulative effects. These effects are very hard to deal with on a project by project basis through Environmental Impact Assessment. It is at the strategic level that they are most effectively identified and addressed.

Cumulative effects assessment is a systematic procedure for identifying and evaluating the significance of effects from multiple activities. The analysis of the causes, pathways and consequences of these effects is an essential part of the process.

Cumulative (including additive, neutralising and synergistic) effects have been considered throughout the entire SEA process, as described below:

- Identification of key environmental issues as part of the review of relevant strategies, plans and programmes and baseline data analysis.
- Establishing the nature of likely cumulative effects, causes and receptors.
- Identifying key receptors in the process of collecting baseline information and information on how these have changed with time, and how they are likely to change without the implementation of the WRMP24.
- The development of SEA objectives and assessment aid questions has been influenced by cumulative effects identified through the process above and SEA objectives that consider cumulative effects have been identified.

Regulatory consultation feedback received as part of the dWRMP SEA Environmental Report submission identified the need to reconsider the cumulative impacts from options selected across the region, not just the plan area. Following discussions with Natural England, Portsmouth Water have completed an In-Combination Assessment (ICA) that considers:

- Impacts between options within the plan;
- Impacts between options in neighbouring water companies' plans; and
- Impacts between other plans and projects in the area, including operations outside Portsmouth Water’s WRMP, e.g drought plan, Non-Government Organisations (NGOs) and Nationally Significant Infrastructure Projects (NSIPs).

The results of Portsmouth Waters ICA, alongside the five other water companies in the region, have been provided to WRSE who have completed a review of the interaction of the options to ensure consistency and ensure no potential in combination effects have been overlooked.

The results of the Portsmouth Water ICA are presented in Chapter 13 of this report.

4.3.2.4. Monitoring the effects of the WRMP24 implementation

The SEA has indicated a series of possible monitoring indicators that could be implemented through the WRMP24.

It is anticipated that the monitoring programme will cover significant environmental effects and will involve measuring indicators that will enable the establishment of a causal link between the implementation of WRMP24 and the likely significant effects (both positive and negative) being monitored. This will allow identification at an early stage of unforeseen adverse effects and allow appropriate remedial action to be undertaken.

Since the dWRMP24, Portsmouth Water have produced a new adaptive plan monitoring plan, alongside WRSE, to detail what metrics they will monitor to inform which adaptive pathway / alternative future is emerging and what interventions are needed.

The Portsmouth Water monitoring programme includes an annual review of catchment abstractions monitored through the AMP8 (2025 – 2030) and AMP9 (2030 – 2035) Water Industry National Environment Programme (WINEP) investigations and options appraisal programme. The WINEP outputs will detail the scale of the abstraction licence reductions required by Portsmouth Water to meet their 'Environmental Destination' (including 'Licence Capping') which in turn informs which of the post 2035 adaptive pathways is the most appropriate.

This monitoring plan, which forms part of the Environmental Assessments details what monitoring is needed to further quantify any potential environmental effects of the options already considered in WRMP24.

The Portsmouth Water WINEP programme will take place in two phases over the first 10 years of their WRMP24 (with the majority of investigation being between 2025 to 2030), including environmental assessments for all the river catchments in their supply area, to ascertain the extent of any capping of their abstraction licences necessary to deliver improvements to the environment ('Environmental Destination'). This includes investigations for the River Ems catchment and South East, Southern and Portsmouth Water's abstractions which influence the River Itchen.

Developing the evidence base will quantify the scale of reductions required to the current sources of supply to achieve 'good' environmental status of the water bodies in plan area. There is a possibility that less demanding abstraction reductions could be required following these 'no deterioration' studies and these would inform future WRMPs. The scale of future sustainability reductions is a key driver of the level of investment needed to meet potential future deficits.

Full details and a programme for Portsmouth Waters WINEP studies, as set out in Appendix 5B 'Investigation and Achieving Sustainable Abstraction' and Appendix 10A 'Portsmouth Waters adaptive plan monitoring plan' of the fWRMP24 will inform, and be informed by, the SEA monitoring plan which will be constantly reviewed and updated as results are available.

The SEA monitoring indicators are presented in Chapter 14 of this report.

4.3.3. Stage C – Preparing the SEA Report

This SEA Environmental Report has been prepared to accompany the fWRMP24. It is to be noted that this SEA is being published for information only, and not for a further period of public consultation.

4.3.4. Stage D – Consulting on the draft WRMP24 and SEA Environmental Report

4.3.4.1. Assessing significant changes

This SEA Environmental Report has been updated to reflect regulatory and non-regulatory feedback received from the dWRMP24 consultation process. The results of the formal public consultation exercise, as discussed in section 3.8, has resulted in changes to the schedule of interventions required to meet the anticipated future water supply and demand challenges at both the regional and company level. As a result the consultation exercise has resulted in direct changes to the contents of the SEA Environmental Report. These will be reported in the Post Adoption Statement.

It is important to note, that the changes to the rdWRMP24, and indeed this final WRMP24, both at the regional and water company level, are not considered 'material' for which a second round of consultation would be required. WRSE completed a 'Materiality Assessment' based on the All Company Working Group (ACWG) 'Assessing materiality' guidance document[12]. The document sets out a framework to allow such changes to be reviewed and determine if any changes to the plan are material. The key principle used in the framework is whether the changes to input data have materially affected early or late decisions that are required in the plan and whether this changes the basis on which stakeholders' views were sought for decisions that need to be taken in the near term. Changes that cause a different / increased scale of scheme to be selected in the early years of the plan are likely to be material, whereas changes that lead to different scheme decisions over time periods covered by future plan updates and consultations will be less material. Given the options selected in the Portsmouth Water dWRMP24 and fWRMP24 remain unchanged in the BVP core path in the first 25 years, in line with the 'Materiality Principles' of the ACWG guidance document', changes in the revised draft plan can be considered immaterial.

4.3.4.2. Post Adoption Statement

Following completion of the public consultation and adoption of the final WRMP24, a statement (separate document) will be prepared setting out the following:

- How environmental considerations have been integrated into the plan, for example any changes to or deletions from the plan in response to the information in the SEA Environmental Report.
- How the SEA Environmental Report has been taken into account.
- How the opinions and consultation responses have been considered and addressed. The summary should be sufficiently detailed to show how the plan was changed to take account of issues raised, or why no changes were made.
- The reasons for choosing the plan as adopted in the light of other reasonable alternatives dealt with.
- The measures that are to be taken to monitor the significant environmental effects of implementation of the WRMP24.

[12] ACWG 'Assessing Materiality' v2.0 Nov 22 - https://www.wrse.org.uk/media/smxnp1sw/acwg-materiality-framework-for-resource-plans.pdf

5. Relationship with other Policies, Plans and Programmes

The SEA Regulations require that information be provided on:

*"The degree to which the plan or programme influences other plans and programmes including those in a hierarchy" (*Schedule 1*);*

*"Its relationship with other relevant plans and programmes" (*Schedule 2*);* and

*"The environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation." (*Schedule 2*)*

WRMP24 will both influence and be influenced by other plans, policies and programmes (PPPs) produced by local authorities, statutory agencies (at an international, national, regional and local level) and other bodies with plan making responsibilities. Legislation is a further driver that sets the framework for WRMP24, both directly and indirectly.

Therefore, the SEA needs to set out the relationship between WRMP24 and relevant legislation, other relevant plans and programmes and the environmental protection objectives established at international, national (UK wide), regional (taken for the purposes of this study to be the Portsmouth Water area) and local (local authorities within and immediately adjacent to the Portsmouth Water area) levels. This ensures that the objectives in the SEA generally adhere to, and are not in conflict with, objectives found in other plans, programmes and legislation and also assists in the setting of objectives for the SEA. It can also be used to ascertain potential conflicts between objectives, which will need to be addressed as part of the process.

Building on the comprehensive review undertaken to inform the WRSE Regional Plan SEA Scoping Report, which covered international, European, national and regional plans, programmes and legislation, the plans, programmes and legislation of particular note to WRMP24 listed in Appendix B have been reviewed. Appendix B also provides the full list of plans, programmes and legislation that were reviewed under the WRSE process.

The focus of the review undertaken has been recent plans, programmes and legislation published after the WRSE SEA Scoping Report was published such as the National Policy Statement for water resources infrastructure; UK Environment Act; UK Net Zero Strategy and updates to the National Planning Policy Framework. Portsmouth Waters own relevant corporate plans and strategies have also been reviewed, in particular 2030 Net Carbon Zero Roadmap.

The review has also focussed on local policies, plans and programmes that fall within the boundary of the Portsmouth WRMP24 including:

- The Portsmouth Plan (The Portsmouth Core Strategy) adopted January 2012
- Draft Portsmouth Local Plan (September 2021)
- Portsmouth City Local Plan (2006)
- Somerstown and North Southsea Area Action Plan (2012)
- Southsea Area Action Plan (2007)
- East Hampshire Adopted Local Plan/Joint Core Strategy (2014)
- East Hampshire Emerging Local Plan
- Fareham Borough Local Plan Part 1 (Core Strategy)
- Fareham Borough Local Plan Part 2 (Development Sites and Policies)
- Fareham Borough Local Plan Part 3 (The Welbourne Plan)
- Gosport Borough Local Plan 2008
- Havant Adopted Local Plan (Core Strategy 2011 and Site Allocations Plan 2014)
- Havant Borough Submission Local Plan (Draft 2021)
- Winchester Development Plan
- Winchester District Local Plan (2018-2039)
- Arun Local Plan (2011-2031)

- Chichester Local Plan (2014-2029)
- South Downs Local Plan (2014-2033)
- Site Improvement Plans for Natura 2000 sites, Natural England;
- South East River Basin District - River Basin Management Plan (December 2015);
- Joint Strategic Flood Risk Assessment (Partnership for Urban South Hampshire) – under review
- Portsmouth Local Flood Risk Management Strategy
- Portsmouth Surface Water Management Plan
- South East Hampshire Catchment Flood Management Plan (2009)
- North Solent Shoreline Management Plan
- Southsea Seafront Masterplan (Coastal defences)
- The East Hampshire Catchment Partnership: Catchment Management Plan 2021-2027
- Arun and Western Streams Catchment Flood Management Plan 2009
- Strategic Flood Risk Assessment of Chichester District Council 2008
- Strategic Flood Risk Assessment 2007 – Winchester City Council
- Strategic Flood Risk Assessment (Level 1) Gosport Borough
- Strategic Flood Risk Assessment – Fareham Borough Council
- Strategic Flood Risk Assessment – East Hampshire District Council (2018)
- Portsmouth Water 2030 Net Carbon Zero Roadmap
- Portsmouth Water Climate Change Adaption Report
- Havant Thichket Reservoir Planning and Construction (in association with Southern Water, Havant Borough Council and East Hampshire District Council
- East Hampshire Abstraction Licensing Strategy, Environment Agency (March 2019)
- Solent and South Downs Abstraction Licensing Strategy (CAMS process), Environment Agency;
- Landscape Character Assessment (LCA);
- National Character Areas (NCAs);
- South Downs National Park Partnership Management Plan (PMP) – 'Shaping the future of you South Downs National Park 2014 – 2019'
- Test and Itchen Catchment Flood Management Plan 2009
- River Itchen Catchment Management Plan
- Downs and Harbours Clean Water Partnership

A series of key themes and messages relating to environmental sustainability within the context of water management planning which have emerged from the review are presented below.

Air Quality

- Reduce emissions of NO_2
- Reduce emissions from road transport in particular
- Reduce emissions from other forms of transport
- Increase use of low emission / zero emission at point of use vehicles
- Reduce emissions of PM_{10} and $PM_{2.5}$

Greenhouse Gas (GHG) Emissions

- Reduce GHG emissions, particularly CO_2
- Maximise the use of renewable energy
- Increase energy efficiency and make use of new technology

- Minimise use of fossil fuels
- Contribute to the achievement of national Net Zero target by 2050
- Portsmouth Water to achieve Net Zero operational emissions by 2030

Adaptation to a Changing Climate and Flooding

- Prepare for extreme weather events and sea level rise
- Minimise the risk and impact of river, surface and groundwater flooding
- Minimise risk and impact of coastal flooding and erosion damage
- Minimise risk and impact of heatwaves, wildfires, reduced water availability and soil desiccation.

Biodiversity, Fauna and Flora

- Protection of sites designated for nature conservation purposes and areas of irreplaceable habitat
- Protect and enhance endangered or important species and habitats
- Contribute to the delivery of biodiversity strategies and plans
- Increase area of important habitat
- Protect, maintain and enhance natural habitat networks and green infrastructure, to avoid fragmentation and isolation of networks
- Creation of green infrastructure
- Achievement of Biodiversity Net Gain

Cultural Heritage

- Conserve and protect historic assets (designated and undesignated) and those of cultural note, including archaeology and historic landscapes
- No harm to physical assets and their settings
- Improve setting to historic assets, including buildings and landscapes of value where appropriate

Water Resources

- Protect and improve the quality of ground and surface water and optimise conjunctive use of sources
- Help to meet objectives of the Water Framework Directive (WFD) Regulations
- Make use of Sustainable Drainage Systems (SuDS)
- Prevent or limit inputs of pollutants into groundwater, including chlorides and nitrates
- Monitor and provide information to consumers on drinking water quality
- Promote efficient use of water
- Accelerate the programme to reduce nutrient overload, particularly from diffuse pollution
- Make space for water and wildlife along rivers and around wetlands
- Restore natural processes in river catchments, including ways to support climate change adaptation and mitigation
- Ensure resilience in river catchments so that they are better able to cope with periods of dry weather / heavy rainfall

Land Use, Soil and Agriculture

- Prioritise development on brownfield sites
- Seek to reclaim derelict and contaminated land
- Prevent soil contamination
- Protect farmland and soils, particularly those considered Best and Most Versatile Agricultural Land
- Promote change of agricultural land use to forestry to help with carbon sequestration targets

Landscapes and Townscapes

- Protect and enhance landscape and townscape character and local distinctiveness
- Protect tranquillity from the impacts of noise and light pollution
- Protect and enhance seascapes

Natural Resources and Waste

- Ensure efficient resource use and minimise resource footprint
- Use secondary and recycled materials
- Consider opportunities to maximise on-site re-use of materials
- Employ waste reduction methods to minimise construction and maintenance waste
- Reduce the amount of waste disposed of at landfill
- Promote circular economy
- Avoid the sterilisation of mineral resources

Population and Human Health

- Tackle poor health by improving the health of everyone, and of the worst off in particular
- Create a green economy and promote sustainable growth
- Promote sustainable and healthy communities
- Promote social inclusion and community participation
- Address pockets of deprivation
- Provide for an ageing population

Cross cutting

- Support the UK Government's 25 Year Plan to Improve the Environment 2018 goals and key actions as follows:
  - Using and managing land sustainably, including embedding an "environmental net gain" principle into development.
  - Recovering nature and enhancing the beauty of landscapes.
  - Connecting people to the environment to improve health and wellbeing.
  - Increase resource efficiency and reducing pollution.
  - Securing clean, healthy and productive and biologically diverse seas and oceans.
  - Protecting and improving the global environment.

- Support Environment Act 2021 stipulations:
  - targets for four priority areas: (a) air quality; (b) water; (c) biodiversity; (d) resource efficiency and waste reduction to be set.
  - two priority areas: air quality ($PM_{2.5}$ air quality target) and biodiversity (species abundance target) and important new target to reverse the decline in species abundance by the end of 2030.
  - environmental improvement plan for significantly improving the natural environment for a period no shorter than 15 years.
  - 10% biodiversity net gain required for new development.
  - prevent waste/reduce the amount of a product that becomes waste and increase re-use, redistribution, recovery and recycling.

- Adhere to Portsmouth Water commitment to becoming net zero operational carbon by 2030. This will be achieved through combination of:
  - Minimising water leakage and promoting more efficient water usage.
  - Investing in energy efficient measures to streamline consumption.

- Installing sub-metering across our sites to better monitor energy consumption.
- Decarbonising our vehicle fleet and optimising travel.
- Keeping to a minimum any carbon emissions from new projects and growth

6. Baseline information and key environmental issues

6.1. Introduction

The SEA Regulations state that the Environmental Report should provide information on:

"*The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme*" and "*The environmental characteristics of areas likely to be significantly affected*" (Schedule 2)

and

"*Any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC on the conservation of wild birds and the Habitats Directive* " (Schedule 2).

In order to assess the potential environmental sustainability effects of the WRMP on Portsmouth and surrounding areas, it is therefore necessary to establish a baseline against which predicted effects can be assessed, and then to identify issues and trends that are related to each of the environmental, social and economic interests that may be affected by, or affect, the proposed plan. As such, it is first important to understand the current state of the baseline and then examine the likely evolution of the environment without the implementation of the plan.

The current environment and socio-economic baseline has been reviewed and summarised for the WRSE region in the WRSE Scoping Report. The baseline summarised is a high-level overview of the baseline conditions for the region but more detailed location specific baseline information has been developed in a GIS database which WRSE has made available as the starting point for this baseline exercise.

Baseline information also plays a key role in the other environmental assessments (HRA, WFD, BNG, NC and INNS), as well as those carried out in relation to impact on heritage assets and the potential for effect on SSSI's.

6.2. Data Collection Methodology

The most efficient way to collate relevant baseline data is using indicators. This ensures that the data collation is both focused and effective. The identification of relevant indicators has taken place alongside the assessment of other relevant plans, policies and programmes, the identification of environmental sustainability issues and development of the SEA framework.

The baseline information in this chapter was collected from published sources, including but not limited to the following sources:

- Office for National Statistics (ONS);
- Local Authority Health Profiles (Public Health England, 2018);
- UK Climate Projections 2018 (UKCP18);
- Historic England;
- Natural England;
- Department for Environment, Food and Rural Affairs (Defra);
- Environment Agency;
- Joint Nature Conservation Committee (JNCC);
- Woodland Trust;
- RSPB;
- National Health Service (NHS) Digital;
- Public health England;
- Consumer Data Research Centre (CDRC) Mapmaker;
- Letsrecycle.com;

- Energy Network Association;
- South East Waste Planning Advisory Group (SEWPAG);
- Ministry of Housing, Communities and Local Government;
- Department for Business, Energy & Industrial Strategy;
- Local Government Association;
- United Nations Educational, Scientific and Cultural Organisation (UNESCO);
- Department for Culture, Media and Sport; and
- The National Association for Areas of Outstanding Natural Beauty.

References to all relevant baseline information is provided in the supporting Appendices document.

It should be noted that the SEA process does not require the collection of primary data, but relies on the analysis of existing information. As such, where data gaps exist this is highlighted in this report.

Indicators have been selected for their ability to provide objective data that will, over time, offer an insight into general trends taking place. Throughout the assessment process the following issues will need to be addressed:

- What is the current situation, including trends over time?
- How far is the current situation from known thresholds, objectives or targets?
- Are particularly sensitive or important elements of the environment, economy or society affected?
- Are the problems of a large or small scale, reversible or irreversible, permanent or temporary, direct or indirect?
- How difficult would it be to prevent, reduce or compensate for any negative effect?
- Have there been, or will there be, any significant cumulative or synergistic effects over time?

The datasets used to form environmental baseline are presented in Table 6-1 below.

Table 6-1 - Datasets used in Environmental Baseline

Topic	Environmental datasets used to form environmental baseline
1. Biodiversity	SAC, SPA, Ramsar, Marine Protection Areas/Marine Conservation Zones, SSSI, SSSI Impact Risk Zones, NNR, LNR, Ancient Woodland, Local Wildlife Sites, Priority Habitat, Nature Improvement Areas, National Priority Focus Areas, RSPB Reserves, Woodland Priority Habitat,
2. Cultural Heritage	Grade I, II, II* Listed Structures, Grade I, II, II* Registered Parks and Gardens, Protected Wreck, Heritage at Risk, Registered Battlefields, Scheduled Monuments, Conservation Areas, World Heritage Sites
3. Landscape	AONB, National Landscape Character Areas, Woodland, Urban grade Agricultural Land, Green Belt
4. Air Quality	Air Quality Management Areas, Noise Action Planning Important Areas, Air Quality monitoring points and data
5. Community Health and Wellbeing	Allotments or Community Growing Spaces, Borough, Bowling Green, Cemetery, Country Parks, Golf Course, Medical facilities, National Parks, National Trails, Indices of Multiple Deprivation, Population and Migration Projections, Local Authority area profiles (NOMIS and Public Health England information)
6. Geology and Soils	Agricultural Land Classification, Geologically designated SSSIs, EA Special Sites
7. Water Quality and Resources	Source Protection Zones, Groundwater Vulnerability Zones, Drinking Water Safeguard Zones, WFD Groundwater status, Main Rivers, Surface Water Features, Bathing Waters, Shellfish Waters, Catchments and River Basins
8. Flood Risk	Flood Zones, Flood Alert/Warning Areas, EA Flood Defences

9. Infrastructure / Material Assets	Open access areas, Other Sports Facility, Play Space, Playing Field, Public Park Or Garden, Registered Common Land, Religious Buildings, Religious Grounds, Schools, Tennis Courts, Transport Route Major Roads, Railway tracks, Nationally designated cycle routes, National Grid Infrastructure (high voltage electricity lines and substations), Authorised and Historic Landfill sites

Since SEA is an iterative process, subsequent stages in its preparation and assessment might identify other issues and priorities that require the sourcing of additional data and/or information and identification of monitoring strategies. This makes the SEA process flexible, adaptable and responsive to changes in the baseline conditions and enables trends to be analysed over time.

Data Analysis

Data have been collated and analysed for the following indicators (as detailed in Appendix C):

Environmental Data

- CO_2 emissions
- Climate change
- Local air quality
- Noise / Light pollution ('Tranquillity')
- Biodiversity, fauna and flora (including designated sites)
- Landscape and townscape
- National Character Areas
- Heritage assets
- Green space
- Soil / land classification
- Water quality
- Flooding
- Waste and resources

Economic Data

- Employment
- Long term trends in GVA
- Long term trends in population
- Economic sectors, including those related to rural output
- Performance gap and sub-regional performance
- Identification of economic centres

Social Data (including Health, Equalities and Community Safety)

- Population and diversity
- General health statistics
- Accessibility
- Equality target groups
- Multiple deprivation

The baseline data provide an overview of the environmental characteristics of the WRMP area. This overview, together with contextual information, is presented in Appendix C. The analysis of the baseline has highlighted a number of key issues across the Portsmouth area. These, together with implications and opportunities arising for the WRMP, have been summarised in Table 6-2.

6.3. Data Limitations

It is believed that the data sets available and utilised in this assessment, along with the output from the WRSE process, provide a comprehensive and robust overview of the environmental situation across the Portsmouth Water area and the South East region as a whole.

It is to be noted that option development is in most cases at an outline or preliminary stage and as such may be subject to change or further development. In some instances, option routes (e.g. new transfers) or locations (e.g. new treatment works) are not sufficiently developed and point or coordinate data has been used to represent indicative locations. Each option assessment significance of effect has been attributed with a 'certainty' classification that reflects limitations in locational understanding, data availability and reliability among other considerations that have an impact on the certainty of effect.

Specific data limitations with regard the technical environmental assessments (HRA, WFD, Biodiversity Net Gain, Natural Capital, SSSI Assessment, HIA and INNS) have been set out within the corresponding Technical Reports (Appendix F – K and the HRA report).

6.4. Future baseline

The SEA Regulations require that "the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the Plan or Programme" is identified. Prediction of future trends depends on a wide range of global, national and regional factors and decision making. Key trends have been identified as part of the analysis of key issues and opportunities.

6.5. Key issues and opportunities

The SEA Regulations state that the Environmental Report should provide information on:

"*Any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC on the conservation of wild birds and the Habitats Directive*." (Schedule 2)

The key environmental issues have been identified from the review of baseline information and other plans and programmes (see Chapter 5). These key issues are summarised in Table 6-2 below. This table also provides a discussion on the implications/opportunities of such issues to the WRMP24 and provides clear links to the SEA Objectives. The analysis of key sustainability issues has influenced the development of the SEA Framework (see Chapter 7), in particular in formulating decision making questions. Please note the following table is not an exhaustive examination of all the issues, rather it is a summary and synthesis of the baseline information contained within Appendix C and the review of Plans and Policies within Appendix B, in order to help inform how the SEA Objectives and related decision aid questions have been identified.

Table 6-2 - Key issues, implications and opportunities for Portsmouth WRMP24

Key Environmental Issue	Implications / Opportunities for the WRMP24	SEA Objective
Biodiversity Within the South East region, there are a wide range of sites designated for nature conservation. Of note, there are 21 Ramsar sites, 25 Special Protection Areas, 69 Special Areas of Conservation and 1,189 Sites of Special Scientific Interest. Specifically within the Portsmouth Water Plan area there are: • **Five SPAs** (Portsmouth Harbour; Pagham Harbour; Chichester and Langstone Harbours; Solent and Dorset Coast; and Solent and Southampton Water SPA); • **Six SACs** (Rook Clift; Singleton and Cocking Tunnels; Kingley Vale; Butser Hill; Solent Maritime and Solent and Isle of Wight Lagoons SAC); • **Four Ramsar sites** (Solent and Southampton; Pagham Harbour; Portsmouth Harbour; and Chichester and Langstone Harbours Ramsar); and • **39 SSSIs.** Within the South East region, 52 National Nature Reserves and 623 Local Nature Reserves can be found. Within the Portsmouth Water Plan area there are five NNRs and 26 LNRs. Key pressures and risks in respect of biodiversity and nature conservation that are particularly relevant have been identified from air pollution and climate change, which can change distribution of species and habitats.	WRMP24 should aim to protect and enhance all sites of biodiversity importance and should place a particular emphasis on protecting sites designated for nature conservation and geodiversity purposes. Consideration should be made of protected and priority species and their habitats, including local wildlife sites, as well as consideration of issues such as Suitable Alternative Natural Greenspace. Opportunities for new habitat creation and enhancement associated with water resources should be explored. There should be achievement of Biodiversity Net Gain in areas not formally designated, recognising that a target of 10% has been set out in the Environment Act 2021 for new development. WRMP24 should avoid the fragmentation of green infrastructure, by seeking the integration and enhancement of the green infrastructure network to contribute to protecting natural habitats and delivering biodiversity net gain through all new developments. WRMP24 should help create cohesive habitat networks to help habitats and species adapt to the consequences of climate change, in particular. consider the support of water-dependent designated sites and priority habitat/species to adapt to climate change more specifically. WRMP24 should promote the increased accessibility to appropriately designed multi-functional green infrastructure which can play a	To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain

Areas of Ancient Woodland, i.e. those areas that have been continuously wooded since at least 1600AD are scattered across the South East region. The Ancient Woodland Inventory for England identifies over 4,600 sites of Ancient Woodland, within the Plan area.

There are ten Marine Conservation Zones in waters off the South East of England. Within/adjacent to the Plan Area there are two classified MCZs (Selsey Bill and the Hounds MCZ and Pagham Harbour MCZ).

There are other priority habitats within the plan area that fall inside and outside of designated sites which are likely to be impacted by the WRMP. Examples include fen, wet heath, wet woodlands, reedbeds, wet grazing marsh etc. There are also unique flushes and seepages which are reliant on the chalk aquifers.

A strategic direction for England's biodiversity policy over the next decade is set out in *Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services*[13]. The mission for this strategy is to halt overall biodiversity loss, support healthy well-functioning ecosystems and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people. This involves action to improve the quality of priority habitat and Marine Protected Areas and recover priority species.

Likely evolution of the baseline

Habitats and species are likely to continue to be protected through European and UK legislation.

significant role in diverting pressure away from more sensitive sites or areas.

In parallel with the SEA of the WRMP24, HRA is being undertaken which will identify the internationally designated nature conservation areas, where possible establish the likelihood of impacts on the integrity of these sites and identify appropriate avoidance and mitigation measures early in the development of the WRMP24.

The INNS assessment also being undertaken in parallel with the SEA will in turn consider potential for INNS dispersal and assess this risk and mitigate where appropriate.

[13] DEFRA (2011) *Biodiversity 2020: A strategy for England's wildlife and ecosystem services*. Available: Biodiversity 2020: A strategy for England's wildlife and ecosystem services - GOV.UK (www.gov.uk)

Climate change will however likely result in decline of some habitats and species, though may afford opportunities for other species, including invasive species. England's wildlife habitats have also become increasingly fragmented and isolated, leading to declines in the provision of some ecosystem services, and losses to species populations'. It is worth nothing that as a water company, Portsmouth Water are required under the NERC Act 2006 and subsequent Environment Act 2021 to further the conservation and enhancement of biodiversity. This should afford opportunities for species and habitat improvement over time. In addition, as part of Portsmouth Water's approach to developing their 'Environmental Destination', they set out a target to enhance a greater environmental protection for protected areas such as SSSI, river and wetlands and principal salmon and chalk rivers. This includes a number of SSSI investigations under their WINEP in AMP7 (2020-2025).		
Soil There are a mix of land uses across the Portsmouth Water Plan area, ranging from rural areas of open countryside or arable farmland and pasture to extensive heavily urbanised. There are also areas of suburban and urban fringe associated with the main towns and distinct pockets of 'isolated' urban development in the form of villages and small towns. Soils in England are already, and continue to be, degraded by human activity including intensive agriculture, historic levels of industrial pollution and urban development, making them vulnerable	Soil is a non-renewable resource and is vulnerable to erosion, degradation and contamination. In addition, historic land uses have contributed to contamination across large areas. WRMP24 should seek to make best use of areas that are already urbanised and provide an opportunity for regeneration / improvements to land quality. Where use of agricultural land is unavoidable, measures should be taken to avoid those areas of the highest quality and aim to protect soil and agricultural holdings through avoidance of impacts such as erosion, contamination or severance.	To protect and enhance the functionality, quantity and quality of soils

to erosion (by wind and water), compaction and loss of organic matter. Large swathes of the Plan area comprise Grades 3 and 4 under the Agricultural Land Classification. Large areas of Grade two persist towards the coast and 'non-agricultural' and 'urban' areas align with urbanised areas. Many areas of land in the UK have been contaminated by past industrial and other human activities, including former factories, storage depots and landfills. Land at the full range of potentially contaminated sites could be contaminated by a wide range of harmful substances such as oils and tars, heavy metals, asbestos and chemicals. By its nature, it is often very difficult to know where land has been contaminated previously or is currently suffering ongoing contamination. As such the number of known sites of contamination is likely to be only a very small fraction of the overall number of potentially contaminated sites. Likely evolution of the baseline Declining - it is likely that greenfield sites will experience increasing pressure for development in preference to the complexities of redeveloping previously developed and potentially contaminated sites. This could reduce available high quality soil resources and fail to realise the potential of existing capacity within existing urban and previously developed areas. Remediation of contamination is likely to remain sporadic and reflective of individual site requirements	WRMP24 must protect soils as they are essential for achieving a range of important ecosystem services and functions. Dealing with the past pollution / contamination legacy is a major issue and should be addressed at all opportunities due to its ongoing environmental impact. WRMP24 should seek to avoid land that is covered by Mineral Safeguarding Area designations, to prevent the sterilisation of key mineral resources.	
Water There are considerable pressures on water resources with resulting major impacts on many of the waterbodies across the UK. For the purposes of taking a holistic approach to management of	WRMP24 options should seek implement and maximise opportunities to improve waterbody status through the suite of options proposed. Improving network and preventing leaks and bursts is a key outcome of many of the options	To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies

water resources and to address the pressures on the water environment, under the Water Framework Directive (WFD), the UK has been divided into a series of 10 River Basin Districts (RBD). Those of relevance to the Portsmouth Water Plan area are:

- South East

There are 282 surface water bodies within the South East RBD.

As with most water bodies in England, there are a range of significant water management issues manifested in these RBD. For the South East River Basin District, the following were identified as significant issues[14]:

- Abstraction and other artificial flow regulation
- Nitrate
- Organic Pollution (ammonia and biochemical oxygen demand)
- Pesticides
- Phosphorus

Groundwater provides a third of drinking water in England, and it also maintains the flow in many rivers. In some areas of Southern England, groundwater supplies up to 80% of the drinking water. Protecting these sources (along with any private water supplies) will help ensure that water is safe to drink.

In order to help protect sources, Source Protection Zones (SPZs) for groundwater sources such as wells, boreholes and springs used for public drinking water supply have been defined.

contained within the WRMP24 and the plan should seek out areas that stand to benefit most from such interventions.

Pollution prevention should also be sought during construction through robust construction management plans and pollution prevention plans

In parallel with the SEA of the WRMP24, the WFD assessment is being undertaken which will identify if options will likely deteriorate water body classification or prevent the WFD objectives from being reached and propose appropriate avoidance and mitigation measures early in the development of the WRMP24.

The WRMP24 should also seek to reduce the need for drought permits / orders through the suite of options proposed.

[14] Annex 4 : Pressures and risks to the water environment (publishing.service.gov.uk)

24 DWSZ fall entirely or partially within the plan area. Similarly, parts of the country at which there is increased risk of contamination to groundwater supplied from activities which might cause pollution are covered by Source Protection Zones (SPZs). There are several SPZs noted within the Portsmouth Water Plan area. Likely evolution of the baseline Maintained and improving - Surface and ground water quality is predicted to increase through legislation such as WFD, though significant challenges remain as noted in the River Basin Management Plan. The region is already water-stressed and projected economic and population growth will likely place further pressure on the region's water resource quantity (surface and groundwater) and water resource dependent environments. It is important to note that Portsmouth Water recognise that there are a range of ongoing issues across their area relating to the impact of the existing supply of potable water on the water environment. These issues are being addressed systematically with relevant bodies such as Environment Agency, through WINEP as part of their approach to reaching their 'Environmental Destination' and this would continue in the absence of the WRMP.		
Air Air pollution impacts on public health, the natural environment and the economy.	The options within WRMP24 have the potential to impact air quality and noise. This could include the generation of air pollutants and noise from treatment plants and there is also likely to be effects from the construction phase.	To reduce and minimise air and noise emissions.

Air quality has improved in the UK over the last sixty years as a result of the switch from coal to gas and electricity for heating of domestic and industrial premises, stricter controls on industrial emissions, higher standards for the composition of fuel and tighter regulations on emissions from motor vehicles.

Poor air quality is generally associated with urban/industrial areas and major road infrastructure and this is reflected in the typical location for Air Quality Management Areas (AQMA), many of which have been designated due to high NO_2 and PM_{10} levels. A high proportion of the local authorities which fall within the South East region contain at least one AQMA (118 AQMAs in total) and are predominately designated for Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10}). There are 10 AQMAs declared within the Portsmouth Water Plan area.

135 Noise Action Important Areas have been identified within the plan area. The source of noise in these areas is predominately roads, with the exception of a small number in which the source is rail.

Likely evolution of the baseline

Improving - At the national level air quality is generally improving as industrial practices, energy sources and tighter environmental legislation have contributed to reductions in pollutants.

While air quality is generally improving at a national level, new development, economic growth and tourism may lead to increased car journeys and congestion could lead to localised air quality effects.

The Plan should meet Government targets for air quality and noise and be reflective of appropriate legislation and should consider ecological receptors alongside human receptors.

There is also potential for the WRMP24 to mitigate any increases in air pollutants as a result of the options and improve air quality in the region.

Greenhouse gas emissions

Based on the local authorities which intersect the Portsmouth Water Plan area, as detailed in Appendix C, the total carbon dioxide (CO_2) emissions for 2018 across all sectors is estimated at 4,558.5 ktCO_2.

Winchester is identified as having the highest emissions of all relevant LAs.

Portsmouth Water abstract, treat and pump an average of 170 million litres of water each day. Each million litres of water produces around 95kg of carbon dioxide equivalent emissions. Portsmouth Water currently produce around 16 tonnes of CO_2e each day through daily operations.

Likely evolution of the baseline

Carbon and other GHG emissions will continue to be emitted, however regulations and government legislation and incentives will continue to promote the reduction in emissions through national commitments to net zero by 2050. Portsmouth Water have been early adopters of solar power, which since installation in 2011 has saved 800 tonnes of CO_2e emissions. Portsmouth Water anticipate reaching a net-zero operational emissions target by 2030.

There is potential for an increased need for wastewater treatments as a result of WFD water quality standards combined with population increase. Given the energy intensity of wastewater treatment, the water industry CO_2 emissions may increase as a result of increased water consumption leading to increased volumes of wastewater requiring treatment and further contribute to climate change.

WRMP24 must work to minimise water demand from households and businesses as this will result in reduced need to abstract, treat and transport water (and also less wastewater to treat) and consequently lesser carbon emissions.

The options within WRMP24 have the potential to result in carbon emissions during the construction and operation phase which will further contribute to climate change. The impact of such emissions should be considered through the optioneering and design processes.

WRMP24 should also ensure that opportunities are taken for maximising tree planting. Amongst other benefits, such flood protection, biodiversity enhancement and recreation, careful tree species selection can contribute to carbon sequestration by absorbing increased amounts of CO_2 from the atmosphere.

To achieve Portsmouth Water target of reducing operational carbon emissions to Net Zero by 2030 and contribute to national target of Net Zero by 2050.

Adaptation to a changing climate

Current observations indicate that the UK is continuing to warm. In 2019, four new temperature records were set, including a high of 38.7°C and a new winter record of 21.2°C. The decade between 2010 and 2019 has been on average 0.3°C warmer than the 1981-2010 average and 0.9°C warmer than 1961- 1990. Annual precipitation has increased across the UK in the last few decades with 2019 seeing 107% more rainfall than the 1981-2010 average. Summers have been 11% wetter on average than 1981- 2010 and 13% wetter than 1961-1990. Winters have been 4% and 12% wetter than 1981-2010 and 1961-1990 respectively.

These general trends have also been witnessed in the Porstmouth Water area.

Likely evolution of the baseline

The climate is expected to continue to change with annual average temperatures projected to increase, particularly in summer. Winters are projected to be wetter and summers drier. Climate change is projected to result in more extreme weather events, potentially causing or exacerbating periods of drought which alongside population and economic growth will impact water availability.

A greater degree of resilience will have to be incorporated into the WRMP24 optioneering and design processes to increased river, surface and groundwater flooding due to extreme winter rainfall events and increase in winter mean rainfall as well as increased coastal flooding and erosion damage due to sea level rise and storms sea level rise and the potential risks posed by increased heatwaves, wildfires, reduced water availability and soil desiccation due to increased summer temperatures and reduction in summer mean rainfall.

There is a need to manage the risks associated with flooding over the infrastructure's lifetime, without increasing the flood risk elsewhere and identifying opportunities to reduce the risk overall, including through working with nature based solutions. There are multiple benefits associated with the use of nature based solutions to reduce vulnerability such as tree planting or peat restoration. Flood risk should be considered in any design and the implementation of multi functional green infrastructure including SuDS and other similar appropriate measures or new approaches should be considered and encouraged where feasible. This should include Natural Flood Management and other means of increasing flood storage capacity. WRMP24 should seek to explore the possibilities for creating blue infrastructure which can both help to manage localised flood risk and simultaneously create new habitats.

There is also a need to manage risks related to periods of limited water availability. It is possible limitations of abstraction could mean water infrastructure may have to cease to operate for periods of time and abstraction could cause environmental damage, including for sites with

To reduce vulnerability built infrastructure to climate change risks and hazards

To reduce or manage flood risk, taking climate change into account

	legal habitats and water protections (e.g. SSSIs, SACs, Water Framework Directive etc.).	
Landscapes The South East region's landscape is diverse and there are important landscapes within the region, including two National Parks, eight AONB and 34 National Character Areas (NCAs). Specifically within the Plan area there is/are: • One National Park (South Downs National Park, designated for its rolling hills, picturesque towns and villages, and dramatic cliffs) • One AONBs (Chichester Harbour); and • Five NCAs (Hampshire Downs; Wealden Greensand; South Downs; South Coast Plain; and South Hampshire Lowlands). There are a range of pressures on landscape, many of which are altering landscapes in a direction which could be regarded as inconsistent with the traditional landscape vernacular of the area. These changes are a reflection of the fact that the landscape of the UK has changed over many years due to a range of issues such as urbanisation, changes to agriculture, reduced tranquillity, loss of habitats and forests, etc. In an effort to preserve the best landscapes a series of National Parks and Area of Outstanding Natural Beauty (AONBs) were designated. Within the Plan area there are 114 designated Conservation Areas, the first areas designated in 1969, with the most recent being 2005, covering a range of building characters and reflecting a diverse array of architectural styles. Likely evolution of the baseline	There is potential for the options within WRMP24 to have an impact on the landscape. This could include temporary construction effects and permanent effects associated with infrastructure which could affect visual amenity or the character of the area. WRMP24 should seek to preserve and enhance the character of the region's landscape and seascape by ensuring that its integrity and valuable natural open space is not lost. WRMP24 should also aim to ensure that sensitive areas are avoided and respect particular landscape settings, with consideration made of design quality in both an urban, rural or sea setting. Opportunities for landscape enhancement should be explored, e.g. through sympathetic design and enhancements to existing landscape improvement areas, new planting opportunities. Where a scheme would involve physical development within a Conservation Area or a wider area for which a townscape/urban character appraisal has been undertaken, the design of the scheme should take account of relevant guidance for the Conservation Area / townscape character area.	To conserve, protect and enhance landscape, townscape and seascape character and visual amenity

Stable - Many of the region's most exceptional landscape and townscapes benefit from protection through designations that will persist in the absence of the WRMP. In general terms, modern design / landscaping principles and interested parties expectations are promoting a renewed focus on the quality of scheme design and this trend is likely to continue, though risks from increased urbanisation and infrastructure development remain.		
Cultural Heritage There are eight World Heritage Sites within the South East Region, and none falling within the Plan Area. There are however a wide range of other historic and cultural heritage features located across the WRMP24 area and which span the full range of human settlement, from the prehistoric to the present. These include Scheduled Monuments, Registered Parks and Gardens, Historic Battlefields, Listed Buildings and Heritage at Risk sites. Numbers of sites within the Plan area are as follows: • Listed Buildings – 3825 (90 Grade I, 3556 Grade II and 178 Grade II*) • Registered Parks and Gardens – 14 (one Grade I, eight Grade II and five Grade II*); • Scheduled Monuments – 171; • Historic Battlefields – none; and • Heritage at Risk Sites – 50. It is important to note that the nature of cultural heritage features means that not all are known at present; in particular, buried archaeological remains. Likely evolution of the baseline	WRMP24 should aim to protect and preserve designated and non-designated heritage assets and their contexts and settings. The options within WRMP24 have the potential to directly or indirect impact the historic environment through effecting the asset's fabric or setting. It is to be noted that some heritage features can be affected by changes to hydrological conditions. Infrastructure should be sensitively designed to be sympathetic to existing character and quality and opportunities for improving settings should be examined. Where schemes would involve physical development that could affect previously undiscovered archaeological assets the design of the scheme and site selection should be informed by early investigation of the potential archaeological interest of the affected land.	To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains

Stable / Declining - Historic England recently reported that heritage assets at risk are decreasing. It is also the case that designated heritage assets benefit from protection that will continue without the WRMP. Nevertheless, there is also the risk of uncoordinated and piecemeal development, including that from the need for water supply infrastructure, to result in the successive erosion of the quantum and integrity of the region's cultural heritage resource.		
Population and Human Health There are approximately 19 million people living within the South East Region, which accounts for 30% of the UK's population. Within Portsmouth City there are approximability 205,000 people. Portsmouth Water supply a domestic population exceeding 698,000. Population is expected to grow which will likely place additional pressure on the water environment within the Plan area. Economic growth and climate change will also add to this pressure. Health profiles for LAs across the Plan Area show four LAs reporting generally better health than the England average and four reporting a varied picture. Potential options within the WRMP24 have the potential to result in temporary disturbance effects during the construction phase. There is also potential for impacts on the water or natural environment which could have impacts on recreation and wellbeing. Likely evolution of the baseline Stable / Uncertain – Population is projected to increase in the region and life expectancy is also higher than the national average meaning that the	The options within WRMP24 have the potential to result in temporary disturbance effects during the construction phase and disturbance effects for the local community must be prevented There is also potential for impacts on the water or natural environment which could have impacts on recreation and wellbeing. WRMP24 should aim to protect public health and promote well being. There is an opportunity for WRMP24 to engage with the local community and maximise opportunities for recreation through enhancing access and the condition of the water environment, greenspaces or areas of the natural environment. Thus, improving the inclusivity of and connection to the local natural environment. WRMP24 also has the opportunity to ensure a resilient and reliable potable water supply for customers now and in the future, through continuing to increase awareness of water conservation and adapting to climate change so that there is enough water for a growing population and to support economic growth.	To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing To maintain and enhance tourism and recreation

numbers of elderly residents are likely to increase. As such, water demand will increase, and further pressure will be placed on water resources within the region. Water available for consumptive use may also be affected by climate change whereby access to water is limited. Climate change may manifest through more frequent droughts or floods.		
Material Assets Within the UK, the south east is the most populated region with a population of approximately 19 million and expected long-term growth of around four million. and Portsmouth Water supply a domestic population exceeding 698,000. Settlements within the Plan area are diverse and range from large population centres to small rural hamlets and seaside towns. Key Urban areas within the Portsmouth Plan area include: • Chichester population of 26,795 • Havant population of 120,684 • Clanfield population of 4,637 • Bognor Regis population of 24,064 • Southbourne population of 5,648 • North Mundham population of 1,201 • Bishops Waltham population of 6,723 Portsmouth Water supply a domestic population exceeding 698000 as well as industry, large defence establishments and varied commercial businesses via thirty service reservoirs and 21 treatment works. In terms of infrastructure, the South East region contains over 400 authorised landfill sites. 18	WRMP24 has the opportunity to consider the efficiency in the use of resources within the option development and reduce the use of energy, materials and prevent waste generation through the promotion of low/zero carbon energy, use of recycled or secondary materials and furthering concepts of circular economy. WRMP24 area contains important transport links which could be affected during construction works. There is also significant water and wastewater treatment infrastructure across the area operated by Portsmouth Water.	To minimise resource use and waste production To avoid negative effects on built assets and infrastructure

authorised landfill sites and 213 historic landfill sites are identified within the Plan area. While there are no gas terminals or pipelines within the Plan area, Lovedean electrical substation is within the Plan area situated west of Hrondean and the A3 motorway. From the substation extent four 132Kv and 400Kv overhead lines which traverse the Plan area north, east and west / south west.

There are a number of railway tracks within the plan area connecting areas such as Chichester and Littlehampton, Fareham and Portsmouth and Petersfield and Havant.

Portsmouth Port or Portsmouth Continental Ferry Port is a cruise, ferry and cargo terminal located in the city of Portsmouth

Likely evolution of the baseline

Regeneration and future investment and demand are likely to increase the number and quality of material assets such as housing, transport infrastructure, waste facilities, and community facilities. Portsmouth Port is anticipated to expand with over £33 million worth of investment earmarked from 2019. The expansion works are anticipated to lead to an increase in the number of cruise passengers at the Port from 50,000 to 15000. Of the investment £15 million is anticipated to be invested in improving facilities at Portico who operate two commercial quays within the Port

7. SEA Framework

7.1. Introduction

Following good practice, a number of bespoke SEA objectives have been developed for the WRMP24. These SEA objectives reflect the environmental sustainability objectives the WRMP24 should be aiming to achieve and the areas that the WRMP24 is expected to impact upon or have an influence on. The expectation is that even though some objectives may not be within the WRMP's direct remit, the WRMP24 should be able to influence the direction of change through setting out clear policies and approaches which could inform the work of Portsmouth Water's partners and other stakeholders.

7.2. Assessment Framework

The SEA Framework is a key component in completing the SEA, through providing a set of SEA objectives against which the performance of the WRMP can be predicted and evaluated.

An SEA Framework of 10 objectives and associated decision-making / assessment aid questions (see Table 7-1) has been drawn up for the assessment of WRMP24, developed through the analysis of baseline information and identification of key environmental sustainability issues and opportunities, as well as the review of relevant plans, policies and legislation.

In order to assess how each aspect of the WRMP24 performs against each of the SEA objectives, a series of decision-making criteria / assessment aid questions have also been developed. The decision-making criteria are a way of guiding the assessment. They are not the only considerations to be taken into account when determining likely effects arising from the WRMP24, as it is unlikely that every relevant question can be known at this stage, but they do provide a useful starting point and a transparent structure to help demonstrate how the assessment of the effects arising from the implementation of the WRMP24 will be undertaken. As the SEA progressed, they also helped in the development of a set of indicators to be included in the monitoring programme.

In deriving the SEA Framework, the information contained within the WRSE SEA Scoping Report has been considered (together with the comments received from statutory consultees on the WRSE SEA Scoping Report) have also been taken into account alongside a review of specific baseline data relevant to the Portsmouth Water area. An overview of the key issues identified that are specific to the Portsmouth area has been provided in the previous chapter. Allied to the identification of detailed baseline data relevant to the Portsmouth area, the SEA Objectives identified in the All Companies Working Group SEA Core Objective Identification Report (2020) were considered and a revised set of SEA Objectives has been developed that allow examination of a greater level of detail than would be expected at WRSE regional level. This has led to the addition of an important separate objective to reduce greenhouse gas emissions reflecting the climate emergency and adjustments in the wording of other WRSE SEA Objectives and decision-making criteria to better reflect Portsmouth Water priorities.

It should be noted that, from an assessment perspective, all SEA objectives are considered equally important to be achieved by the WRMP24 and that there is no inherent prioritisation of objectives.

It is also to be noted that there is a certain degree of cross-over of Assessment Aid Questions within the SEA Framework i.e. the same question may be asked across a number of Objectives. The rationale for this is that while the question may be the same, it is considered from a differing viewpoint and within a different context. This is the role of the Assessment Aid Questions i.e. to help consider all aspects of an Objective in arriving at an assessment of the performance.

Table 7-1 - SEA Objectives and decision aid questions for WRMP24

SEA Topic	SEA objective	Decision aid questions
Biodiversity	To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	Will WRMP24: • Protect and enhance the conservation status of designated sites and their qualifying features (SPAs, SACs, Ramsar sites, MCZs, SSSIs, National Nature Reserves and Ancient Woodland)? • Ensure HRA compliance with regards to international sites? (taken from HRA results) • Affect direct or indirectly a priority habitat on the priority habitat inventory? • Protect and enhance priority habitats and species, including surface and ground water-dependent habitats and species? • Affect the marine environment, habitats and species (including MCZs and MPAs)? • Contribute to the loss or gain in habitat connectivity at local, regional and national scale? • Create or restore habitat delivering a 10% net gain for biodiversity? (taken from BNG assessment results) • Avoid the possibility for INNS to be spread/ introduced? • Create an opportunity to improve biodiversity value through removal of INNS? • (taken from the INNS assessment results)
Soil	To protect and enhance the functionality, quantity and quality of soils	Will WRMP24: • Affect high grade agricultural land? • Promote the efficient use of land? • Prevent soil erosion and retain soil stocks as a natural resource? • Involve use of brownfield or greenfield land? • Prevent mineral sterilisation? • Result in soil contamination or involve soil remediation? • Affect SSSIs of geological importance?

SEA Topic	SEA objective	Decision aid questions
Water	To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies and water dependent habitats	Will WRMP24: • Affect surface water quality or quantity? • Affect groundwater quality or quantity? • Affect estuarine or coastal water quality or quantity? • Affect bathing waters? • Affect shellfish water protected areas? • Affect chalk rivers? • Reduce the flashy nature of surface waters? • Slow the flow in upper catchments and reduce soil losses to river systems? • Support achievement of environmental objectives set out in River Basin Management Plans and Shoreline Management Plans • Protect and enhance the environmental resilience of the water environment to climate change? • Contribute to the achievement of WFD objectives (taken from the WFD assessment results)?
Air	To reduce and minimise air and noise emissions	Will WRMP24: • Minimise air emissions (pollutants and noise) that affect human health and biodiversity? • Affect an existing air quality management area (AQMA) or lead to the creation of a new one? • Promote enhancements to green infrastructure networks to help improve air quality?
Greenhouse Gas Emissions	To achieve Portsmouth Water target of reducing carbon emissions to Net Zero by 2030 and contribute to national target of Net Zero by 2050	Will WRMP24: • Reduce direct and indirect emissions of all greenhouse gases, including carbon dioxide, during construction, operation and decommissioning of schemes? • Maximise supply of energy from low carbon/renewable energy sources / use of low carbon/renewable energy? • Maximise opportunities for making use of waste heat? • Use negative carbon emissions technologies to offset residual emissions such Nature Based Solutions?

SEA Topic	SEA objective	Decision aid questions
		• Create new carbon sinks/removals through natural sequestration including that provided by green infrastructure and soils which contribute to carbon sequestration?
Climate Factors	To reduce vulnerability of built infrastructure to climate change risks and hazards	Will WRMP24: • Avoid development in areas likely to be affected by flooding or where this is not possible ensure that flooding can be managed throughout the lifetime of the infrastructure? • Avoid development in areas likely to be affected by coastal erosion or where this is not possible ensure that coastal change can be managed throughout the lifetime of the infrastructure? • Avoid development which would cause or exacerbate climate related issues such as freshwater and coastal squeeze? • Manage the risks associated to periods of limited water availability during droughts over the lifetime of the infrastructure? • Manage the risks associated with heatwaves and wildfires over the lifetime of the infrastructure? • Manage the risks of flooding and coastal erosion, particularly through working with nature-based solutions?
	To reduce or manage flood risk, taking climate change into account	Will WRMP24: • Avoid development in flood risk areas (whether existing or future) when possible? • Lead to infrastructure development that is flood resilient over its lifetime, considering the effects of climate change, without increasing the flood risk elsewhere and identifying opportunities to reduce the risk overall?
Landscape	To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	Will WRMP24: • Protect and enhance designated landscapes and features? • Affect the character of the landscape, townscape or seascape, including tranquility and views? • Protect conservation areas or historic landscape/townscape areas? • Minimise noise and light pollution from construction and operational activities on residential amenity and on sensitive locations, receptors and views? • Improve access to the countryside? • Create or improve green infrastructure which contributes to access to the landscape?

SEA Topic	SEA objective	Decision aid questions
Cultural Heritage	To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	Will WRMP24: • Protect designated heritage assets and their settings, sites and features? • Protect heritage assets at risk? • Protect non-designated heritage assets, including important archaeological remains (including unknown archaeological remains)? • Alter the hydrological conditions of water-dependent heritage assets, including organic remains?
Population and Human Health	To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	Will WRMP24: • Allow for green economic development? • Provide employment opportunities and economic diversity? • Minimise disturbance from noise, light, visual, and transport due to construction and operational activities? • Minimise disturbance to active travel (pedestrian and cycle routes, Public Rights of Way) during construction and operational activities? • Secure resilient water supplies for the health and wellbeing of customers?
	To maintain and enhance tourism and recreation	Will WRMP24: • Affect terrestrial, freshwater or marine water resources that are used for tourism and recreation? • Maintain or enhance tourism in the region through the creation or improvement of terrestrial or water-based attractions? • Improve access to the natural environment for recreation, including those living within deprived areas? • Provide education or information resources for the public about the natural environment?
Material Assets	To minimise resource use and waste production	Will WRMP24: • Minimise the use of materials, energy and resources? • Promote water efficiency and encourage a reduction in water consumption? • Minimise the production of waste? • Promote sustainable waste management practices in line with the waste hierarchy? • Encourage the use of recycled and / or secondary materials? • Promote the use of low carbon materials and technologies?

SEA Topic	SEA objective	Decision aid questions
		• Promote the use of local suppliers that use sustainably-sourced and locally produced materials?
	To avoid negative effects on built assets / infrastructure	Will WRMP24: • Reuse existing infrastructure? • Affect major built assets and infrastructure, including transport infrastructure?

8. Technical Environmental Assessment

The SEA objectives, as set out in Section 7, have been formulated to incorporate the findings of the various technical environmental assessments, specifically the Habitats Regulations Assessment, Water Framework Directive Assessment, Biodiversity Net Gain and Natural Capital assessments. In addition, further assessment has been made of effects on heritage assets and potential effects on SSSI's. This has helped to provide an integrated environmental assessment of the plan.

It is however important to note, that whilst the results of the various technical environmental assessments have been used to inform the SEA, care has been taken to align the approaches to ensure there is no risk of double counting where overlaps between some of the SEA objectives and various metrics used in the technical assessments may have occurred (introducing undue bias).

A summary of each of the environmental assessments has been provided in this section. Full reports are attached to this SEA Report in the Appendices (Appendix F – K), and the HRA report and should be consulted for further information.

8.1. Habitat Regulation Assessment

Habitat Regulation Assessment (HRA) is required by Regulation 63 of the Conservation (Natural Habitats, and Species) Regulations 2017 (as amended). The HRA for WRMP24 comprises Stage 1 'Screening' and Stage 2 'Appropriate Assessment' (AA). It was undertaken following a methodology based on the extent and nature of the WRMP24 as a 'plan' and taking a precautionary approach.

The assessment provides a summary of the WRSE screening results for the all the supply options selected in the fWRMP24, undertakes a Stage 1 Screening review where AA was concluded and, dependent on the findings, takes forward to Stage 2 Appropriate Assessment those European Sites which could not be screened out, either alone or in-combination.

Four options were reviewed and one, 'Upgrade Source O Booster to 25 Ml/d', remained screened in for Appropriate Assessment. 'Drought Permit: Source S' was reassessed and found to have 'No Effect' on the European Sites screened and both 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) were reassessed and found to have no Likely Significant Effects (LSE) 'alone'.

The in-combination effects assessment at Stage 1 identified potential in-combination effects with other plans and projects affecting water quality and the 'Upgrade Source O Booster to 25 Ml/d option'. This did not affect the screening assessment as the relevant European Sites were already being taken to Appropriate Assessment for the option. No within-plan in-combination effects were identified. However, potential inter-company in-combination effects were identified for 'Upgrade Source O Booster to 25 Ml/d' and 'Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 2)' options with 17 Southern Water options for 12 European Sites. The outcome did not affect the assessment for 'Upgrade Source O Booster to 25 Ml/d', as this was already taken through to Appropriate Assessment; however, 'Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 2)' was screened back in for AA as a result of potential in-combination effects.

In the absence of detailed project-specific information, a high-level assessment of the potential for options within fWRMP24 to have an adverse effect on the integrity of European Sites was undertaken at Stage 2 Appropriate Assessment. As the 'Drought Permit: Source S' option had been screened out, the Appropriate Assessment only included the 'Upgrade Source O Booster to 25 Ml/d' and 'Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 2)' options. A total of ten European Sites were included in the Appropriate Assessment following the inclusion of potential effects from groundwater sources in the assessment.

It is considered reasonable to anticipate from the information available that the 'Upgrade Source O Booster to 25 Ml/d option' could be delivered in a manner which avoids any adverse effects on the integrity of the European Sites. This is through a combination of modelling and investigation to inform design, sensitively designing, programming and constructing options, and using standard mitigation techniques. The potential pathway relating to water quality is generally one that can be resolved through standard mitigation measures, unless linked to aquifer recharge and release of nutrients, in which case alternative measures considering the management of abstractions would be required. Impacts relating to water quantity may also need to be managed in this way. However, this must be confirmed based on project design. HRA will therefore be

required at project stage for Upgrade to Source O Booster to 25 Ml/d to fully assess all potential impacts upon European sites once the option design has been finalised and the construction programme is known.

Three European Sites were included in the Appropriate Assessment for 'Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 2)': Solent and Dorset Coast SPA, Portsmouth Harbour SPA/Ramsar site. As the option was screened in due to potential in-combination effects with other discharges to The Solent from Southern Water options, an adverse effect cannot be ruled out without further assessment.

Taking into account the findings of the assessment, it can reasonably be concluded that the inclusion of most options in fWRMP24 will not have an adverse effect on the integrity of the European sites alone or in-combination. However, further assessment at a project-level will be required to allow any conclusion to be drawn with certainty for 'Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 2)'.

8.2. Water Framework Directive

The WFD report available as Appendix H presents the findings of the Water Framework Directive (WFD) assessment that has been undertaken as part of the environmental assessment process to support the development of the WRSE Regional Plan.

The WFD assessments have been undertaken by WRSE and results considered in the undertaking of the SEA of Portsmouth Water's WRMP24. The Level 1 WFD assessments have been reviewed and updated for the WRMP24 Schemes. The Level 2 assessment has been undertaken only on those supply options selected before 2050 by the WRSE Best Value Plan (BVP), Best Environmental and Societal Plan (BESP) or the Least Cost Plan (LCP) and is based on the All Companies Working Group methodology for each of the Schemes.

The pre-2050 Portsmouth Water options selected in the WRSE BVP, BESP and/or LCP is listed as follows:

- Drought Permit: Source S
- Upgrade Source O Booster to 25 Mld
- Works A treatment Capacity increase to treat water from Havant Thicket Reservoir (Phase 1)
- Pipeline associated with Works A treatment capacity increase to distribute water from Havant Thicket Reservoir
- Works A treatment Capacity increase to treat water from Havant Thicket Reservoir (Phase 2)

All options with the exception of Drought Permit: Source S were Screened as WFD compliant in the Level 1 assessment and did not require a Level 2 assessment.

In summary, the L2 assessment for this drought permit option concludes that there is Medium risk for the temporary increased abstraction from the Chichester Chalk to be WFD non-compliant and, therefore, further assessment is required to ensure that the additional abstraction does not negatively impact under the quantitative GWDTE, dependent surface water body and water balance tests.

8.3. Biodiversity Net Gain

Biodiversity Net Gain (BNG) is a specific, measurable outcome of project activities that deliver demonstrable and quantifiable benefits to biodiversity compared to the baseline situation. Biodiversity metrics provide a way of measuring and accounting for biodiversity losses and gains resulting from development and/or land management change.

A BNG assessment forms an integral part of the Strategic Environmental Assessment and the inclusion of BNG as part of the WRMP24 environmental assessment process is supported by the updated Water Resources Planning Guideline Supplementary Guidance 'Environmental Society in Decision Making' (November 2021).

BNG assessments for the nine Portsmouth Water supply options were screened out as they will not result in a change in land use.

8.4. Natural Capital

Natural capital assessments (NCA) are required in order to evaluate the impact of the proposed Portsmouth Water (PW) options on the natural environment through an assessment of the impact of the Option on the natural capital stocks and subsequent ecosystem services these stocks provide.

This was undertaken by Water Resources South East's (WRSE) in accordance with the WPRG SG. A condition under this is that only supply-side options are within scope of a NCA, of which there are nine options for Portsmouth Water.

All supply side options considered were either scoped out of a natural capital assessment by WRSE, included in the baseline scenario for Portsmouth Water, or allocated as options to other water companies (due to being a transfer between two water companies). This means that there are no numerical outputs of the NCAs of Portsmouth Water options due to no expected future impacts, or the costs and benefits were allocated to other water companies.

This analysis contributes to the wider WRMP objectives of Portsmouth Water through highlighting that the proposed options are not expected to materiality harm the natural capital stocks of the region.

8.5. Invasive Non-Native Species

This INNS risk assessment (the risk of INNS being introduced and spread through the functioning of each scheme via transfer pathways that may become active once the scheme is operational) has been undertaken through a Level 1 screening assessment only. The Level 1 screening assessment is used to determine whether any schemes are considered high-enough risk to warrant a Level 2 risk assessment using the Environment Agency's SAI-RAT. The tool can be used to quantify (as a percentage) the INNS risk associated with options, based on the conceptual design information currently available.

Water Resources South East's (WRSE) high-level screening methodology was used to complete the L1 assessment which accounts for frequency in which transfers would be operational and the severity of their impact, as inferred by the nature and volume of water being transferred. These criteria formed a screening matrix for assessment, in which only schemes scoring 'low', 'medium' or 'high' are taken forward for a Level 2 assessment.

The INNS Report concluded that the operation of all supply options in Portsmouth Water's fWRMP24 can be deemed of 'very low risk' of spreading INNS. As none of the supply options achieved a screening risk of greater than 'very low', no L2 risk assessments have been completed.

During construction it has been assumed that standard mitigation can be put in place to prevent the spread of INNS, including the requirement to have an Invasive Species Management Plan in place which will set out the general ways in which a contractor will work in a biosecure way, abiding by biosecurity best practice. An Invasive Species Management Plan may include the following requirements; to adopt the Check – Clean –Dry approach, provide all construction staff with identification guides for the species known to be in the area, and provide a toolbox talk to educate staff members in identifying high-risk INNS.

Engagement with the Environment Agency will take place, where required, to identify measures that are most appropriate. Portsmouth Water are committed to ensuring INNS are kept under review going forward both during the Design and Construction phases, to ensure that INNS spread is kept to a minimum.

8.6. Heritage Impact Assessment

This HIA provides high-level heritage impact assessments for all options that feature in either Portsmouth Waters Best Value Plan (BVP), or one of their alternative plans (Best Environmental & Societal Plan, Least Cost Plan or Low Demand Strategy), up to 2035. This includes the Upgrade Source O Booster to 25Ml/d and Drought Permit: Source S options.

Demand side options include measures such as demand reduction, addressing leakage, water efficiency and catchment management. These options do not have any potential for impact on heritage assets and are therefore not considered in this HIA. The effective use of demand reduction measures minimises the need for new infrastructure and reduces the potential for impacts on heritage assets as a result of development.

Two supply side options were assessed, these were Upgrade Source O Booster to 25Ml/d and Drought Permit: Source S.

In relation to Upgrade Source O Booster to 25Ml/d the main risks from construction work within the study area are to unknown buried remains associated with a Roman Villa complex, which may include human remains and waterlogged organic remains. Construction works that uncover unexpected remains will incur extra costs and time delays, which can be prevented through planning and mitigation. It is presumed that these risks will be avoided, as the designs for the scheme relate only to replacement of and instalment of pumps within the pump house, within existing excavations. The likely significance of effect has been identified as **Neutral**.

The HIA found that for Drought Permit: Source S further detailed, assessment of receptors and impacts is recommended to be undertaken commensurate with option selection and potentially using additional outputs

from groundwater modelling. This may include a more detailed desktop assessment covering the receptors identified by future modelling, and may also include on site assessments following guidance provided by Historic England on the preservation of archaeological remains[15]. In order to assess and manage long term impacts, it will first be necessary to better understand the archaeological character and preservation of remains within vulnerable areas.

8.7. Sites of Special Scientific Interest Assessment

This SSSI Assessment sets out the WRMP24 Options and identifies those SSSI where an Option, being progressed early in the plan period (pre-2035), (and its related construction / operation) could potentially pose a risk to that SSSI.

Note that those schemes considered baseline and those that have secured planning approval have been excluded from assessment. Also excluded are demand options including consumption reduction measures and non-essential use bans owing to their broader application across the Plan area, an absence of construction phase impacts, temporal duration (either construction or operation) or a combination of these factors. Assessments were therefore carried out for Upgrade Source O Booster to 25 Mld and Drought Permit: Source S.

Due to the works being limited to within an existing pumping station it was considered that none of the ORNECs associated with the SSSIs would be relevant to Upgrade Source O Booster to 25 Mld option. Consequently, no adverse effects on the respective SSSIs were identified.

While it is to be noted that re-assessment will be required at the project stage (when further design information is available in respect of each of the supply options) the SSSI assessment finds that of the early options, Drought Permit: Source S has the potential to give rise to adverse effects on Arundel Park SSSI. Importantly, the Source S Drought Permit is supported by an Environmental Assessment Report which includes a comprehensive monitoring programme designed to better understand the potential for impacts and mitigate accordingly. This includes specific actions to ensure adverse effects on Arundel Park SSSI are avoided.

The potential for adverse effects on Duncton to Bignor Escarpment SSSI has also been identified owing to possible sensitivity to abstraction and the operation of the Source S Drought Permit. The EAR noted that while there is a potential pathway (Chalk aquifer) it was outside the zone of influence. It is considered that mitigation and monitoring set out in the Source S Drought Permit EAR would be sufficient so as to identify potential impacts and implications of groundwater level changes to environmental receptors.

[15] *ibid*

9. Existing Options

9.1. Existing Abstractions

It is important to recognise that the WRMP24 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. Portsmouth Water set out their existing/current licences in Table 2 of Appendix 5B 'Investigating and Achieving Sustainable Abstraction', which is adapted in 9-1 below.

Table 9-1 – 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

Portsmouth Water recognise the global importance of chalk aquifers and streams within their 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, the Portsmouth Water 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, 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 WRMP24;
5. Prevent negative effects from temporary increases in abstraction (i.e. via drought permits); and
6. Ensure Portsmouth Water's 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 are set out in Appendix 5B of the fWRMP24 and 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).

Further detail has been provided on Portsmouth Water's planned WINEP investigations (scope and programme) linked to potentially environmentally damaging abstractions, as well as further work required, in line with Portsmouth Water's Environmental Destination to reduce their reliance on any environmentally damaging abstractions.

9.1.1. Abstractions subject to WINEP

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:

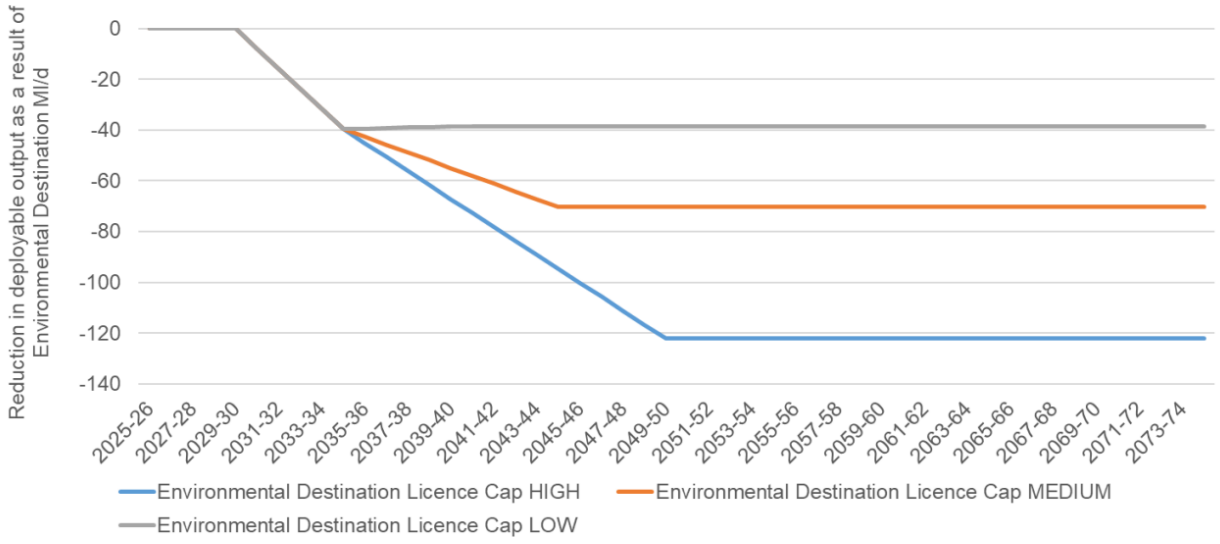
- Confirming the magnitude of abstraction reductions required to meet short-term and longer-term environmental requirements in each catchment alone and across the operational area to inform water resource modelling.
- Reducing uncertainty regarding the potential adaptive pathway that is likely to be 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.

Appendix 5B 'Investigating and Achieving Sustainable Abstraction' further sets out Portsmouth Waters possible licence reductions which are detailed in the fWRMP24. 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 (fWRMP24) which is replicated in Table 9-2. Figure 9-1 further sets out the profiles of potential abstraction reduction (and as a result deployable output losses) over the planning period.

Table 9-2 - Potential Licence Changes per Source

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	0.1	0.10	0.00	0.00
Sources GFH	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**

Figure 9-1 - Potential Deployable Output Reduction Profiles



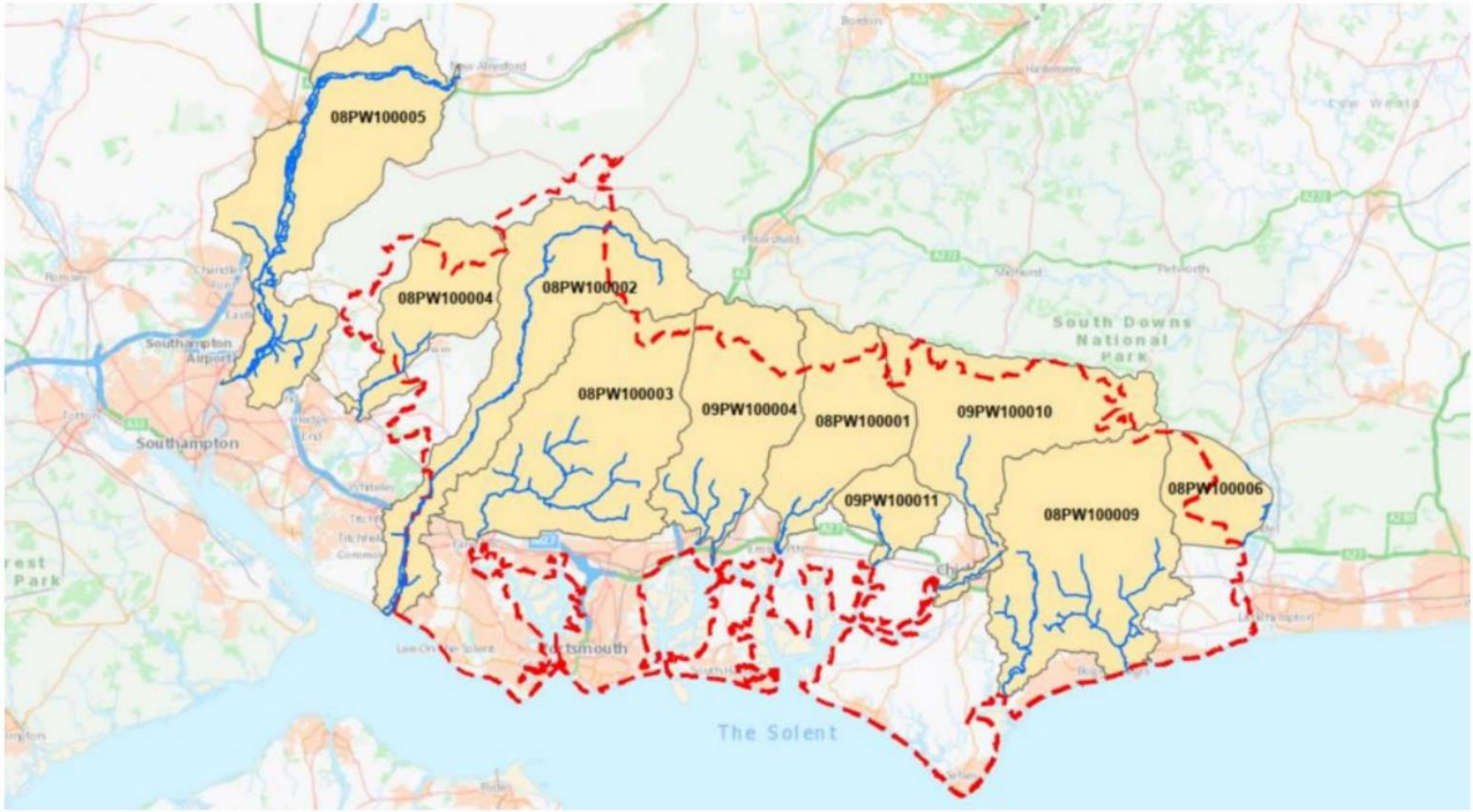
The range in potential reductions is obviously significant and drives very different investment scenarios in the fWRMP24, so it is vital Portsmouth Water achieve a higher degree of certainty to allow the necessary detailed planning to occur. Portsmouth Water's WINEP submission therefore proposed their 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 presented in Table 9-3 and Figure 9-2.

Table 9-3 - 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 9-2 - Location of the Catchment based WINEP Investigations Proposed



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 9-3, 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 9-3.

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 9-4.

Table 9-4 - 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 9-4) shows that some urgent actions are needed with the following recommended target dates:

- Initial phase: agreed ASFs by Autumn 2024
- Phase 1: Phase 2 monitoring plan plus detailed scope and approach for Phase 3 by May 2025
- 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 bodies as required on an ongoing basis to ensure a continued iterative approach to resolving uncertainties related to environmental effects of potable water supply.

For further information on the WINEP process and outcomes please see Appendix 5B of the fWRMP24.

9.1.2. Abstractions not subject to WINEP

The fWRMP24 clarifies that each of Portsmouth Waters sources require investigation. This represents 21 sites across 10 catchment units.

9.2. Existing Options

9.2.1. Havant Thicket Reservoir

A key legacy from WRMP19, which has formed a cornerstone of Portsmouth Waters ongoing planning process, is the development of Havant Thicket Reservoir. The Reservoir enables Portsmouth Water to store winter spring flows for use in the summer, increase the quantity of water supplied to Southern Water, which in turn allows them to make environmental improvements by reducing their reliance on sensitive chalk sources in Hampshire. In addition to supporting reduced abstraction on chalk rivers, the scheme has an overall biodiversity net gain and will offer a new community leisure facility for the area.

The reservoir scheme, as proposed in WRMP19, is unchanged and has been included in the baseline assumptions for this plan (with a revised delivery date of 2031/32[16]). It was supported by customers and regulators and is being developed in partnership with Southern Water. This will be the first new reservoir to be built in the South East since the 1970s. Havant Thicket Reservoir has received planning permission and work onsite is ongoing.

The approval for the development of Havant Thicket Reservoir within WRMP19 enables Portsmouth Water to make a major contribution to long-term resilient water resources in the South East.

Completing Havant Thicket Reservoir unlocks new local and regional options for future water security, such as water recycling. These types of options are needed to meet some of the new challenges, such as significant reductions in the abstractions from Chalk catchments and improved resilience to droughts occurring once every 500 years.

Havant Thicket Reservoir is part of the Portsmouth Water baseline supply forecast and therefore included in the Water Available for Use (WAFU) calculation. The reservoir has received planning permission and is in the construction phase.

It should be noted that given the Havant Thicket reservoir and the associated 21 Ml/d bulk supply was granted planning permission and work on site is ongoing, this options has been excluded from the SEA and HRA as both elements of the project have been subject to their own environmental assessments as part of their planning application which was granted by Havant Borough Council and East Hampshire District Council in 2021. Please see Havant Borough Council website[17] for further details and supporting environmental assessments.

9.2.2. Continuation of bulk supplies to SWS

Portsmouth Water have an existing bulk supply agreement with Southern Water to supply their Hampshire Southampton East (HSE) zone. The bulk supply exports up to 15 Ml/d from us to Southern Water's HSE WRZ. Flow is abstracted from the River Itchen at Source A, treated at Source A treatment works and then transferred to Southern Water.

Within the WRSE investment model the 15 Ml/d bulk supply to the HSE WRZ is treated as part of the baseline until 2028–29, beyond which point it becomes an option that can be selected.

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[16] The Havant Thicket Reservoir was originally designed to provide benefit from 2029-30 but is now forecast to provide benefit from 2031-32. The delay is the result of an opportunity to future proof the pipeline tunnel included within the approved scheme to accommodate HWTWRP if approved and is a worst-case scenario.
[17] Havant Thicket Reservoir | Havant Borough Council

Over the planning period exports gradually reduce and eventually becomes zero. This results from less water available in the Portsmouth Water supply network due to higher levels of Environmental Protection.

10. Assessment of Alternatives

10.1. Introduction

Water resource planning is complicated and there is a lot of uncertainty, largely as it is an exercise in understanding the current water supply system that reflects past decision making processes, against future scenarios that are influenced by aspects such as climate change, population growth, changes in technology and economic outcomes. At all times, there is a need to ensure that the company can achieve a secure supply of water for the period 2025 – 2075. Where a risk of deficits in supply are identified, a series of 'demand side' (measures that reduce demand for water) and 'supply side' (measures that increase supply) Options are considered and incorporated into modelling, with the goal of identifying a preferred set of Options to meet the requirements and objectives of the Plan.

Traditionally, plans were developed to meet deficits at the least cost. Whilst this is still an important criterion, there are other factors which are considered. It was the aim of Portsmouth Water to develop a plan that represents 'best value'. A best value plan is defined as one that considers factors alongside economic cost and seeks to achieve an outcome that increases the overall benefit to customers, the wider environment and overall society. WRSE were tasked with developing the decision-making approach and tool (the investment model) that would be used by all companies in WRSE to select their preferred plan[18].

In addition to developing the BVP, and as required by the revised Water Resources Planning Guidelines (WRPG), further optimisation runs were also automatically shortlisted by the regional model, from the same suite of options, to benchmark and appraise the BVP against. All alternatives where constrained to securing a wholesome supply of water to customers and other sectors (multi-sector plan) over the planning period.

The options in the alternative plans therefore went through the same level of environmental assessment and used the same metrics that were derived by WRSE and were based on the UKWIR guidance, the National Framework, and the WRPG. Eight broad metrics used to develop Portsmouth Water's BVP and its alternatives including environmental, resilience and customer preferences. Full details of how the SEA informed the selection of options is described in Section 11.2 and further within the SoR: Additional Information Requested by Defra' document[19].

WRSE developed two reasonable alternatives for each water company, as set out in Chapter 1.4.3:

- **Least Cost Plan**: The model was run in adaptive mode, solving all the future branches and design drought conditions simultaneously, but optimising to minimise cost only (i.e., no other objectives are optimised). The outputs from various runs of the least cost plan helped to identify the options that are selected most frequently, and the potential tipping points along the adaptive pathways. This helped to inform decision-making around best value.
- **Best Environmental and Societal Plan:** This programme is not optimised on cost, but the programme that Portsmouth Water consider delivers best overall environment and society value outcomes. This takes into account overall performance across the SEA, Natural Capital and Biodiversity Net Gain metrics, and through engagement with stakeholders.

Portsmouth Water considered the modelling outputs of the two strategic alternatives to consider what the plan would look like if it was optimised on Least Cost, or on producing the best environmental and social metrics. Table 10-1 sets out implementation dates of interventions and options Portsmouth Water need to deliver under each of the alternative plans. The results show that across the entire planning period the selection of options are consistent across each of the plans. This largely results from the requirement of demand reductions to meet Environmental Improvement Plan (EIP) targets (see section 2.2 for details). The consistency of the selection of options gives confidence in the option selection process for Portsmouth Waters plan.

Whilst the options remain consistent, the dates for two options selected deviate where the LCP and/or BESP select slightly differing times to implement the options for upgrading the existing Source O pumping station and increasing treatment capacity at Service Reservoir C. Source O Booster is selected in the BVP and LCP in 2033-34, whilst in the BESP it is selected one year later in 2034-35. Phase 2 of the additional treatment

[18] WRSE Method Statement (Jan 2022) and 'Developing our 'best value' multi-sector regional resilience plan' (Feb 2022)

[19] PRT-WRMP24-Defra-Letter-Response_final.pdf (portsmouthwater.co.uk)

capacity at Reservoir sees the option implemented in the BESP in 2061-62, the LCP in 2063-64 and finally in the BVP in 2069-70.

Table 10-2 further presents a comparison of metrics between the LCP, BESP and the BVP. There is very little difference between these three plans, both in terms of costs, metrics and strategic scheme selection. As would be expected, the LCP scores worse on Environment, with the BESP scoring the highest for environment and society with the BVP generally in the middle. The consistency of the selection of options gives confidence in the option selection process for the plan.

It is important to note that previous iterations of Portsmouth Water's WRMP24 contained plans that were distinguishable from one another. The draft and revised draft plans saw an additional Phase 3 treatment capacity option at Reservoir C being selected in the Least Cost Plan in 2069-70. As noted, this option has not been selected in the regional model as part of the fWRMP24 modelling process. The option was previously marginal, only appearing in Situation 4 near the end of the planning horizon. Subtle model input changes for these final modelling runs made elsewhere in the WRSE region, plus the inclusion of the base year NAV demand, has resulted in a slightly different solution with respect to the Portsmouth Water supply area. Previous iterations of the SEA therefore presented the assessment results for the alternative option. Please refer to the dWRMP24 SEA Environmental Report and rdWRMP24 SEA Environmental Report for full details. Given the fWRMP24 BVP and alternative plans are consistent in their options selected, this chapter has not replicated the option assessment as that presented in Chapter 11 'Assessment of BVP Options within fWRMP24'.

Table 10-1 Options featuring in each of the Alternative Plans in comparison to the BVP

Options	Option Description	BVP	BESP	LCP
Supply				
Drought Permit: Source S	This option involves increasing the DO from Source S WTW to 11 Ml/d (an increase of 8.5 Ml/d) during a 1 in 200-year drought condition, which could last up to 12 months. Source S WTW currently has a maximum instantaneous flow of 2.5 Ml/d. The treated water from Source S WTW is distributed for supply via a Service Reservoir. It is assumed that the distribution of extra water from the reservoir is possible without network enhancements. To enable the increase in supply from 2.5 Ml/d to 11 Ml/d, further works are required on site to upgrade the disinfections process, this includes new cartridge filters, a new UV treatment plant and uprated chlorination. When Swanbourne Lake is already dry (i.e. in a severe drought 1:100 or worse - not dry due to abstraction) increase abstraction from the Source S from licensed limit of 2.5Ml/d to 11.5 Ml/d. This would require a drought permit. Under normal dry conditions abstraction from Source S is limited due to its assumed impact on the SSSI (but artificial) Swanbourne Lake (at Arundel). The Source S source is part of a licence Group. The group abstraction licence limited to 41 Ml/d and not more than 2,100 Ml in any period of 60 days. The permit would increase the group limit to 49.5 Ml/d.	2025-26	2025-26	2025-26
Upgrade Source O Booster to 25Mld	Upgrade to existing pumping station to remove a 'bottleneck' in the supply network and improve movement of water through the system, to allow 'freeing up' of water resources where they are needed. Option will increase annual deployable output in the range of 4.1 Mld to 7.3 Ml/d (depending on the drought condition). Since the dWRMP24 this option has been revised to capture a shared conjunctive use of the scheme with Southern Water based on the updated modelling. The other key change is that the option has no benefit in a 'normal', non-drought year. This is to conserve water within Havant Thicket Reservoir ahead of a drought. This change in yield is one of the key factors that this option is now selected almost 10 years later in the fWRMP24.	2033-34	2034-35	2033-34
Import from Southern Water: Potable Resource for Otterbourne WSW to Source A (Import of potable water from Southern Water	Reversal of flow in the existing and planned bulk supplies to Southern Water (i.e. once Southern Water has more water in Hampshire, bulk supplies from Portsmouth Water to Southern Water will end and instead supplies from Southern Water will be received to Portsmouth Water) up to 45 Ml/d.	2039-40	2039-40	2039-40

(SWSHSE) to the west of our supply area)				
Works A treatment capacity increase to treat and distribute water from Havant Thicket Reservoir	Increased treatment capacity at Works A to accommodate increased draw from Havant Thicket Reservoir and pass forward of treated water to Service Reservoir B (Phase 1)	2046-47	2046-47	2046-47
	Increased draw from Havant Thicket reservoir to increased treatment capacity at Works A. Pass forward treated water to Service Reservoir B (Phase 1)	2046-47	2046-47	2046-47
	Additional treatment capacity at Works A to accommodate increased draw from Havant Thicket Reservoir and pass forward of treated water to Service Reservoir B (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 (Phase 1)	2049-50	2051-52	2049-50
	Spur from proposed raw water transfer between Havant Thicket and Otterbourne. This option includes booster pumping but it is likely that sufficient head will be available from the Pipeline associated new treatment works at Service Reservoir C to distribute water from Havant Thicket Reservoir (Phase 1)	2049-50	2051-52	2049-50
	Additional treatment capacity at Service Reservoir C (Phase 2)	2069-70	2061-62	2063-64
Demand				
‘High Plus’ demand basket (including demand reductions, leakage and Government led interventions)	Implementation of the ‘High Plus’ basket of demand management measures which aims to reduce leakage by 50 per cent by 2040 and overall customer demand for water by around 26 per cent by 2050 compared to 2021–22 levels. Basket includes: • Home water efficiency audits outside of the smart metering programme; • Education; • Community Reward Platform; • General broadcast messages (multi-channel proactive comms); • Community campaign; • Leak Alarms (e.g., Leakbot); • Universal smart metering; • Household flow reduction (pressure control); • Household Incentives: Innovative tariffs; • Non-Household efficiency checks / audits;	2025-26	2025-26	2025-26

	• Vulnerability / Inclusion and Equality; and • Leading by example.			
Non-essential use bans	Between the start of the plan in 2025–26 until 2039–40. These options are no longer needed when the level of resilience that is planned for in the WRMP improves from a 1 in 200 to a 1 in 500 year drought event.	2025-26	2025-26	2025-26
Temporary use bans	As above	2025-26	2025-26	2025-26

Table 10-2 - Comparison of metrics between LCP, BESP and BVP at a WRSE Regional Level

Metric	LCP	BESP	BVP
Environmental Benefit (%)	22	85	57
Environmental Disbenefit (%)	54	72	77
Natural Capital (%)	33	92	60
Biodiversity Net Gain (%)	45	75	36
Customer Preference for Option Type (%)	28	75	87
Reliability (%)	32	56	54
Adaptability (%)	27	63	39
Evolvability (%)	27	84	56
Environmental & Societal	36	69	63
Environment	39	81	58
Resilience (%)	29	84	50
BVP Weighted (%)	35	72	57
BVP Weighted Situation 4 (%)	17	68	48
BVP Unweighted (%)	34	68	58
Customer Preference Score (%)	76	90	79
Average Cost (£m)*	17824	17769	18119
Capex (STPR) (£m)*	4648	4624	4818
Opex (STPR) (£m)*	11882	11826	11984
* programmes were optimised at the regional level and therefore costs for each programme at the WRSE regional costs.			

11. Assessment of BVP Options within fWRMP24

11.1. Introduction

In order to meet the requirements of WRMP24 to ensure Portsmouth Water customers and communities have continued adequate amounts of clean drinking water supplies available, a series of Options for enabling supplies have been identified and included within the BVP.

As set out in Chapter 1.4, the preferred BVP is an adaptive plan which allows Portsmouth Water to cover future uncertainties relating to population growth, customer behaviour, impacts of climate change and impacts of environmental destination on the available sources. There are nine adaptive pathways ('situations') spanning from low challenge benign futures to high challenge adverse futures. For the purposes of the assessment the reported pathway is Pathway 4 ('Situation 4'). Pathway 4 meets the regulatory guidance. It uses growth scenarios that are compliant with regulatory guidance, incorporates climate change impacts and an environmental destination preferred by Natural England and the Environment Agency. Critically, it includes all activities that need to be undertaken to be ready for all plausible future scenarios.

Stage B2 of the SEA process normally involves the generation and assessment of plan options. This exercise is undertaken in part to fulfil the requirements of the SEA Regulations, which requires that the Environmental Report should consider:

'reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme' (SEA Regulations Part 3 Section 12 (2)b.

11.2. Development of Options

Previous Water Resource Management Plans were derived by considering costs that included the economic cost of delivering and operating a scheme, plus a carbon cost.

As noted in Section 1.3.1, Portsmouth Water's WRMP24, along with five other water companies WRMPs in the south east, were produced alongside the Water Resources South East (WRSE) regional resilience Plan, in order to give a complete picture of the nation's water resources for the first time. The regional plan, and thereby water company plans, was derived by considering a wider set of criteria, that builds on a cost-efficient plan, ensuring that it delivers regulatory and government policy, whilst also protecting and enhancing the environment.

Detail on how the SEA informed both the regional and Portsmouth Water's company plan has been set out below.

11.2.1. Regional Planning

The 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. The development of a best value plan was promoted by the Environment Agency, Ofwat and Natural Resources Wales in the Water Resources Planning Guideline. WRSE were required to ensure the regional plan met several legal and regulatory requirements and policy expectations at the most efficient cost possible; however, through engagement with customers and stakeholders, the WRSE group 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)[20] sets out the requirements for companies to follow in producing their WRMPs. The supporting Environment Agency National Framework[21] 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. A best value plan therefore builds from a cost-efficient plan but ensures it delivers regulatory and government policies.

[20] April 2023 Water resources planning guideline - GOV.UK (www.gov.uk)
[21] Environment Agency, March 2020 Meeting our future water needs: a national framework for water resources - GOV.UK (www.gov.uk)

WRSE developed the best value plan objectives, criteria, and metrics through a consultation process in 2021, before the regional plan was developed. The metrics were developed based on the UKWIR guidance, the National Framework, and the WRPG, to ensure the regional plan met legal, regulatory and policy expectations through a consultation process. Eight broad metrics used to develop the WRSE regional best value plan:

- **Environmental**
  - Strategic Environmental Assessment – positive
  - Strategic Environmental Assessment – negative
  - Natural Capital
  - Biodiversity Net Gain
- **Resilience**
  - Reliability
  - Evolvability
  - Adaptability
- **Customer**
  - Customer option preferences

As the WRSE objectives were high-level, they were turned into measurable indices on which best value could be assessed. Each objective was represented by a set of value criteria which, in turn, had an associated metric[22] that measured the additional value it delivered. WRSE used the criteria and metrics to assess the different water resource programmes that were produced through investment modelling. WRSE also used them to compare the shortlisted good value programmes and explain the differences between them and the additional value each delivered. Each programme comprised a series of options and each option has a series of metrics associated with it.

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.
2. All options that were uploaded into the WRSE Data Landing Platform (DLP) were assessed at an option level for environmental (including SEA, HRA Screening, WFD Level 1 assessment, Natural Capital Assessment, BNG Assessment and INNS Screening) and resilience metric evaluation. The
3. The environmental metrics (translated from the assessment results) were included in the investment model to influence the selection of options.
4. The WRSE investment model then constructed adaptive programmes[23] 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

[22] By its nature SEA does not include numerical values for scoring effects. However, in order to incorporate environmental considerations directly into the programme appraisal optimisation model, a SEA metric was developed by WRSE to summarise the environmental performance of each option in numerical form. The SEA metric was developed from the results of the SEA, HRA and WFD assessment processes, and included non-monetised natural capital. For full details refer to WRSE's WRSE Regional Plan Environmental Assessment Methodology Guidance, WRSE / Mott Macdonald June 2020. wrse_file_1347_wrse-regional-plan-environmental-assessment-methodology-guidance.pdf

[23] WRSE developed a 'root and branch' adaptive tree as the base for forecast for its regional plan investment modelling. This included the most likely set of future challenges and uncertainties facing the south east region over the next 50 years. This required examination of nine different pathways with different combinations of population growth, climate change impacts and levels of environmental ambition. The regional plan identifies the immediate investment needed in all the future pathways. It can then adapt depending on which future occurs. This ensures water companies, including Portsmouth Water, will make the right immediate investment decisions so they can provide resilient water supplies to their customers in the years ahead

options selected in the plan for each adaptive planning 'situation' through the duration of the plan. 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.

It is important to recognise that the assessment stage followed a two-stage process, including an initial high level screening assessment and a detailed assessment stage. The above details the process for the later stage. The initial environmental assessments for the 'screening' stage of WRMP24 option appraisal, completed by Portsmouth Water, helped to shape the feasible option data set that was offered to the WRSE investment model. It acted to validate the unconstrained list screening that Portsmouth Water undertook to ensure environmentally damaging options were not considered further and to flag options with high environmental risk, that can still be considered, but where mitigation will be needed. 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'.

See also Section 3.2.3 of the 'SoR: Additional information requested by Defra'[24] document for full details of BVP and best value metrics.

11.2.2. Portsmouth Water Planning

The option identification and appraisal process was an important stage in the development of the fWRMP24. A multi-stage process was used to develop a feasible option list to be taken forward into the regional investment model; the key steps were:

7. Identified an extensive list of all potential options, the 'Unconstrained Options' List, which either increased available water resource or reduced the water demand.
8. Primary screening of the unconstrained options to refine the options down to a Feasible Options List.
9. Where required, secondary screening of the feasible options to produce a Refined Feasible Options List.
10. The Refined Feasible options was then taken forward for optimisation modelling and programme appraisal from which the Best Value Programmes was derived (as discussed above in the regional planning section).

The unconstrained, feasible and refined feasible options all went through an options appraisal process that screened the options based on overarching principles at two levels. Primary screening reviewed options for showstoppers. Criteria were considered on a pass/fail basis; failure against one criteria, with appropriate justification captured, was sufficient to screen an option out. Early engagement with the Environment Agency supported the assessment of a number of supply options against the question "Is the option promotable - will it likely be objected to by regulator/ customer? The secondary screening included conducting a preliminary environmental screening of options with physical assets or activities against SEA, HRA and WFD measures. Full details on the appraisal process used to screen the options is contained within WRMP24 Appendix 7A 'Options Appraisal – Options Identification and Screening'[25].

Once the feasible option list had been offered to the regional investment model (IVM), WRSE completed further assessment on the options. This included SEA, HRA Screening, WFD Level 1 assessment, Natural Capital Assessment, BNG Assessment and INNS Screening as noted above. Where the Level 1 assessments identified the need for further assessment, water companies completed the more detailed Level 2 assessments. This included HRA Appropriate Assessment, WFD Level 2 assessment and INNS Risk Assessment.

[24] PRT-WRMP24-Defra-Letter-Response_final.pdf (portsmouthwater.co.uk)
[25] 7A-rdWRMP24-Appendix-7A-Options.pdf (portsmouthwater.co.uk)

Revised SEA metrics were populated, reflecting the refined, plan area specific SEA Framework[26] scoring and the results of any Level 2 assessment work, in addition to two additional environmental assessment streams that were requested as part of the consultation exercise, including a Heritage Impact Assessment (that impacted the heritage objective score) and SSSI assessment (that informed the biodiversity objective score).

The metrics for the revised SEA and stage 2 assessments were in turn fed back into the regional model as part of the iterative option selection process.

It should also be noted that if new/more detailed scheme information (e.g design information) was available at the time of company level assessment stage, the assessment utilised the information and allowed for increased certainty of effect in the assessment.

As such, the SEA has been applied iteratively with the preparation of the regional and company plans. Three main teams were involved in this iterative process – the SEA team, WRSE and the plan making team. While there was a good working relationship between the teams, it is to be noted that as per good practice, these teams were independent of each other, with the SEA team consisting of employees of AtkinsRéalis, while the plan making team comprised of staff in Portsmouth Water and WRSE (Mott MacDonald). It was the role of the SEA Team to iteratively challenge the plan making team.

Environmental and social considerations made in WRMP24 were aligned with the following Themes:

- Biodiversity;
- Population;
- Human health (covering noise issues among other effects on local communities and public health);
- Fauna and flora;
- Soil;
- Water;
- Air;
- Noise;
- Climatic factors;
- Material assets (covering infrastructure, waste and other assets);
- Cultural heritage including architectural and archaeological heritage; and
- Landscape.

The SEA Environmental Report of WRMP24 was produced in line with relevant legislation and guidance and the SEA has been developed through various stages.

11.3. Portsmouth Water's BVP

It is normal practice when developing a Plan to propose different ways (options) of fulfilling its objectives. WRMP24 sets out a series of supply and demand management options which can be implemented in a phased approach to address identified water supply requirements. The range of supply and demand management options identified in the BVP pathway 4 (along with the yield and year they are anticipated to be in service) are set out in Table 11-1 and 11-2 respectively.

In addition, Portsmouth Water's BVP includes a range of catchment management measures. Catchment management is an environmentally friendly and potentially low-carbon impact method of influencing raw water quality at its source by managing land use practices on a catchment scale. It can also help build stakeholder trust, reduce flood risk and increase resilience.

Portsmouth Water recognise that a holistic approach to the protection of the water environment is critical. To this end, Portsmouth Water undertake a range of catchment management measures across the Plan area with a view to increasing environmental resilience, addressing historic and ongoing water quality issues and ultimately improving the water environment. For example, as outlined in the fWRMP, there are ongoing issues

[26] See Section 2.1.1 for more detail on revised SEA framework

across the Plan area relating to high levels of nitrate in rivers or groundwater. This is difficult and expensive to treat and without effective action at a catchment level, will only become increasingly challenging in future. Portsmouth Water are committed to a long-term catchment management programme and working with a range of partner organisations to address such issues today. This will result in benefits for all with improved water quality at drinking water sources, but also across the wider environment. Similarly, Portsmouth Water's catchment management programme identifies and addresses potential pollution hazards to try to prevent pollution incidents from occurring e.g. there is an oil care campaign offering advice and incentives to inspect and replace heating oil tanks, with consequent benefits for the water environment.

All of these measures within Portsmouth Water's catchment management programme can be expected to result in benefits to the water environment and wider aspects such as biodiversity across the Plan area. However, in order to ensure a precautionary approach to the assessment of Options, such benefits have not been quantified in respect of any Option detailed within the fWRMP.

This assessment will therefore focus on the supply and demand options as set out in Portsmouth Water's WRMP24 BVP option tables.

11.3.1. BVP Supply Side Options

Table 11-1 - Supply Side Options in BVP Pathway 4

Option	Year in Service	Brief description
Upgrade Source O Booster (including the conjunctive use option benefit)	2033-34	Upgrade to pumping station to remove a 'bottleneck' in the supply network and improve movement of water through the system, to increase annual deployable output in the range of 4.1 Ml/d to 7.3 Ml/d (depending on the drought condition). Since the dWRMP24 this option has been revised to capture a shared conjunctive use of the scheme with Southern Water based on the updated modelling. The other key change is that the option has no benefit in a 'normal', non-drought year. This is to conserve water within Havant Thicket Reservoir ahead of a drought. This change in yield is one of the key factors that this option is now selected almost 10 years later in the fWRMP24.
Drought Permit Source S (to 2041)	2025-26	Between 2025-26 and 2040-41 Portsmouth Water will seek to use a drought permit at Source S in drought conditions. This option will improve deployable output to 11 Ml/d. To enable the increase in supply from 2.5 Ml/d to 11 Ml/d, further works are required at the WTW site to upgrade the disinfection process, this includes new cartridge filters, a new UV treatment plant and uprated chlorination.
Bulk import of potable water from Southern Water (SWS HSE) to the west of the Portsmouth Water supply area (Otterbourne WSW to Source A)	2039-40	Reversal of flow in the existing and planned bulk supplies to Southern Water (i.e. once Southern Water has more water in Hampshire, bulk supplies from Portsmouth Water to Southern Water will largely end and instead potable supplies from Southern Water will be received to Portsmouth Water). This option is first selected for use in 2039-40 as providing 25.25 megalitres per day (Ml/d) under dry year annual average conditions. The volume gradually increases to 45 Ml/d from 2046-47 for the remainder of the planning period.
Continue existing bulk supplies to Southern Water	2025-26	This is the Portsmouth Water export to SWS SNZ and SWS HSE Zones. These exports are part of the baseline until 2025-26 and 2028-29 respectively, after which they become optional. Over the planning period exports gradually reduce and eventually becomes zero. This results from less water available in the Portsmouth Water supply network due to higher levels of Environmental Protection.

Additional treatment capacity of 20 Ml/d at Works A and additional pipeline to utilise water from Havant Thicket Reservoir. This includes subsequent upgrades to increase treatment capacity further.	2046-47	Works A increased treatment capacity (phase 1). This option improves treatment capacity to treat water across the Portsmouth Water supply area to utilise the water most effectively from Havant Thicket Reservoir and is selected from 2047 onwards. Additional pipeline (phase 1). This option improves interconnectivity to transfer water across the Portsmouth Water supply area to utilise the water most effectively from Havant Thicket Reservoir and is selected from 2047 onwards. This option was only selected in the alternative pathways of the dWRMP. Due to greater sustainability reductions resulting from Environmental Destination this option is now selected in the BVP Pathway 4.
	2048-49	Works A increased treatment capacity (phase 2). This option was only selected in the alternative pathways of the dWRMP. Due to greater sustainability reductions resulting from Environmental Destination this option is now selected in the BVP Pathway 4.
A new 10 Ml/d WTW at the location of Service Reservoir C from the early 2050s to utilise water from Havant Thicket Reservoir. This includes serval phased enhancements and upgrades.	2049/50	New treatment works at Service Reservoir C (Phase 1). This option improves treatment capacity to treat water across the Portsmouth Water supply area to utilise the water most effectively from Havant Thicket Reservoir and is selected from 2047 onwards. New pipeline (Phase 1). This option improves interconnectivity to transfer water across the Portsmouth Water supply area to utilise the water most effectively from Havant Thicket Reservoir and is selected from 2047 onwards. Due to greater sustainability reductions resulting from Environmental Destination this option is now selected in the BVP Pathway 4.
	2069/70	Additional treatment capacity at Service Reservoir C (phase 2)

It should be noted that two of the options that feature in WRMP24 Best Value Plan, as presented in Table 11-1, have not been subject to SEA. This includes the continuance of existing bulk supply to SWS as this is an extension to an existing bulk supply agreement and is considered in the baseline supply forecasts (see Chapter 9.2 of this SEA for full details) as well as the bulk import of potable water from Southern Water (SWS HSE) to the west of the Portsmouth Water supply area (Otterbourne WSW to Source A) due to lack of information / scheme detail at the time of writing. From discussions with Portsmouth Water, it is understood that the current pipeline would not be capable of transferring the 45 Ml/d of the option design and that a new pipeline would be needed to convey the required water, however the route of the pipeline was yet to be agreed. A review of the scheme to determine the upgrades required will therefore be completed by Southern Water / Portsmouth Water as part of WRMP29.

11.3.2. BVP Demand Side Options

Table 11-2 - Demand Side Options in BVP Pathway 4

Option	Year	Brief Description
Demand Basket “High Plus”	2025-26	• Home water efficiency audits outside of the smart metering programme • Education • Community Reward Platform • General broadcast messages (multi-channel proactive comms) • Community campaign • Leak Alarms (e.g., Leakbot) • Universal smart metering (Non-Household and Household) • Household flow reduction (pressure control)

		• Household Incentives: Innovative tariffs • Non-Household efficiency checks / audits • Vulnerability / Inclusion and Equality • Active leakage control • Leading by example
Non-essential use bans	2025-26	Non-essential use bans for non-households. From the start of the plan in 2025–26.
Temporary use bans	2025/26	Temporary use bans for households. From the start of the plan in 2025–26.

More information on the above Options is contained within the relevant Assessment tables within Appendix E, with further detail also available within the fWRMP24.

Each Option has been assessed against the SEA Framework in respect of construction and operation phases and considering positive and negative effects separately. Full details of the assessment for each Option is provided within Appendix E. Where available, the assessment tables have been supplemented with Option IDs, descriptions and mitigation that is considered embedded as part of the option.

To allow for the identification of different levels of effects when assessing WRMP24 proposals, a scoring system has been used to differentiate in terms of magnitude and significance of effects. This scoring system is widely used in SEA and is based around the following scale (colour aligned with WRSE scale) to reflect the assessment aid questions in the SEA Framework.

Table 11-3 - Assessment Scoring Scale

Assessment Scale	Assessment Category	Significance of Effect
+++	Major beneficial	Significant
++	Moderate beneficial	
+	Slight beneficial	Not Significant
0	Neutral or no obvious effect	
-	Slight adverse	
--	Moderate adverse	Significant
---	Major adverse	

It is to be noted that the scores derived will be considered ‘in the round’ in light of the assessment aid questions (detailed in the SEA Framework) and a judgement made as to an appropriate summary score for that aspect of the WRMP24 being considered. The commentary provided explains the rationale behind the score. Any recommendations are noted, as are references to appropriate additional mitigation that is proposed to maximise beneficial effects and/or minimise/avoid any potential adverse effects identified.

This scoring system seeks to capture both the nature and the scale of predicted effects arising from the Options set out in the WRMP24. Alongside the overall summary rating (colour and symbol), the assessment tables attempt to identify the nature of the effects of the WRMP24 on the SEA objectives according to the level of detail required by the SEA Directive. This includes commentary on the effects, magnitude, scale, duration, permanence and certainty as shown in Table .

Table 11-4 - 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)	Long term (LT) Medium term (MT) Short term (ST)	Temporary (T) Permanent (P)	High (H) Medium (M) Low (L)

	Global (G)			

The commentary below will focus on significant effects only. These are effects which are considered to be moderate or major adverse/positive, as set out in Table ‘Assessment Scoring Scale’ table. The full details of the assessment for each Option are however provided within Appendix E.

Note that the assessment of significance, presented for each Option, in the summaries below, are presented in terms of residual effects (i.e., after any additional mitigation is applied) in respect of construction and operation.

The SEA objectives are:

1. To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain
2. To protect and enhance the functionality, quantity and quality of soils
3. To protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal waterbodies
4. To reduce and minimise air and noise emissions
5. To achieve Portsmouth Water target of reducing carbon emissions to Net Zero by 2030 and contribute to national target of Net Zero by 2050
6. To reduce vulnerability of built infrastructure to climate change risks and hazards
7. To reduce or manage flood risk, taking climate change into account
8. To conserve, protect and enhance landscape, townscape and seascape character and visual amenity
9. To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains
10. To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing
11. To maintain and enhance tourism and recreation
12. To minimise resource use and waste production
13. To avoid negative effects on built assets / infrastructure

It is to be noted that where appropriate, the SEA has been informed by the findings of the Water Framework Directive, Biodiversity Net Gain, Natural Capital, SSSI Assessment, HIA and Habitats Regulations Assessments. The findings of these assessments are contained within Appendices F to K and the HRA report.

11.4. Overview of assessment results

The following tables provide an overview of the assessment ‘scores’ for all of the BVP Options considered within the SEA, for both the construction and operation phases (post mitigation). The assessment findings of each option is then discussed in turn, with full detail provided in Appendix E.

Table 11-5 - Construction Scores (Post Mitigation)

	Biodiversity		Soil		Water		Air Quality		Greenhouse Gas Emissions		Climate Factors				Landscape		Cultural Heritage		Population and human health				Material Assets			
	To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain		To Protect and enhance the functionality, quantity and quality of soils		To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats		To reduce and minimise air and noise emissions		To achieve Portsmouth Water target of reducing carbon emissions to Net Zero by 2030 and contribute to national target of Net Zero by 2050		To reduce vulnerability of built infrastructure to climate change risks and hazards		To reduce or manage flood risk, taking climate change into account		To conserve, protect and enhance landscape, townscape and seascape character and visual amenity		To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains		To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing		To maintain and enhance tourism and recreation		To minimise resource use and waste production		To avoid negative effects on built assets / infrastructure	
Option Name	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Upgrade Source O Booster to 25Mld	0	-	0	0	0	0	0	-	0	-	0	0	0	0	0	-	0	0	0	0	0	0	0	-	0	-
Source S drought permit	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
New treatments work at Service Reservoir C to treat water from Havant Thicket	0	-	0	-	0	-	0	-	0	-	0	-	0	0	0	-	+	-	+	-	0	-	0	-	+	-
New pipeline at Service Reservoir C to distribute water from Havant Thicket Reservoir	0	-	0	-	0	-	0	-	0	-	0	0	0	0	0	-	+	-	0	-	0	-	0	-	0	-
Works A treatment capacity increase to treat water from Havant Thicket (Phase 1)	0	0	0	0	0	0	0	-	0	-	0	0	0	0	0	0	0	-	0	-	0	-	+	-	0	-
Works A treatment capacity increase to treat water from Havant Thicket (Phase 2)	0	0	0	0	0	0	0	-	0	-	0	0	0	0	0	0	0	-	0	-	0	-	+	-	0	-

New pipeline at Works A to distribute water from Havant Thicket (Phase 1)	0	-	0	-	0	-	0	-	0	-	0	0	0	-	0	-	+	-	0	-	0	-	0	-	0	-
'High Plus' Basket	0	-	0	-	0	-	0	-	0	-	0	0	0	0	0	-	0	-	0	-	0	0	0	-	0	-
NEUBS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TUBS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 11-6 - Operation Scores (Post Mitigation)

	Biodiversity		Soil		Water		Air Quality		Greenhouse Gas Emissions		Climate Factors				Landscape		Cultural Heritage		Population and human health				Material Assets			
	To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain		To Protect and enhance the functionality, quantity and quality of soils		To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats		To reduce and minimise air and noise emissions		To achieve Portsmouth Water target of reducing carbon emissions to Net Zero by 2030 and contribute to national target of Net Zero by 2050		To reduce vulnerability of built infrastructure to climate change risks and hazards		To reduce or manage flood risk, taking climate change into account		To conserve, protect and enhance landscape, townscape and seascape character and visual amenity		To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains		To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing		To maintain and enhance tourism and recreation		To minimise resource use and waste production		To avoid negative effects on built assets / infrastructure	
Option Name	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Upgrade Source O Booster to 25Mld	0	-	0	0	+	-	0	-	0	-	0	-	0	0	0	0	0	0	0	0	0	0	0	0	+	0
Source S drought permit	0	--	0	0	+	--	+	-	+	-	++	-	0	0	0	0	0	-	++	0	0	0	++	0	+	0
New treatment works at Service Reservoir C to treat water from Havant Thicket	0	0	0	0	+	0	0	-	0	-	++	0	0	0	0	-	0	-	++	-	0	0	0	0	0	0
New pipeline at Service Reservoir C to distribute water from Havant Thicket Reservoir	0	-	0	0	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	-	0	0	0	-	0	0
Works A treatment capacity increase to treat water from Havant Thicket (Phase 1)	0	0	0	0	+	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Works A treatment capacity increase to treat water from Havant Thicket (Phase 2)	0	0	0	0	+	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New pipeline at Works A to distribute water from Havant Thicket (Phase 1)	0	-	0	0	+	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
'High Plus' Basket	++	0	0	0	++	0	+	0	+	0	+	0	+	0	+	0	0	0	+	0	0	0	++	0	0	0
NEUBS	+	-	0	-	+	0	+	0	+	0	+	0	0	0	0	-	0	0	0	-	0	-	+	0	0	-
TUBS	+	-	0	-	+	0	+	0	+	0	+	0	0	0	0	-	0	0	0	-	0	-	+	0	0	-

11.4.1. BVP Supply Options

The following provides an overview of assessment results for Supply Side Options considered. Note that the assessment of significance is presented in terms of residual effects (i.e., after any additional mitigation is applied) in respect of construction and operation. A discussion on these assessment results follows, with full details of the assessment for each Option provided within Appendix E.

Upgrade Source O Booster to 25Mld

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Upgrade Source O Booster to 25Ml/d														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	-	0	0	-	-	0	0	-	0	0	0	-	-
Operation	Positive Residual Effects	0	0	+	0	0	0	0	0	0	0	0	0	+
	Negative Residual Effects	-	0	-	-	-	-	0	0	0	0	0	0	0

Modelling has shown that the Source O Boosters are a bottleneck for moving water throughout the Portsmouth Water network and it has been shown that increasing the boosters maximum flow rate resulted in a significant increase in Water Resource Zone Deployable Output. This option involves upgrades required to secure pumping from the Source O Boosters. A key element of this will be the replace the existing pumps (a total of three which were installed in 1998 and are approaching the end of the working life), with new pumps and variable speed drives for additional operational benefit. There would also be some pipe upgrades around the pumping station to allow for more efficient pumping.

It is anticipated that this option would not result in any significant adverse or beneficial effects during its construction. No slight beneficial effects during construction were identified either, though slight adverse effects are anticipated during construction in respect of Objective 1 due to potential effects on groundwater having an adverse effect on designated sites. Slight adverse effects are also anticipated from construction on air and noise emissions (Objective 4), carbon emissions (Objective 5), visual amenity (Objective 8) as the Option is located in the South Downs National Park, resource use and built assets (Objectives 12 and 13) due to the requirement for materials and potential effects on the transport network.

It is anticipated that all construction effects would be small scale, short term and temporary to the construction phase.

During operation, slight beneficial effects are anticipated in respect of Objective 3 (water quality) as it will help to contribute to resilience of supply and in respect of Objective 13 (built assets / infrastructure), the upgrade of this infrastructure will ensure that it remains as a valued built asset.

Slight adverse effects are anticipated in respect of biodiversity (Objective 1), water (Objective 3), air and noise emissions (Objective 4), carbon emissions (Objective 5), and vulnerability of built infrastructure to climate change (Objective 6).

It is anticipated that operational effects would be at the local scale, but would be long term (as per the lifespan of the infrastructure) and effectively permanent.

Drought Permit: Source S

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Source S Drought Permit														
Construction	Positive Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Negative Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Operation	Positive Residual Effects	0	0	+	+	+	++	0	0	0	++	0	++	+
	Negative Residual Effects	--	0	--	-	-	-	0	0	-	0	0	0	0

The option looks to increase abstraction from Source S from licensed limit of 2.5Ml/d to 11.5 Ml/d when Swanbourne Lake is already dry (i.e. in a severe drought 1:100 or worse - not dry due to abstraction). This would require a drought permit. Under normal dry conditions abstraction from Source S is limited due to its assumed impact on the SSSI (but artificial) Swanbourne Lake (at Arundel). Source S is part of the QRST Group. The group abstraction licence limited to 41 Ml/d and not more than 2,100 Ml in any period of 60 days. The permit would increase the group limit to 49.5 Ml/d.

As the existing infrastructure at Source S is sized for the original licence (11Ml/d) which was reduced to 2.5Ml/d in 1996, implementation of the new drought permit would not require modifications to the site nor construction of new ancillary infrastructure as operation would revert back to using the higher capacity pumps.

There is no construction phase associated with this option thus no effects on the SEA objectives emerging from construction.

A small number of slight beneficial effects are anticipated in respect of Objective 3 (water quality) as it will help ensure water supply during drought conditions, Objective 4 and 5 (air, noise and carbon emissions) as it may help reduce the need for additional intensive external transfers and abstractions with greater emissions implications. In addition, slight beneficial effects are anticipated in respect of Objective 13 (built assets / infrastructure) as the drought permit may act to alleviate demand restrictions which have the potential to impact on built assets by enforcing cleaning and maintenance restrictions.

During operation, slight adverse effects are anticipated in relation to Objective 4 and 5 (air, noise and carbon emissions) due to additional pumping and treatment requirements leading to emissions, as well as Objective 6 (vulnerability to climate change) as ultimately this could result in additional pressure on remaining resources. Slight adverse effects are also anticipated in relation to cultural heritage (Objective 10) potential effects to archaeological remains from waterlogging due to fluctuating water tables.

Effects are anticipated to be local in scale, short term and temporary.

The operation of this option will likely produce significant (moderate) adverse effects in relation to two SEA objectives:

- **Objective 1: 'To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain'**, as the EAR (2022) records likely impacts on designated sites as up to major adverse for Arundel Park SSSI (unit 2) and for Arun Valley Watersfield to Arundel LWS. This effect is considered to be of regional scale, short term and temporary to the drought period. Consultation received for NE on the dWRMP24 HRA submission requested that the Arun Valley SPA, Arun Valley SAC, and Arun Valley Ramsar site, that were screened out of the dWRMP24 HRA, are taken forward to Stage 2 Appropriate Assessment. Further consideration to the potential impact on these sites, located over 8.4km to the northeast of the Source S source, upstream and on the opposite (east) bank of the River Arun has been completed. The SAC, SPA and Ramsar sites are located predominantly on alluvium, peat and head superficial deposits that overlie bedrock comprising Gault Formation and underlying Folkestone Formation which are hydraulically isolated from the Chalk Group from which the Source S source abstracts. Although there is potential for the Arun Valley SAC, SPA and Ramsar sites to receive some springflow from the Chalk escarpment that runs along the southern boundary of the SAC/SPA/Ramsar site, these Chalk springs would be fed from a different, and hydraulically isolated, Chalk aquifer block to that from which the Source S source abstracts. Groundwater from these separate Chalk aquifer blocks discharges to the River Arun where it cuts through the South Downs at the Arun Gap and the river effectively separates the groundwater systems of the two aquifer blocks. Therefore, the risk of abstraction changes at the Source S source impacting groundwater levels in or springflows to the Arun SAC/SPA/Ramsar is considered negligible. As such the options have not been progressed to Level 2 Appropriate Assessment and have been ruled out of the ICA.
- **Objective 3: 'To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats'**, as the additional abstraction of groundwater from subterranean chalk spring, which supply groundwater to proximate waterbodies within the vicinity of the borehole (e.g. Swanbourne Lake and Arundel Park) and the increased abstraction limit may potentially exacerbate the effects of drought on the local water system regarding

supply and recovery. This effect is considered to be of local scale, short term and temporary to the drought period. Note that the WFD Level 2 assessment concluded that there is a possible risk of WFD status deterioration (Chichester Chalk groundwater body).

The operation of this option will likely produce significant beneficial effects in relation to three SEA objectives:

- **Objective 6: 'To reduce vulnerability of built infrastructure to climate change risks and hazards'**, as implementation of this measure will increase resilience to climate change.
- **Objective 10: 'To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing'** owing to the options capacity to ensure provision of drinking water during periods of drought.
- **Objective 12: 'To minimise resource use and waste production'** as the drought permit has the potential to reduce the need for more resource intensive external transfers and abstractions.

Beneficial effects are considered to be of local scale, short term and temporary to the drought period.

New Treatment works at Service Reservoir C to treat water from Havant Thicket Reservoir

Supply Side Option	SEA Objective												
	1	2	3	4	5	6	7	8	9	10	11	12	13

New Treatment works at Service Reservoir C to treat water from Havant Thicket Reservoir														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	+	+	0	0	+
	Negative Residual Effects	-	-	-	-	-	-	0	-	-	-	-	-	-
Operation	Positive Residual Effects	0	0	+	0	0	++	0	0	0	++	0	0	0
	Negative Residual Effects	0	0	0	-	-	0	0	-	-	-	0	0	0

This option includes a new WTW adjacent to an existing reservoir site.

It is anticipated that this option would not result in any significant adverse or beneficial effects during its construction. Slight beneficial effects are anticipated in respect of cultural heritage (Objective 9) due to the potential to uncover unknown buried archaeology and therefore contribute to local archaeological understanding. Slight beneficial effects are also anticipated for Objective 10 (health and wellbeing) due to employment opportunities and for Objective 13 (built assets / infrastructure) as the WTWs situation in proximity to an existing reservoir is considered efficient and may reduce supporting / enabling infrastructure requirements.

Slight adverse effects are anticipated during construction in respect of Objective 1 (biodiversity) due to potential indirect effects on priority habitat, Objective 2 (soil) due to potential loss of Grade 3 agricultural land and Objective 3 (Water) due to the likelihood of a pollution incident occurring. Slight adverse effects are also anticipated for Objective 4 (Air Quality), Objective 5 (Greenhouse Gas Emissions) and Objective 6 (Climate Factors) as construction is likely to give rise to noise and carbon emissions. In addition, slight adverse effects during construction apply to Objective 8 (Landscape) due to the impact on visual amenity, Objective 9 (Cultural Heritage) as the setting of historic assets may be affected, Objectives 10 and 11 (Population and Human Health) due to the potential for indirect effects on residents of nearby dwellings and amenities, and Objectives 12 and 13 (Material Assets) due to the use of materials, generation of waste and potential for disruption to the local transport network.

Effects during construction are anticipated to be local in scale, short term and temporary.

During operation, slight beneficial effects in relation to Objective 3 (Water) are anticipated due to the use of CEMP which outlines measures to protect the water environment.

In addition, operation is anticipated to cause slight adverse effects are anticipated in relation to Objective 4 (Air Quality) and Objective 5 (Greenhouse Gas Emissions) as operation is likely to give rise to noise and carbon emissions, Objective 8 (Landscape) due to the impacts on visual amenity, Objective 9 (Cultural Heritage) as operation may affect the setting of historic assets, and Objective 10 (Population and Human Health) due to the potential for indirect effects on residents of nearby dwellings.

Effects during operation are anticipated to be local in scale, long-term and permanent.

The operation of this option will likely produce significant beneficial effects in relation to two SEA objectives:

- **Objective 6: 'To reduce vulnerability of built infrastructure to climate change risks and hazards'**, due to treatment resulting in increased potable water within the network.
- **Objective 10: 'To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing'** as operation of the WTW may secure health and wellbeing benefits by improving the resilience of water supply.

New pipeline at WTW at Service Reservoir C to distribute water from Havant Thicket Reservoir

Supply Side Option	SEA Objective												
	1	2	3	4	5	6	7	8	9	10	11	12	13

New pipeline at WTW at Service Reservoir C to distribute water from Havant Thicket Reservoir													
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	+	0	0	0	0
	Negative Residual Effects	-	-	-	-	-	0	0	-	-	-	-	-	-
Operation	Positive Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	-	0	0	0	-	0	0	-	-	-	0	-	0

Spur from proposed raw water transfer between Havant Thicket and Otterbourne. This option includes booster pumping but it is likely that sufficient head will be available from the Pipeline associated new treatment works at Service Reservoir C to distribute water from Havant Thicket Reservoir.

It is anticipated that this option would not result in any significant adverse or beneficial effects during its construction. Slight beneficial effects are anticipated in respect of Objective 9 (Cultural Heritage) due to the potential to uncover unknown buried archaeology and therefore contribute to local archaeological understanding.

Slight adverse effects are anticipated during construction in relation to Objective 1 (Biodiversity) due to potential indirect effects on adjacent areas of ancient woodland, Objective 2 (Soil) as construction may result in the loss of best and most versatile land, and Objective 3 (Water) as construction increases the likelihood of a pollution incident. In addition, slight adverse effects are anticipated for Objective 4 (Air Quality) and Objective 5 (Greenhouse Gas Emissions) due to the potential for noise and carbon emissions. Slight adverse effects also apply to Objective 8 (Landscape) due to minor impacts on visual amenity, Objective 9 (Cultural Heritage) due to the effect on the setting of historic assets, Objectives 10 and 11 (Population and Human Health) due to the potential for disturbance to residents within 100m of the option and effects on amenity, noise and access, and Objectives 12 and 13 (Material Assets) due to the use of materials, generation of waste and the potential for temporary disruption affecting road users.

Effects during construction are anticipated to be local in scale, short term and temporary.

It is anticipated that this option would not result in any significant adverse or beneficial effects during its operation. No slight beneficial effects during operation were identified either, though slight adverse effects are anticipated during operation in respect of Objective 1 (Biodiversity) due to the effect on Priority Habitats, Objective 5 (Greenhouse Gas Emissions) due to a rise in carbon emissions and Objective 8 (Landscape) due to the impact on visual amenity. Slight adverse effects also apply to Objective 9 (Cultural Heritage) due to the impact on the setting of historic assets, Objective 10 (Population and Human Health) due to disturbance to residents within 100m of the option, and Objective 12 (Material Assets) due to energy consumption during operation.

Effects during operation are anticipated to be local in scale, long term and permanent.

The operation of this pipeline will likely produce significant beneficial effects in relation to two SEA objectives:

Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 1)

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 1)														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	0	0	0	+	0
	Negative Residual Effects	0	0	0	-	-	0	0	0	-	-	-	-	-
Operation	Positive Residual Effects	0	0	+	0	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	0	0	0	0	-	0	0	0	0	0	0	0	0

Increased treatment capacity at Works A to accommodate increased draw from Havant Thicket Reservoir and pass forward of treated water to Service Reservoir B.

It is anticipated that this option would not result in any significant adverse or beneficial effects during its construction. Slight beneficial effects are anticipated in respect of Objective 12 (Material Assets) as the option may save resources and waste by increasing treatment capacity at a current WTW as opposed to construction of new infrastructure.

Slight adverse effects are anticipated during construction in respect of Objective 4 (Air Quality) due to potential air and noise emissions, and Objective 5 (Greenhouse Gas Emissions) due to minor construction carbon emissions. Slight adverse effects also apply to Objective 9 (Cultural Heritage) due to anticipated effects on the setting of historic assets, Objectives 10 and 11 (Population and Human Health) due to impacts to the users of community recreational facilities and the wider community, and Objectives 12 and 13 (Material Assets) due to the use of materials, generation of waste and potential minor disruption to the local road network.

Effects during construction are anticipated to be local in scale, short term and temporary.

During operation, slight beneficial effects are anticipated in relation to Objective 3 (Water) as the option will facilitate water supply. Slight adverse effects are anticipated in relation to Objective 5 (Greenhouse Gas Emissions) due to minor operational carbon emissions.

Effects during operation are anticipated to be local in scale, long-term and permanent.

Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 2)

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 2)														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	0	0	0	+	0
	Negative Residual Effects	0	0	0	-	-	0	0	0	-	-	-	-	-
Operation	Positive Residual Effects	0	0	+	0	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	0	0	0	0	-	0	0	0	0	0	0	0	0

Increased treatment capacity at Works A to accommodate increased draw from Havant Thicket Reservoir and pass forward of treated water to Service Reservoir B.

It is anticipated that this option would not result in any significant adverse or beneficial effects during its construction. Slight beneficial effects are anticipated in respect of Objective 12 (Material Assets) as the option may save resources and waste by increasing treatment capacity at a current WTW as opposed to construction of new infrastructure.

Slight adverse effects are anticipated during construction in respect of Objective 4 (Air Quality) due to minor air and noise emissions, and Objective 5 (Greenhouse Gas Emissions) due to minor construction carbon

emissions. Slight adverse effects also apply to Objective 9 (Cultural Heritage) due to potential effects on the setting of historic assets, Objectives 10 and 11 (Population and Human Health) due to impacts to the users of community recreational facilities and the wider community, and Objectives 12 and 13 (Material Assets) due to the use of materials, generation of waste and potential minor disruption to the local road network.

Effects during construction are anticipated to be local in scale, short term and temporary.

During operation, slight beneficial effects are anticipated in relation to Objective 3 (Water) as the option will facilitate water supply. Slight adverse effects are anticipated in relation to Objective 5 (Greenhouse Gas Emissions) due to minor operational carbon emissions.

New pipeline at works A to distribute water form Havant Thicket Reservoir (Phase 1)

Supply Side Option	SEA Objective												
	1	2	3	4	5	6	7	8	9	10	11	12	13

New pipeline at works A to distribute water form Havant Thicket Reservoir (Phase 1)														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	+	0	0	0	0
	Negative Residual Effects	-	-	-	-	-	0	-	-	-	-	-	-	-
Operation	Positive Residual Effects	0	0	+	0	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	-	0	0	0	-	0	0	0	0	0	0	0	0

Increased draw from Havant Thicket reservoir to increased treatment capacity at Works A treatment works. Pass forward treated water to Service Reservoir B.

It is anticipated that this option would not result in any significant adverse or beneficial effects during its construction. Slight beneficial effects are anticipated during construction in respect of Objective 9 (Cultural Heritage) due to the potential to uncover unknown buried archaeology and improve local archaeological understanding.

Slight adverse effects are anticipated during construction in relation to Objective 1 (Biodiversity) due to potential impacts on Priority Habitats, Ancient Woodland and chalk rivers, Objective 2 (Soil) as there is potential for direct impact to land considered best and most versatile, and Objective 3 (Water) due to potential impacts on water quality and quantity. Slight adverse effects also apply to Objective 4 (Air Quality) due to temporary construction impacts on air and noise quality, Objective 5 (Greenhouse Gas Emissions) due to carbon emissions, Objective 7 (Climate Factors) due to an increased risk of pollution incidents and Objective 8 (Landscape) due to impacts on visual amenity as there is potential for loss or degradation of natural landscape features. In addition, slight adverse effects are anticipated in relation to Objective 9 (Cultural Heritage) as construction may affect the setting of the historic features, Objectives 10 and 11 (Population and Human Health) due to expected disturbance to the local community and temporary effects on recreation, and Objectives 12 and 13 (Material Assets) due to new infrastructure required, energy consumption, and excavated material generated, as well as road diversions and disruption to access.

Most effects during construction are anticipated to be local in scale, short term and temporary, excluding the permanent loss of biodiversity.

It is anticipated that this option would not result in any significant adverse or beneficial effects during its operation. However, slight beneficial effects are anticipated in relation to Objective 3 (Water) as the option will facilitate increased water supply. A small number of slight adverse effects are anticipated during operation in respect to Objective 1 (Biodiversity) due to potential impacts on Priority Habitats, Ancient Woodland and chalk rivers, and Objective 5 (Greenhouse Gas Emissions) due to the rise in carbon emissions.

Most effects during construction are anticipated to be local in scale, long term and permanent, excluding the short term slight adverse effect on Biodiversity (Objective 1) as habitat is reinstated.

11.4.2. BVP Demand Side Options

The following provides an overview of assessment results for Demand Side Options considered. Note that the assessment of significance is presented in terms of residual effects (i.e., after any additional mitigation is

applied) in respect of construction and operation. A discussion on these assessment results follows, with full details of the assessment for each Option provided within Appendix E.

'High Plus' Demand basket

Demand Management		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
'High Plus' Demand basket														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	-	-	-	-	-	0	0	-	-	-	0	-	-
Operation	Positive Residual Effects	++	0	++	+	+	+	+	+	0	+	0	++	0
	Negative Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0

The option will involve:

- Home water efficiency audits outside of the smart metering programme
- Education
- Community Reward Platform
- General broadcast messages (multi-channel proactive comms)
- Community campaign
- Leak Alarms (e.g., Leakbot)
- Universal smart metering
- Household flow reduction (pressure control)
- Household Incentives: Innovative tariffs
- Non-Household efficiency checks / audits
- Vulnerability / Inclusion and Equality
- Leading by example

It is to be noted that this Option applies across the whole of the Portsmouth area. It is anticipated that this option would not result in any significant adverse or beneficial effects during its construction. During construction though, a number of slight adverse effects have been identified. These include on Biodiversity (Objective 1), where there may be minor effects such as disturbance or small areas of habitat loss during repair works, and Soil (Objective 2) as construction has the potential to disturb contaminated material and impact on BMV agricultural land. Similar slight adverse effects could be expected through the activities associated with repair leakage works on water quality (Objective 3), air, noise and carbon emissions (Objective 4 and 5), landscape and visual amenity (Objective 8), the historic environment (Objective 9), health and wellbeing due to disturbance causing effects on wellbeing (stress) induced by repair works (Objective 10). Repair works will also lead to the use of resources and increase waste (Objective 12), while there may be effects on built infrastructure (Objective 13) such as road surfacing.

Such construction adverse effects are anticipated to be local scale, excluding the regional impact on biodiversity, short term and temporary to the construction / repair phase.

A range of slight beneficial effects have been identified associated with the operation phase of this Option. These include in relation to air, noise and carbon emissions (Objective 4 and 5) as reduced water pumping and treatment is required. Keeping water in the environment may also help avoid negative effects on the built environment (Objective 6). Network improvements are also likely to lead to a reduction in pipe bursts and help to reduce the risk of accidental flooding (Objective 7). More water will also be retained in the environment and help maintain visual amenity (Objective 8). Securing a more resilient water supply will also help maintain health and wellbeing (Objective 10). Reduced leakage and improved repair etc. will help maintain built infrastructure (Objective 13).

The operation of this Option will likely produce significant beneficial effects in relation to three SEA objectives:

- **Obj 1: 'To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain'**, due to awareness campaigns, retrofitting, metering and leakage reduction works resulting in water being kept within the environment, the protection of water resources, reduced pressures on water supplies and improved efficiency.
- **Obj 3: 'To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats'**, due to awareness campaigns, retrofitting, metering and leakage reduction works resulting in water being kept within the environment.
- **Obj 12: 'To minimise resource use and waste production'**, as leakage works will reduce resource use and wastage.

These beneficial effects can be considered of local scale, excluding the regional effect on Biodiversity, but long term and can be considered permanent.

Non-essential use bans

Supply Bans		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
NEUBS														
Construction	Positive Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Negative Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation	Positive Residual Effects	+	0	+	+	+	+	0	0	0	0	0	+	0
	Negative Residual Effects	-	-	0	0	0	0	0	-	0	-	-	0	-

This Option would apply to the whole of the Portsmouth area. NEUBs target non-domestic users and may only be implemented following approval of an Ordinary Drought Order by the Secretary of State. Typically, NEUBs would include:

- Watering outdoor plants on commercial premises;
- Filling or maintaining a non-domestic swimming or paddling pool;
- Filling or maintaining a pond;
- Operating a mechanical vehicle-washer;
- Cleaning any vehicle, boat, aircraft or railway rolling stock;
- Cleaning any exterior part of a non-domestic building or non-domestic wall;
- Cleaning a window of a non-domestic building;
- Cleaning industrial plant;
- Suppressing dust; and
- Operating cisterns on unoccupied buildings.

There is no construction phase associated with this Option thus no effects on the SEA objectives emerging from construction. In relation to operational effects, while no significant beneficial effects have been identified, there are anticipated to be a number of slight beneficial effects, and these are mainly associated with the outcome of reducing demand and potentially reducing abstraction / treatment. Slight beneficial effects are anticipated in relation to Biodiversity (Objective 1) as more water will remain in the environment, with consequent benefits for water dependant species and habitats. Reduced abstraction will help maintain river and groundwater levels (Objective 3) and this could have beneficial effects on built infrastructure by helping to ensure soil moisture does not reduce to a level that could pose a risk to infrastructure foundations (Objective 6). Reduced treatment and pumping will also reduce air, noise and carbon emissions (Objectives 4 and 5). Reduced abstraction, treatment and pumping will also reduce the use of resources and waste produced (Objective 12).

It is considered that all slight beneficial effects will be at the very local scale, short term and temporary.

It is not anticipated that the operation of this option will produce significant adverse effects in relation to any of the SEA objectives. A number of slight adverse effects have been identified though. In relation to Biodiversity (Objective 1), the restrictions on watering plants and using hosepipes may have minor adverse effects on pollinators, insects, fish (domestic ponds) and birds (bird baths) where gardens are found to support such biodiversity. There could also be effects on soils (Objective 2) through dust generation and erosion e.g. in gardens or other such open spaces. Lack of ability to water open spaces or operate ornamental fountains etc. could impact visual amenity and landscapes (Objective 8). Non-essential use ban is likely to have minor negative effects on the community and social well-being (Objective 10) as there will be restrictions on irrigation of gardens and allotments and use of water for recreational purposes. There may also be a small increased risk of fires in allotments as vegetation dries out. Risk to human health and wellbeing may also be increased where dust suppression measures cannot be implemented and cleaning of paths and other infrastructure restricted. This may increase health and safety risks. Assuming commercial properties including gardens are exempt from bans and restrictions there is likely to be only a minor effect on tourism and recreation (Objective 11). Non-commercial tourism sites may be affected. In addition, while temporary, the Option is likely to impact on the maintenance of buildings and industrial plant (Objective 13).

It is considered that all slight adverse effects will be short term and temporary and confined to the local scale.

Temporary use bans (TUBs)

Supply Bans		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
TUBS														
Construction	Positive Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Negative Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation	Positive Residual Effects	+	0	+	+	+	+	0	0	0	0	0	+	0
	Negative Residual Effects	-	-	0	0	0	0	0	-	0	-	-	0	-

This Option would apply to the whole of the Portsmouth area. TUBs are restrictions which cover the outdoor use of water for household purposes and can be introduced quickly. It is considered that these would be introduced in phases and include the following components:

- Watering a garden using a hosepipe
- Cleaning a private motor-vehicle using a hosepipe
- Watering plants on domestic or other non-commercial premises using a hosepipe
- Cleaning a private leisure boat using a hosepipe
- Filling or maintaining a domestic swimming or paddling pool
- Drawing water, using a hosepipe, for domestic recreational use
- Filling or maintaining a domestic pond using a hosepipe
- Filling or maintaining an ornamental fountain
- Cleaning walls, or windows, of domestic premises using a hosepipe
- Cleaning paths or patios using a hosepipe

There is no construction phase associated with this option thus no effects on the SEA objectives emerging from construction. In relation to operational effects, while no significant beneficial effects are identified, there are a number of slight beneficial effects anticipated and these are mainly associated with the outcome of reducing demand and potentially reducing abstraction / treatment. Slight beneficial effects are anticipated in relation to Biodiversity (Objective 1) as more water will remain in the environment, with consequent benefits for water dependant species and habitats. The option aims to reduce the water required for supply, therefore resulting in a reduction in abstraction which will help maintain river flows and protect ground water and surface water bodies (Objective 3) and this could have beneficial effects on built infrastructure by helping to ensure soil moisture does not reduce to a level that could pose a risk to infrastructure foundations (Objective 6). Reduced treatment and pumping will reduce air, noise and carbon emissions (Objectives 4 and 5). Reduced abstraction, treatment and pumping will also reduce the use of resources and waste produced (Objective 12).

It is considered that all slight beneficial effects will be at the very local scale, short term and temporary.

It is not anticipated that the operation of this option will produce significant adverse effects in relation to any of the SEA objectives. A number of slight adverse effects have been identified though. In relation to Biodiversity (Objective 1), the restrictions on watering plants and using hosepipes may have minor adverse effects on pollinators, insects, fish (domestic ponds) and birds (bird baths) where gardens are found to support such biodiversity. There could also be effects on soils (Objective 2) through dust generation and erosion e.g. in gardens or other such open spaces. Lack of ability to water open spaces or operate ornamental fountains etc. could impact visual amenity and landscapes (Objective 8). Non-essential use ban is likely to have minor negative effects on the community and social well-being (Objective 10) as there will be restrictions on irrigation of gardens and allotments and use of water for recreational purposes. There may also be a small increased risk of fires in allotments as vegetation dries out. Wellbeing impacts associated with reduced water based recreational activities which improve tolerance and capacity to enjoy higher temperatures. Assuming commercial properties including gardens are exempt from bans and restrictions there is likely to be only a minor effect on tourism and recreation (Objective 11). Non-commercial tourism sites may be affected. In addition, while temporary, the Option is likely to impact on private assets / residential properties (Objective 13).

It is considered that all slight adverse effects will be short term and temporary and confined to the local scale.

12. Mitigation

12.1. Introduction

The term mitigation encompasses any approach that is aimed at preventing, reducing or offsetting any significant adverse environmental effects that have been identified. In practice, a range of measures applying one or more of these approaches is likely to be considered in mitigating any significant adverse effects predicted as a result of implementing WRMP24. In addition, it is also important to consider measures aimed at enhancing positive effects. All such measures are generally referred to as mitigation measures.

However, the emphasis should be in the first instance on proactive avoidance of adverse effects. Only once alternative options or approaches to avoiding an effect have been examined, should mitigation then examine ways of reducing the scale / importance of the effect.

Mitigation can take a wide range of forms, including:

- Refining Intervention measures in order to improve the likelihood of positive effects and to minimise adverse effects;
- Technical measures (such as setting guidelines) to be applied during the implementation phase;
- Identifying issues to be addressed in project assessment, such as Environmental Impact Assessment and the development of Environmental Management Plans for certain projects or types of project;
- Proposals for changing other plans and programmes; and
- Contingency arrangements for dealing with possible adverse effects.

Note that Portsmouth Water are committed to ensuring that mitigation is applied at all appropriate stages of planning and design and will be implemented on site during construction. Mitigation will be further developed through for example the Environmental Impact Assessment process which would apply to many of the Options within the Plan.

12.2. Mitigation approaches applied through the SEA

A number of mitigation approaches have been used throughout the development of the Water Resource Management Plan, in order to mitigate potential effects (significant or otherwise). Of note is that within a number of Options, ‘embedded mitigation’ has been considered as part of the assessment process i.e. ‘Embedded mitigation’ is mitigation that has been incorporated into the development of the Option and is set out for each Option in the tables below. Through the SEA process, and following assessment, further ‘additional mitigation’ has also been identified and this is also set out in Table to Table 12-10. ‘Additional mitigation’ is mitigation that is required to address specific issues relating to significant effects in addition to ‘embedded mitigation’ and identified through the SEA process.

Table 12-1 – Upgrade Source O Booster to 25Ml/d Mitigation

Upgrade Source O Booster to 25Ml/d	
Embedded Mitigation considered in Option assessment	
None identified	
Additional Mitigation derived from Option assessment	
Objective 1: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	During the replacement of the pumps standard pollution control best practices will be applied at all times, and although HRA appropriate assessment will be required these measures are considered sufficient to mitigate for any significant effect on the designated sites. HRA Mitigation as follows: • Best practice measures during construction. • Sensitive design and avoidance/mitigation measures required during construction in order to minimise impacts. Further details on the required works and anticipated pollution levels are required in order to determine the likely impacts on the Chichester Chalk groundwater body.
Objective 2: To Protect and enhance the functionality, quantity and quality of soils	Best practicable means to prevent impacts associated with contaminated land.
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	Further assessment to understand potential to impact groundwater resources.
Objective 4: To reduce and minimise air and noise emissions	Best practice mitigation measures implemented during construction, however minor and temporary impacts on air quality may remain. Investigate use of renewables during operation for energy supply
Objective 5: To achieve Portsmouth Water target of reducing operational carbon emissions to Net Zero by 2030 and contribute to national target of Net Zero by 2050	Investigate use of renewables during construction and operation for energy supply and use of materials with lower embodied carbon. Carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available.
Objective 6: To reduce vulnerability of built infrastructure to climate change risks and hazards	Monitor water levels, especially during long dry periods.
Objective 7: To reduce or manage flood risk, taking climate change into account	None identified

Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	Best practicable means to minimise visual intrusion during construction.
Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	None identified
Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	None identified
Objective 11: To maintain and enhance tourism and recreation	None identified
Objective 12: To minimise resource use and waste production	Seek opportunity to implement sustainable design measures (design to reduce footprint, selection of materials) and reuse excavated material to reduce the impact, however it is likely that minor negative effects will remain. This may involve a Site Waste Management Plan and consideration of the waste hierarchy.
Objective 13: To avoid negative effects on built assets / infrastructure	Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction. However, minor and temporary effects are likely to still occur.

Table 12-2 - Drought Permit: Source S Mitigation

Drought Permit: Source S	
Embedded Mitigation considered in Option assessment	
None identified	
Additional Mitigation derived from Option assessment	
Objective 1: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	Further investigation/modelling required to improve certainty of effect on receptors including Arundel Park SSSI and Arun Valley Watersfield to Arundel LWS and dependant species.
Objective 2: To Protect and enhance the functionality, quantity and quality of soils	None identified
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	Further WFD assessment and modelling required.
Objective 4: To reduce and minimise air and noise emissions	None identified
Objective 5: To achieve Portsmouth Water target of reducing operational carbon emissions to Net Zero by 2030 and contribute to national target of Net Zero by 2050	Investigate use of renewables during operation for energy supply. As the electricity grid is decarbonised, greener energy will be available.
Objective 6: To reduce vulnerability of built infrastructure to climate change risks and hazards	None identified
Objective 7: To reduce or manage flood risk, taking climate change into account	None identified
Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	None identified
Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	Further detailed assessments of receptors and impacts is required using more detailed modelling. Recommendations arising from further modelling and assessment to be adopted in full.

Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	None identified
Objective 11: To maintain and enhance tourism and recreation	None identified
Objective 12: To minimise resource use and waste production	None identified
Objective 13: To avoid negative effects on built assets / infrastructure	None identified

Table 12-3 –High Plus Basket Mitigation

Demand Basket High Plus Company	
Embedded Mitigation considered in Option assessment	
None identified	
Additional Mitigation derived from Option assessment	
Objective 1: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	Ensure best practicable means to prevent loss of habitat during construction. Use of access shafts (or similar) for leakage works would be used to avoid ecologically sensitive locations.
Objective 2: To Protect and enhance the functionality, quantity and quality of soils	Land reinstated upon completion of leakage works. Best practice construction measures to be implemented. Complete appropriate contaminated land investigations where necessary.
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	Measures to reduce pollution risk during construction associated with capital works may include implementation of CEMP.
Objective 4: To reduce and minimise air and noise emissions	Best practice mitigation measures implemented during construction.
Objective 5: To achieve Portsmouth Water target of reducing operational carbon emissions to Net Zero by 2030 and contribute to national target of Net Zero by 2050	None identified
Objective 6: To reduce vulnerability of built infrastructure to climate change risks and hazards	None identified
Objective 7: To reduce or manage flood risk, taking climate change into account	Measures to reduce the impact on flooding during the construction phase (leakage works) should still be implemented. This may include implementation of CEMP.
Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	Best practice measures will likely be implemented to minimise effects during construction (leakage works), however minor and temporary impacts may remain.
Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	Best practice measures will likely be implemented to minimise effects during construction (leakage works), however minor and temporary impacts may remain.

Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	Best practice mitigation measures e.g. noise management to be implemented to minimise effects during construction (leakage works). However, minor and temporary effects are likely to still occur.
Objective 11: To maintain and enhance tourism and recreation	None identified
Objective 12: To minimise resource use and waste production	Consider use of Waste Management Plan and KPIs in respect of waste reuse for capital projects.
Objective 13: To avoid negative effects on built assets / infrastructure	Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction (leakage works). However, minor and temporary effects are likely to still occur.

Table 12-4 - NEUBS Mitigation

NEUBS	
Embedded Mitigation considered in Option assessment	
None identified	
Additional Mitigation derived from Option assessment	
Objective 1: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	Risk of INNS to be considered when banning washing of water craft. Consider mandating of visual inspections to ensure no transfer of INNS
Objective 2: To Protect and enhance the functionality, quantity and quality of soils	None identified
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	None identified
Objective 4: To reduce and minimise air and noise emissions	None identified
Objective 5: To achieve Portsmouth Water target of reducing operational carbon emissions to Net Zero by 2030 and contribute to national target of Net Zero by 2050	None identified
Objective 6: To reduce vulnerability of built infrastructure to climate change risks and hazards	None identified
Objective 7: To reduce or manage flood risk, taking climate change into account	None identified
Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	None identified
Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	None identified

Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	Allowing allotments limited supplies of water and ensuring high levels of communication before, during and following the implementation of these measures will mitigate these effects. Consider exemptions where dust suppression would alleviate impacts on particularly vulnerable groups e.g. construction works near hospitals, schools, nursery and care homes.
Objective 11: To maintain and enhance tourism and recreation	None identified
Objective 12: To minimise resource use and waste production	None identified
Objective 13: To avoid negative effects on built assets / infrastructure	None identified

Table 12-5 - TUBS Mitigation

TUBS	
Embedded Mitigation considered in Option assessment	
None identified	
Additional Mitigation derived from Option assessment	
Objective 1: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	None identified
Objective 2: To Protect and enhance the functionality, quantity and quality of soils	None identified
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	None identified
Objective 4: To reduce and minimise air and noise emissions	None identified
Objective 5: To achieve Portsmouth Water target of reducing operational carbon emissions to Net Zero by 2030 and contribute to national target of Net Zero by 2050	None identified
Objective 6: To reduce vulnerability of built infrastructure to climate change risks and hazards	None identified
Objective 7: To reduce or manage flood risk, taking climate change into account	None identified
Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	None identified
Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	None identified

Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	Allowing allotments limited supplies of water and ensuring high levels of communication before, during and following the implementation of these measures.
Objective 11: To maintain and enhance tourism and recreation	None identified
Objective 12: To minimise resource use and waste production	None identified
Objective 13: To avoid negative effects on built assets / infrastructure	None identified

Table 12-6 - Pipeline associated new treatment works at Service Reservoir C to distribute water from Havant Thicket Reservoir Mitigation

Pipeline associated new treatment works at Service Reservoir C to distribute water from Havant Thicket Reservoir	
Embedded Mitigation considered in Option assessment	
None identified	
Additional Mitigation derived from Option assessment	
Objective 1: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	Best practice methods to be implemented to minimise disturbance effects and habitat loss including refining pipeline alignment to avoid woodland habitat and other Priority Habitats. Habitat to be reinstated on completion, or if unavoidable compensatory habitat to be considered to replace damaged or lost habitat. During pipeline and pump construction, pollution control best practices will be applied at all times. This is expected to include implementation of a robust CEMP which outlines measures to protect areas of biodiversity value. Chalk rivers are very sensitive waterbodies that could be impacted through sediment loading and / or pollution incidents during construction. As such mitigation should include, for example, a Construction Method Statement for crossing the chalk river that embeds sediment and pollution management measures. Site selection for the pumping station should avoid areas of biodiversity value. Further ecology surveys likely to be required. Results of such surveys should be used to inform site selection and detailed design in respect of pumping station.
Objective 2: To Protect and enhance the functionality, quantity and quality of soils	Further surveying to establish presence of BMV land and design accordingly to reduce / minimise loss and reinstate on completion. Best practicable means to prevent impacts associated with contaminated land.
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	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. Monitoring of any discharges during construction and operation to ensure no adverse change in water quality.
Objective 4: To reduce and minimise air and noise emissions	Best practice mitigation measures implemented during construction, however minor and temporary impacts on air quality may remain. Site selection of pumping station and detailed design to consider location of NIA and dwellings. Consider need for noise barriers during construction.

	Investigate use of renewables during operation of pumping station for energy supply
Objective 5: To achieve Portsmouth Water target of reducing operational carbon emissions to Net Zero by 2030 and contribute to national target of Net Zero by 2050	Best practice mitigation measures implemented during construction, however minor and temporary impacts on air quality may remain. Site selection of pumping station and detailed design to consider location of NIA and dwellings. Consider need for noise barriers during construction. Investigate use of renewables during operation of pumping station for energy supply
Objective 6: To reduce vulnerability of built infrastructure to climate change risks and hazards	None identified
Objective 7: To reduce or manage flood risk, taking climate change into account	Measures to reduce the impact of flooding during the construction phase such as pollution control measures and incident response plan to be incorporated. Location and design of pumping station to consider flood risk.
Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	Best practicable means to minimise visual intrusion during construction.
Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	Best practice measures to be implemented to minimise setting effects during construction and consideration of unexpected heritage discovery in CEMP. Further work likely to be required to determine significance of effect, depending on the presence or absence of buried archaeology and potential need for archaeological watching brief during construction – particularly in areas not previously developed. Residual effects may remain due to potential loss of archaeological remains due to construction. Situation of above ground infrastructure to be sensitive to historic environment. Consider use of screening.
Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	Early consultation with nearby residents recommended. Site selection and detailed design to consider measures to reduce impact on nearby residents and land users.
Objective 11: To maintain and enhance tourism and recreation	Early consultation, erection of fencing, signage and use of diversionary routes where necessary.
Objective 12: To minimise resource use and waste production	Reuse excavated material and consider use of trenchless techniques during construction. Employment of Site Waste Management Plan and consideration of the waste hierarchy.

Objective 13: To avoid negative effects on built assets / infrastructure	Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction. Consider use of trenchless techniques to minimise disruption in sensitive areas. Consider night working to minimise disruption to road and rail intersections, specifically A32.

Table 12-7 – Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 1) Mitigation

Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 1)	
Embedded Mitigation considered in Option assessment	
None identified	
Additional Mitigation derived from Option assessment	
Objective 1: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	Best practice methods to be implemented to minimise disturbance effects. Future design will need to undertake ecology surveys.
Objective 2: To Protect and enhance the functionality, quantity and quality of soils	Best practicable means to prevent impacts associated with contaminated land.
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	Best practice construction methods will be implemented to mitigate the effects.
Objective 4: To reduce and minimise air and noise emissions	Best practice mitigation measures implemented during construction, however some minor impacts anticipated to remain.
Objective 5: To achieve Portsmouth Water target of reducing operational carbon emissions to Net Zero by 2030 and contribute to national target of Net Zero by 2050	Investigate use of renewables during construction and operation for energy supply and use of materials with lower embodied carbon. Carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available.
Objective 6: To reduce vulnerability of built infrastructure to climate change risks and hazards	None identified.
Objective 7: To reduce or manage flood risk, taking climate change into account	None identified.
Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	None identified.
Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	Given there is potential to impact buried archaeology, an Archaeology Watching Brief may be required during the construction phase. Further work may be required to determine the significance of the effect depending on the presence / absence of buried archaeology. Residual effects may remain due to potential loss of archaeological remains due to construction.

Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	Best practice mitigation measures e.g. noise management to be implemented to minimise effects during construction. However, minor and temporary effects are likely to still occur.
Objective 11: To maintain and enhance tourism and recreation	Best practice mitigation measures e.g. noise management to be implemented to minimise effects during construction. However, minor and temporary effects are likely to still occur.
Objective 12: To minimise resource use and waste production	Seek opportunity to implement sustainable design measures (design to reduce footprint, selection of materials) and reuse excavated material to reduce the impact, however it is likely that minor negative effects will remain.
Objective 13: To avoid negative effects on built assets / infrastructure	Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction. However, minor and temporary effects are likely to still occur.

Table 12-8 - Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 2) Mitigation

Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 2)	
Embedded Mitigation considered in Option assessment	
None identified	
Additional Mitigation derived from Option assessment	
Objective 1: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	Best practice methods to be implemented to minimise disturbance effects. Future design will need to undertake ecology surveys.
Objective 2: To Protect and enhance the functionality, quantity and quality of soils	Best practicable means to prevent impacts associated with contaminated land.
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	Best practice construction methods will be implemented to mitigate the effects.
Objective 4: To reduce and minimise air and noise emissions	Best practice mitigation measures implemented during construction, however some minor impacts anticipated to remain.
Objective 5: To achieve Portsmouth Water target of reducing operational carbon emissions to Net Zero by 2030 and contribute to national target of Net Zero by 2050	Investigate use of renewables during construction and operation for energy supply and use of materials with lower embodied carbon. Carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available.
Objective 6: To reduce vulnerability of built infrastructure to climate change risks and hazards	None identified.
Objective 7: To reduce or manage flood risk, taking climate change into account	None identified.
Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	None identified.
Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	Given there is potential to impact buried archaeology, an Archaeology Watching Brief may be required during the construction phase. Further work may be required to determine the significance of the effect depending on the presence / absence of buried archaeology. Residual effects may remain due to potential loss of archaeological remains due to construction.

Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	Best practice mitigation measures e.g. noise management to be implemented to minimise effects during construction. However, minor and temporary effects are likely to still occur.
Objective 11: To maintain and enhance tourism and recreation	Best practice mitigation measures e.g. noise management to be implemented to minimise effects during construction. However, minor and temporary effects are likely to still occur.
Objective 12: To minimise resource use and waste production	Seek opportunity to implement sustainable design measures (design to reduce footprint, selection of materials) and reuse excavated material to reduce the impact, however it is likely that minor negative effects will remain.
Objective 13: To avoid negative effects on built assets / infrastructure	Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction. However, minor and temporary effects are likely to still occur.

Table 12-9 – Pipeline associated with Works A treatment capacity increase to distribute water from Havant Thicket Reservoir Mitigation

Pipeline associated with Works A treatment capacity increase to distribute water from Havant Thicket Reservoir	
Embedded Mitigation considered in Option assessment	
None identified	
Additional Mitigation derived from Option assessment	
Objective 1: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	Monitor levels at the reservoir to avoid ecological effects. Best practice methods to be implemented to minimise disturbance effects and habitat loss including refining pipeline alignment to avoid or minimise intersection with woodland habitat (including ancient woodland). Scope opportunities to use alternative methods of construction that avoid open trenching, particularly in areas of increased habitat and biodiversity value. Consider Tree Protection Plan that includes consideration of root protection measures where relevant (ancient woodland sites) Chalk rivers are very sensitive waterbodies that could be impacted through sediment loading and / or pollution incidents during construction. As such mitigation should include, for example, a Construction Method Statement for crossing the chalk river that embeds sediment and pollution management measures. Habitat to be reinstated on completion, or if unavoidable compensatory habitat to be considered to replace damaged or lost habitat. Future design will need to undertake ecology surveys. Opportunities to support or engage with National Priority Focus Area objectives should be considered. The scheme should, as a minimum, have general biosecurity measures (e.g. Check Clean Dry protocols and INNS management plan).
Objective 2: To Protect and enhance the functionality, quantity and quality of soils	Consider opportunities to avoid or minimise intersection with Grade 2 and 3 agricultural land. Undertaking of Agri-land classification surveys to determine BMV value and design accordingly.
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	Monitor levels at the reservoir to avoid water quality/flow effects. Best practice construction measures to be implemented including provision of CEMP which outlines measures to protect the water environment.
Objective 4: To reduce and minimise air and noise emissions	Best practice mitigation measures likely to be implemented during construction. However minor and temporary impacts may remain.

Objective 5: To achieve Portsmouth Water target of reducing operational carbon emissions to Net Zero by 2030 and contribute to national target of Net Zero by 2050	Investigate use of renewables during construction and operation for energy supply. As the electricity grid is decarbonised, greener energy will be available
Objective 6: To reduce vulnerability of built infrastructure to climate change risks and hazards	None identified
Objective 7: To reduce or manage flood risk, taking climate change into account	None identified
Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	Best practice measures will likely be implemented to minimise effects during construction, however minor and temporary impacts may remain. Land reinstated upon completion.
Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	Best practice measures will likely be implemented to minimise setting effects during construction. Further investigation for archaeological potential.
Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	Best practice measures will likely be implemented to minimise disturbance during construction. However, minor and temporary effects are likely to still occur.
Objective 11: To maintain and enhance tourism and recreation	Best practice measures will likely be implemented to minimise disturbance during construction. However, minor and temporary effects are likely to still occur.
Objective 12: To minimise resource use and waste production	Opportunity to implement sustainable design measures to reduce impact, minor negative effects will likely remain. Reuse of excavated material.
Objective 13: To avoid negative effects on built assets / infrastructure	Best practice measures will likely be implemented to minimise disturbance during construction. However, minor and temporary effects are likely to still occur.

Table 12-10 – New Treatment works at Service Reservoir C to treat water from Havant Thicket Reservoir (Phase 1) Mitigation

New Treatment works at Service Reservoir C to treat water from Havant Thicket Reservoir (Phase 1)	
Embedded Mitigation considered in Option assessment	
None identified	
Additional Mitigation derived from Option assessment	
Objective 1: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	During WTW construction, pollution control best practices will be applied at all times. This is expected to include implementation of a robust CEMP which outlines measures to protect areas of biodiversity value. Further ecology surveys likely to be required. Results of such surveys should be used to inform site selection and detailed design.
Objective 2: To Protect and enhance the functionality, quantity and quality of soils	Further surveying to establish presence of BMV land and design accordingly to reduce / minimise loss. Best practicable means to prevent impacts associated with contaminated land.
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	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. Monitoring of any discharges during construction and operation to ensure no adverse change in water quality.
Objective 4: To reduce and minimise air and noise emissions	Site selection and detailed to consider location of NIA. Consider need for noise barriers during construction and appropriate noise mitigating measures in design and operation of the WTW. Investigate use of renewables during operation for energy supply.
Objective 5: To achieve Portsmouth Water target of reducing operational carbon emissions to Net Zero by 2030 and contribute to national target of Net Zero by 2050	Investigate use of renewables during construction and operation for energy supply and use of materials with lower embodied carbon. Carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available.
Objective 6: To reduce vulnerability of built infrastructure to climate change risks and hazards	None Identified.
Objective 7: To reduce or manage flood risk, taking climate change into account	None Identified.
Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	Best practicable means to minimise visual intrusion during construction.

Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	Best practice measures to be implemented to minimise setting effects during construction and consideration of unexpected heritage discovery in CEMP. Further work likely to be required to determine significance of effect, depending on the presence or absence of buried archaeology and potential need for archaeological watching brief during construction – particularly in areas not previously developed. Residual effects may remain due to potential loss of archaeological remains due to construction. Situation of above ground infrastructure to be sensitive to historic environment. Consider use of screening.
Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	Early consultation with nearby residents recommended. Site selection and detailed design to consider measures to reduce impact on nearby residents and land users. Local workforce to be utilised where possible. Operation of wtw to incorporate local apprenticeships where possible.
Objective 11: To maintain and enhance tourism and recreation	None identified
Objective 12: To minimise resource use and waste production	Seek opportunity to implement sustainable design measures (design to reduce footprint, selection of materials) and reuse excavated material to reduce the impact, however it is likely that minor negative effects will remain. This may involve a Site Waste Management Plan and consideration of the waste hierarchy.
Objective 13: To avoid negative effects on built assets / infrastructure	Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction.

13. Cumulative, synergistic and indirect effects

13.1. Introduction

As noted in the SEA Directive, there is a requirement to consider secondary, cumulative and synergistic effects of implementation of the WRMP24. Secondary effects are effects that are not a direct result of the WRMP24, but which occur away from the original effect or as the result of a complex pathway. Cumulative effects arise where several proposals or elements individually may or may not have significant effect but in-combination have a significant effect due to spatial crowding or temporal overlap. Synergistic effects are when two or more effects act together to create an effect greater than the simple sum of the effects when acting alone.

Following consultation from Natural England on the draft WRMP24 SEA, concerns raised relating to the methodology used to complete the In-Combination assessment, have been addressed in this fWRMP24 SEA. The methodology used has been developed in discussion with Natural England and satisfies their concerns and is considered appropriate to the level of detail available for the Options outlined in the WRMP24.

13.2. In-plan cumulative effects

WRMP24 options which have the potential for cumulative effects have been identified (as required by the SEA Regulations) from the analysis of plans and programmes, the baseline data, consultation responses and an examination of the identified key issues and cumulative, synergistic and indirect effects have also been considered during the SEA.

In respect of HRA, it is necessary to consider what the implications for European Sites might be between options within the Plan. This component of the assessment will help to determine if the Plan overall will result in LSEs through in-combination effects. With reference to the assessment for inter-company option impacts, whether there could be an in-combination effect depends on when the option will be delivered and then whether the predicted effects could combine to result in an LSE on the European Site. The results only include designated sites where more than one option is considered likely to have any LSE. If only one option within the plan is considered likely to have a LSE then an within-plan in-combination effect is not possible.

The WFD cumulative assessment looks at whether the individual options that make up the plan could have in-combination effects that would affect the WFD objectives of a waterbody, noting that while an individual option may not affect WFD status on its own, when combined with another option or group of options, there could be an in-combination effect. The in-combination assessments for the screened in water bodies were then undertaken by collating the Level 1 and Level 2 (if available) assessment information for each of the options within that water body. The schemes were then considered in-combination to identify the impacts of multiple schemes occurring in the catchment. It was considered whether the schemes were in isolation, and if not, if appropriate mitigation could be used to offset and prevent WFD deterioration. The overall maximum impact score for the in-combination assessment was assigned using the same impact scoring system as for the Level 1 and Level 2 assessments.

The findings of the respective WFD and HRA in-plan cumulative effects assessment have been used to inform the following sections.

13.2.1. Construction In-plan cumulative effects

There are 17 supply options that feature in Portsmouth Waters BVP however many of these are already in operation and represent extensions to existing baseline conditions (see Section 9.2 for further details).

It is not possible to know at this stage precisely where measures taken under the ‘Demand Basket High Plus’ will take place. These could include works such as leakage reduction on trunk mains or at reservoirs. Such activities and their consequent effects are anticipated to be small scale and will be localised to specific areas (reservoirs or trunk mains). It is also anticipated that in general such works would be undertaken at a wide spatial scale (at various locations across the Portsmouth area) and likely to be undertaken on a rolling programme, with little or no spatial overlap and undertaken at different times. As such demand management options have been excluded as unlikely to give rise to cumulative construction effects.

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. For overlapping construction periods to be considered likely, those schemes within 1km of each other must also be selected as operational

within 5 years of each other. These have been identified and recorded in Table 13-1**Error! Reference source not found.**, as follows:

Table 13-1 - 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 (All options intersect within an existing treatment site)	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. 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.	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.
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	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	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.

from Havant Thicket Reservoir (Both options intersect at New Treatment works)	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. 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	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.

	scale, short term and temporary to the construction phase.	

The HRA identified that Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 1); Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 2); and Upgrade Source O Booster to 25Ml/d may affect Solent Maritime SAC and Chichester and Langstone Harbours SPA and Ramsar. The HRA reports that the impacts as a result of the Upgrade Source O Booster to 25Ml/d option is only related to construction works. Given the temporal separation between the options, the HRA concludes that it is considered unlikely that an in-combination effect will occur between the Upgrade Source O Booster to 25Ml/d and Works A options.

The HRA also notes that the 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) will not happen at the same time, as Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 2) is for a further increase in the water treatment capacity at the same location as Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 1). Therefore no in-combination effect during construction is considered possible for these two options.

The WFD assessment did not identify any in-plan cumulative effects that would result in non-compliance during construction.

13.2.2. Operational In-plan cumulative effects

As noted in Section 9.2, many of the supply side options that feature in the BVP represent existing options that are reflected in the baseline conditions and therefore unlikely to give rise to cumulative effects.

It is anticipated that the Demand Management Options noted in WRMP24 will apply across the whole of the Portsmouth area and are anticipated to have cumulative beneficial effects from reducing the demand for water. For example, while Demand Management Options such as NEUBs and TUBs would typically be implemented in a phased, sequential manner, it is the intention that such measures will act to reduce pressure on water resources by reducing demand for water and as such, reduce the need for abstraction, treatment and onward pumping. This will act cumulatively across the Plan area and into nearby / linked resource areas. Savings in water would likely have cumulative beneficial effects in respect of resilience to biodiversity (Obj. 1), the water environment (Obj. 3), reducing carbon, air and noise emissions (Obj. 4 and Obj. 5), climate change (Obj. 6), maintaining health and wellbeing (Obj. 10), as well as minimising resource use (Obj. 12). While some of the savings made are anticipated in themselves small and benefits would be slight, it is to be noted that cumulatively effects could be significant and of importance given that these will be implemented in a drought situation when the environment is naturally under stress. Other Demand Management measures would apply at all times and act cumulatively to continually reduce pressure on sources, with consequent permanent benefits for people and the environment.

The assessment of the Preferred Plan in Section 11 identifies the potential for adverse effects to arise during operation of the plan options individually. While post-mitigation effects are for the most part non-significant, it must be recognised that there remains the potential for significant adverse effects when operating in conjunction with one-another.

During operation cumulative effects on European sites, specifically SPA, SAC and Ramsar sites and on WFD designated waterbodies remains a particular focus and robust assessment has been undertaken in respective technical reports (see the HRA Report and Appendix H). This section integrates findings of HRA and WFD cumulative assessments and therefore effects arising through hydrological connection. In order to consider the potential for cumulative effects across the full range of sustainability issues, this assessment considers the proximity of options to one another as a means to identify options having greatest potential to give rise to cumulative effects.

It is considered that where the Preferred Plan options are within 1km distance of each other there is increased potential to interact and give rise to cumulative effects during operation. Those options within an approximate 1km have been identified and recorded in Table 13-2. Adverse effects identified for those respective options have then been considered and the potential for cumulative effects and mitigation, where appropriate, reported.

Table 13-2 - 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* Pipeline associated new treatment works at Service Reservoir C to distribute water from Havant Thicket Reservoir	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. 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.	Investigate use of renewable energy sources during operation for energy supply. 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.

During operation, the HRA reported that no options have the potential to give rise to in-combination effects nothing that the Source S drought permit option has been screened out alone, and potential for in combination LSE also ruled out.

Further to the assessment provided in Table 13-2 the WFD assessment identified in-combination effects on Chichester Chalk groundwater body from Upgrade Source O Booster to 25 Mld and Drought Permit: Source S. It reported that Chichester Chalk water body presents a medium, possible deterioration from the schemes. In

combination, the schemes are likely to have minimal interaction and deterioration together, as the operation and construction on the upgrade to Lavant Booster is considered to present a low risk to WFD. However, the Level 2 assessment of Source S drought permit concluded that there is a WFD medium risk of deterioration of the water body. Further details can be found in the WFD report (See Appendix H).

13.3. In-combination cumulative effects with other plans and projects

The SEA Regulations require that Portsmouth Water's WRMP24 is assessed in combination with other plans and programmes.

The cumulative effects of WRMP24 are difficult to accurately assess given the inherent uncertainties concerning future changes to baseline environmental conditions, future population and economic growth, the deliverability of some NSIPs (and the potential for new NSIPs to be brought forward), and the complexities associated with water resource planning at the regional level.

Cumulative effects may arise as a result of Portsmouth Water's WRMP24 interaction with a wide range of other plans and programmes including:

- Portsmouth Water Drought Plan;
- Southern Water Drainage and Wastewater Management Plan;
- Portsmouth Local Plan (2021);
- Portsmouth City Local Plan (2006);
- East Hampshire Adopted Local Plan / Joint Core Strategy (2014);
- Gosport Borough Local Plan (2038);
- Action Plans including Somerstown and North Southsea Area Action Plan (2012);
- River Basin Management Plans including that for the South East River Basin District (2015);
- Joint Strategic Flood Risk Assessment (Partnership for Urban South Hampshire);
- Portsmouth Surface Water Management Plan;
- National Policy Statements (NPSs); and
- Nationally Significant Infrastructure Projects (NSIPs).

The above Plans have been considered as part of the SEA, for example to help identify baseline and are set out in Appendix B.

Within the above noted plans (as well as those not listed here), there are measures set out which could result in construction activities (of potentially significant scale), or operational plans. However, as noted above, it is anticipated that construction activities related to Options within WRMP24 will be small scale and of localised effect. A range of mitigation measures have been noted within this SEA which would act to reduce effects, many of which could be included in construction Environmental Management Plans – these would be further developed through detailed scheme design and would reflect conditions and context prevailing at that time. In addition, it is to be expected that all major infrastructure such as that which may arise from other Plans, will be developed within the appropriate Planning framework and will itself be subject to measures to ensure cumulative effects are addressed. As such, no significant cumulative effects are anticipated in respect of other plans in relation to any of the SEA Objectives at this stage.

A key element of the wider Portsmouth Water approach to water management is the development of the Havant Thicket reservoir. Clearly this project will require significant construction activities, but it is anticipated that there will be no construction cumulative effects for the reasons outlined above (the Options within WRMP24 being relatively small scale in construction / refurbishment terms, the mitigation measures identified and the expectation of the reservoir being developed within a strictly controlled construction and planning framework).

It is considered that there will be no cumulative effects between the Demand Management Options within WRMP24 and the Havant Thicket development, other than these will increase the availability of water from the reservoir (by reducing demand across the water resource zone).

13.3.1. Nationally Significant Infrastructure Projects

Review of the National Infrastructure Planning website[27] suggests five NSIPs are considered likely to interact with the Portsmouth Water study area and are considered in Table 13-3 below

Table 13-3 – Nationally Significant Infrastructure Projects within proximity to Portsmouth Water's WRMP24 area

Nationally Significant Infrastructure Project	Likely Cumulative Effects	Mitigation Proposed
Rampion 2 Offshore Wind Farm **Description:** Offshore Wind Farm with a generating capacity of up to 1200MW together with associated electrical infrastructure. (7.1km from nearest Portsmouth Water option Drought Permit: Source S)	**Construction** Construction of the Rampion 2 Offshore Wind Farm is not anticipated to give rise to significant cumulative effects in respect of WRMP24. Note the nearest Portsmouth Water option (Drought Permit: Source S) is not anticipated to give rise to construction effects. The nearest Portsmouth Water option then that is associated with construction effects (Upgrade Source O Booster to 25Ml/d) is 20km from the proposed Offshore Wind Farm and therefore unlikely to give rise to cumulative effects. Also, construction periods are unlikely to overlap as Rampion 2 construction is expected to begin 2026/2027. **Operation** Operation of the offshore wind farm is not anticipated to give rise to significant cumulative effects in respect of WRMP24. It is envisaged that the cables connecting the wind farm to shore based facilities would be below ground and as such no local cumulative effects would arise from operation.	Close liaison to take place between Rampion Extension Development Limited and Portsmouth Water regarding timings of construction and issues such as traffic management and transport of materials. Discussions to include all aspects of environmental management. It is to be noted that the Rampion 2 Offshore Wind Farm proposal is being subject to Environmental Impact Assessment that will provide mitigation to address all identified significant impacts. It is also anticipated that any proposed scheme at Portsmouth would also be subject to EIA that would also detail appropriate mitigation. This would consider the potential for cumulative effects in light of conditions and construction timing prevailing at that time.
AQUIND Interconnector **Description:** AQUIND Limited is developing proposals to build a new High Voltage Direct Current marine and underground electric power transmission link between the south of England and Normandy in France. (1.7km from nearest Portsmouth Water option Works A treatment Capacity increase to treat water	**Construction** Although cumulative effects have been identified as part of the DCO application for the AQUIND Interconnector, a review of these identifies no cumulative effects in respect of WRMP24. Although major construction works are likely to be approximately 2km from each other, AQUIND Interconnector construction is expected to begin 2024/2025,	Close liaison to take place between AQUIND Limited and Portsmouth Water regarding timings of construction and issues such as traffic management and transport of materials. Discussions to include all aspects of environmental management. It is to be noted that the AQUIND Interconnector proposals are being subject to Environmental Impact Assessment that will provide mitigation to address all

[27] https://infrastructure.planninginspectorate.gov.uk/

from Havant Thicket Reservoir (Phase 1))	therefore construction periods are unlikely to overlap. **Operation** Although cumulative effects have been identified as part of the DCO application for the AQUIND Interconnector, a review of these identifies no cumulative effects in respect of WRMP24. It is envisaged that the cables would be below ground and as such no local cumulative effects would arise from operation.	identified significant impacts. It is also anticipated that any proposed scheme at Portsmouth would also be subject to EIA that would also detail appropriate mitigation. This would consider the potential for cumulative effects in light of conditions and construction timing prevailing at that time.
A27 Arundel Bypass **Description:** The project involves replacement of the existing A27 single carriageway road with a dual carriageway bypass, linking together the two existing dual carriageway sections of the road. In the west, the Scheme will tie in approximately 1km east of the A27/A29 Fontwell East roundabout to the west of Arundel. In the east, the proposed bypass will tie into the existing Crossbush Junction, which will be reconfigured. (2.2km from nearest Portsmouth Water option Drought Permit: Source S)	**Construction** Construction of the A27 Arundel Bypass is not anticipated to give rise to significant cumulative effects in respect of the WRMP24. Note the nearest Portsmouth Water option (Drought Permit: Source S) is not anticipated to give rise to construction effects. The nearest Portsmouth Water option then that is associated with construction effects (Upgrade Source O Booster to 25Ml/d) is 15.7km from the proposed bypass and therefore unlikely to give rise to cumulative effects. A27 Arundel Bypass construction is expected to take place 2025-2030, therefore construction periods are unlikely to overlap. **Operation** Operation of the A27 Arundel Bypass is not anticipated to give rise to significant cumulative effects in respect of the WRMP24. The scheme is anticipated to reduce congestion, reduce travel time, and improve journey time reliability along the A27.	Close liaison to take place between National Highways and Portsmouth Water regarding timings of construction and issues such as traffic management and transport of materials. Discussions to include all aspects of environmental management. It is to be noted that the A27 Arundel Bypass proposal will be subject to Environmental Impact Assessment that will provide mitigation to address all identified significant impacts. It is also anticipated that any proposed scheme at Portsmouth would also be subject to EIA that would also detail appropriate mitigation. This would consider the potential for cumulative effects in light of conditions and construction timing prevailing at that time.
Hampshire Water Transfer and Water Recycling project **Description:** The proposed development comprises a combination of both water transfer and water recycling technology, with a proposed water recycling plant and associated pipeline transferring recycled water to the planned Havant Thicket Reservoir. The proposed development also comprises a transfer pipeline between Havant Thicket Reservoir and Southern Water's Otterbourne Water Supply	**Construction** Construction of the Hampshire Water Transfer and Water Recycling project is not anticipated to give rise to significant cumulative effects in respect of the WRMP24. Construction of the project is expected to begin 2025, therefore construction periods are unlikely to overlap. **Operation** The SW Hampshire Water Transfer and Water Recycling	Close liaison to take place between Southern Water Services Limited and Portsmouth Water regarding timings of construction and issues such as traffic management and transport of materials. Discussions to include all aspects of environmental management. It is to be noted that the Hampshire Water Transfer and Water Recycling proposal has been subject to Environmental Impact Assessment and this has provided detailed mitigation to

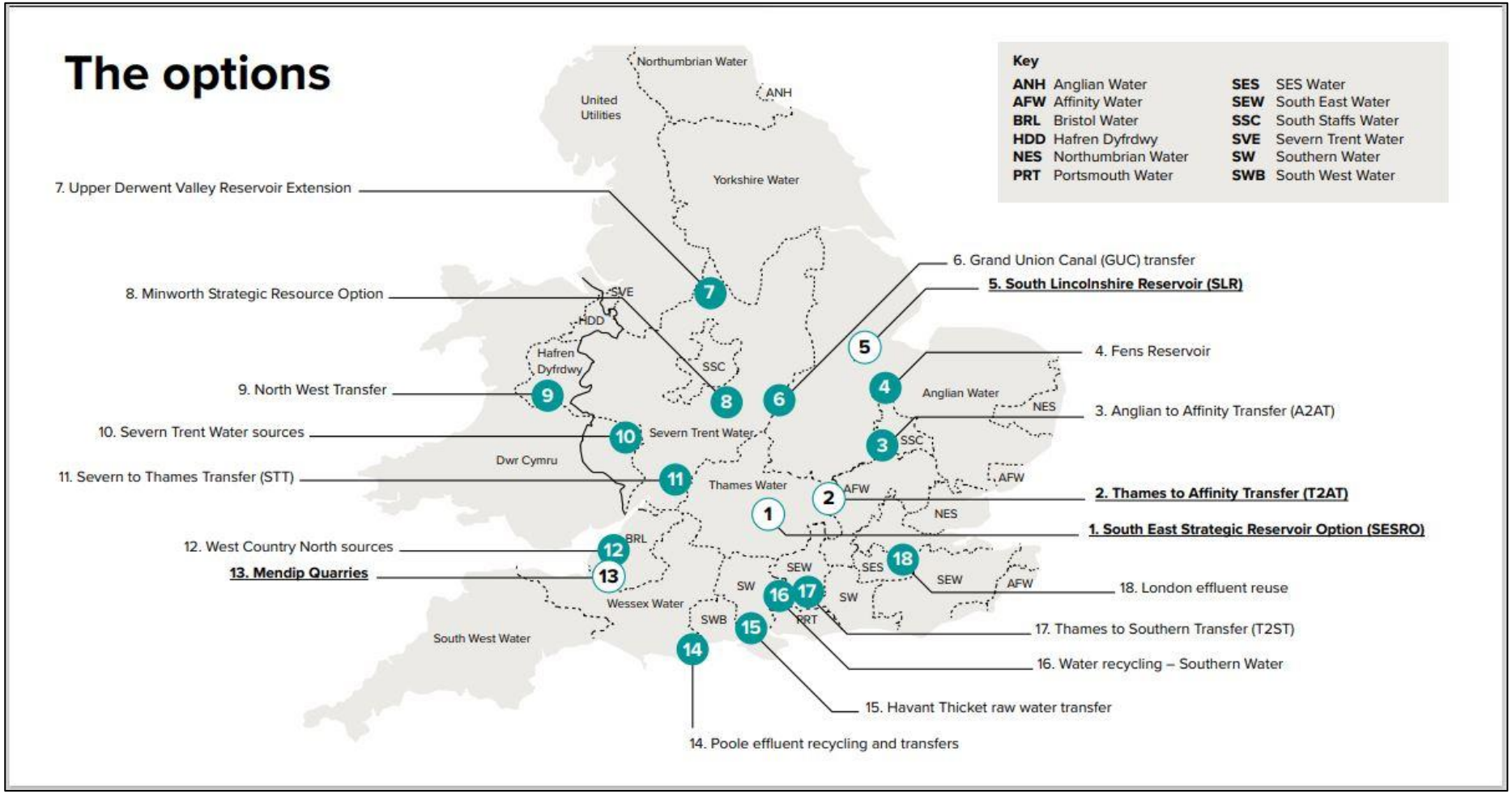
Works (WSW) in order to serve its Western supply area in Hampshire. (Intersects three Portsmouth Water options: Drought Permit: Source S, Works A treatment Capacity increase to treat water from Havant Thicket Reservoir (Phase 1) and Pipeline associated new treatment works at Service Reservoir C to distribute water from Havant Thicket Reservoir)	project is anticipated to intersect three Portsmouth Water WRMP24 options, however it is envisaged that each of the Portsmouth Water transfers would be below ground, contained features and as such no local cumulative effects would arise from operation.	address all identified significant impacts. It is also anticipated that any proposed scheme at Portsmouth would also be subject to EIA that would also detail appropriate mitigation. This would consider the potential for cumulative effects in light of conditions and construction timing prevailing at that time.
Southampton to London Pipeline Project **Description:** The project aims to replace 90km of Esso Petroleum Company Limited's 105km aviation fuel pipeline that runs from Fawley Refinery near Southampton to Esso's West London Terminal Storage Facility in Hounslow. (5km from nearest Portsmouth Water option Pipeline associated new treatment works at Service Reservoir C to distribute water from Havant Thicket Reservoir)	**Construction** Construction of the Southampton to London Pipeline project is not anticipated to give rise to significant cumulative effects in respect of the dWRMP. Construction of the project is expected to be completed in 2023, therefore construction periods are unlikely to overlap noting also that the project is 5km from the nearest Portsmouth Water option. **Operation** Operation of the Southampton to London Pipeline is not anticipated to give rise to significant cumulative effects in respect of the dWRMP. It is envisaged that the pipeline would be a contained, below ground feature and as such no local cumulative effects would arise from operation.	Close liaison to take place between Esso Petroleum Company Limited and Portsmouth Water regarding timings of construction and issues such as traffic management and transport of materials. Discussions to include all aspects of environmental management. It is to be noted that the Southampton to London Pipeline Project has been subject to Environmental Impact Assessment and this has provided detailed mitigation to address all identified significant impacts. It is also anticipated that any proposed scheme at Portsmouth would also be subject to EIA that would also detail appropriate mitigation. This would consider the potential for cumulative effects in light of conditions and construction timing prevailing at that time.

13.3.2. Strategic Resource Options

SRO's are large infrastructure schemes, that are developed between water companies and with RAPID to ensure water supplies across the network, often in the form of reservoirs and bulk water transfers. Their locations are shown in Figure 13-1 below.

No SROs have been identified within the Portsmouth Water plan area and as such the potential for significant cumulative effects as a result of SRO development is reduced. Note that neighbouring Southern Water are progressing Hampshire Water Transfer and Water Recycling project which is an SRO. This option has been captured through review of NSIPs in Section 13.4.1.

Figure 13-1 - Strategic Resource Option Locations



Source: Safeguarding England's water future, Mott Macdonald

13.4. Cumulative effects with neighbouring water companies

A key focus of the in-combination assessment with other plans and policies is that of neighbouring water companies, specifically supply options contained in their respective WRMPs. There is potential for Portsmouth Water's WRMP24 options to interact cumulatively either through construction or operation with options contained in the following, neighbouring water companies WRMP24:

- Southern Water, and
- South East Water.

Portsmouth Water have engaged with both of the neighbouring water companies in order to understand the nature of their respective WRMPs, the options contained and the likely effects arising through assessments including SEA, HRA, WFD and other supporting technical work.

13.4.1. Southern Water WRMP24

Engagement with project and environmental leads working on behalf of Southern Water in support of their WRMP24 identified 59 supply options featuring in their BVP. Of those 53 options are expected to feature on or before 2055. One further option Recycling (SNZ): Horsham WTW with storage at Pulborough (6.8Ml/d) is selected 2056. Owing to the nature of the scheme (water recycling) it has been included to give a total of 54 schemes. Of those options, six SW options are within 1km of a Portsmouth Water option. These six SW options are identified in Table 13-4 below alongside the respective option description.

Table 13-4 - SW Options within 1km of a Portsmouth Water option

SW Option Name	Option description	Note on SEA option assessment
Havant -Pulborough WSW R 20	This is a pipeline to represent reverse flow from Havant Thicket Reservoir to Pulborough through a bidirectional raw water transfer from Pulborough to Havant Thicket. INNS treatment will be provided at Pulborough WSW.	SW SEA option assessments concern the same pipeline route and assessment differs only in the operational benefit attributed to delivering reliable and resilient water supplies (minor beneficial for R 20 and moderate beneficial for R50). It is not envisaged that the capacity change would give rise to differences in cumulative effects with other schemes and for the purpose of Portsmouth Water cumulative assessment these options have been grouped into one option assessment
Havant -Pulborough WSW R 50	This is a pipeline to represent reverse flow from Havant Thicket Reservoir to Pulborough through a bidirectional raw water transfer from Pulborough to Havant Thicket. INNS treatment will be provided at Pulborough WSW.	
Bulk import (HSE): Havant Thicket Reservoir to Otterbourne WSW pipeline - first section (90Ml/d)	A new raw water transfer (Pumping Station, Pipeline & Break Pressure tank) between Havant Thicket Reservoir and Otterbourne WSW. The capacity of the first section is for 90Ml/d to the mid point and a possible connection to Portsmouth Water. Second section for 90Ml/d capacity from the mid point to Otterbourne. 22h/d operation is assumed.	These options have been grouped into one option assessment by SW.
Bulk import (HSE): Havant Thicket Reservoir to Otterbourne WSW pipeline - second section (90Ml/d)	A new raw water transfer (Pumping Station, Pipeline & Break Pressure tank) between Havant Thicket Reservoir and Otterbourne WSW. The capacity of the first section is for 90Ml/d to the mid point and a possible connection to Portsmouth Water. Second section for 90Ml/d capacity from the mid point to Otterbourne. 22h/d operation is assumed.	
Recycling (HSE): Recharge of Havant	60Ml/d of recycled water will be sent to Otterbourne via Havant Thicket Reservoir. Budds Farm WWTW transfer to new Water	None – however note that the WRSE Regional Plan has identified that the recharge of

SW Option Name	Option description	Note on SEA option assessment
Thicket reservoir from Budds Farm (60Ml/d)	Recycling Plant then transfer to Havant Thicket. Direct raw water transfer from Havant Thicket to Otterbourne for treatment.	Havant Thicket from Budds Farm may result in cumulative adverse effects owing to its proximity to adjacent Southern Water options. Please see WRSE Regional Plan SEA and Southern Water WRMP24 SEA Report for details.

In addition to the above listed options, Portsmouth Water HRA Report and the WFD identified the following SW options as also having the potential to give rise to in-combination effects:

Table 13-5 - Additional SW options identified through HRA as having potential to give rise to in-combination effects

SW Option Name	Option description	Note on SEA option assessment
Recycling (IOW): Sandown WTW (8.5Ml/d)	This option proposes the transfer of treated effluent from Sandown WwTW (currently discharged to sea), to support flows in the Eastern River Yar upstream of the Sandown WSW abstraction. Treated water in excess of the local demand will be transferred through a new transfer pipeline to a service reservoir near Newport, for supply to much of the island. This option is reliant on the WSR enlargements carried out in IZT_CSM Cross-Solent upgrade. (2) Option 2 also includes upgrades to Sandown WSW to achieve the extra flow.	N/A
Desalination (SWZ): Tidal River Arun (20Ml/d)	This option proposes a 20Ml/d desalination plant to treat estuarine water from the tidal River Arun to supply treated water to the Sussex Worthing WRZ. It is assumed that the water could be used during drought conditions to meet demand in Sussex Worthing WRZ. There is an existing bi-directional transfer between Sussex Worthing WRZ and Sussex North WRZ which means this option could have result in additional benefit to Sussex North WRZ. An investigation in AMP4 indicated that land adjacent to the WwTW showed the greatest potential for a new desalination site because of the existing land use, the availability of services (access roads, power, etc.) and the potential savings if it is possible to use the WwTWs existing long-sea outfall.	N/A
Desalination (SWZ): Tidal River Arun (20Ml/d) Phase 2	This option proposes a second phase development of an additional 20Ml/d desalination capacity to treat estuarine water from the tidal River Arun to supply treated water to the Sussex Worthing WRZ. This option is contingent on the first phase 10Ml/d or 20Ml/d desalination plant options (Aru10 or Aru20)	N/A
Bulk import (HSE): PWC Source A to	A new additional potable water transfer of 21Ml/d capacity using a new pipeline from	N/A

SW Option Name	Option description	Note on SEA option assessment
Otterbourne WSW (21Ml/d)	Portsmouth Water Source A to Otterbourne. This scheme is dependent on development of Havant Thicket reservoir to provide the water. 22 h/d operation assumed.	
Interzonal transfer (HSW-HRZ): (3.1Ml/d)	Development and upgrade of existing transfer (HSW-HRZ). This option involves installing a new booster station with 5Ml/d flow capacity to an existing transfer to allow bi-directional flow.	N/A
Bulk export (SNZ): Pulborough to Havant Thicket Reservoir (20Ml/d)	This is a pipeline to represent reverse flow from Havant Thicket Reservoir to Pulborough through a bidirectional raw water transfer from Pulborough to Havant Thicket. INNS treatment will be provided at Pulborough WSW.	N/A
Bulk export (SNZ): Pulborough to Havant Thicket Reservoir (50Ml/d)	This is a pipeline to represent reverse flow from Havant Thicket Reservoir to Pulborough through a bidirectional raw water transfer from Pulborough to Havant Thicket. INNS treatment will be provided at Pulborough WSW.	N/A

13.4.1.1. Construction cumulative effects

It is considered that SW options within an approximate 1km of Portsmouth Water options and with potentially overlapping construction periods are most likely to give rise to cumulative construction effects. For overlapping construction periods to be considered likely, those schemes within 1km of each other must also be selected as operational within 5 years of each other. These have been identified below.

PW Upgrade Source O Booster to 25 Ml/d option is within 1km and a 5 year window of the following SW options:

- SW Havant – Pulborough WSW R 50 / SW Havant – Pulborough WSW R 20

Through a review of the Portsmouth Water HRA, no additional options were identified as having to potential to give rise to significant construction in-combination effects.

Additionally, through a review of Portsmouth Water WFD assessment, the below options have been included as having to potential to give rise to significant operational in-combination effects.

Pipeline associated with new treatment works at Service Reservoir C to distribute water from Havant Thicket Reservoir and New Treatment works at Service Reservoir C to treat water from Havant Thicket Reservoir (Phase 1) have the potential to impact on the Meon surface water body alongside the following SW option:

- Southern Water (SWS): Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (60Ml/d)

Table 13-6 sets out the potential cumulative effects arising from construction of these options.

Table 13-6 – Potential for cumulative effects with SW during construction

Options assessed cumulatively	Likely cumulative effects during construction	Mitigation proposed
PW Upgrade Source O Booster to 25 Ml/d *And*	The Source O Booster pumping station is situated approximately 750m south of the SW Havant – Pulborough WSW R 50 pipeline at its closest point. Of note, works would be separated by a number of minor roads, agricultural land, industrial premises	None identified

Options assessed cumulatively	Likely cumulative effects during construction	Mitigation proposed
SW Havant – Pulborough WSW R 20 / SW Havant – Pulborough WSW R 50	and woodland. While the Portsmouth Water Upgrade Source O Booster to 25Ml/d option is within the South Downs National Park and the SW transfer intersects the National Park, it is not considered that works at either location would give rise to potential cumulative effects, noting also the short duration at which works might be concurrent at this proximity. No other cumulative effects have been identified including through HRA and WFD.	
Portsmouth Water Pipeline associated with new treatment works at Service Reservoir C to distribute water from Havant Thicket Reservoir *And* PW New Treatment works at Service Reservoir C to treat water from Havant Thicket Reservoir (Phase 1) *And* SW Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (60Ml/d)	The potential for cumulative effects has been identified through the WFD in relation to Meon surface water body. Due to SWS identifying non-compliance from their option 'Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (60Ml/d)', further ICA is not required for this water body as non-compliance has been identified as a result of the pipeline beneath the River Meon. See WFD assessment for further details.	Note the cumulative effects is triggered by the non-compliance by Southern Water recycling option, as such please see mitigation set out in the option assessment presented by Southern Water.

13.4.1.2. Operation cumulative effects

It is considered that SW options within an approximate 1km of Portsmouth Water options are most likely to give rise to cumulative operational effects. These have been included in Table 13-4. Additionally, through review of the Portsmouth Water HRA, the below options have been included as having to potential to give rise to significant operational in-combination effects.

Portsmouth Water Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 2) has the potential to impact on the Solent and Dorset Coast SPA alongside the following SW options:

- Recycling (IOW): Sandown WTW (8.5Ml/d)
- Desalination (SWZ): Tidal River Arun (20Ml/d)
- Desalination (SWZ): Tidal River Arun (20Ml/d) Phase 2

Upgrade Source O Booster to 25 Ml/d option has the potential to impact on the Chichester and Langstone Harbours Ramsar site alongside the following SW options:

- Bulk import (HSE): Havant Thicket Reservoir to Otterbourne WSW pipeline - both sections

Upgrade Source O Booster to 25 Ml/d option has the potential to impact on the Solent Maritime SAC alongside the following SW options:

- Bulk import (HSE): PWC Source A to Otterbourne WSW (21Ml/d)

- Interzonal transfer (HSW-HRZ): (3.1Ml/d)
- Recycling (HSE): Recharge of Havant Thicket reservoir from Budds Farm (60Ml/d)
- Bulk export (SNZ): Pulborough to Havant Thicket Reservoir (20Ml/d)
- Bulk export (SNZ): Pulborough to Havant Thicket Reservoir (50Ml/d)
- Bulk import (HSE): Havant Thicket Reservoir to Otterbourne WSW pipeline - both sections

Through a review of the Portsmouth Water WFD, no additional options were identified as having to potential to give rise to significant operation in-combination effects.

Table 13-7 sets out each of these options and likely cumulative effects arising from operation.

Table 13-7- Potential for cumulative effects with SW during operation

Options assessed cumulatively	Likely cumulative effects during operation	Mitigation proposed
PW Drought Permit: Source S *And* SW Havant – Pulborough WSW R 20 / Havant – Pulborough WSW R 50	SW Havant Thicket – Pulborough WSW options concerns the operation of a bidirectional raw water transfer. At its closest proximity to the Source S Drought Permit option, it is envisaged that the pipeline would be a contained, below ground feature and as such no local cumulative effects would arise from operation of both options. It is acknowledged that through operation of both options, increased carbon emissions may be associated with pumping or abstraction requirements however, effects are not anticipated to be significant.	Investigate use of renewable energy sources to support operational energy requirements
PW Upgrade Source O Booster to 25Ml/d *And* SW Havant – Pulborough WSW R 20 / Havant – Pulborough WSW R 50	SW Havant Thicket – Pulborough WSW options concerns the operation of a bidirectional raw water transfer. At its closest proximity to the Upgrade Source O Booster to 25Ml/d option, it is envisaged that the pipeline would be a contained, below ground feature and as such no cumulative effects would arise from operation of both options. It is acknowledged that through operation of both options, increased carbon emissions may be associated with pumping or abstraction requirements however, effects are not anticipated to be significant.	Investigate use of renewable energy sources to support operational energy requirements
Portsmouth Water Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 1) *And* SW Bulk import (HSE): Havant Thicket Reservoir to Otterbourne WSW pipeline (90Ml/d) (both sections)	SW pipeline option is a new raw water transfer (comprising pumping station, pipeline & break pressure tank). At its closest proximity to the Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 1) option the SW pipeline would be a contained, below ground feature. No cumulative effects have been identified from operation of both options locally however, it is not clear where the pumping station and break pressure tank would be located in respect of the SW option. Should these be in proximity or within the Works A site itself, intensifying activities at the site may give rise to additional operational noise locally. It is also acknowledged that through operation of both options, increased carbon emissions may be associated with pumping, abstraction or treatment requirements however, effects are not anticipated to be significant.	Clarification in respect of siting of pumping station and break pressure tank associated with the SW Bulk import option. Should these facilities be operated from within the Works A site, further assessment in respect of operational noise may be required. Investigate use of renewable energy sources to support

Options assessed cumulatively	Likely cumulative effects during operation	Mitigation proposed
		operational energy requirements
Portsmouth Water Pipeline associated with Works A treatment capacity increase to distribute water from Havant Thicket Reservoir *And* SW Havant – Pulborough WSW R 20 / Havant – Pulborough WSW R 50 *And* SW Bulk import (HSE): Havant Thicket Reservoir to Otterbourne WSW pipeline (90Ml/d) (both sections)	Each of the SW pipeline options concern the operation of a water transfer. At their respective closest proximities to the Portsmouth Water Pipeline associated with Works A treatment capacity increase to distribute water from Havant Thicket Reservoir option, it is envisaged that the pipelines would be contained, below ground features and as such no cumulative effects would arise from operation of these options locally. It is acknowledged that through operation of these options, increased carbon emissions may be associated with pumping requirements however, effects are not anticipated to be significant.	Investigate use of renewable energy sources to support operational energy requirements
PW Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 2) *And* SW Bulk import (HSE): Havant Thicket Reservoir to Otterbourne WSW pipeline (90Ml/d) (both sections)	The SW pipeline option concerns the operation of a water transfer. At its closest proximity to the Portsmouth Water Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 2), it is envisaged that the pipeline would be a contained, below ground feature and as such no cumulative effects would arise from operation of these options locally. The HRA reported there to be no scope for in-combination effects. The pathway assessed was potential changes in water chemistry from discharge into The Solent. It is acknowledged that through operation of these options, increased carbon emissions may be associated with increased pumping or treatment requirements however, effects are not anticipated to be significant.	Investigate use of renewable energy sources to support operational energy requirements
PW New Treatment works at Service Reservoir C to treat water from Havant Thicket Reservoir (Phase 1) *And* SW Bulk import (HSE): Havant Thicket Reservoir to Otterbourne WSW pipeline (90Ml/d) (both sections)	The SW pipeline option concerns the operation of a water transfer. At its closest proximity to the Portsmouth Water transfer option, it is envisaged that the pipeline would be a contained, below ground feature and as such no cumulative effects would arise from operation of these options locally. It is acknowledged that through operation of these options, increased carbon emissions may be associated with increased pumping requirements however, effects are not anticipated to be significant.	Investigate use of renewable energy sources to support operational energy requirements
Portsmouth Water Pipeline associated new treatment works at Service Reservoir C	The Portsmouth Water pipeline option concerns the operation of a water transfer. During operation of the Portsmouth Water option in proximity to the	Investigate use of renewable energy sources to support

Options assessed cumulatively	Likely cumulative effects during operation	Mitigation proposed
to distribute water from Havant Thicket Reservoir *And* SW Bulk import (HSE): Havant Thicket Reservoir to Otterbourne WSW pipeline (90Ml/d) (both sections) *And* SW Recycling (HSE): Recharge of Havant Thicket reservoir from Budds Farm (60Ml/d)	respective SW schemes, it is to be noted that the Portsmouth Water option would be a contained, below ground feature and as such no cumulative effects would arise locally from its operation alongside the respective SW transfer and SW recycling schemes. It is acknowledged that through operation of these options, increased carbon emissions may be associated with increased pumping requirements however, effects are not anticipated to be significant.	operational energy requirements
Portsmouth Water Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 2) *And* SW Recycling (IOW): Sandown WTW (8.5Ml/d) *And* SW Desalination (SWZ): Tidal River Arun (20Ml/d) *And* SW Desalination (SWZ): Tidal River Arun (20Ml/d) Phase 2	The potential for cumulative effects has been identified through the HRA. The Solent and Dorset Coast SPA is an ultimate down-catchment receptor for a number of options and respective SW options have the potential to adversely affect the site (both no adverse effects alone). The HRA reports that these options will not result in environmental changes that will overlap to cause spatially coincident additive effects, and that alone effects would be too small to cumulatively affect the integrity of the site or its value to foraging terns. The HRA concludes that all options are located outside the SPA boundary and given it's a dynamic, high dispersion environment and discharges will be subject to controls, even in-combination effects are unlikely to be significant but cannot be discounted. See the HRA Report for further details.	None identified
PW Upgrade Source O Booster to 25 Ml/d *And* SW Bulk import (HSE): Havant Thicket Reservoir to Otterbourne WSW pipeline - both sections	The potential for cumulative effects has been identified through the HRA in relation to Chichester and Langstone Harbours Ramsar site. Without details of the operational effects and as Budds Farm has a discharge into The Solent, the effect of combined operational impacts is uncertain and cannot be discounted. See the HRA Report for further details.	None identified
Portsmouth Water Upgrade Source O Booster to 25 Ml/d *And*	The potential for cumulative effects has been identified through the HRA in relation to Solent Maritime SAC.	None identified

Options assessed cumulatively	Likely cumulative effects during operation	Mitigation proposed
SW Bulk import (HSE): PWC Source A to Otterbourne WSW (21Ml/d) *And* SW Interzonal transfer (HSW-HRZ): (3.1Ml/d) *And* SW Recycling (HSE): Recharge of Havant Thicket reservoir from Budds Farm (60Ml/d) *And* SW Bulk export (SNZ): Pulborough to Havant Thicket Reservoir (20Ml/d) *And* SW Bulk export (SNZ): Pulborough to Havant Thicket Reservoir (50Ml/d) *And* SW Bulk import (HSE): Havant Thicket Reservoir to Otterbourne WSW pipeline - both sections	The SAC is the downstream receptor for a number of schemes. Without details of the operational effects and as Budds Farm has a discharge into The Solent, the effect of combined operational impacts is uncertain and cannot be discounted. See the HRA Report for further details.	
Works A treatment capacity increase to treat water from Havant Thicket Reservoir (Phase 2) *And* Bulk import (HSE): Havant Thicket Reservoir to Otterbourne WSW pipeline - both sections *And*	The potential for cumulative effects has been identified through the HRA in relation to Portsmouth Harbour SPA/ Ramsar site. Without details of the operational effects and as Budds Farm has a discharge into The Solent, the effect of combined operational impacts is uncertain and cannot be discounted.	None identified

Options assessed cumulatively	Likely cumulative effects during operation	Mitigation proposed
Recycling (HSE): Recharge of Havant Thicket reservoir from Budds Farm (60Ml/d)		

13.4.2. South East Water WRMP24

Engagement with project and environmental leads working on behalf of South East Water in support of their WRMP24 identifies 36 supply options featuring in their BVP. Of those 24 options are expected to feature on or before 2055. Of those options, no SEW options are within 1km of a Portsmouth Water option. Further, the HRA cumulative assessment finds that there are no options likely to give rise to significant cumulative effects during construction or operation. The WFD cumulative assessment did not identify any options likely to be non-complaint when considered cumulatively during construction or operation.

14. Monitoring

The SEA Regulations state that *'shall monitor the significant environmental effects of the implementation of each plan or programme with the purpose of identifying unforeseen adverse effects at an early stage and being able to undertake appropriate remedial action'* (Part 4 Post Adoption Procedures Regulation 17). In addition, the Environmental Report should provide information on a '*description of the measures envisaged concerning monitoring*' (Schedule 2 Information for Environmental Reports).

In line with the SEA Regulations, monitoring will cover significant environmental effects and it will involve measuring indicators that will enable the establishment of a causal link between the implementation of the WRMP24 and the likely significant effects (both positive and negative) being monitored. The SEA Regulations make clear that it is not necessary to monitor everything, or to monitor an effect indefinitely, rather monitoring should focus on those identified significant environmental effects. The DCLG guidance states that it is inappropriate to monitor everything, and monitoring proposals should be focused on the following areas:

- Identify potential breaches of international, national, or local legislation, recognised guidelines, or standards.
- Actions which may give rise to irreversible damage, with a view to identifying trends before such damage occurs.
- Where there was any uncertainty in the SEA and where monitoring would enable prevention or mitigation measures to be taken.

In short, it is the intention that the results of the monitoring will be of particular benefit to those involved with the further iterations of WRMP24 (which will be of particular importance to help further consideration of this Adaptive Plan) and if required, will allow early remediation to be undertaken of any identified adverse effects.

14.1. Monitoring programme

It should be noted that many of the effects identified that would arise from implementation of the Options contained within the fWRMP24 will be experienced during construction of infrastructure only and will not be experienced during operation of these facilities. In these circumstances monitoring will be restricted to the construction phase only.

It is also to be noted that as options are brought forward for development, further specific monitoring requirements may be incorporated in detailed designs and plans accompanying scheme development (including, where applicable, formal applications for any required environmental permits or abstraction licences, planning permission, as well as any scheme-specific HRA and WFD assessments). These will be discussed with relevant regulatory and statutory bodies and stakeholders to agree the appropriate scale and duration of such scheme-specific monitoring activities proportionate to the assessed environmental risks. The following table provides a list of monitoring that can be utilised to ensure that monitoring can be aligned with requirements of SEA Objectives for both construction and operation phases and will act to ensure any adverse effects can be identified. These could be included in Environmental Management Plans for both construction and operation, or measured across the company.

It is also the case that a number of Options within the fWRMP24 are continuations or expansions of existing operational practice and are subject to existing regulatory requirements. At present Portsmouth Water undertake water quality monitoring data from a series of boreholes, in order to demonstrate DWI compliance. In addition, monitoring is undertaken in respect of groundwater levels and river flows, along with some general environmental monitoring in certain catchments. Use is also made of a range of monitoring carried out by stakeholder organisations such as Environmental Agency and adjacent water companies such as Southern Water. It is anticipated that this monitoring will continue.

Table 14-1 - Proposed monitoring

Objective	Options to which Monitoring Applies	Overview of typical effect	Requirement for monitoring	Applicable in Construction (Frequency)	Applicable in Operation (Frequency)	Monitoring Action**	Adaptative Pathway
Objective 1: To reduce vulnerability of built infrastructure to climate change risks and hazards	Company wide and across all Options	The climate is changing. This is anticipated to result in more extreme weather events which could disrupt or destroy infrastructure, including that related to water supply, on a more frequent basis.	• No. of days / hours when water infrastructure disrupted (loss of service) due to extreme weather events	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
Objective 2: To reduce or manage flood risk, taking climate change into account	Company wide and across all Options	Increased occurrence of extreme weather events due to a changing climate could increase flood risk, or increase the area at risk of flooding. Flood risk can also occur due to the increase in areas of hardstanding or loss of floodplain due to the construction of infrastructure, including that related to water supply infrastructure.	• No. of days / hours when water infrastructure disrupted (loss of service) due to flooding	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
			• Area (Ha) of flood plain lost	Y (Pre and post construction)	N	Measure pre construction and review post construction.	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.

			• No. of projects where flood risk compensation was required or increase provided	N	Y (Annually)	Review annually during operation to monitor and if activity needs to be stepped up	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	Company wide and across all Options Upgrade Source O Booster to 25Ml/d Drought Permit: Source S	Construction and operation of the water supply network can have a wider range of effects on the water environment, resulting in changes in water quantity within the environment, for example due to increased abstraction and water quality through pollution incidents.	• Changes in WFD condition (positive or negative) of relevant waterbodies.	Y (Monthly)	Y (Monthly)	Review monthly during construction and monthly during operation to ensure no adverse effects and whether further work is required.	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
			• No. of pollution incidents (both during construction and operation)	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
			• Continuation of monitoring at raw water intakes.	Y (Monthly)	Y (Monthly)	Review monthly during construction and monthly during operation to ensure no adverse effects	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.

						and whether further work is required.	
Objective 4: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	Company wide and across all Options Upgrade Source O Booster to 25Ml/d Drought Permit: Source S	Construction and operation of the water supply network can have implications for biodiversity, for example through loss of habitat or disturbance to species. There is a potential that invasive species can spread through activities associated with moving water around the network, or through activities such as maintenance.	• Area (Ha) of designated site (including geological sites) directly affected by WRMP Options	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required. This should include habitat or species impacts through hydrological connection.	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
			• Area or length of Priority Habitat affected / restored or created	Y (Pre and post construction)	N	Measure pre construction and review post construction.	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
			• Area of Green / Blue Infrastructure created	Y (Pre and post construction)	N	Measure pre construction and review post construction.	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
Objective 5: To Protect		Soil is a non-renewable resource and is	• Area of Best and Most Valuable (Grade 1-3a)	Y	N	Measure pre construction and	Monitoring to be reviewed in light of

and enhance the functionality, quantity and quality of soils	Company wide and across all Options	vulnerable to erosion, degradation and contamination. Valuable soil resources can be lost of degraded due to construction of water supply infrastructure. Pollution incidents during construction and operation can lead to contamination of the soil resource.	soils lost to WRMP Options	(Pre and post construction)		review post construction.	Adaptive Pathway chosen and amended appropriately.
			• Total area of soil reinstated for agricultural use	Y (Pre and post construction)	N	Measure pre construction and review post construction to ensure completion or whether further work is required.	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
			• No. of pollution / contamination incidents during construction or operation of water supply infrastructure.	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
Objective 6: To reduce and minimise air and noise emissions	Company wide and across all Options	Construction or repair activities are likely to have implications for air and noise emissions. These could include dust or other particulate matter generated by the activities themselves or the required plant and vehicles. Treatment	• Scheme-specific monitoring during construction works / during operation (where applicable) would be monitored through an Environmental Management Plan agreed as part of the planning permission process	Y (as directed by Environmental Management Plan)	Y (as directed by Environmental Management Plan)	Reviews to be carried out in line with Environmental Management Plan.	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.

		and pumping of water is likely to lead to an increase in air and noise emissions. While most facilities will operate using energy mains supply, there may be a requirement for standby generators.	• Number of electric generators in use and period of usage.	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to monitor and if activity needs to be stepped up	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
Objective 7: To achieve Portsmouth Water target of reducing operational carbon emissions to Net Zero by 2030 and contribute to national target of Net Zero by 2050	Company wide and across all Options Upgrade Source O Booster to 25Ml/d Drought Permit: Source S	As with air and noise, construction activities are likely to result in carbon emissions. Options would also result in embedded carbon, but also potentially ongoing emissions through the requirement for energy for pumping / treating water.	• Percentage of energy use from renewable sources	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to monitor and if activity needs to be stepped up	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
			• Renewable energy generated on Company property	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to monitor and if activity needs to be stepped up	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
			• Tonnes of embedded carbon in construction of Option	Y (Post Construction)	N	Review post construction.	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.

			• Carbon emissions from Company operations	N	Y (Annually)	Review annually during operation to monitor and if activity needs to be stepped up	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
			• Area (Ha) planted / restored for sequestration	Y (Pre and post construction)	N	Measure pre construction and review post construction to ensure completion or whether further work is required.	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
			• Net greenhouse gas emissions per Ml (million litres) of treated water (kg CO2 equivalent emissions per Ml)	N	Y (Annually)	Review annually during operation to monitor and if activity needs to be stepped up	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
			• Company fleet fuel consumption	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to monitor and if activity needs to be stepped up	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
Objective 8: To conserve, protect and enhance	Company wide and across all Options	Construction activities can lead to effects on landscape or visual amenity, though	• Area / length of Option located within areas designated for landscape protection	Y (Pre and post construction)	N	Measure pre construction and review post construction.	Monitoring to be reviewed in light of Adaptive Pathway chosen and

landscape, townscape and seascape character and visual amenity		reinstatement would remove these effects or provide opportunities to improve visual amenity. Options may lead to the creation of new infrastructure in the landscape.					amended appropriately.
			• Area / length of completed reinstatement	Y (Post Construction)	N	Review post construction.	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	Company wide and across all Options	Construction activities can lead to effects on historic assets, including unknown artefacts though reinstatement would remove these effects or provide opportunities to improve the setting of these assets. Note that effects on archaeological remains cannot be undone. Dewatering of areas could damage buried assets. Archaeological investigation may provide opportunities to understand the past history of the Portsmouth area better.	• Number of scheduled monuments or other historic asset (designated & non-designated) harmed / damaged or conserved / enhanced by WRMP Option	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
			• Length of pipeline routes realigned to avoid heritage assets	Y (Pre and post construction)	N	Measure pre construction and review post construction.	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
Objective 10: To maintain and enhance	Company wide and across all Options	Construction activities could result in direct and indirect effects on	• Monitoring to be discussed and agreed in light of prevailing conditions with	Y (Monthly)	Y (Annually)	Review monthly during construction and	Monitoring to be reviewed in light of Adaptive Pathway

the health and wellbeing of the local community, including economic and social wellbeing		health and wellbeing, as well as impact on access to community facilities or provision of services.	relevant Health Officers of Local Authorities in the Plan area, or any other relevant parties e.g. health or educational establishments. Consideration to be given to need for monitoring of air and noise emissions.			annually during operation to ensure no adverse effects and whether further work is required.	chosen and amended appropriately.
			• Number of days / hours when water supply to people on the vulnerable groups register is disrupted.	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
			• Duration of highways works	Y (Monthly)	N	Review monthly during operation to monitor and if activity needs to be stepped up	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
			• Number of complaints relating to construction works	Y (Monthly)	N	Review monthly during construction to ensure no adverse effects and whether	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.

						further work is required.	
Objective 11: To maintain and enhance tourism and recreation	Company wide and across all Options	Tourism and recreation are two important sectors to the Portsmouth region. Construction and operation of WRMP Options could affect both tourism and recreational facilities through direct disturbance or loss. This could be both temporary or permanent.	• No net loss of important recreational / tourism amenity caused by WRMP Option	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
			• Generation of new recreational facilities	N	Y (Upon operation of the option)	Review upon operation of the option	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
			• Area of greenfield / Open Space disturbed or lost	Y (Monthly and pre and post construction)	N	Review monthly during construction to ensure no adverse effects and whether further work is required. Review pre and post construction to determine greenfield / Open Space lost.	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
			• Km of PRoW affected / lost /	Y	Y	Review monthly during	Monitoring to be reviewed in light of

			created by WRMP Option	(Monthly)	(Annually)	construction and annually during operation to ensure no adverse effects and whether further work is required.	Adaptive Pathway chosen and amended appropriately.
Objective 12: To minimise resource use and waste production	Company wide and across all Options	Construction and operation of WRMP Options will likely require resource use (including valuable treated water) and generate waste production.	• Proportion of material reused on site	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to monitor and if activity needs to be stepped up	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
			• Proportion of recycled material used on site	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to monitor and if activity needs to be stepped up	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
			• Tonnes of construction waste sent to landfill as a proportion of total waste produced	Y (Monthly)	N	Review annually during operation to monitor and if activity needs to be stepped up	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
			• Tonnes of sludge sent to landfill	Y (Monthly)	Y (Annually)	Review monthly during construction and	Monitoring to be reviewed in light of Adaptive Pathway

						annually during operation to monitor and if activity needs to be stepped up	chosen and amended appropriately.
Objective 13: To avoid negative effects on built assets / infrastructure	Company wide and across all Options	Likely effects on built assets and infrastructure. This may include the maintenance and operation of public or private buildings, transport, amenity resource, machinery and plant. Major users such as hospitals, factories and food producers may be most susceptible unless protected.	• Number and nature of complaints to be measured and discussions to take place with sensitive operators in light of prevailing conditions.	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.
			• Complaints / incidence of strategic infrastructure disruption or loss of service	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.	Monitoring to be reviewed in light of Adaptive Pathway chosen and amended appropriately.

** Monitoring actions outlined may be dependent on the option type and individual options and the potential effects they may have. Therefore the monitoring actions outlined will not be applicable to all option types and the relevance to individual options can be determined using the SEA Option Assessment Tables (Appendix E).

14.2. WINEP Monitoring

Please note that in addition to the above monitoring proposed in relation to the SEA of the WRMP, Portsmouth Water also undertake a series of monitoring in relation to WINEP. This WINEP monitoring will act to further boost understanding of the effects of the existing water supply infrastructure and its operation and can also be used to help inform future iterations of the WRMP. Please see Appendix 5B of the Portsmouth Water document 'Investigating and achieving sustainable abstraction'. It is also the case that a series of monitoring is proposed in order to help inform decision making relating to the Adaptive planning detailed in the fWRMP – this is set out in Appendix 10a to the fWRMP.

15. Summary and Conclusions

The SEA and other assessments carried out throughout the development of fWRMP24 has been thorough and comprehensive. Assessment was made of an initial long list of sites and environmental issues were considered through all stages of short listing and Option development. This was at both a regional level (carried out by WRSE) and at a more 'local' level that considered issues in light of the environmental context of the Portsmouth area. Consideration of both the regional and local level has meant that two SEA teams have been involved and have acted independently of each other, though liaison has been maintained and results of assessments shared. These teams have also liaised closely with the Portsmouth WRMP making team and have challenged the Plan development team when appropriate.

Based on the findings of the SEA, it is possible to recognise a number of key considerations and draw conclusions with regards to the WRMP24 and its 'environmental performance'. These are outlined as follows.

In the first instance, it is important to recognise that while WRMP24 clearly fits within a regional context, it also needs to reflect the issues and opportunities of the Portsmouth area. Similarly, there are a range of challenges and uncertainties facing both the region and the Plan area. Notably these include climate change and the need for increased climate resilience, water stress, population growth, along with economic uncertainties. Of particular note within the Portsmouth area is that there is a need to reduce reliance on chalk aquifers and this has been a key consideration within the development of the fWRMP24 and a significant driver of proposed new Options and investment required. The approach to assessment made, of considering wider regional issues (by WRSE), as well as considering a 'local' Portsmouth baseline and review of relevant plans and policies to develop a bespoke SEA Framework has resulted in an enhanced understanding of environmental issues in the Plan area and the surrounding region and this has allowed full and robust consideration of Options proposed under WRMP24.

Another key driver to development of this fWRMP24 has been the introduction of Environmental Improvement Plan (as part of the Government's 25 Year Plan) in April 2023 (post-draft plan submission). As a result, the fWRMP24 demand options have been reviewed to meet the demand reductions required under the EIP. These targets are more challenging than those proposed for the dWRMP24 and as a result there are a limited number of demand options available to meet these expected reductions.

The Adaptive plan approach that has been developed, recognises the inherent uncertainties involved in water resource planning and has been specifically designed to help water companies adopt a forward-looking approach to allow companies to plan for schemes that may be required from 2025 and beyond. The essence of this approach is that the Plan can adapt depending on which of the potential future scenarios identified occurs.

Consideration of WRSE of the adaptive planning approach identified the following three plans:

- Best Value Plan – Investment model pareto runs for Best Value Plan metrics (Customer Preference, SEA+, SEA-, Natural Capital, Carbon, Resilience (reliability, adaptability, evolvability), intergenerational equity), this is optimised on both individual Best Value Plan and cost metrics
- Least Cost Plan – Investment model run result when optimising on cost only
- Best Environmental and Societal plan - Removes the resilience metrics from the Best Value Plan

Examination was made of the trade-offs between the anticipated additional value that different portfolios of options could provide against the least cost criterion to try to derive something that is best value – for the environment, society and Portsmouth Water customers. WRMP24 has taken the adaptive planning approach and having identified the three Plan types, further identified what is considered the most realistic scenario, alongside the most realistic future pathway and from this has outlined a series of supply options (i.e. those which in general will increase the amount of water in the supply system), alongside a series of demand options (i.e. those which will act to reduce the need for water). Having identified the Options in the Best Value Plan, WRSE carried out initial assessment of these for SEA and the associated environmental assessments of Habitats Regulations Assessment, Water Framework Directive, Biodiversity Net Gain, Natural Capital Assessment and Invasive Non-Native Species. These assessments were further built upon by Portsmouth Water, with a particular emphasis on trying to identify issues of note in a local context. In addition, further assessment was undertaken of potential effects on heritage assets and SSSI's.

It is important to note that there were a series of Options that are also included but which were not subject to SEA for a range of reasons such as they are existing bulk supplies, previously approved bulk supplies, are associated with Options in adjacent water companies (and as such considered under the SEA of both WRSE and that water company), or are part of the Havant Thicket Option.

Havant Thicket Reservoir is a key legacy from WRMP19, which has formed a cornerstone of Portsmouth Waters ongoing planning process. The Reservoir enables Portsmouth Water to store winter spring flows for use in the summer, increase the quantity of water supplied to Southern Water, which in turn allows them to make environmental improvements by reducing their reliance on sensitive chalk sources in Hampshire. In addition to supporting reduced abstraction on chalk rivers, the scheme has an overall biodiversity net gain and will offer a new community leisure facility for the area.

The reservoir scheme, as proposed in WRMP19, is unchanged and has been included in the baseline assumptions for this plan (with a revised delivery date of 2031/32). It was supported by customers and regulators and is being developed in partnership with Southern Water. This will be the first new reservoir to be built in the South East since the 1970s. Havant Thicket Reservoir has received planning permission and work onsite is ongoing.

Assessment of the Options outlined considered both construction effects and those which are anticipated to occur during operation of the Option. A series of mitigation measures were also identified, with the aim of reducing or nullifying any adverse effects, while potentially maximising any beneficial effects from the Option.

It is anticipated that three of the Options (Source S drought permit, NEUBS and TUBS) within the fWRMP24 will not require any construction activities. Construction activities are anticipated in relation to the implementation of all other Options, although where adverse or beneficial effects were identified they were not considered significant. Such construction effects for these Options are anticipated to be in the most part local scale, short term and temporary to the construction / repair phase.

During operation, effects have been identified for all options, with significant adverse effects in relation to the Drought Permit: Source S, and significant beneficial effects in relation to Drought Permit: Source S, New treatment works at Service Reservoir C to treat water from Havant Thicket and ‘High Plus’ Basket options.

Drought Permit: Source S, is anticipated to have moderate adverse impacts in terms of biodiversity (Objective 1) due to the likely impacts on designated sites and on water (Objective 3) as there is a possible risk of WFD status deterioration on Chichester Chalk groundwater body. These effects are anticipated to be short term, temporary, and regional in relation to biodiversity whilst effects are expected to be local for water.

Moderate beneficial effects are anticipated for 'High Plus' Basket for both biodiversity (Objective 1) water (Objective 3) due to awareness campaigns, retrofitting, metering and leakage reduction works resulting in water being kept within the environment.

Both Drought Permit: Source S and New treatment works at Service Reservoir C to treat water from Havant Thicket are anticipated to have moderate beneficial effects in respect of climate change (Objective 6) due to the increased resilience they provide. Moderate beneficial effects are also anticipated for health and wellbeing (Objective 10) for these two options by improving the resilience of water supply.

Drought Permit: Source S and 'High Plus' Basket are anticipated to have moderate beneficial effects on resource use (Objective 12) as the drought permit has the potential to reduce the need for more resource intensive external transfers and abstractions and 'High Plus' Basket will reduce resource use and wastage.

During operation of Drought Permit: Source S these effects are anticipated to be short term, temporary and local with the exception of biodiversity which would be regional. For 'High Plus' Basket and New treatment works at Service Reservoir C to treat water from Havant Thicket effects are anticipated to be long term, permanent and local with the exception of biodiversity for 'High Plus' Basket which would be regional.

Another important element within the fWRMP24 that will have ongoing beneficial effects is the Havant Thicket Reservoir and associated elements. As this Option has been granted planning permission it has not been specifically considered in this SEA, but it is worth noting here as its presence allows for WRMP24 to concentrate on measures such as Demand Management, with consequent benefits for the environment. The development of the Havant Thicket reservoir itself is anticipated to secure more reliable water supplies for the South East region. Portsmouth Water anticipate that by using the reservoir to supply their own customers, they can then share supplies from other water sources with Southern Water. This will mean Southern Water will be able to reduce the amount of water that they take from the Chalk Rivers Test and Itchen in Hampshire, which as noted in WRMP24, are rare and sensitive chalk streams and are considered of particular value.

It is recognised that WRMP24 will not act or be delivered in isolation and will influence and be influenced by, other Plans and Policies or developments across and beyond the Portsmouth Water area and the south east as a whole. While there is a potential for cumulative effects during construction, it is anticipated that for the most part construction works associated with the WRMP are anticipated to be relatively small scale, with localised effects and for the most part likely to be spatially and temporally isolated from major infrastructure developments. A range of mitigation measures have been noted within this SEA which would act to reduce effects, many of which could be included in construction Environmental Management Plans – these would be

further developed through detailed scheme design and would reflect conditions and context prevailing at that time. In addition, it is to be expected that all major infrastructure such as that which may arise from other (non-water sector) plans, will be developed within the appropriate planning framework and will itself be subject to measures to ensure cumulative effects are addressed.

Nevertheless, there is a potential that individual options could act cumulatively with options within other water company areas to produce adverse effects and WRSE have identified that in a drought event where emergency drought groundwater options were operational, an in-combination effect would occur which could lead to temporary reduction in groundwater levels, leading to potential changes in the water balance and surface water dependant status elements. Similarly, WRSE identified that the Recharge of Havant Thicket reservoir from Budds Farm, cumulative adverse effects, including significant adverse effects, have been identified across a range of objectives owing to its proximity to adjacent Southern Water options.

While many aspects of WRMP24 are anticipated to result in beneficial effects, it is important that Portsmouth Water understand the effect of implementation of WRMP24, particularly in regard to those areas where significant adverse effects could occur. Portsmouth Water already undertake water quality monitoring data from a series of boreholes, in order to demonstrate DWI compliance. In addition, monitoring is undertaken in respect of groundwater levels and river flows, along with some general environmental monitoring in certain catchments. Use is also made of a range of monitoring carried out by stakeholder organisations such as Environmental Agency and adjacent water companies such as Southern Water. It is anticipated that this monitoring will continue – indeed this will continue to form a cornerstone of the ongoing WINEP programme that Portsmouth Water undertake in cooperation with Environment Agency to set out their pathway for environmental destination. In addition, a series of monitoring measures have been noted through this SEA that could be incorporated into Environmental Management Plans for both the construction and operation phases of Option, or which could be applied across Portsmouth Water to help understand how implementing WRMP24 will interact with the Objectives of the SEA. This would allow early identification of unforeseen adverse effects, as well as crucially build up an evidence base to inform consideration of future iterations of this adaptive plan.

In conclusion, Portsmouth Water have developed a final Water Resource Management Plan (fWRMP24) which has been subject to a set of thorough and comprehensive environmental assessments, at both a regional level and at a level local to the Portsmouth Water area. The assessments undertaken have been consistent in approach and resulted in iterative development of the Plan, thereby allowing the Plan to be developed in the context of a thorough understanding of the key environmental issues and constraints of the Portsmouth Water area and beyond. This allowed for a robust consideration of alternatives to the Plan and allowed identification of a Preferred set of Options. The range and significance of anticipated effects to be anticipated from implementation of the fWRMP24, including both beneficial and adverse, have been identified and mitigation proposed where required. An emphasis on Demand Management will help to ensure that water can remain in the environment, unless absolutely needed. Monitoring will help to protect the environment by allowing action from unexpected effects to be taken and will help inform future iterations of the Plan. Overall, it is considered that fWRMP24 represents a well balanced approach, in terms of environmental performance, to providing water to the Portsmouth area.

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