SRN26 Water Resources- Supply Options

Enhancement Business Case

2nd October 2023
Version 1.0

from Southern Water

Contents

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Glossary

Acronym	Term	Definition
ADO	Average Deployable Output	Annual average deployable output from a source
BVP	Best Value Plan	A Water Resource Management Plan (WRMP) or regional plan which considers a range of factors (alongside economic cost) with the aim of increasing overall benefit to customers, the environment and society
	Central Area	Supply area made up of the Sussex North, Sussex Brighton and Sussex Worthing Water Resource Zones
CAP	Competitively Appointed Provider	The entity that will own and deliver the assets of a DPC scheme
Defra	Department of Environment, Food and Rural Affairs	The government department responsible for setting water policy
DO	Deployable Output	The output of a source or bulk supply as per the licence (if applicable); pumping plant and/or well/aquifer properties; raw water mains and/or aqueducts; transfer and/or output main; treatment; water quality
	Drought Permit	An authorisation granted by the Environment Agency under drought conditions, which allows for removal and storage of water outside the schedule of existing licences on a temporary basis
	Drought Order	Powers granted by the Secretary of State during drought to manage quantities of water removed and released on a temporary basis
DPC	Direct Procurement for Customers	
DYAA	Dry Year Annual Average	Represents a period of low rainfall and unrestricted demand and is used as the basis of a Water Resource Management Plan

Acronym	Term	Definition
DYCP	Dry Year Critical Period	The period(s) during the year when water resource zone supply and demand balances are at their lowest
DYMDO	Dry Year Minimum Deployable Output	This is the autumn period in a dry year when groundwater levels and river flows are at their lowest and we limit water sources to their minimum deployable outputs
DWI	Drinking Water Inspectorate	The government's drinking water quality regulator
	Eastern Area	Supply area comprising the Kent Thanet, Kent Medway East, Kent Medway West and Sussex Hastings Water Resource Zones
EA	Environment Agency	The government's environmental regulator
ED	Environmental Destination (or Environmental ambition)	A strategy developed at a regional level to help enhance the natural environment through water resources activities and sustainable abstraction (water removal)
ERP	Emerging Regional Plan	The draft least cost regional plan prepared by Water Resources South East (WRSE) under the National Framework, as put into public consultation in January 2022
GW	Groundwater	Water held underground in the soil or in voids in rock
HWTWRP	Hampshire Water Transfer and Water Recycling Project	An SRO with two component parts including a WRP that makes use of the storage in Portsmouth Water's consented Havant Thicket reservoir and a transfer pipeline from the reservoir to Otterbourne WSW, being progressed as a collaboration between SW and PWC
LTDS	Long term delivery strategy	A component of the PR24 business plan
IVM	Investment model	Model developed at a regional level used to select a suite of preferred options by mathematically optimising

Acronym	Term	Definition
		across the different best value metrics.
MDO	Minimum deployable output	Deployable output for the period when groundwater levels are at their lowest
Ml/d	Mega litres per day	Millions of litres per day. Unit of measurement for flow in a river or pipeline
NE	Natural England	The government's adviser for the natural environment in England
NYAA	Normal Year Annual Average	This is the demand for water expected under normal conditions
PCC	Per Capita Consumption	Amount of water typically used by one person, per day
PDO	Peak Deployable Output	Deployable output for the period in which there is the highest demand
RAPID	Regulators' Alliance for Progressing Infrastructure Development	The collaborative regulatory group of Ofwat, the Environment Agency and DWI formed to accelerate development of new water infrastructure and design future regulatory frameworks
RBVP	Regional Best Value Plan	The Best Value Plan for the region prepared by WRSE.
SRO	Strategic Resource Option	One of a number of large-scale new water resource options being administered by RAPID.
WRSE	Water Resources South East	An alliance of six water companies within the South East of England, with the aim 'to secure water supplies for future generations through a collaborative, regional approach to managing water resources
WRZ	Water Resource Zone	An area treated as distinct within the WRMP

Executive Summary

Our customers' put reliable supplies of high-quality water as one of their highest long-term priorities. We are however at a transformational point with water scarcity and shortfalls driven by climate change, population growth and the need to leave more water in the environment.

Building on our WRMP19, our revised draft WRMP24 has confirmed our supplies, services and region face significant challenges, requiring significant changes to the sources of water we supply. We are planning to replace the equivalent of around 30% of our water supplies over the next six years – equivalent to around 80% of the water we supply in Hampshire, to protect iconic chalk streams. This is an unprecedented change and the last time new water resources were developed on this scale in the UK, was to support the fast growing industrial cities of Liverpool and Birmingham in the late 1800s.

This document presents the need and justification for AMP8 enhancement expenditure on supply side options developed as part of our long term strategic WRMP24. Our WRMP is currently in draft and has not been signed off by the Secretary of State and hence is subject to change. Our Water Resources Management Plan requires a step change in investment to an unprecedented level, and this plan is six times larger than our equivalent plans in AMP7. This submission and linked WRMP24 submissions in August and September 2023 do not yet close all the deficits. We will work with regulators to develop and agree potential mitigations over the medium term to provide drought contingency as the solutions are built. For more information please see SRN58 Uncertainty Mechanism Technical Annex. As such this business case represents the supply side options identified in the revised draft WRMP submitted to the EA on the 31st of August 2023. Our rdWRMP has been produced as part of the Water Resources South East (WRSE) regional revised plan and in line with the WRMP guidelines.

This business case presents the need for £839m of investment, to deliver supply side and internal interconnector schemes. This covers schemes that are being developed in the current AMP, as well as those for delivery from AMP8 onwards to ensure we provide resilient water supplies to our customers. The investment is summarised in Table 1 below.

Table 1: Summary of investment

	Benefit (Ml/d)	In-house delivery	Alternative Delivery	Total Investment
AMP8 Interconnectors	110	164.3		164.3
New Sources and transfer renewals available by 2030	78	8.4	98.3	106.7
New Sources available from 2030	82	120.4	271.3	391.7
Short term mitigation		91.4		91.4
Portsmouth Water payments		85.0		85.0
Total	270	469.5	369.6	839.09

These solutions were identified as part of the Water Resources South East (WRSE) best value, regional plan and our revised draft WRMP24. We are requesting £469.49m to cover in house delivery. This includes the requirement for funding for our WRMP24 mitigation plan (£91m), to address the change of schemes and their delivery dates in Hampshire and Sussex.

We have identified a number of schemes that will be delivered via an alternative funding route, totalling £369.6m of spend.

This business case shows that there is a need for this investment and that the best value option for our customers is to deliver the proposed schemes in AMP8.

Summary of Enhancement Case	
Name of Enhancement Case	Water Resources- Supply side schemes
Summary of Case	This business case covers the justification for AMP8 totex for supply side options and Internal interconnector schemes in our revised draft WRMP24. It also covers the capex associated with the continued development, planning and construction of further schemes to be completed in AMPs 9 and 10. We are asking for £469.5m Totex in AMP8, this will deliver an AMP8 benefit of 187.8Ml/d, allow us to deliver options in AMP8 as part of our mitigation plan and allow us to continue progressing schemes to deliver a further 82.4Ml/d of benefit in AMP9 We have identified 4 schemes that we will look to progress through alternative funding routes. These schemes require £369.6m of investment in AMP8 and are expected to deliver 8.5Ml/d in AMP8 and 36.5Ml/d in AMP9. Expenditure will ensure that we can secure sustainable, long-term water supplies for our customers, whilst protecting the environment. Schemes were selected through the WRMP options appraisal process. This involved screening of a long list of options followed by best value programming using the WRSE investment model. This enhancement case therefore consists of the best value mix and order of supply-side options which alongside the best value mix and order of demand-side options represents the best value plan to maintain the supply-demand balance for the next 50 years. During AMP8, all nine scenarios are the same and therefore options selected are core pathway options. Our Water Resources Management Plan requires a step change in investment to an unprecedented level, and this plan is more than six times larger than our equivalent plans in AMP7. This submission and linked WRMP submissions in August and September 2023 do not yet close all the deficits. We will work with regulators to develop and agree potential mitigations over the medium term to provide drought contingency as the solutions are built. This business case also includes £91m for mitigation options to be delivered in AMP8 as part of our WRMP24 mitigation plan, to address the change of schemes and their delivery dates in Hampshire and Sussex. This business case does not include the WFLH Strategic Regional Options (SRO options), which are covered in the SRO business case. We have used our standard enhancement solution costing approach when pricing the supply side schemes. We have completed ndustry benchmarking to assess the efficiency of the costs and provide confidence in their robustness

	Customers will be protected through a PCD that covers the Ml/d benefit of the schemes delivering in AMP8 identified in this business case. It is important customers are protected from capacity being less than planned and therefore a deficit in supply remaining.
Expected Benefits	The total WAFU benefit of 187.8Ml/d provided in AMP8 is split into three elements; • The delivery of 2 supply side schemes providing 9.7Ml//d • The delivery of 5 internal interconnector schemes, providing a total benefit of 110Ml/d in AMP8, via a maximum transfer capacity of 163Ml/d • 68.1Ml/d provided by the continuation of 4 bulk supplies with neighbouring companies and 3 internal transfers A further 13 schemes will also be developed to provide a total of 82.4M/d in AMP9. All the options are selected in our "best value plan" and deliver environmental and social benefits in addition to new supply. Improved supply and demand balance, contributing to an improved EPA score
Associated Price Control	Wholesale Water: Water Resources
Enhancement TOTEX	£469.49m
Enhancement OPEX	£124.8
Enhancement CAPEX	£344.7
Is this enhancement proposed for a direct procurement for customer (DPC)?	Yes, a number of schemes within this business case have been identified as suitable for a delivery route including third party financing – either under the DPC framework or through an alternative delivery mechanism. The schemes selected for alternative delivery are: • Recycling: Sandown WwTW • Recycling (SNZ): Littlehampton WTW • Recycling (KME): Sittingbourne Industrial Water recycling • Recycling (KMW): Medway WTW These schemes make up £369.6 m of the required AMP8 totex and are expected to deliver 8.5Ml/d in AMP8 and 36.46Ml/d in AMP9. Please see the SRO business case for information on the delivery route for the SRO schemes.

1. Introduction and Background

1.1. Introduction

Ensuring a reliable supply of high-quality water is one of our customers' highest long-term priorities. Our supplies, services and region face significant challenges. We are at a transformational point with water scarcity and shortfalls driven by climate change, population growth and increasing demand from industry a reality. 2022 was the warmest year on record and climate change is causing droughts to become more frequent and more severe.

Our rdWRMP24 has reconfirmed and increased the likely water supply deficits we face due to environmental protection, climate change and population growth – we could have a shortfall of 500 million litres per day by 2050. This includes huge reductions to the amount of water we take from iconic chalk streams, unique to our region.

We are planning to replace the equivalent of around 30% of our water supplies over the next six years – equivalent to around 80% of the water we supply in Hampshire to protect iconic chalk streams. The last time new water resources were developed on this scale in the UK, was to support the fast-growing industrial cities of Liverpool and Birmingham in the late 1800s.

This enhancement case covers the AMP8 expenditure on supply side schemes (excluding our SROs) that form part of our rdWRMP24 best value plan.

The WRMP24 strategy is built on four pillars that work in tandem to secure sustainable water supplies:

1. Efficient use of water and minimal wastage across society
2. New water sources that provide resilient and sustainable supplies
3. A network that can move water around the region
4. Catchment and nature-based solutions that improve the environment we rely upon

This business case covers supply side enhancement schemes (pillars 2 and 3) that will be delivered in AMP8, as well as those that require AMP8 investment to ensure delivery from AMP9 onwards. Strategic water resource options (SRO) selected in our Hampshire region are covered in SRN29 Water Resources – Strategic Resource Options Enhancement Business Case.

Demand and catchment and nature based solutions (pillars 1 and 4) are detailed in separate business cases. Our WINEP programme is detailed in business case reference Water WINEP-Supporting abstraction. Taken together, the proposals represent the second AMP of a continuation of our 50-year strategy to ensure water supplies are available to meet every demand scenario in each of our water resource zones (WRZ).

This is an Ofwat enhancement case as it allows us to provide water provisions to our customers in 1 in 200 year drought conditions, increasing to 1 in 500 year drought conditions by 2030, taking into account the impact of growth, climate change and license reductions.

1.2. Background Information

Southern Water, as part of WRSE, is facing a multi-dimensional problem: Water is an increasingly scarce resource due to the impacts of climate change, population growth and environmental needs, with the whole of the South East England classed as being seriously water stressed[1].

[1] Water stressed areas – final classification 2021, Environment Agency 2021.

Development of WRMP24

WRMP24 is a statutory plan that sets out how we aim to ensure a secure supply of wholesome water to our customers, which covers the following periods: 2023-2025 and 2025-2075. Since WRMP19, water resource planning has undergone significant change, including:

- The National Framework, published in 2020[2], which called for a shift to collaborative regional planning
- The introduction of the concept of best value planning[3]
- Adoption of an adaptive planning approach
- The Water Resources Planning Guideline (WRPG) for WRMP24 requires water companies to maintain supplies in a drought, with a return period of 1-in-500-year (1:500 drought) from 2040 and to use drought permits and orders less frequently in the future. This is a change from the 1-in-200 year return period planned for at WRMP19, which remains in place until 2040[4]

WRMP24 has been developed with these changes in mind and in close collaboration with WRSE. It utilises an adaptive planning approach to ensure options that meet the water resource need across all future scenarios are selected and implemented at the correct time. This is a key difference between WRMP24 and previous WRMPs and means that, together with other companies in the region, we can identify and deliver schemes that will give regional-scale benefits, for customers, the environment and other sectors that rely heavily on water. Enabling more water transfers between companies to provide better regional resilience has been a key outcome of this process.

The options selected for each of our three areas, as part of our adaptive plan, allow us to maintain supply-demand balance across all future scenarios we have considered with key decision points in 2030 and 2035.

For further details on how our WRMP24 was developed please see section 4, pg. 47 of our revised dWRMP24 Technical Report[5]. This summarises how our WRMP has been drafted, the stages of consultation and how the dWRMP aligns with the wider regional strategy, our neighbouring companies and other strategic plans.

Our draft WRMP24 was published in 2022 for public consultation. It has been updated and revised, with the revised draft WRMP24 being submitted to our regulators in August 2023. One of the key changes we have made since the draft Water Resources Management Plan was submitted for consultation is a revision in the delivery dates of Littlehampton Wastewater Treatment Works recycling option (delayed by 5 years), Budds Farm Wastewater Treatment Works recycling option (delayed by 5 years) and the Havant Thicket Reservoir (delayed by 2 years). These delays were identified via testing of our plan and have been caused by a combination of factors including environmental factors, consenting risks and changes to schemes caused by bulk transfer options no longer being available to us. This has extended the period when we may need drought permits and orders, alongside our supply and demand side options.

This has meant that alongside our revised draft WRMP we have developed an initial mitigation plan that will reduce the risk of our requirement to use these drought orders and permits between 2030 and the availability of our planned schemes. The mitigation plan can be found in Appendix 27 of the revised draft WRMP.

Our Water Resources Management Plan requires a step change in investment to an unprecedented level, and this plan is more than six times larger than our equivalent plans in AMP7. This submission and linked WRMP submissions in August and September 2023 do not yet close all the deficits. We will work with

[2] Meeting our Future Water Needs: A National Framework for Water Resources, Environment Agency, 2020

[3] Deriving a Best Value Water Resources Management Plan, UKWIR, 2020. Report ref. No. 20/WR/02/14

[4] Water Resources Planning Guideline (WRPG), GOV.UK as updated 2023.

[5] Revised Draft Water Resources Management Plan 2024:Technical Report, Southern Water 2023

regulators to develop and agree potential mitigations over the medium term to provide drought contingency as the solutions are built.

Working with the regional group

WRSE is an alliance of six water companies within the South East of England and its aim is 'to secure water supplies for future generations through a collaborative, regional approach to managing water resources' [6]. As part of WRSE we have worked closely with the other five member water companies in developing a regional plan aligned with government guidelines and best practice. This is a new innovative approach bringing greater benefit to our customers by allowing best value solutions for the region to be identified on a scale not previously considered.

All key decisions are taken by the WRSE project management board (PMB), which consists of representatives from each water company as well as the Environment Agency.

We have worked both independently and collaboratively as part of WRSE, contributing to the development of method statements on demand forecasts and approaches such as Best Value planning, as well as decision-making. While independently developing demand and supply forecasts and options appraisals. We completed our own modelling for our baseline water supply forecasts and demand forecasts.

There are other elements where we have adopted a common regional approach across the WRSE members, following an iterative process. This includes development of our adaptive planning pathways and best value metrics. In terms of investment modelling, we have worked with the regional group to provide the outputs so that results for the entire region are produced from a single source consistent between regional and company plans.

WRSE consulted on its Emerging Regional Plan (ERP) from January to March 2022 (WRSE, 2022a) and its draft Regional Best Value Plan (dRBVP) from November 2022 to February 2023. Our dWRMP24 was consistent with the dRBVP and took account of the feedback on the ERP. Similarly, our revised dWRMP24 maintains consistent with the revised dRBVP. For example, this plan is based on a BVP run agreed by all WRSE member companies in July 2023. This ensures there are consistent assumptions on regionally strategic resources.

Development of the supply demand balance

To ensure that we continue to provide uninterrupted supply in the future, we need to start by understanding how much water will be needed in the future.

We do this by forecasting demand, as well as forecasting the supplies that will be available to meet that demand, taking account of associated risks and uncertainties. All components of existing and future supply and demand are taken into account via a rigorous development process followed by WRSE, WRSE member companies and ourselves. For regional planning and through our supply and demand forecasts we looked at 6 growth scenarios, 28 climate change scenarios and 5 Environmental Destination scenarios[7]. To come up with a more practical number of future supply-demand situations, we, alongside WRSE decided to limit the number of 'situations' to nine.

These are nine different sets of circumstance that reflect the range of uncertainty in future population growth, climate change and the amount of abstraction reduction, as well as demand management targets and the progressive move to being resilient to a 1-in-500-year drought by 2040. The range of possible outcomes for growth, environmental destination climate change and resulting supply and demand balance are set out in section 5.5 of the revised dWRMP technical report. Situation 9 being the most benign and situation 1 the most adverse. Of these nine situations, for regulatory purposes, Situation 4 has been selected by Southern Water as our core reported pathway and this situation is reported in our WRMP tables. We have agreed to

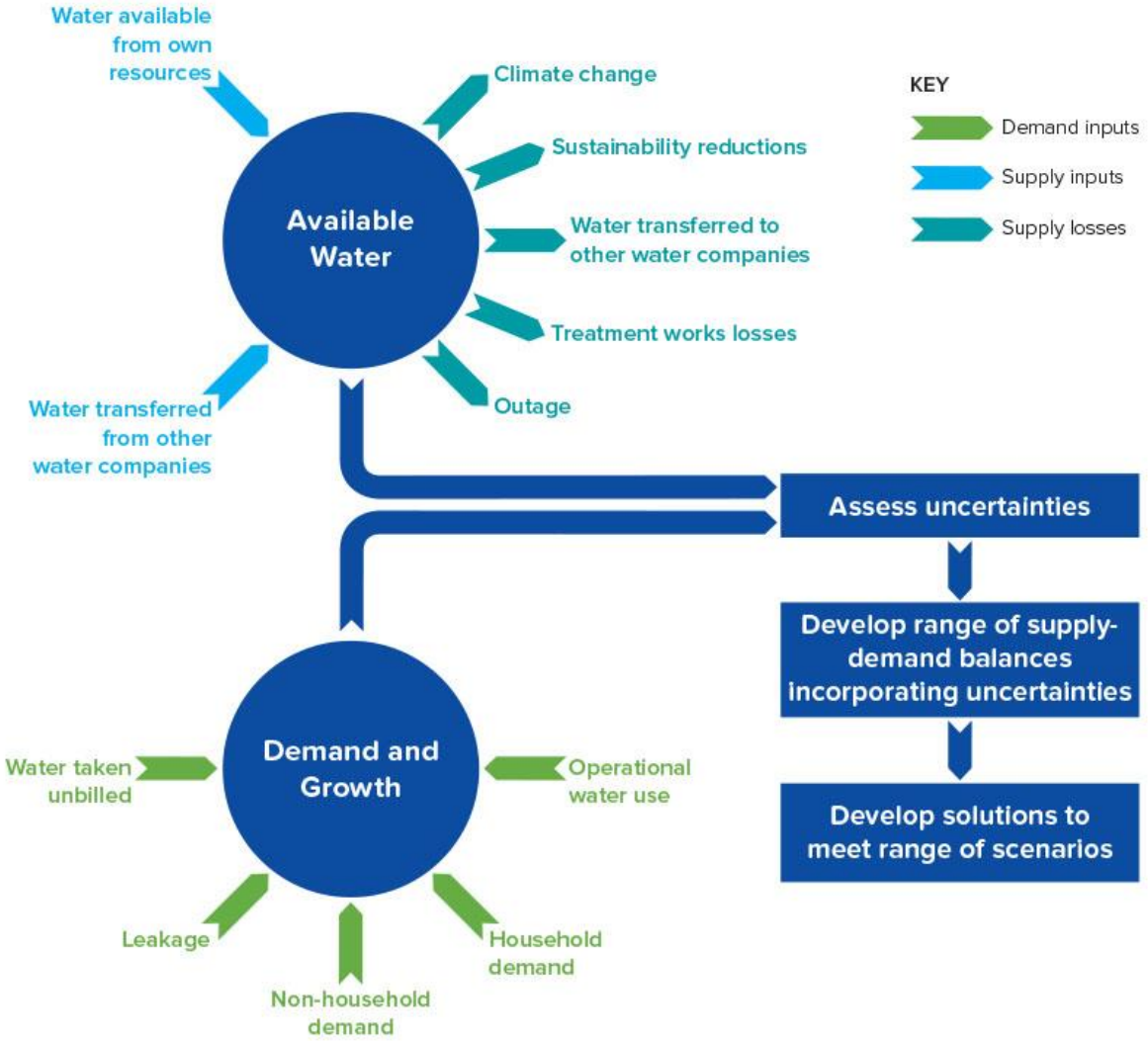
[6] Water Resources South East webpage; wrse.org.uk/aboutus

[7] Annex 8: Supply Forecast, draft revised WRMP24

use this pathway in discussion with WRSE and through regulatory feedback which included a requirement that our core pathway reflect housing plan growth and BAU+ Environmental Destination. This is purely a table reporting convention and our plan remains fully adaptive across the whole range of the future situations[8].

The key components of the supply and demand forecasts are shown in Figure 1. This is further detailed in Section 2.1; Supply and demand balance and in section 5 of the dWRMP24 technical report[2]. Figures used to build the supply and demand balance, such as leakage and demand originate from APR data.

Figure 1: Key components of the supply and demand forecasts[2]



Our revised dWRMP has identified that we will see demand increase to 587Ml/d by 2030 and to 637Ml/d by 2050, which when balanced with a baseline total water available for use (WAFU) of 385Ml/d by 2030 and 136Ml/d by 2050 presents a baseline deficit of -202Ml/d by 2030 and -501Ml/d by 2050[9].

[8] Revised Draft Water Resources Management Plan 2024: Technical Report, Chapter 5.5

[9] WRMP24 Table 3, Revised draft WRMP24

1.3. High level overview of supply side options

This business case presents the need for £839m of investment, to deliver supply side and internal interconnector schemes. This is summarised in Table 2.

We are requesting £469.49m[10] to cover in house delivery. This includes the requirement for funding for our WRMP24 mitigation plan (£91.4m), to address the change of schemes and their delivery dates in Hampshire and Sussex and payments to Portsmouth Water.

This will deliver an AMP8 benefit of 187.8Ml/d[11] through the delivery of supply side schemes and internal interconnector schemes and allow us to continue progressing supply side and internal interconnector schemes that will deliver a further 82.36Ml/d[10] of benefit in AMP9. We are progressing 4 schemes via alternative funding, reducing the cost and risk to our customers. DPC cost totals £369.6m.

Table 2: Summary of investment

	Benefit (Ml/d)	In-house delivery	Alternative Delivery	Total Investment
AMP8 Interconnectors	110	164.3		164.3
New Sources and transfer renewals available by 2030	78	8.4	98.3	106.7
New Sources available from 2030	82	120.4	271.3	391.7
Short term mitigation		91.4		91.4
Portsmouth Water payments		84.99		84.99
Total	270	469.49	369.6	839.09

The total WAFU benefit of 187.8M/d provided in AMP8 is split into three elements;

- The delivery of 2 supply side schemes providing 9.7Ml//d
- The delivery of 5 internal interconnector schemes, providing a WAFU benefit of 110Ml/d in AMP8, via a maximum transfer capacity of 163Ml/d. Where the mains are bidirectional, the benefit to WAFU has only been included once.
- 68.1M/d provided by the renewal of 4 bulk supplies with neighbouring companies and 3 internal transfers.

A further 13 schemes will also be developed to provide a total of 82.36M/d in AMP9.This is comprised of the following options:

- 2 new imports
- 3 new ground water sources
- 3 new water recycling plants
- 1 treatment works capacity increase
- 1 process loss recovery scheme
- Planning for 1 reservoir (planning only no benefit associated with scheme)
- Planning for 1 new groundwater source (planning only no benefit associated with scheme)

[10] Data table CW8

[11] Data table CW8

- Planning for 1 aquifer recharge/ aquifer storage and recovery scheme (planning only no benefit associated with scheme)

Table 3 shows the schemes where are requesting AMP8 funding. These options were selected via a rigorous options appraisal process followed by best value programming and therefore represent the best value mix and order of supply-side options, which alongside demand-side options represents the best value plan to maintain the supply-demand balance for the next 50 years

Table 3: WRMP24 schemes requiring AMP8 enhancement spend

Area	Option	Option Type	Benefit (ML/d)	Completion Year
Western	Newbury Groundwater	Water treatment works capacity increase	1.2	2027-28
	Romsey Groundwater	New groundwater	4.8	2034-35
	Test MAR - Planning & Development	Aquifer recharge/Aquifer storage recovery	0	2031-32
	Groundwater: Eastern Yar replacement BH	New groundwater	0	2034-35
	Groundwater: Newchurch LGS	New groundwater	1.95	2034-35
	Recycling: Sandown WwTW	Water reuse	8.5	2027-28
	Additional import from Portsmouth Water (Additional 21Ml/d)	External potable bulk supply/transfer	21	2031-32
	Southampton Link Main: Southampton link main 45 Ml/d (HSW-HSE)	Internal potable transfer	45	2027-28
	Southampton Link Main: Hampshire grid (reversible link HSE-HW)	Internal potable transfer	38	2027-28
	Andover Link Main: Hampshire grid (HW-HA)	Internal potable transfer	15	2027-28
	Transfer: Romsey Town & Broadlands valve	Internal potable transfer	3.1	2027-28
	Import from Portsmouth Water (additional 30Ml/d)	External potable bulk supply/transfer	15	Renewal of bulk transfer from2029-30
Central	Groundwater: Lewes road	Water treatment works capacity increase	3.5	2030-31
	Recycling: Littlehampton WwTW	Water reuse	14.96	2030-31
	Storage: River Adur offline Reservoir - Planning	New reservoir	0	2033-34
	Outwood To Turners Hill: 10Ml/d	External potable bulk supply/transfer	10	2033-34
	Transfer: Winter transfer stage 1 - Provision of a permanent	Water treatment works loss recovery	2	2030-31

Area	Option	Option Type	Benefit (ML/d)	Completion Year
	sludge treatment facility at Pulborough WSW (2Ml/d)			
	Transfer: Winter transfer Stage 2: New main Shoreham/North Shoreham and Brighton A (4Ml/d)	Internal potable transfer	3	2027-28
	Bulk import (SNZ): SES re-zoning extension (4Ml/d)	External potable bulk supply/transfer	4	2025-26
	Import: PWC at Pulborough extension (15Ml/d)	External potable bulk supply/transfer	15	Renewal of bulk supply from 2026-27
	Transfer: Bi-directional transfer (SWZ-SNZ) (15Ml/d)	Internal potable transfer	15	Continuation of transfer
Eastern	Groundwater: recomission Gravesend source	New groundwater	2.65	2030-31
	Recycling: Sittingbourne industrial reuse	Water reuse	7.5	2030-31
	Recycling: Medway WwTW	Water reuse	14	2031-32
	Transfer: Utilise full existing KME-KTZ transfer capacity	Internal potable transfer	9	2027-28
	Transfer: KTZ-KME (14Ml/d)	Internal potable transfer	14	Continuation of transfer
	Import: SEW Kingston to KTZ Near Canterbury (2Ml/d)	External potable bulk supply/transfer	2	2025-26

Supply options and demand measures have been selected via our best value decision making process and consider uncertainty related to climate change, population growth and environmental destination to allow a number of scenarios to be planned for.

Our WRMP24 selects a combination of options to mitigate deficits in supply in AMP8 and to ensure that water supplies are planned for and balanced into the future across a range of scenarios. These options are split into the following categories;

- **Supply side capital schemes**: Also referred to as hard infrastructure, which include options such as water recycling, new groundwater sources, increased water supply works capacity and desalination. Supply side capital schemes that require funding to deliver in AMP8 or to progress through investigation, design, or construction in AMP8 for delivery in AMP9 and 10 are included in this business case, with the exception of the SRO deliverables which are detailed in a separate business case.

- **Internal interconnectors or interzonal transfers**: We will utilise interzonal transfers, where available, to share surplus deployable output between our water resource zones and balance supplies. This can be split into the utilisation of those already in place and the delivery of infrastructure to facilitate new transfers.

Costs associated with current interzonal transfers are covered in base funding, but enhancement spend to deliver new functionality, via the construction of new transfer pipelines, are detailed in this business case.

- **Imports and exports**: Where possible we work with neighbouring water companies to utilise available water resources in the form of potable bulk supply imports and exports.
  This business case covers the opex required to continue bulk supply imports that are already in place in AMP8 and to deliver the infrastructure required to facilitate new transfers in AMP9 and 10.

- **Efficient use and management of water**- Split into demand measures and leakage measures. These measures are covered in our demand management and smart metering business cases and form an important part of our suite of options to mitigate any deficits in supply.

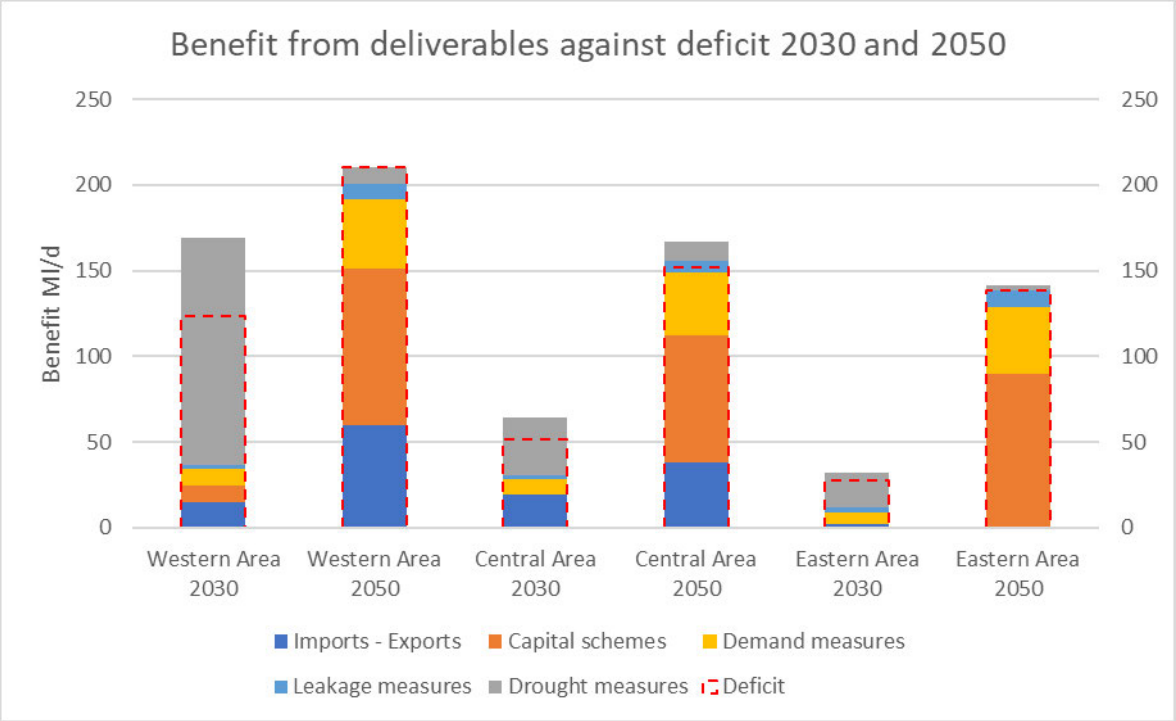
- **Drought measures**- Our revised dWRMP utilises drought permits and orders to ensure deficits in supply are met. These are intended to temporarily increase supplies by relaxing abstraction licence conditions, increasing licensed quantities or other measures. Our revised draft WRMP has had to utilise drought permits and orders to mitigate deficits in supply caused by delays to key schemes. Drought permits and orders have environmental impacts of their own and therefore we have developed a plan of supplemental operational mitigations to reduce the frequency of drought permits and orders being needed and to minimise the duration of use if they are required. Our regulators have yet to agree that this proposed use of drought permits would enable us to comply with our statutory and regulatory obligations and we continue to work with regulators to refine this mitigation plan and identify deliverable options. This is further detailed in Section 3.7; Mitigation plan.

The supply and demand deliverables listed above are portrayed in Figure 2, against the forecast deficit. This is broken down into the three regional areas we supply to show the scale of the forecast deficit in each area and how this is mitigated. The majority of the deficit is covered by utilising drought measures at present. Capital schemes make up a large part of resolving the deficit as well as providing resilience into the future. The graph also includes imports from other water companies, minus the exports we make to other water companies. These imports and exports are an important part of ensuring a resilient water supplies across the region.

Options identified as part of the mitigation plan are currently not included in the WAFU benefit as they are being worked through with our regulators to determine feasible, preferable options that are deliverable in the timescales, and are acceptable environmentally and on affordability grounds.

In addition to the benefits seen in Figure 2 we will deliver interzonal interconnector and interzonal transfer schemes. Although this isn't new water, it does allow us to transfer water from one water resource zone to another, thus removing the need to build new supplies where a more resilient network would suffice. The volume of water this releases in the Western area is 101Ml/d, in the Central area 3Ml/d and in the Eastern area 9Ml/d.

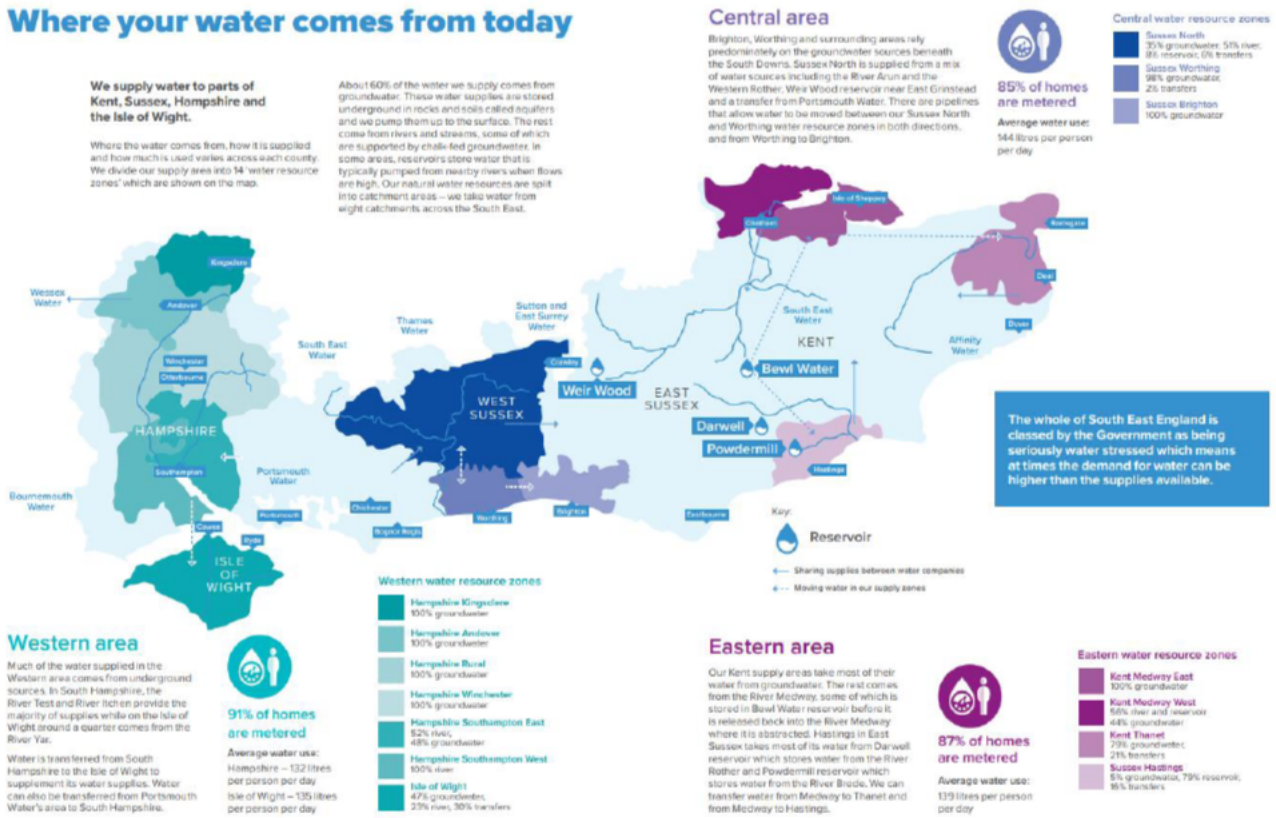
Figure 2: Benefit from deliverables against deficit in 2030 and 2050



1.4. Regional summaries

Our water supply area consists of three sub-areas (Western, Central and Eastern) and fourteen water resource zones (WRZs). Figure 3 summarises shows how these zones are linked and key metrics related to their supply and demand.

Figure 3: Summary of Southern Waters water supply area



We have developed a separate strategy for each of the three sub-areas. The supply options for each of these areas are summarised in Table 4 for the Western Area, Table 5 for the Central Area and Table 6 for the Eastern Area and detailed below. For a further overview of the strategies for each area , please see section 7.2 of the WRMP24 technical report[2] and Annex 21[12]

1.4.1. Western Area

In our Western Area which covers Hampshire, we face significant deficits in our supply and demand balance under dry year scenarios. These deficits first appeared in WRMP19, following the implementation of water abstraction reductions in 2019 by the EA on the Rivers Test and Itchen. WRMP19 identified a 2030 deficit of c.190 ML/d in a 1:200 year PDO scenario.

The deficit created a need for large scale infrastructure investment, demand management measures and environmental mitigation and improvements. A number of the schemes are covered by a legally binding and enforceable agreement with the EA (The "Section 20 Agreement") which covers the strategic water resources options (SRO's). WRMP24 Situation 4 currently forecasts a deficit of 123Ml/d in the Western area by 2030 under 1 in 200 Dry Year Annual Average conditions. The supply side and internal interconnector options needed to remedy the deficits are grouped into a programme we call Water for Life – Hampshire. This programme can be divided into SRO and Non-SRO options, this business case includes all Non-SRO options, however for further detail on the SRO options please see SRN29 Water Resources – Strategic Resource Options Enhancement Business Case.

The key non-SRO supply side options due for delivery in AMP 8 by the 1st of April 2027 are:

- Recycling (IOW): Sandown WTW; with a maximum benefit of 8.5Ml/d.

[12] Revised draft Water Resources Management Plan 2024- Annex 21

- Groundwater (HKZ): Remove constraints at Newbury to increase yield; with a maximum benefit of 1.2Ml/d.
- Southampton Link Main; This scheme will provide a transfer capacity of 74Ml/d (28Ml/d existing + 46Ml/d new) between Water Resource Zones (WRZ) Hampshire Southampton East and Hampshire Winchester (HSE-HW) and a peak transfer of 60Ml/d between Hampshire Winchester and Hampshire Southampton West (HW-HSW. This will provide a total benefit into the zones of 83Ml/d (38Ml/d between Hampshire Southampton East and Hampshire Winchester & 45Ml/d between Hampshire Winchester and Hampshire Southampton West).
- Andover Link Main; The scheme will provide a transfer capacity of 15Ml/d between Water Resource Zones (WRZ) Hampshire Winchester and Hampshire Andover (HW-HA) providing a benefit of 15Ml/d.

The Sandown recycling scheme, Newbury Groundwater source option and the Southampton and Andover Link Mains were selected in WRMP19 and are already in design for delivery next AMP. The configuration of these transfers has been altered since WRMP19 to reflect the revised SRO. Please see SRN29 Water Resources – Strategic Resource Options Enhancement Business Case for further details on the SRO schemes.

As well as delivering schemes that provide benefit in AMP8, it is important that we begin work on schemes identified by WRMP24 as providing benefit from AMP9 onwards. This work will include feasibility, design and planning investigations. Schemes in Hampshire that will be delivered after AMP8, but require funding to allow investigations and design to take place are:

- Groundwater (HRZ): Romsey; from 2034 with a maximum benefit of 4.38Ml/d
- Groundwater (IOW): Newchurch Lower Greensand (LGS); from 2034 with a maximum benefit of 1.95Ml/d
- Test MAR – Planning and development; from 2031, this stage covers the planning and investigation
- Groundwater: Eastern Yar replacement BH; from 2034. This stage covers the planning and investigation.
- Additional import from Portsmouth Water (Additional 21Ml/d) from 2031 with a maximum benefit of 21Ml/d.

These schemes are selected at different timescales and volumes based on the situations within the adaptive planning, therefore the above timeframes and volumes represent the earliest utilisation and maximum volume. For further details on these please see Annex 21 of WRMP.

Table 4 details the benefit, delivery date and financial summaries of the non-SRO Western Area schemes. Each scheme is then discussed in further detail in section 3.1 & 3.2. For schemes that have been selected for an alternative funding route, the totex we are requesting is related to scheme overheads. Totex, capex and opex related for in house delivery is shown in brackets to reflect the costs included in the WRSE model and CW8.

Table 4: WRMP24 non-SRO supply side schemes in the Western area

WESTERN AREA								
Option	Option Type	Delivery route (In house or DPC	Benefit (ML/d)	Delivery year	AMP8 Totex (£m)	AMP8 Capex (£m)	Total AMP8 Opex (£m)	PR24 BP reference
Newbury Groundwater	Water treatment works capacity increase	In house	1.2	2027-28	£0.38	£0.00	£0.38	CW8.8
Romsey Groundwater	New groundwater	In house	4.8	2034-35	£3.38	£3.38	£0.00	CW8.10
Test MAR - Planning & Development	Aquifer recharge/Aquifer storage recovery	In house	NA	2031-32*	£0.89	£0.89	£0.00	CW8.14
Groundwater: Eastern Yar replacement BH	New groundwater	In house	NA	2034-35*	£0.72	£0.72	£0.00	CW8.2
Groundwater: Newchurch LGS	New groundwater	In house	1.95	2034-35	£2.68	£2.68	£0.00	CW8.3
Recycling: Sandown WwTW	Water reuse	DPC	8.5	2027-28	In house: £8.00m DPC: £98.34	In house: £0.00 DPC: £95.37	In house: £8.00 DPC: £2.97	CW3.131 SUP12.9
Additional import from Portsmouth Water (Additional 21Ml/d)	External potable bulk supply/transfer	In house	21	2031-32	£44.01	£44.01	£0.00 Portsmouth water contributions: £85.00	CW8.1 CW3.133
Southampton Link Main: Southampton link main 45 Ml/d (reversible link HSW-HSE)	Internal potable transfer	In house	45	2027-28	£57.88	£56.82	£1.06	CW8.11

Southampton Link Main: Hampshire grid (reversible link HSE-HW)	Internal potable transfer	In house	38	2027-28	£50.93	£50.08	£0.85	CW8.4
Andover Link Main: Hampshire grid (reversible link HW-HA)	Internal potable transfer	In house	15	2027-28	£22.13	£21.36	£0.77	CW8.5
Transfer: Romsey Town & Broadlands valve (HSW-HRZ) (3.1Ml//d)	Internal potable transfer	In house	3.1	2024-25	£0.002	£0.00	£0.002	CW8.15

*delivery date is based on the date the investigation and planning of these schemes will be completed, construction of these schemes is included in a future scheme.

1.4.2. Central Area

Our Central Sussex Area, relies on a mixture of water sources that is predominantly made up of groundwater from sources under the South Downs, but also by the River Adur and Rother. We see significant deficits in our supply demand balance in our Central area. Under dry year conditions, WRMP24 forecasts that there will be an 51Ml/d deficit by 2030 without intervention. Our Sussex North and Sussex Worthing WRZs are particularly vulnerable and we are presently planning to a 1 in 100 scenario in these zones until 2030, in order to maintain a supply and demand balance.

There are also concerns regarding the long-term sustainability of the Pulborough groundwater abstraction and potential impact on site integrity of habitats at designated SSSIs. Investigations and discussions between Southern Water, the Environment Agency and Natural England are ongoing, including a sustainability investigation to assess a sustainable level of ground and surface water abstractions. Whilst investigated, the zone is covered by a water neutrality position statement, which means that any development must not increase abstraction from the Pulborough groundwater source[13].

It is therefore important that we implement innovative solutions within Sussex that protect the natural environment, maintain supplies and allow sustainable growth to continue. The main focus of AMP8 is on progressing schemes that deliver large benefits to the area in future AMPs, including a large water recycling plant at Littlehampton that will bring supplies to Sussex North WRZ in AMP9. We intend to deliver Stage 2 of our Pulborough Winter by the 1st of April 2027, providing 3Ml/d to our Sussex Brighton WRZ. This was a WRMP19 scheme and investigations are underway this AMP.

We will progress the below schemes in AMP8, that will providing benefit from AMP9 onwards. This work will include feasibility, design, planning investigations and starting build, if required.

- Recycling (SNZ): Littlehampton WTW; delivery by 2031 to provide up to 14.96Ml/d
- Bulk import (SNZ): Outwood to Turners Hill; first selected in 2033 to provide up to 10Ml/d
- Groundwater (SBZ): Lewes Road; first selected from 2030 to provide 3.5Ml/d
- Treatment capacity (SWZ): Pulborough Winter Transfer Stage 1; This option provides additional benefit through improvement of treatment process at Pulborough WSW. This option is first selected in 2030, providing a benefit of 2Ml/d
- River Adur offline reservoir; Planning associated with this scheme which is due to be concluded by 2033. Construction of the reservoir is currently forecast to provide 19.5Ml/d of benefit from 2044.

Both the Lewes Road Ground Water option and the Littlehampton Recycling options were selected in WRMP19 and are already in design for delivery in AMP9.

Table 5 details the benefit, delivery date and financial summaries of the Central Area schemes. Each scheme is then discussed in further detail in section 3.3 & 3.4.

For schemes that have been selected for an alternative funding route, the totex we are requesting is related to scheme overheads. Totex, capex and opex related for in house delivery is shown in brackets to reflect the costs included in the WRSE model and CW8.

[13] Natural England's Position Statement for Applications within the Sussex North Water Supply Zone, September 2021

Table 5: WRMP24 supply side schemes in the Central area

CENTRAL AREA								
Option	Option Type	Delivery route (In house or DPC	Benefit (ML/d)	Delivery year	AMP8 Totex (£m)	AMP8 Capex (£m)	Total AMP8 Opex (£m)	PR24 BP reference
Groundwater: Lewes road (3.5Ml/d)	Water treatment works capacity increase	In house	3.5	2030-31	£13.35	£13.35	£0.00	CW8.29
Recycling: Littlehampton WwTW (15Ml/d)	Water reuse	DPC	14.96	2030-31	In house: £10.00 DPC: £62.79	In house: £0.00 DPC: £62.79	In house: £10.00 DPC: £0.00	CW3.131 SUP12.9
Storage: River Adur offline Reservoir – Planning	New reservoir	In house	NA	2033-34*	£0.67	£0.67	£0.00	CW8.12
Outwood To Turners Hill: 10Ml/d	External potable bulk supply/transfer	In house	10	2033-34	£7.25	£7.25	£0.00	CW8.9
Transfer: Winter transfer stage 1 - Provision of a permanent sludge treatment facility at Pulborough WSW (2Ml/d)	Water treatment works loss recovery	In house	2	2030-31	£18.89	£18.89	£0.00	CW8.31
Transfer: Winter transfer Stage 2: New main Shoreham/North Shoreham and Brighton A (4Ml/d)	Internal potable transfer	In house	3	2027-28	£15.2	£14.85	£0.35	CW8.25

*Delivery date is based on the date the investigation and planning of these schemes will be completed, construction of these schemes is included in a future scheme.

1.4.3. Eastern Area

Our Eastern Area covers Kent and Hastings in Sussex. The majority of the water supply in Kent comes from groundwater sources, with the rest coming from the River Medway. Hastings takes most of its water from Darwell SWR, which takes water from the River Rother, and Powdermill WSR, which takes water from the River Brede.

WRMP24 forecasts that we will see a 27Ml/d deficit by 2030 in our Eastern Area under DYAA conditions.

We intend to deliver one interzonal transfers scheme in Kent in AMP8:

- Utilise full existing transfer capacity between Kent Medway East and Kent Thanet Water resource zones. This will provide a max benefit of 9Ml/d by the 1st of April 2027.

This scheme was selected in WRMP19 and is already being developed. It requires infrastructure upgrades to be implemented to allow the transfer to be maximised.

As well as delivering schemes that provide benefit in AMP8, it is important that we begin work on schemes identified by WRMP24 as providing benefit from AMP9 onwards. We intend to deliver two innovative water recycling projects within the Kent region in AMP9, via alternative funding initiatives:

- Recycling (KMW): Medway WTW; to provide up to 14Ml/d from 2031. This scheme was first selected in WRMP19 and therefore design and investigations are well under way.
- Recycling (KME): Sittingbourne Industrial Water recycling; first selected from 2030 to provide up to 7.5Ml/d. This scheme was first selected by WRMP24 and therefore investigations and design will begin in AMP8.

We will also begin work on the following groundwater option, due for delivery in AMP9:

- Groundwater: commission Gravesend source; first selected from the 1st of April 2031 to provide a maximum of 2.65Ml/d.

Table 6 details the benefit, delivery date and financial summaries of the Eastern Area schemes. Each scheme is then discussed in further detail in section 3.5 & 3.6.

Table 6: WRMP24 supply side schemes in the Eastern area

EASTERN AREA								
Option	Option Type	Delivery route (In house or DPC	Benefit (ML/d)	Delivery year	AMP8 Totex (£m)	AMP8 Capex (£m)	AMP8 Opex (£m)	PR24 BP reference
Groundwater: commission Gravesend source	New groundwater	In house	2.65	2030-31	£0.59	£0.59	£0.00	CW8.26
Recycling: Sittingbourne industrial reuse	Water reuse	DPC	7.5	2030-31	In house: £9.00 DPC: £108.62	In house: £0.00 DPC:£108.62	In house: £9.00 DPC: £0.00	CW3.131 CW12.9
Recycling: Medway WwTW	Water reuse	DPC	14	2030-31	In house: £9.00 DPC:£98.83	In house: £0.00 DPC:£96.07	In house: £9.00 DPC: £2.76	CW3.131 SUP12.9
Transfer: Utilise full existing KME-KTZ transfer capacity	Internal potable transfer	In house	9	2027-28	£18.20	£17.75	£0.46	CW8.27

2. Needs Case for Enhancement

2.1. Supply and demand balance

Our rdWRMP24 has been produced as part of the WRSE regional best value plan, in accordance with the WRPG, whereby we plan for supplies resilient to a 1 in 200 event drought in all zones apart from Sussex North WRZ and Sussex Worthing WRZ, where we plan to a 1 in 100 event drought and to achieve resilience to a 1 in 500 year drought, across all zones, by 2040.

Our region's water supplies face huge pressure from population growth, climate change and the need to retain more water in the environment, including sustainability reductions on the Rivers Test and Itchen, these are summarised below in Table 7.

Table 7: Summary of challenges to our Supply and Demand Balance (under DYAA conditions)[14]

	Challenge by 2030	Challenge by 2050
Population Growth	+5%	+18%
Demand	+19Ml/d	+70Ml/d
Sustainability reductions on the River Test and Itchen	-119Ml/d	-131Ml/d
Further sustainability reductions	0Ml/d	-230Ml/d
Climate change	-25Ml/d	-55Ml/d
DYAA deficit	-202Ml/d	-501Ml/d

Sustainability reductions on the Rivers Test and Itchen are included in our supply forecast baseline in WRMP24 but have been included here to show the scale of the reductions.

Our plan is an adaptive plan that considers nine future situations regarding population growth, climate change and environmental destination as set out in our rdWRMP24. In line with all companies in the WRSE region, we have adopted situation 4 as our preferred pathway in our WRMP and our PR24 business plan. The range of deficits across the planning scenarios, range of situations and over the WRMP planning horizon can be seen in the Table 8 below.

[14] Water Resources Planning Tables 2024

Table 8: Supply and demand balance across the nine future scenarios[15]

Planning scenario	Situation	Supply-demand balance (Ml/d) 2030	Supply-demand balance (Ml/d) 2035	Supply-demand balance (Ml/d) 2050	Supply-demand balance (Ml/d) 2075
NYAA	Situation 1	9.97	-94.58	-474.53	-550.82
	Situation 2	9.97	-94.58	-356.15	-414.65
	Situation 3	9.97	-94.58	-272.68	-326.22
	Situation 4	9.97	-92.59	-455.88	-511.78
	Situation 5	9.97	-92.59	-353.67	-412.02
	Situation 6	9.97	-92.59	-270.20	-323.59
	Situation 7	9.97	-73.18	-417.29	-469.88
	Situation 8	9.97	-73.18	-315.08	-370.12
	Situation 9	9.97	-73.18	-231.61	-262.75
1:100 DYAA	Situation 1	-182.25	-250.12	-508.94	-587.77
	Situation 2	-182.25	-250.12	-433.08	-490.71
	Situation 3	-182.25	-250.12	-349.64	-406.03
	Situation 4	-182.25	-247.91	-488.70	-545.36
	Situation 5	-182.25	-247.91	-430.32	-487.79
	Situation 6	-182.25	-247.91	-346.89	-403.10
	Situation 7	-182.25	-227.02	-447.09	-500.19
	Situation 8	-182.25	-227.02	-388.71	-442.61
	Situation 9	-182.25	-227.02	-305.28	-337.33
1:500 DYAA	Situation 1	-230.20	-319.40	-560.74	-635.12
	Situation 2	-193.87	-282.38	-458.39	-507.44
	Situation 3	-193.87	-282.38	-380.84	-421.57
	Situation 4	-193.87	-280.17	-502.85	-552.58
	Situation 5	-193.87	-280.17	-455.63	-504.52
	Situation 6	-193.87	-280.17	-378.08	-418.65
	Situation 7	-193.87	-259.28	-461.25	-507.40
	Situation 8	-193.87	-259.28	-414.02	-459.34
	Situation 9	-193.87	-259.28	-336.48	-352.87
1:500 DYCP	Situation 1	-171.05	-211.16	-391.54	-459.53

[15] Revised Draft Water Resources Management Plan 2024: Technical Report, Section 5.5

Planning scenario	Situation	Supply-demand balance (Ml/d) 2030	Supply-demand balance (Ml/d) 2035	Supply-demand balance (Ml/d) 2050	Supply-demand balance (Ml/d) 2075
	Situation 2	-171.05	-211.16	-303.77	-343.22
	Situation 3	-171.05	-211.16	-300.66	-354.14
	Situation 4	-171.05	-208.43	-367.26	-407.97
	Situation 5	-171.05	-208.43	-300.38	-339.61
	Situation 6	-171.05	-208.43	-297.27	-350.53
	Situation 7	-171.05	-183.16	-316.64	-352.72
	Situation 8	-171.05	-183.16	-249.76	-284.36
	Situation 9	-171.05	-183.16	-246.65	-270.01

Table 7 shows we could have a DYAA deficit of 500Ml/d by 2050. Our WRMP includes highly ambitious plans to halve leakage from our 2017/18 base level by this date and to have reduced per capita consumption (PCC) to 110 l/h/d by 2045. These measures will significantly reduce this deficit but that still means we need to deliver many new major sources of water.

3. Selected Options

Our revised dWRMP uses all available methods to fix the deficit. Where possible demand management schemes will be put in place to relieve or reduce this deficit. Interzonal transfers are also optimised to allow available supplies to be balanced across the region. Due to the size of the deficit identified by WRSE and our revised dWRMP, investment in new water sources and new interzonal transfers are also required to ensure that the demand and headroom requirements are met into the future.

The options described in this section represent those identified by the best value plan. Further details on the optioneering process and options that were considered and excluded are detailed in section 6. The plan is adaptive, ensuring the options can take into account future deficits across a number of different scenarios. All AMP 8 activities are core options selected across all of our planning scenarios, therefore delivery of AMP8 activities is important in setting the stage to ensure deficits are planned and mitigated for across all futures. They also form part of the LTDS core pathway, please see section 2.2.7 for further details.

Our WRMP represents our most ambitious plan to date. To enable efficient delivery, ensuring the water needs of our customers are met and the environment is protected, we will utilise our Asset Lifecycle Process (ALP), driven by our Risk & Value (R&V) mechanism and Investment Decisions (ID). We use this process to optimise solutions and ensure they are delivered efficiently.

We have identified potential sector wide delivery challenges and reflected on our past delivery in order to establish a strong set of measures that will support the delivery of these schemes and our wider PR24 plan. For more information please see SRN56 Deliverability Technical Annex.

Delivery of the schemes identified in this business case will ensure:

- That customers have a resilient source of water into the future and that the level of service to our customers is maintained. Our customers expect a certain level of service from us in terms of their risk to supply interruptions and demand restrictions due to drought. WRMP24 sets out a plan that ensures there is enough water available to meet anticipated demand in all WRZs without requiring to implement severe drought restrictions in events of less than 1 in 500 year severity by 2040.
- That we are more resilient to severe droughts, minimising our influence on the economic and social impact of these drought events.
- The use and reliance on drought permits and orders is lowered, reducing detrimental impact on the environment. The chalk landscape of the South East contains some of the most precious and valuable water resources in the world. Protecting the water environment is vital for long-term sustainability and biodiversity.
- WRMP24 plans for a range of different futures, that take into account the uncertainty of the impacts of climate change, population growth and environmental needs. Delivery of these schemes represents the best value plan to prepare for these futures.

Please see SRN29 Water Resources – Strategic Resource Options Enhancement Business Case for further information on the business need to the SRO schemes.

3.1. Western Area schemes delivering in AMP8

Newbury Ground Water		
Scheme Description	This scheme will increase the capacity for pumping water from our Newbury site to a reservoir in our Hampshire Kingsclere Water Resource Zone up to 5Ml/d, providing a net SDB benefit of 1.2Ml/d.	
Proposed assets to be delivered	• New high lift pumping station capable of delivering 5Ml/d • Construction of a new 7.1km 300mm diameter pipeline from our Newbury site to our Beacon Hill WSR. • Pipework and valve modifications at both the water supply works and water service reservoir.	
Ml/d Benefit	1.2Ml/d	
Completion year	2027-28	
AMP8 Capex (£m)	**AMP8 Opex (£m)**	**AMP8 Totex (£m)**
£-	£0.38	£0.38

Recycling Sandown WwTW		
Scheme Description	The project represents our first water recycling plant, which will be located at Sandown's wastewater treatment works and will allow a discharge to the River Yar via associated pipelines. It will provide vital water supplies to the Isle of Wight, reducing risk of restrictions in drought and providing resilience to the Isle of Wight. This scheme forms part of the s.20 agreement with the EA to facilitate the required abstraction reduction and is part of our Water for life Hampshire Programme. This scheme has been identified for alternative delivery, therefore we are asking for the overhead costs and CAP costs. These costs are shown below, with full totex scheme costs if not delivered via alternative delivery shown in brackets.	
Proposed assets to be delivered	• A new water recycling plant with a capacity of 8.5Ml/d. • A c.1.9km transfer pipeline through the Isle of Wight Area of Outstanding Natural Beauty (AONB) to the River Yar. • Additional tertiary treatment will also be required at the existing Sandown wastewater treatment works (WwTW) in order to adjust the process to reflect the introduction of the water recycling plant (WRP).	
Ml/d Benefit	8.5Ml/d	
Completion year	2027-28	
AMP8 Capex (£m)	**AMP8 Opex (£m)**	**AMP8 Totex (£m)**
In house: £0.00 DPC: £95.37	In house: £8.00 DPC: £2.97	In house: £8.00 DPC: £98.34

Hampshire Grid		
The Hampshire Grid is comprised of 3 large internal interconnecting transfer pipelines, which will allow us to balance supplies within our region and increase our resilience in Hampshire by linking critical areas. They are split into two sections referred to as the Southampton Link Main and Andover Link Main. Through our Water for Life Hampshire programme, these schemes link with our SRO options to provide water to our customers in Hampshire, they are critical in ensuring the benefit is maximised and resilience in the area increased. The Hampshire Grid was selected in WRMP19, however since its publication, restrictions on the River Test and the s.20 agreement have come into place altering the SRO and the configuration of the Hampshire Grid. The transfer mains have therefore been updated to reflect these changes, allowing us to balance supplies to our customers in Hampshire during drought and to improve resilience.		
Southampton Link Main		
Scheme Description	The Southampton Link Main project is an internal transfer scheme that is composed of two large scale pipeline transfers: • A bidirectional transfer between Hampshire Southampton East and Hampshire Winchester that will allow a peak transfer capacity of 74Ml/d. This 74Ml/d will be achieved through the use of an existing main capable of a peak transfer of 28Ml/d and the construction of a new 4.3km main capable of transferring 46Ml/d. This interzonal transfer will transfer water from Otterbourne WSW to Yew Hill WSR • A new 14.6km potable transfer between Hampshire Winchester and Hampshire Southampton West with a transfer capacity of 60Ml/d. Specifically, this option will transfer water from Yew Hill WSR to Rownhams WSR and Testwood WSW.	
Proposed assets to be delivered	Proposed assets are as follows: • 4.3km of 700mm dia. pipeline from Otterbourne WSW to Yewhill WSR • Expansion of high lift pumping station at Otterbourne WSW • A new 9Ml/d WSR at Yewhill, associated pipework and a cross connection with the existing WSR • 14.6km of 800mm dia. pipeline from Yew Hill WSR to Rownhams WSR • Cross connection to existing Rownhams WSR and associated pipework • Pipework modifications/cross connections at Testwood WSW	
Ml/d Benefit	45Ml/d benefit provided to Hampshire Southampton West WRZ 38Ml/d benefit provided to Hampshire Winchester Total benefit 83Ml/d Total transfer capacity: 134Ml/d	
Completion year	2027-28	
AMP8 Capex (£m)	**AMP8 Opex (£m)**	**AMP8 Totex (£m)**

Southampton link main 45 Ml/d (reversible link HSW-HSE)	£56.82	£1.06	£57.88
Hampshire grid (reversible link HSE-HW)	£50.93	£0.85	£50.93
Andover link main			
Scheme Description	The scheme will provide a peak transfer of 15Ml/d between Water Resource Zones (WRZ) Hampshire Winchester and Hampshire Andover (HW-HA), specifically the scheme will transfer water from Yew Hill WSR to Crab Wood WSR and onward to Micheldever Road WSR and River Way WSW. The Andover Link Main is split into two sections; • the transfer between Yew Hill WSR and Crabwood WSR, which will utilise existing assets. • A new 22km pipeline between Crabwood WSR and Micheldever Road WSR		
Proposed assets to be delivered	• Upgrade to existing Olivers Battery Water Booster Station (WBS) • Crab Wood WSR to Micheldever Road WSR (via. Weeke Down WSR cross connection) new pipeline (c.22km @ 500mm dia.) • Cross connection to existing Micheldever Road WSR and associated pipework		
Ml/d Benefit	15Ml/d benefit to be utilised in Hampshire Andover WRZ. Peak transfer capacity 15Ml/d		
Completion year	2027-28		
AMP8 Capex (£m)	**AMP8 Opex (£m)**	**AMP8 Totex (£m)**	
£21.36	£0.77	£22.13	

3.2. Western Area schemes to be developed in AMP8 for delivery in AMP9

Future Groundwater sources		
Romsey Groundwater		
Scheme Description	Drill new boreholes and return old borehole to service at our Romsey Groundwater site, to replace the shallow adit and allow DO of the site to increase. In AMP8, we will investigate and plan for the delivery of this project in AMP9. The drilling of new boreholes and recommissioning of an old borehole on site, will mitigate quality issues experienced related to the current condition of the wells and adits. Treatment issues also need to be addressed at site to allow the benefit to be realised.	
Ml/d Benefit	4.8Ml/d	
Completion year	2034	
AMP8 Capex (£m)	**AMP8 Opex (£m)**	**AMP8 Totex (£m)**
£3.38	£-	£3.38
Eastern Yar replacement BH		
Scheme Description	The option is to drill a new replacement borehole 100m deep for Lessland Lane Augmentation well on the Isle of Wight. The existing Lessland Lane borehole has c. 90%+ loss in performance and previous well rehabilitation and cleaning has not provided a notable improvement. A replacement well is required to regain resilience within the augmentation well field. In AMP8, we will investigate and plan for the delivery of this project in AMP9.	
Ml/d Benefit	NA (Planning and development only)	
Completion year	2034-35	
AMP8 Capex (£m)	**AMP8 Opex (£m)**	**AMP8 Totex (£m)**
£0.72	£-	£0.72
Newchurch LGS		
Scheme Description	Replacement of onsite Lower Greensand Boreholes so that our Newchurch site can operate to its licensed capacity. In AMP8, we will investigate and plan for the delivery of this project in AMP9.	
Ml/d Benefit	1.95	
Completion year	2034-35	
AMP8 Capex (£m)	**AMP8 Opex (£m)**	**AMP8 Totex (£m)**

£2.68	£-	£2.68

Test MAR - Planning & Development		
Scheme Description	This scheme is to allow a trial and feasibility study to be completed in AMP8 to investigate the potential for abstraction and Managed Aquifer Recharge (MAR) of the confined chalk aquifer below Testwood WSW. To confirm that the proposed wells can reliably supply 5-6Ml/d additional water during late summer and autumn periods. This is the first phase of this scheme, with the second delivery phase being implemented in AMP9.	
Ml/d Benefit	NA (Planning and development only)	
Completion year	2031-32	
AMP8 Capex (£m)	**AMP8 Opex (£m)**	**AMP8 Totex (£m)**
£0.89	£-	£0.89

Additional Import from Portsmouth Water (21Ml/d)		
Scheme Description	Additional 21 Ml/d bulk import from PWC Gaters Mill to Otterbourne. This scheme relies on the delivery of Havant Thicket to enable the spare capacity to be available. Scheme costs include the Capex to start design and delivery and Opex BSA payments to Portsmouth Water for the construction of Havant Thicket.	
Proposed assets to be delivered	• Option is dependent on resource development by Portsmouth Water • 11.8km pipeline • Pumping station upgrades at PWC Gaters Mill. • There are also land purchase requirements.	
Ml/d Benefit	21Ml/d	
Completion year	2031-32	
AMP8 Capex (£m)	**AMP8 Opex (£m)**	**AMP8 Totex (£m)**
£44.01	£85.00	£129.01

3.3. Central Area schemes delivering in AMP8

Winter transfer Stage 2		
Scheme Description	This scheme is designed to allow surplus water supplies available in winter in our Sussex North WRZ to be utilised in an optimised manner, so that sources in our Sussex Worthing WRZ can be rested, for increased use and transfer to our Sussex Brighton WRZ in the Summer. It involves delivery of transfer infrastructure to allow for increased transfer of water from Sussex Worthing to Sussex Brighton WRZ. We are currently investigating the impact of no deterioration studies at Hardham WSW on this scheme	
Proposed assets to be delivered	• 20Ml/d pumping station at Tenants Hill WSR • Construction of a 11km 300mm dia. pipeline from Tenants Hill WSR to Shoreham WSW • Two 7Ml/d WBS's at Mile Oak WSR and Shoreham WSW • 13km 400mm dia. Pipeline from Shoreham WSW to Patcham WSR.	
Ml/d Benefit	3Ml/d	
Completion year	2027-28	
AMP8 Capex (£m)	**AMP8 Opex (£m)**	**AMP8 Totex (£m)**
£9.64	£0.35	£9.99

3.4. Central Area schemes to be developed in AMP8 for delivery in AMP9 & 10 delivery

Recycling: Littlehampton (Ford) WwTW	
Scheme Description	The project involves the construction of a new water recycling plant at Littlehampton's (Ford) wastewater treatment works and associated pipelines across the South Downs to allow discharge into the River Rother for abstraction by our Pulborough WSW . It will provide water to the Sussex North WRZ, located in West Sussex. This scheme has been identified for alternative delivery, therefore we are asking for the overhead costs. These costs are shown below, with full totex scheme costs if not delivered via alternative delivery shown in brackets.
Proposed assets to be delivered in AMP9	• A new water recycling plant resulting in a DO from Pulborough WSW of 12.8Ml/d • Additional tertiary treatment at Ford WwTW • 18km transfer pipeline through the Southdowns National Park to the River Rother along with associated pumping stations and break pressure tanks.
Ml/d Benefit	14.96Ml/d

Completion year	2031	
AMP8 Capex (£m)	**AMP8 Opex (£m)**	**AMP8 Totex (£m)**
In house: £0.00 DPC: £62.79	In house: £10.00 DPC: £0.00	In house: £10.00 DPC: £62.79

Groundwater: Lewes Road WSW		
Scheme Description	Return to service of our Lewes Road WSW, with increased treatment capabilities to account for water quality challenge.	
Ml/d Benefit	3.5 Ml/d	
Completion year	2030-31	
AMP8 Capex (£m)	**AMP8 Opex (£m)**	**AMP8 Totex (£m)**
£13.35	£0.00	£13.35

Outwood to Turners Hill		
Scheme Description	A new transfer from Sutton and East Surrey's Outwood site to our storage reservoir at Turners Hill. This will require a pipeline and associated treatment to account for water quality compatibility issues due to differing water treatment protocols (chloramination vs chlorination)	
Ml/d Benefit	10Ml/d	
Completion year	2033-34	
AMP8 Capex (£m)	**AMP8 Opex (£m)**	**AMP8 Totex (£m)**
£7.25	£0.00	£7.25

Winter Transfer Stage 1	
Scheme Description	Improvements to the turbidity/sludge handling process at Hardham WSW This stage addresses turbidity and sludge handling issues at Hardham which would otherwise constrain the DO that can be achieved following the implementation of the Hardam to Stopham transfer. Improvements at Hardham WSW would allow increased transfer capacity to 7 Ml/d, providing a DO benefit of 2 Ml/d for the Brighton Block (SB)
Ml/d Benefit	2Ml/d
Completion year	2030-31

AMP8 Capex (£m)	AMP8 Opex (£m)	AMP8 Totex (£m)
£18.89	£0.00	£18.89

River Adur Offline Reservoir- Planning		
Scheme Description	This scheme is to investigate the feasibility and planning requirements related to the construction of a new reservoir at Blackstone. This scheme needs sufficient time to allow for the appropriate investigations and planning activities to take place as this scheme would need significant stakeholder consultation.	
Ml/d Benefit	N/A- Planning stage only	
Completion year	2033-34 (This is the conclusion of the planning and investigation stage)	
AMP8 Capex (£m)	**AMP8 Opex (£m)**	**AMP8 Totex (£m)**
£0.67	£0.00	£0.67

3.5. Eastern Area schemes delivering in AMP8

Utilise full existing KME-KTZ transfer capacity (9Ml/d)		
Scheme Description	The operational transfer from Selling WSW limited to the output from the site. This option enables flows from the nearby Throwley source to be directed, via an existing main, towards Selling WSW for treatment. Treatment upgrades, including installation of new UV treatment, are required to enable the ML/d benefit.	
Proposed assets to be delivered	• 13 Ml/d soakaway at WSW • Increased pumping capacity at WSW • New UV treatment at WSW	
Ml/d Benefit	9	
Completion year	2027-28	
AMP8 Capex (£m)	**AMP8 Opex (£m)**	**AMP8 Totex (£m)**
£17.75	£0.46	£18.20

3.6. Eastern Area schemes delivering in AMP9 & 10

Recycling: Sittingbourne industrial reuse		
Scheme Description	This option is to use the reuse scheme to free up additional volume in a borehole licence currently used in commercial paperboard making processes. This scheme involves development of both a water recycling plant and water supply works, as well as associated transfer pipelines, to facilitate license trading with the papermill. It has been assumed at this stage that the RO wastewater can be discharged through Sittingbourne WwTW existing outfall. This scheme has been identified for alternative delivery, therefore we are asking for the overhead costs. These costs are shown below, with full totex scheme costs if not delivered via alternative delivery shown in brackets.	
Proposed assets to be delivered	• A new 7.5Ml/d water recycling plant • A pipeline between the water recycling plant and the paper mill • A new 7.5Ml/d water treatment works, to treat the papermill borehole water • A pipeline from the groundwater works to Sittingbourne	
Ml/d Benefit	7.5	
Completion year	2030	
AMP8 Capex (£m)	**AMP8 Opex (£m)**	**AMP8 Totex (£m)**
In house: £0.00 DPC: £108.62	In house: £9.00 DPC:£0.00	In house: £9.00 DPC: £108.62

Medway (Aylesford) WwTW recycling		
Scheme Description	The project involves the construction of a new water recycling plant at Medway's (Aylesford) wastewater treatment works and associated pipelines to allow discharge into the River Medway. It will provide water to the Kent Medway WRZ. This scheme has been identified for alternative delivery, therefore we are asking for the overhead costs. These costs are shown below, with full totex scheme costs if not delivered via alternative delivery shown in brackets.	
Proposed assets to be delivered	• A new recycling plant on a site near the existing Aylesford treatment works resulting in a 14Ml/d benefit at Burham WSW • 8-kilometer transfer pipeline to the River Medway, upstream of Burham's Springfield abstraction point • 3km Waste stream Pipe from the recycling plant to Ham Hill wastewater treatment works (WTW). • Upgrades to (and potentially relocation of) tertiary treatment on the existing wastewater treatment site.	
Ml/d Benefit	14	
Completion year	2031	
AMP8 Capex (£m)	**AMP8 Opex (£m)**	**AMP8 Totex (£m)**
In house: £0.00 DPC: £96.07	In house: £9.00 DPC: £2.76	In house: £9.00 DPC:£89.83

Recommission Gravesend source		
Scheme Description	Recommissioning of Windmill Hill source which was previously decommissioned due to high nitrate levels.	
Ml/d Benefit	2.65	
Completion year	2030-31	
AMP8 Capex (£m)	**AMP8 Opex (£m)**	**AMP8 Totex (£m)**
£0.59	£-	£0.59

3.7. Mitigation plan

Following publication of WRMP19, a number of schemes that we had identified to reduce the impacts of our abstractions on the rivers Test and Itchen and mitigate supply and demand deficits, were found to be undeliverable as described in our SRN29 Water Resources – Strategic Resource Options Enhancement Business Case. This included our original SRO option, a 75Ml/d desalination plant. We are now progressing an innovative solution to produce high quality recycled water to support Portsmouth Water's Havant Thicket Reservoir which will enable a 90Ml/d capacity raw water transfer to our Otterbourne treatment works. Developing this new, larger solution that integrates a number of major asset components means that it will be delivered later than the date that could have been achieved for the original SRO. We have adopted an availability date of April 2035 in this rdWRMP.

Our rdWRMP also reflects a delay in the delivery of the Littlehampton WwTW recycling scheme in our Central Area to 2031 due to planning and consenting risks.

The delay to the SRO and Littlehampton WwTW recycling has necessitated the extension in the availability of drought permits and orders in the Western Area and the use of drought orders beyond the level seen in our earlier draft plan in the Central Area. The use of drought permits and orders have environmental impact and have yet to be agreed with the EA and as such there is uncertainty as to whether the rWRMP enables us to comply with our statutory and regulatory obligations. We are therefore developing a mitigation plan that will reduce the risk of requiring to use these drought orders and permits between 2030 and the availability of our planned schemes. These schemes are currently in the early stages of development and undergoing deep dives with key stakeholders. Preferred options from these deep dives will be included in our revised WRMP plan. We have therefore included and additional £91.4m Totex in our supply side enhancement submission to allow these options to be investigated and progressed.

Our initial plan of mitigation options and our plan for finalising this with our stakeholders is detailed in our SW Mitigation options review document, which has been shared with our regulators.

4. Low Regret Assessment

We have assessed this programme against the criteria for low regret investment identified in the Long Term Delivery Strategy (LTDS) guidance and Appendix 9 of the Final Methodology. The guidance identified that low regret investments meet the needs across a wide range of plausible scenarios, meet short-term requirements; or keep future options open, including cost minimisation.

The supply options selected in this business case are split into two categories, those delivering in AMP8 and those delivering in future AMPs (AMP9 &10). We consider that the investment proposed in this enhancement case is a low regret investment for the following reasons:

- All options have been identified as required to mitigate future supply and demand deficits as part of WRMP situation 4, for more detail please see section 2.1 on the supply and demand balance.
- Completion of options due for delivery in AMP8 is critical as these are required across all adaptive planning pathways and delay will cause deficits in supply to not be rectified.
- For options due for delivery in AMP9, it is important that work started in AMP7 on design continues and that we progress to construction where required in AMP8. Delays will impact the delivery of the schemes in the future. For example, Littlehampton WwTW recycling scheme is required from 2031. It is critical that we continue work started in AMP7 to continue design and progress to construction in AMP8. There are also land purchase requirements and delaying at this stage may impact the delivery of this option in the future.
- For options that are selected to allow planning and investigations in AMP8, such as Test MAR planning and Adur Offline Reservoir planning, funding is essential to allow these studies to be conducted to enable the option to be retained for WRMP option 4 and other adaptive pathways.

5. Customer and Stakeholder Consultation

For any solution to succeed we need to engage with customers and stakeholder clearly on the need. To help customers understand the impacts of climate change and population growth on water stress, but vitally the need to act in protecting the environment.

As part of WRMP24 development, we have engaged with over 3000 customers and stakeholders, including households, businesses, stakeholders, future customers and harder to reach audiences. We placed particular emphasis on the use of deliberative approaches to ensure we gathered quality research.

The 3 main areas of engagement were:

- Feedback from customers and stakeholders on the draft regional water resources plan (2022)
- Foundational insight on customer preferences (2020-21) which included working with 6 other water companies to conduct collaborative research.
- Feedback on the draft Drought Plan (2021)

Customer and stakeholder feedback is summarised below, however for further information please see WRMP24 Annex 6. Feedback we have received has been incorporated in our draft revised WRMP, to ensure that our plan meets the need and reflects customer and regulator requirements.

5.1. What our customers want

During initial discussions customers are often surprised by the level of water scarcity in the South East and the current and future challenges faced. Water whilst valued, can be taken for granted. With limited experience of shortages, perceptions were that water is in abundance. Upon further exploration, customers understand the challenges of population growth, climate change, environmental protection and support action be taken to ensure a resilient water future the South East. They also support a collaborative approach to long term planning.

Through all our engagement with customers there is a high level of priority placed on environmental protection. Therefore, the focus on reducing abstraction is welcomed, although customers are looking for more detail from plans on how this will be achieved. Our work on sustainability reductions has been ongoing since 2018 and has been factored into WRMP24 to ensure that the environment is protected and the best option is selected for our customers and the environment. We have launched our Catchment First Strategy, which is our commitment to put the well-being of the environment at the centre of the decisions we make and the services we deliver. Whilst promoting a shift away traditional engineering solutions, it is also about ensuring that we work with partners to create long-term sustainable improvements to the environment on which our business and customers depend.

Customers expressed a preference towards making better use of the water that is available and therefore delivery of demand measures to reduce leakage and improvements to water efficiency. They do however also want to see supply side options that address the root cause of supply deficits for future generations and reduced the risk of emergency drought restrictions, recognising that these would be required in combination with demand options. Our plan has taken customer feedback on board and seeks to utilise demand measures first, whilst implementing supply options where and when needed to ensure that sustainable water supplies are secured into the future.

Supply side options such as reservoirs, catchment management and managing land use were the most popular supply options, due to wider wildlife benefits. Participants were open to alternative supply option technologies, such as water recycling and desalination, but were sensitive to cost as well as the potential environmental impacts in terms of energy, use of chemicals, and waste production. Participants were accepting of local transfers and, whilst receptive to larger scale water transfers, they considered such transfers should only be used if absolutely necessary.

Discussion indicated that participants preferred supply options that were seen to be reliable, produced large amounts of water, and were lower cost. The impact on customer bills have been considered and has led us to look into alternative funding routes that would provide best value for money for our customers.

Participants also tended to prefer options that they considered to be 'more natural' and seen to enhance the environment. A further distinguishing feature was the potential for, and scale of, any negative environmental impact such as chemicals and energy usage.

To mitigate deficits in supply now and in the future, we are implementing an adaptive plan that includes a balance of supply options alongside demand measures and catchment and nature-based solutions. Where available, local transfers are utilised alongside more innovative solutions such as water recycling.

Overall, there was a good consensus from our customers that an acceptable plan will protect the environment, have a strong focus on education and demand management, increase the level of resilience and continue to drive down the risk of emergency drought measures, and incentivise companies to minimise waste.

5.2. Stakeholder feedback

In creating our WRMP24 plan we:

- Held detailed pre-consultation discussions with the Environment Agency, Natural England, Ofwat and neighbouring water companies. This involved delivering briefings on the methods and techniques used to stakeholders and review of the feedback provided.
- Reviewed the regional plan with stakeholders as part of WRSE consultations. These focused on water transfers from other part of the South East and looked at technical methods, regional policies and how to measure the additional value the regional plan delivers.
- Reviewed individual responses, and responses from district and county councils, as well as Salmon & Trout conservation UK.
- Reviewed feedback on our early draft WRMP submission to DEFRA
- Ensured in the development of the plan that DWI guidance on the 'Long-Term Planning of Water Supplies' was taken into account.

The **Environment Agency** provided valuable technical comments and inputs, however, also identified some concerns relating to the deliverability and potential impacts of certain options, including desalination and water recycling. They also wanted to see more alignment between our WRMP and the Strategic Resource Options being progressed through the RAPID gated process.

- **Ofwat** requested clarity on the WRMP19 supply demand balance position currently being implemented. Particularly, it wanted to see details on the significant resource developments and demand savings planned for, including glidepaths towards achievement and sensitivity testing around delivery and costings.
- **Portsmouth Water Company** provided comments on options that were common to or shared between our respective WRMPs, seeking an understanding of why options had been included, including information on the outputs and data underpinning them.
- We also received comments on the options, and the assessments of benefits and impacts, particularly from the Environment Agency and Natural England.

In June 2022 we submitted an early draft WRMP submission to Defra as required by the WRMP Direction 2022 and this has enabled us to take on board some early feedback which has influenced the development of this plan. One of the key areas we have improved in this plan in response to that feedback is the inclusion of more detail on both our demand management and supply- side delivery schemes. In addition, in recognition of the comments we have received around delivery risk, we have undertaken a deliverability assessment of our supply-side schemes and included a contingency plan to show how we will mitigate any supply-demand risks associated with the planned timing and benefit of schemes.

We consulted on our draft WRMP from November 2022 until 20th February 2023, at the same time as WRSE consulted on the regional plan. We submitted out revised WRMP in August 2023 and await feedback from our regulators.

6. Best Value for Customers

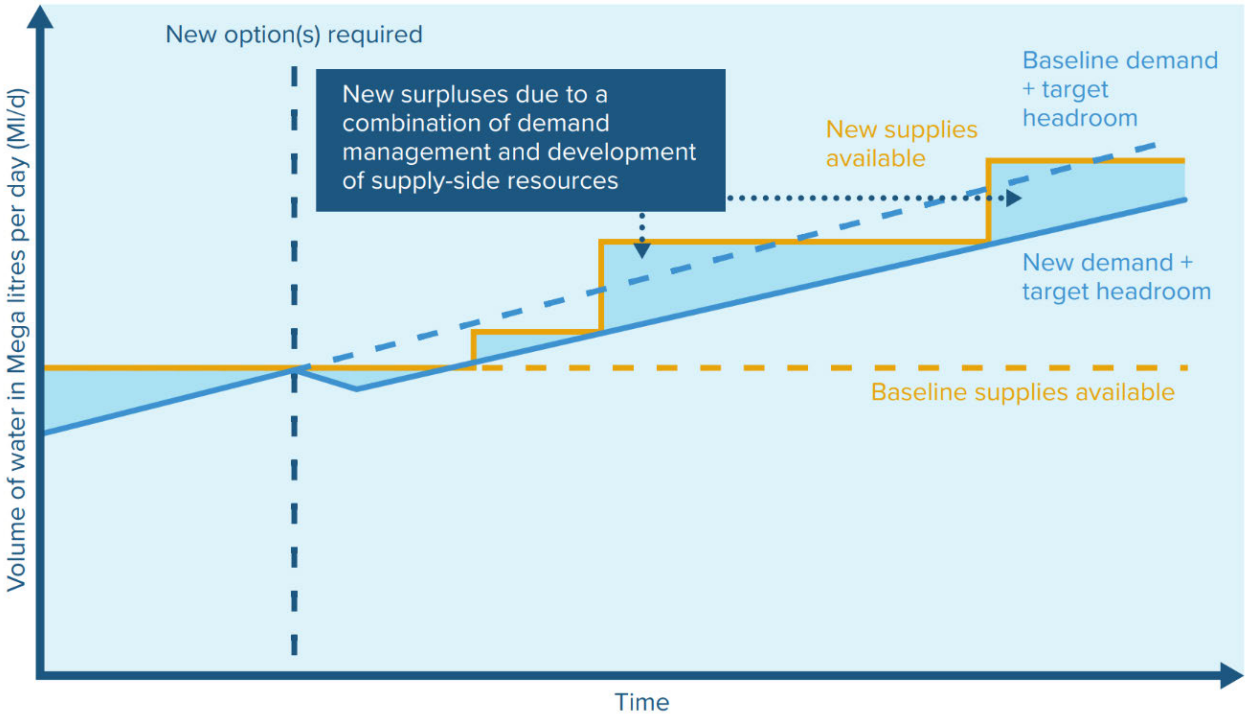
Our WRMP24 represents a best value plan. The supply side schemes presented in this business case (in combination with demand side options) represent the best value options for our customers across an adaptive planning pathway They have been identified by a rigorous options appraisal process which is a key part of WRMP development. We have followed the Environment Agency guidance while undertaking the options appraisal process.

Our options appraisal process is a twin track approach, by which supply side options to increase supply and demand side options to reduce demand are assessed in tandem to allow the supply demand deficit to be rectified (Figure 4). The optimisation of this can be based purely on cost 'least-cost' plan (LCP) or can take account of additional factors such as customer acceptability and resilience to develop a plan that delivers overall best value to the customer i.e. a 'best value' plan (BVP). Our WRMP24 is a BVP.

A best value plan considers a range of factors beyond economic cost. This helps identify the wider benefits water resource schemes can deliver. Together with WRSE we have developed a best value framework[16]. The framework includes criteria and metrics to assess the different options that could feature in the regional plan.

By selecting a best value plan this allows us to maximise the long term benefit for our customers and the environment, in line with Ofwat ambitions.

Figure 4: The twin track approach to meeting the supply and demand balance



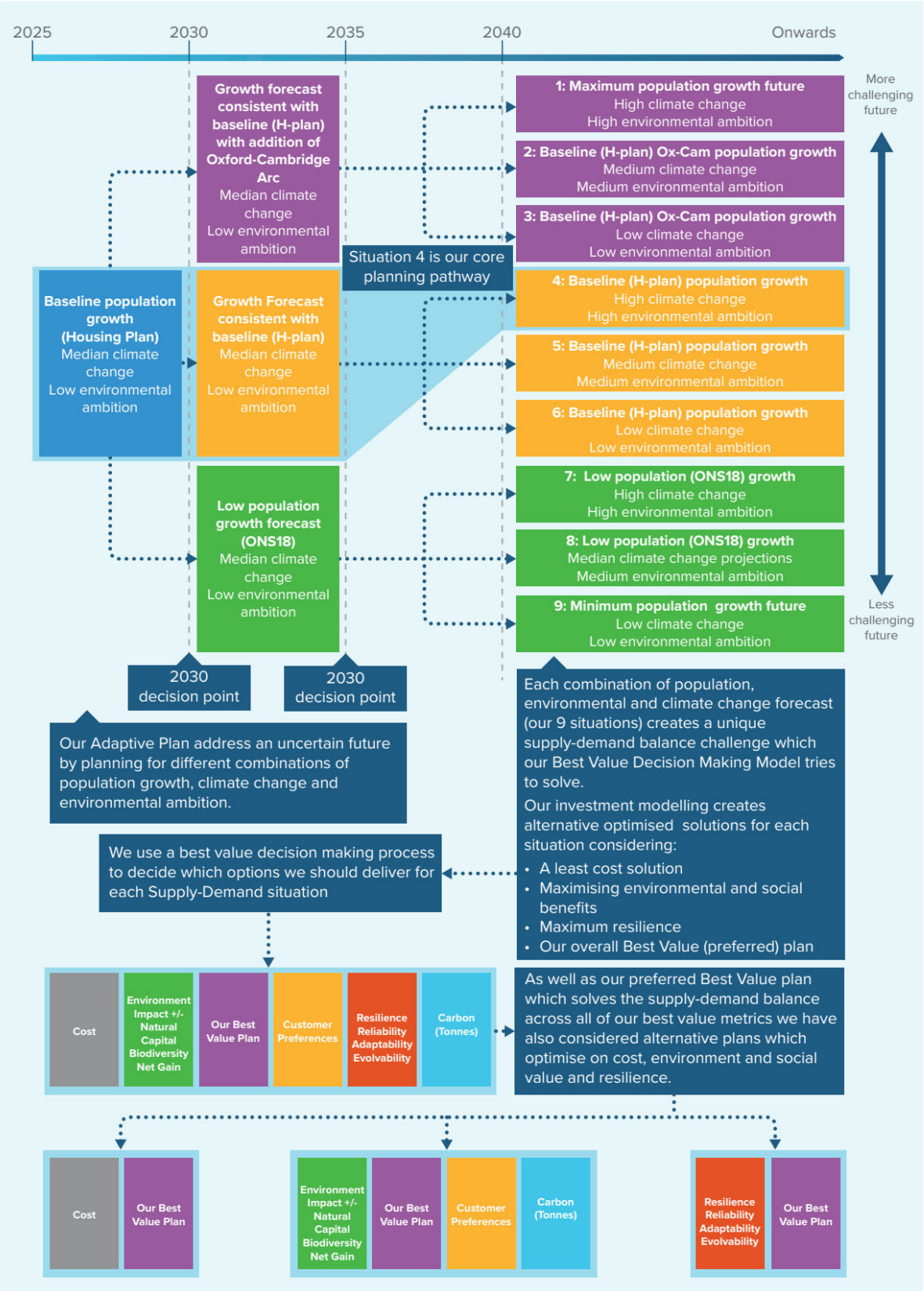
The example in Figure 4 only considers one possible view of the future, but using the same principles, we have worked with WRSE to develop an adaptive planning approach. Our adaptive planning approach (which is described in detail in WRMP Technical annex Section 4.2.1) sets out the supply-demand challenge across each of the nine adaptive planning situations which reflect the range of uncertainty in future population

[16] WRSE, 2022. Developing our 'Best Value' multi-sector regional resilience plan. Our decision making framework.

growth, climate change and the amount of abstraction reduction we will need to achieve to protect and enhance the environment.

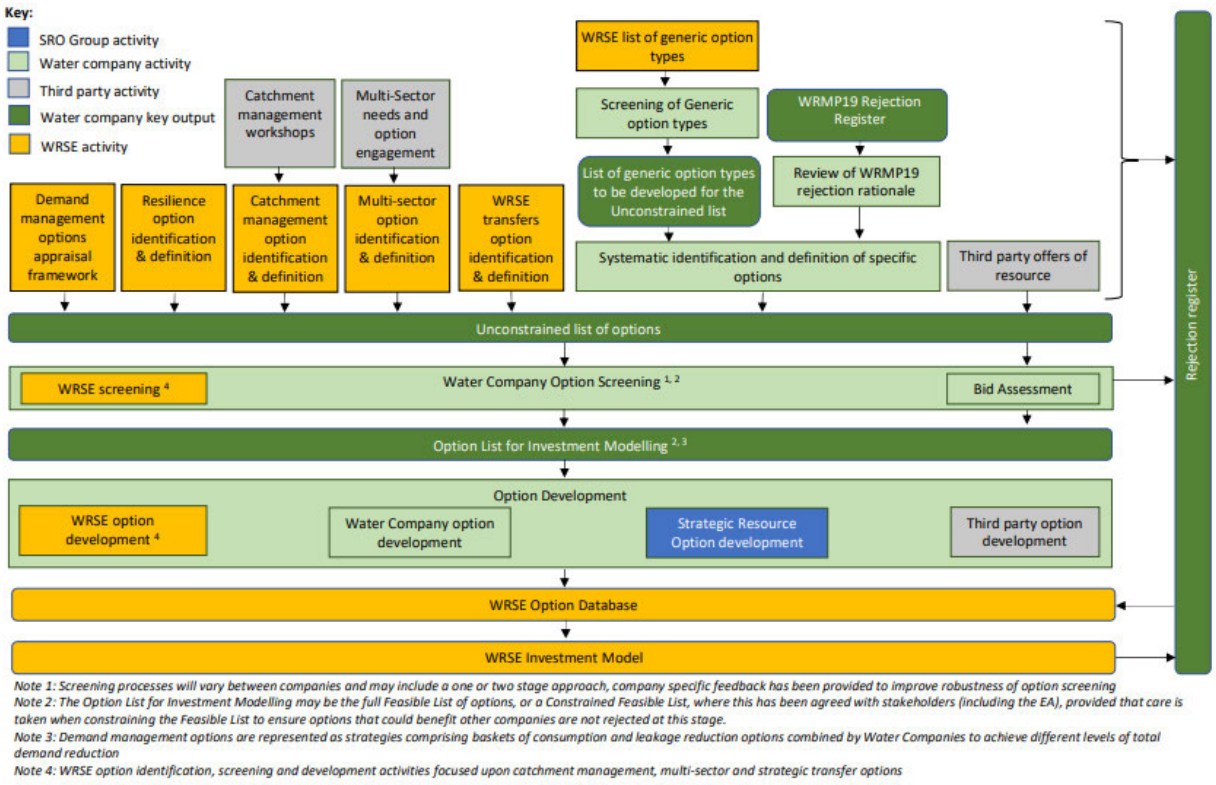
The use of an adaptive planning approach offers us greater ability to account for the uncertainty in the selection and scheduling of future water resource options. It will allow our plan to better accommodate both gradual changes and large step changes in supplies and have more resilience to future outcomes. Our adaptive planning approach is summarised in Figure 5 below.

Figure 5: Summary of our adaptive planning approach



Once we have an idea of the potential supply-demand deficits across different futures we then developed a range of options to fill these deficits. Working with WRSE, we developed a consistent framework for options appraisal[17] as well as a set of a set of best value planning objectives. Some options appraisal work was done at the regional level, but the assessment of the options was carried out by individual water companies. Figure 6 summarises the options appraisal process and details steps taken to compile the long list of options for review.

Figure 6: The options appraisal process developed for the regional plan



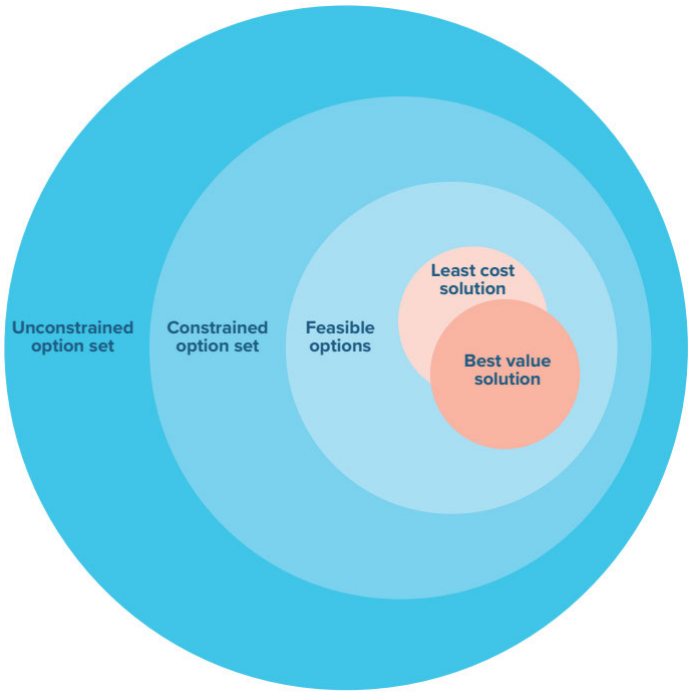
The option appraisal process starts off with identifying all possible options that could be used to meet the projected deficit. As demonstrated in Figure 7, we started off by identifying unconstrained options. The unconstrained list of options is a high-level list including generic types, taking account of government policy and aspirations. To ensure that we as many options as possible were captured and reviewed, we developed a pro-forma to gather information on any potential new options. This invitation was advertised on our company website, employee notice board and on social media. We also invited ideas in stakeholder panels and held employee sessions to gather potential options.

In total more than 2,400 options, including a range of new options such as nature-based solutions and schemes with other water users were identified for the regional model. We Over 1,000 options were rejected at this stage because they are too damaging to the environment or not reliable enough sources of water.

Annex 12 of WRMP24 lists all unconstrained options and details the rational for the rejection of options.

[17] WRSE, 2021. Method Statement: Options Appraisal. Updated version, September 2021.

Figure 7: Option screening process



We applied a screening process to the unconstrained options to develop a constrained list, this process was applied to every option to ensure a fair like-for-like comparison of supply-side and demand-side options.

Each option in the constrained list was screened against the following criteria:

- **Environmental and social assessment** – SEA and HRA have been produced which summarise the environmental and social costs and benefits and impacts upon European designated sites of each option. The SEA screening criterion illustrates:
  - the risk of adverse effects and, where available, mitigation measures; and
  - the opportunity for beneficial (effects e.g. improved water quality, reduced flood risk, improved catchment management) resulting from the option (WRMP24 Annexes 18-20).
- **Links to other options** – in terms of mutual exclusivities and dependencies.
- **Risks** – including vulnerability of the option to future uncertainty relating to climate change impacts, regulatory changes, sustainability and acceptability of the option, potential planning constraints and risks and changes in customer behaviour (for some demand management options).
- **Phasing** – whether the option can be constructed in a phased or modular way,
- which would increase its flexibility to future changes in the forecast supply-demand balance.
- **Resilience** – an indication of the confidence that the option will 'deliver' the required supply-demand balance benefit.

The constrained options were then subject to more detailed engineering and environmental assessment, to provide consistent and comparable information as an input to the selection of options for the dWRMP24. Options identified and scoped as part of WRMP19 have been refined as part of WRMP24, to reflect a better understanding of the needs of each scheme and increasing familiarity with our own scoping of each solution. We have sought the input of our engineering supply chain of technical experts to support developing these solutions, in conjunction with our adjacent Water Companies and Ofwat through the RAPID SRO process.

Options are classified at this stage into the option types and sub-types in Table 9 below using WRSE classifications.

Table 9: Summary of option types

Option types	Option sub-types
Hard infrastructure	• New resources and storage • Transfers between and within regions • Reuse of water already abstracted
Efficient use and management of water	• Reducing leakage • Reducing household consumption • Embedding water efficient practice across industry
Green infrastructure	• Catchment solutions • Protecting vulnerable environments • Stopping damaging abstractions • Reducing net abstractions from the environment
Response to regional events	• Planning responses to extreme events • Coordinating activities across companies and sectors

Supply side options mostly fell into the Hard Infrastructure category, which covers new resources and storage, transfers between regions and reuse of water already abstracted. A total of 485 unconstrained options related to hard infrastructure were identified.

Each option in the Feasible list was further assessed against the following criteria:

- **Monetised costs and benefits** – economic assessment of each option and engineering judgement.
- **Non-monetised costs and benefits** – environmental and social factors
- The opportunity to employ **mitigation measures** in cases where environmental and/ or social impacts are identified.
- **Dependencies** or **mutual exclusivities** with other options and potentially with third parties, including neighbouring water companies.
- The **adaptability** of the option to future uncertainties, and/or the possibility to be implemented in a phased way. This includes assessing the risk to delivery from an extended programme that may spread over multiple AMP periods, before a scheme is implemented.
- The **reliability** and **resilience** of the option i.e. its vulnerability to future regulatory changes, climate change and increasingly severe droughts.

This process therefore ensured we developed a feasible list of options that could be used to develop a plan, considering the range of factors, not just cost.

Table 10 summarises the number of hard infrastructure options reviewed as part of the options appraisal process and how many we classified as feasible and preferred.

Table 10: Number of unconstrained and constrained options

	Option category	Number of unconstrained options	Number of feasible options	Preferred
Hard infrastructure	New resources and storage	87	52	26
	Transfers between and within regions	351	173	51
	Reuse of water already abstracted	47	20	7
	Total	485	245	84

WRMP Technical Annex Section 6.5 sets out the Best Value Planning metrics we will use to decide between them, in summary, these are:

- Strategic Environmental Assessment Score (+ve or -ve)
- Natural Capital
- Biodiversity Net Gain
- Customer preferences
- Resilience metrics (Adaptability, Evolvability and Reliability)
- Programme cost
- Carbon costs which are included in overall option costs.

This section describes how we have chosen between different options following a Best Value Planning methodology, consistent with the regional planning approach, to derive our preferred plan and some alternative strategies.

Whilst our plan needs to be 'cost efficient', our preferred strategy is not necessarily the lowest cost option, but instead considers the trade-offs between cost, and our Best Value objective.

We have used an investment value model (IVM) to select a suite of preferred options by mathematically optimising across the different best value metrics. The model was developed at a regional level and we worked with WRSE to ensure that the decision making process reflects the needs of all the member companies.

Each of the potential supply-demand situations is provided to the IVM as a single future pathway to allow it to select the optimal water resource programme. Strategies are derived using the IVM to meet the projected supply-demand deficit in each situation and under each planning scenario (NYAA, DYAA, DYCP etc). The model output is the combination of demand management strategies and new resource development options that provide the required amount of water to meet the deficit. Through our options appraisal process we identified 1,400 options which were then in the regional investment model. These are detailed in Annex 12: Options appraisal of the draft revised WRMP, alongside our rejection register which describes the options deemed unsuitable and the reason for rejection.

A key principle of the modelling is to select low regrets investment early in the overall programme, where the IVM indicates it is 'best value' to do so. This then favours inclusion of options which will work well across each of the adaptive pathways. When making a decision about inclusion of an option the IVM looks to see if it makes economic sense to defer investment until after 2030 and only includes investment in the 2025–30 period if it makes economic sense once all the futures after the 2030 and 2035 branch points are considered.

The IVM was then run multiple times to examine the potential sensitivity of the plan to changes in inputs, optimisation criteria and different policy choices, these were:

- Development of a Least Cost (Cost Efficient) Plan (LCP) which optimised only on programme cost but still tracked all Best Value metrics,
- Best Value model runs to examine the trade-off between programme cost and Best Value metrics.
- Sensitivity runs to examine a range of issues to support the selection and resilience of the Best Value Plan.

The options selected reflect the outputs of the regional WRSE IVM model.

This enhancement case therefore consists of the best value mix and order of supply-side options which alongside the best value mix and order of demand-side options represents the best value plan to maintain the supply-demand balance for the next 50 years. During AMP8, all nine scenarios are the same and therefore options selected are core pathway options.

7. AMP7 Reconciliation

Our WRMP19 and AMP7 business plan included supply side schemes across all three of our Western, Central and Eastern supply areas, along with the Fawley desalination SRO. During AMP7 we have progressed the development of these schemes whilst working as part of the WRSE regional planning group to produce our WRMP24. Our preferred SRO and other key transfers from other companies have had to be cancelled following engagement with regulators and stakeholders. It was concluded that there were unmitigable impacts that meant they could not proceed. These have been replaced with a revised Hampshire strategy and SRO. Simultaneously, our long-term plans have had to change to reflect new levels of environmental ambition and drought resilience. Further details of the impact of these changes on the delivery of our AMP7 supply side schemes is provided in SRN59 Past Performance (PR19 Reconciliation Mechanisms).

Many of our solutions are multi-AMP investments, and we have been careful to review deliverable timescales for these projects which reflect their scale and complexity, with benefits scheduled to be realised in AMP8 and beyond. In producing the cost estimate for this enhancement case it has therefore been necessary to reconcile our forecast costs with our AMP7 supply demand expenditure.

Between 2020 and 2025 we will have spent in totality our combined, funded, allowance for WRMP supply schemes and SROs, on solutions to sustainably address the long term supply demand balance challenges across our region. Challenges that have changed the viability of original WRMP19 Hampshire schemes have been compensated by the increase capacity of our new SRO in Hampshire and progress on the strategic grid.

More widely, our investment in leakage reduction has greatly exceeded funding to further support delivery of the supply demand balance. Overall, our supply demand balance Totex expenditure in AMP7 will exceed our funded allowances to ensure short term resilience, as evidenced during last year's record summer, along with progression of our long-term supply solutions, that have had to evolve from our WRMP19 plan alongside more informed deliverability assessments.

8. Cost Efficiency

8.1. Our Approach to Cost Estimation

Southern Water's standard enhancement solution costing approach, described in Part B of the Optioneering and Costing Methodology for Enhancements Technical Annex (SRN15), was followed to estimate the costs of the options detailed here. This approach involves pricing solutions based on the best available information for the expected scope and the cost of that scope, and applying standardised allowances based on analysis of historical data for indirect costs, risks and overheads. Assurance was completed on scheme costs for the draft WRMP24 by completing review of individual cost calculation sheets for selected options in collaboration with Mott Macdonald and WRSE.

The level of design development completed determines the granularity of scope that is available and therefore the specific costing approach used. Wherever possible, supplier quotations are used to price work – being of high confidence. Otherwise, costs are predicted using our libraries of standardised cost models developed from historical cost data, augmented with industry information, and regularly updated. These cost libraries are benchmarked internally and externally by our Cost Intelligence Team to understand relative cost efficiency, and further benchmarking has been performed for the chosen option.

The scope for some of the WRMP supply options is still in development and will undergo additional scoping refinement throughout the period. However, we have utilised specialists within our supply chain, both technical designers as well as suppliers, to support the ongoing refinement of these costs.

Our Water Re-use and Internal Potable Transfer solutions represent the biggest proportion of WRMP enhancement investment in AMP8. This section provides an account of how these solution type scheme costs have been robustly developed based on good cost estimation practices with supporting evidence of their efficiency as they are representative of our Supply-side wide approach to ensuring efficient costings.

Our cost estimates are based on proven experience of the complexities of these scheme types, in particular for Water Re-use schemes, which is still an emerging type of solution within the industry. Whereas other water company cost estimates for their Water Re-use are early in their design maturity and are a developing capability, Southern Water are able to draw from our experience across the previous two AMP periods and RAPID SROs such as Havant Thicket and Poole to provide a baseline level of expertise of what is required to deliver these schemes efficiently. We are leveraging actual supply chain partner quotes, matured design scopes and learnings taken from previous delivery to apply a robust level of scrutiny on our cost estimates for PR24.

8.2. Industry Benchmarking

Our recent experience in delivery ensures a degree of robustness in how we have estimated our costs, but we have sought to compare the estimates of these schemes against industry expectations to further enhance our overall confidence. To achieve this, we have assessed how the cost estimates of PR24 Supply options compare with other Water Companies, and historical comparable SRO submissions by comparing the Average Incremental Costs (AIC) of our Water Re-use and Internal Potable Transfer solutions to those from comparator Water Companies published for dWRMP24 and the Poole Effluent Recycling SRO scheme. The Average Incremental Cost is the unit cost rate based on the project lifetime, calculated via long-term Capex and Opex costs of the scheme, assessed against the benefit of Water Available for Use (WAFU). This approach is based on the average incremental cost (AIC) of options as is used as a standard method of comparing WRMP schemes unit costs[18].

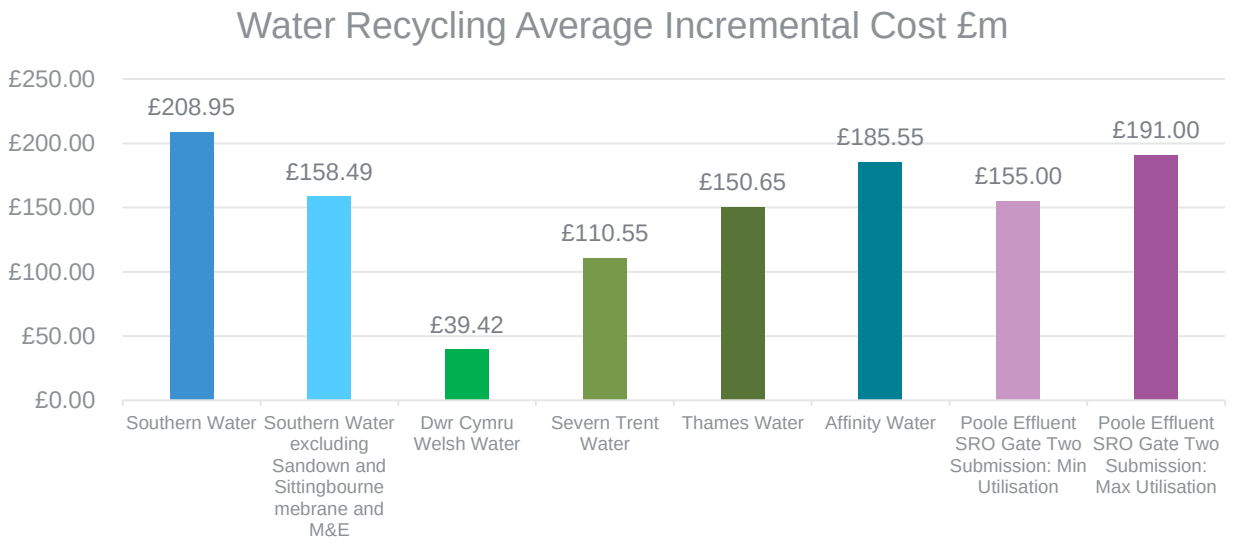
[18] Water resources planning guideline, Updated 14 April 2023

This section provides an account of how scheme specific complexities contribute to significant variance in cost. Our understanding of these complexities, driven from recent experience, places us in a strong position to robustly estimate their impact on overall cost. Where appropriate, we have incorporated benchmarking of PR24 cost estimates against previously delivered schemes and our understanding of how other Water Companies have priced themselves for the corresponding scheme type.

8.3. Water Re-use

We have completed a benchmarking exercise assessing the Average Incremental Cost of our Water Re-use schemes against other Water companies within the industry. In addition to the declared cost positions taken from WRMP, we have included the Poole Water Recycling SRO scheme for added comparison. Benchmarking of Water Recycling Cost Average Incremental Cost against available comparator data below indicates that we are above the industry range of costs, with our cost estimates being at the top.

Figure 8: Water Reuse Industry Comparison – 22/23 prices



Our considerable experience in scoping and delivery of Water Re-use schemes has indicated that these solutions encounter significant variation in costing due to differing degrees of unavoidable costs such as land availability/suitability, existing infrastructure adjacent to or in the way of our proposed works, and specific stakeholder concerns that can influence the type of solutions that are feasible to meet the need. These intricacies are not captured by benchmarking and will have a far greater material impact on some schemes than others. These complexities include:

- **Like for like scope –** Not all of our peers' projects will require the same breakdown of non-infrastructure (treatment processes, tanks, mechanical and electrical works) and infrastructure (pipelines and pumping stations) as our projects. Each individual project breakdown will have a material impact on the overall project cost.
- **Land Availability/Suitability –** several of our solutions have faced significant land availability challenges that have led to more expensive solutioning required to meet the need, as well as instances of the best available land options still providing logistical challenges to navigate. For example, our Littlehampton scheme requires us to construct a pipeline across the South Downs National Park where we have to utilise more no-dig and tunnelling construction techniques than we would on an equivalent project outside of a national park. Where we do have to purchase additional land our costs will be higher than our peers because of the value of land in the South East region of the United Kingdom.

- **Water Quality –** The presence of lower-than-expected water quality has impacted the water treatment requirements across multiple recycling schemes. Additionally, a number of the receiving water courses for our discharges, such as chalk streams, are scientifically significant and very sensitive which requires us to treat our water to a very high standard.

Our Water Re-use costs are higher in PR24 than they were in PR19 because we have continued to develop our projects, identifying and mitigating the specific engineering challenges at each site. Our continued project development to improve detail, refine scope and mitigate risk for our specific project constraints and challenges means that we have increased confidence in our AIC calculations and expect that it may create a wider gap between our costs and those with less mature project development..

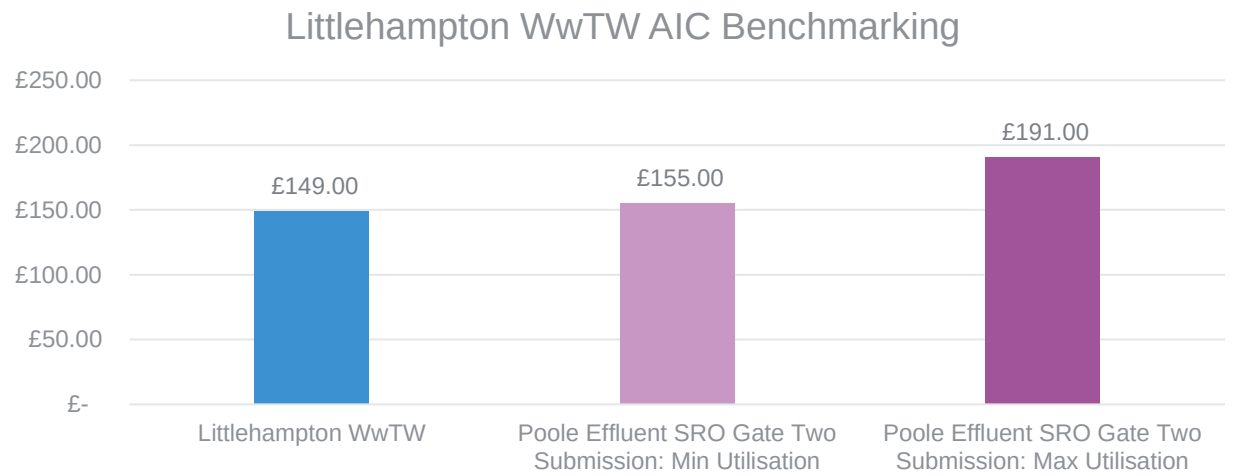
We have benchmarked each of our individual schemes against the cost of the Poole Effluent SRO scheme, as this is a more representative comparison point with other Southern Water recycling schemes due to featuring many of the same complexities when scoping and estimating cost as detailed for each of our schemes below.

8.3.1. Littlehampton WwTW non-SRO Supply

The project involves the construction of a new water recycling plant at Littlehampton's wastewater treatment works (Ford) and associated long distance pipelines to allow discharge into the River Rother. We encountered several key challenges whilst further developing the scope of this solution, impacting its overall cost such as:

- **Water Quality Issues** – Hydrogen sulphide gas issues arising at Bognor and Littlehampton mean that flows arriving at Ford are particularly septic, necessitating significant water treatment.
- **Land Complexities** – The proposed pipeline route runs through a National Park. Whilst this intricacy was known at option selection, additional scoping has revealed complexities with managing landowners along the pipe route, Local Authority planning issues and Environment Agency constraints.

Figure 9: Littlehampton WwTW Non-SRO Benchmark



Despite these challenges, when benchmarked against the Poole SRO options shown, this scheme benchmarks favourably against comparable option types, indicating the approach we have taken is efficient.

8.3.2. Medway WwTW Scheme

The project involves the construction of a new water recycling plant at Medway's wastewater treatment works and associated pipelines to allow discharge into the River Medway.

This scheme saw significant additional sanitary treatment processes as well as recycling to ensure the water is of suitable quality, which our experience with these schemes has indicated is a source of significant unavoidable cost.

Figure 10: Medway WwTW Non-SRO Benchmark

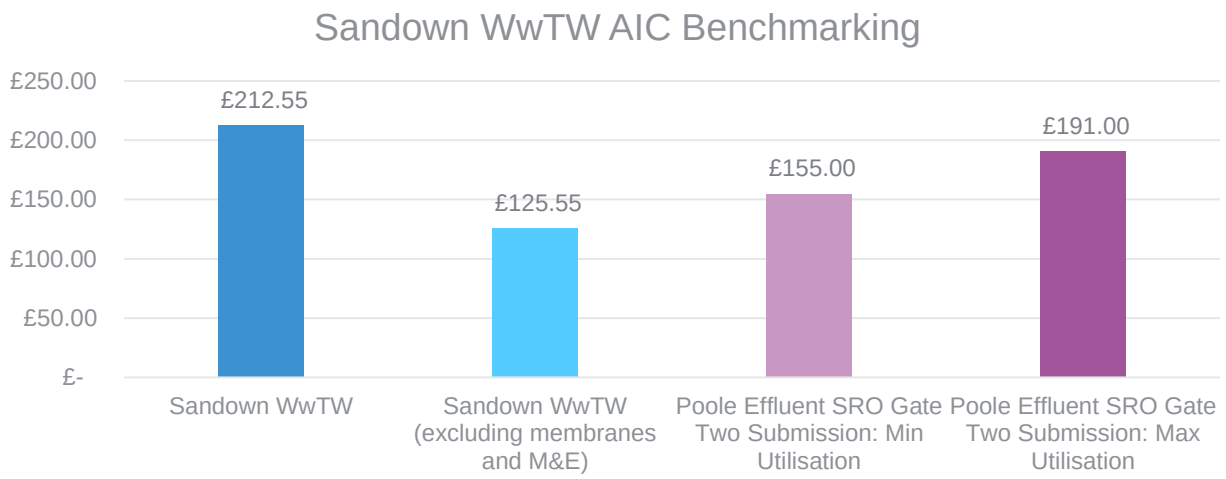
When benchmarked against previous SRO submission, our cost estimates indicate that we have taken an efficient view of scheme requirements.

8.3.3. Sandown WwTW Scheme

The project involves the construction of a new water recycling plant at Sandown's wastewater treatment works and associated pipelines to discharge into the River Yar. Given the location on the Isle of Wight, this project has significant complexities that have had to be addressed within our scoping and subsequent cost estimates.

- **Site location** – The Isle of Wight is inherently challenging for large scale infrastructure due to the additional logistics for importing materials and disposing of waste as a result of the island location. The island cost effects will increase costs over an equivalent project constructed in a mainland location due to all of the additional transport and accommodation costs for non-local labour.
- **Site investigations and survey requirements** – The area of the River Yar to be surveyed is within an Area of Outstanding Natural Beauty (AONB) which places additional constraints on Southern Water to demonstrate no detriment to the environment. Consequently, we will have to undertake additional survey works before and during construction to determine a baseline and to undertake appropriate monitoring. Additionally, the sensitive nature of the seaside location and the tourism based local economy mean that we will have to carefully schedule our works to minimise environmental and peak tourist season disruption.
- **Scope of the solution** – Our Sandown project will be receiving raw sewage, intercepted from the existing Sandown WWTW, rather than final effluent. This means that we will be having to install a full treatment process, to achieve a final effluent that meets permitted standards for discharge in to the Yar. This involves additional nutrient treatment processes that are over and above what might typically be expected for a water recycling project.

Figure 11: Sandown WwTW Non-SRO Benchmark



This scheme benchmarks less favourably against our previous SRO submissions, however, the presence of the challenges listed above and our familiarity with delivering the correct level of mitigation provides us confidence that they are efficient. Our Sandown project does include a larger Mechanical and Electrical component than would be typical for this type of project. M&E represents the largest Capex component of the scheme and is the primary driver of the AIC value. We have removed the M&E from the AIC to show a comparable benchmark position, and this shows us to be much more efficient. We recognise that this type of scheme would always have an M&E component but in this case it is unusually high due to all of the additional treatment plant and pumping stations we need to install.

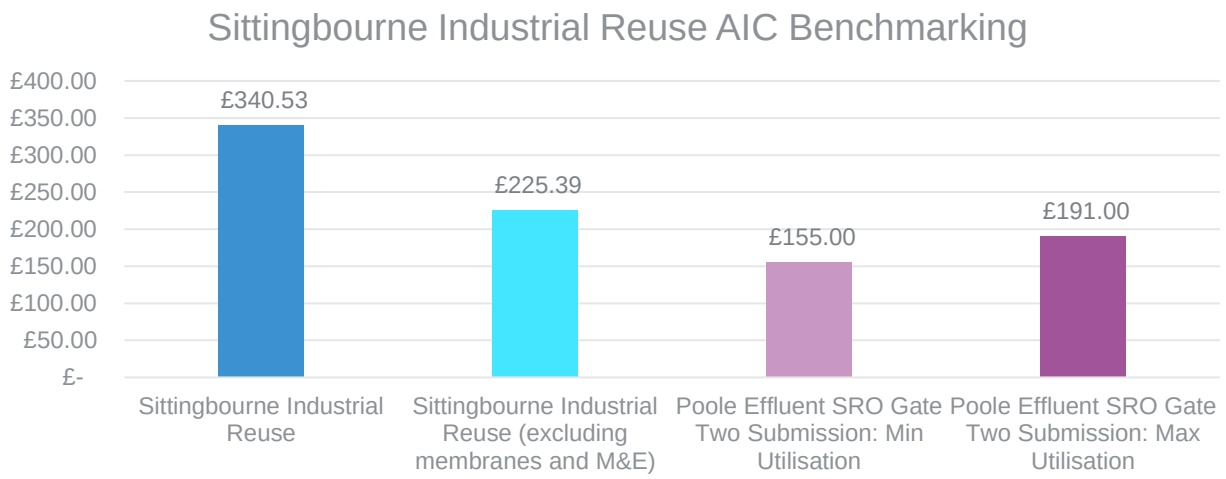
8.3.4. Sittingbourne Industrial Water Recycling Scheme

Our reuse scheme will free up additional volume in a borehole licence currently used in a commercial paperboard manufacturing process. Our proposal is to still utilise the existing outfall at Sittingbourne WwTW to avoid any costs associated with constructing a new one.

The specific challenges we have at Sittingbourne that have contributed to it's estimated include:

- **Location** – [redacted] example, 3 no-dig crossings are needed to cross this environmentally sensitive location. These techniques are inherently more expensive than traditional open cut construction and necessitate additional ground surveys. Additionally, we are undertaking construction within the town where we will have to take extra measures to maintain access to properties and shops throughout the duration of our works.
- **Existing Infrastructure** – The existing Membrane Bioreactor on the site needs to be kept operational throughout the works, and we will need to maintain access at all times. Our cost estimate accounts for mitigations that ensure we do not infringe on this operation.
- **Ground Conditions** – Our scoping has identified poor ground conditions that mean piling will need to be included for all buildings. This is over and above what would typically be expected for a project of this type.
- **Membranes and Mechanical and Electrical** – Our project utilises a membrane treatment process which is a significant contributor to the Capex cost, and would not always be included in all similar reuse projects. In addition to the membranes we are installing a full chemical treatment process with associated M&E plant to achieve the required discharge quality.

Figure 12: Sittingbourne Industrial Water Recycling Benchmark

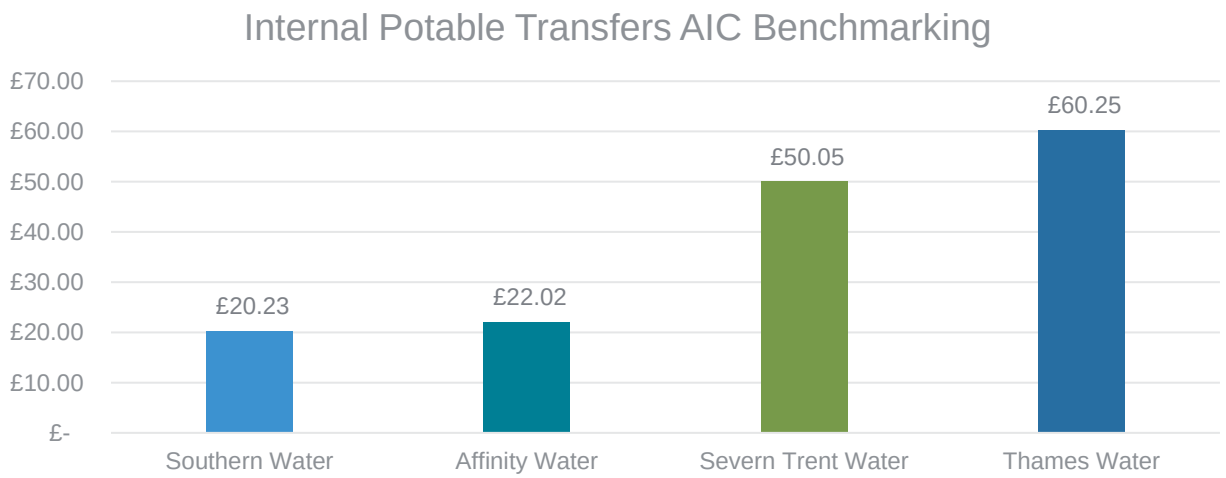


This scheme benchmarks the least favourably of our Water Re-use schemes, however, we feel that when considered in context of the challenges detailed above, particularly the nuances of delivery near the Site of Specific Scientific Interest, that this project has an inherently more complex and costly set of requirements to deliver against. M&E represents the largest Capex component of the scheme and is the primary driver of the AIC value. We have removed the M&E from the AIC to show a comparable benchmark position and this shows us to be much more efficient. We recognise that this type of scheme would always have an M&E component but in this case it is unusually high due to the new treatment plant we need to install to remove chemicals and improve the final discharge quality.

8.4. Internal Potable Transfers

In contrast to Water Reuse, the scope of Internal Potable Transfers is more similar between each project and company. Due to this, benchmarking of AIC is more indicative of the efficiency of our approach, shown below:

Figure 13: Internal Potable Transfer Industry Comparison



The benchmarking of Internal Potable Transfer scheme Average Incremental Cost against the available comparator data indicates that our costs are efficient. We compare favourably with known peer benchmark positions, based on published draft DWMP data.

The internal transfer schemes we have included in our PR24 plan are:

- Southampton Link Main, consisting of two pipelines
  - Southampton link main 45 Ml/d
  - Hampshire grid (reversible link HSE-HW)
- Andover Link Main (Hampshire grid (reversible link HW-HA)
- Utilise full existing KME-KTZ transfer capacity
- Winter transfer Stage 2: New main Shoreham/North Shoreham and Brighton A (4Ml/d)
- Romsey Town & Broadlands valve (HRZ-HSW) (3.1Ml//d)

9. Alternative Delivery

We conducted a systematic review of our entire capital programme for PR24 to assess whether schemes were appropriate candidates for alternative delivery, applying Ofwat's methodology to identify projects that could be DPC- by- default or another alternative delivery route. This process is detailed in SRN17 Direct Procurement for Customers & Alternative Delivery Model Technical Annex.

Four schemes within this business case were identified as suitable for delivery under the DPC framework due to their size and nature.

The schemes identified as being suitable were:

- Recycling (IOW): Sandown WTW
- Recycling (SNZ): Ford re-use (Littlehampton WTW)
- Recycling (KME): Sittingbourne Industrial Water recycling
- Recycling (KMW): Aylesford re-use (Medway WTW)

The proposed delivery model for each scheme is set out in the SRN17 Direct Procurement for Customers & Alternative Delivery Model Technical Annex including the delivery schedule, tender and commercial models, the associated development costs and (where relevant) any proposed incentives.

Using alternative delivery routes, including DPC, provides additional benefits for deliverability and affordability. The CAP will carry out the construction of the contract, deferring bill impacts for customers until the services are commissioned, and offering better value for money than the traditional delivery route.

10. Customer Protection

The supply schemes and internal interconnectors included in this business case are essential components of our WRMP24 and therefore it is important that the funding is utilised for their delivery.

It is important customers are protected from supply capacity being less than planned and therefore a deficit in supply remaining. This protection will be provided via a price control deliverable (PCD).

Customers and the environment will continue to also be protected through the Supply and Demand Balance Index (SDBI). This metric assesses how our actual supply demand balance has performed compared to what is in our water resource management plans (WRMPs). SDBI feeds into the Environmental Performance Metric (EPA).

We have developed a PCD that encompasses the water available for use (WAFU) benefit delivered in AMP8 from the supply side options and internal interconnectors

Please note that the SRO options have not been included as customer protection for these schemes is detailed in SRN29 Water Resources – Strategic Resource Options Enhancement Business Case. Further, any schemes that only require opex funding, are to be delivered after AMP8 or are being delivered by a DPC alternative funding route have not been included in the PCD.

The PCD will contain penalties for late delivery.
Our rdWRMP has not yet received final sign-off from the Secretary of State. Until it does, it is possible that the final set of schemes may need to change (or their delivery dates). We are therefore proposing a bespoke mid-period revenue adjustment mechanism. Please see Technical Annex SRN58: Uncertainty Mechanisms for more details.

Table 11 summarises the PCD.

Table 11: Summary of PCD

Component	Delivery of WAFU to maintain supply
Output	Delivery of supply side and internal interconnector schemes that provide 110Ml/d of supply benefit in AMP8.
Total cost	£164.34
Unit cost	£1.49 m per Ml/d
Penalty rate	As above
Date	2030
Gated dates (if required)	n/a
Late Penalty	A late penalty will be a max of £5.75m, this will be proportionate per Ml/d delivered late, (this is equivalent to 3.5% of our total cost)
Late penalty unit rate	£0.096m for each month late (assuming all 118.5 Ml/d is late, this will be proportionate based on how much Ml/d is delayed)
Measurement	Reported through the WRMP annual review
Conditions (if required)	Update to EA via WRMP24 annual review
Assurance	Third party assurer will assure conditions have been met

Progress against the WRMP is reported through our annual review and any material alterations to a scheme will lead to a re-consultation of the WRMP.

11. Conclusion

Water in our region is a precious resource, with the impact of population growth, climate change, environmental ambition and future abstraction reductions all further driving its scarcity. The supply side and internal interconnector schemes described in this enhancement case are all essential parts of our WRMP24 plans to ensure that our customers have sustainable water supplies and the environment is protected.

This plan involves the delivery of a mixture of options, including innovative solutions, such as our first ever water recycling plant and the design of 3 others. These along with our Southampton and Andover link main schemes, will be delivered by DPC, reducing delivery risk, deferring bill impacts for customers until the services are commissioned, and offering better value for money than the traditional delivery route.

The options included in this business case were selected as part of our best value plan for our revised draft WRMP24 in August 2023.

Section	Key Commentary	Page
Introduction & Background	A combination of supply side and demand side options are required to ensure we maintain a supply and demand balance and a resilient water supply to our customers, whilst protecting the environment. WRMP24 has identified 2 supply-side options and 5 internal interconnector schemes to be delivered in AMP8 and a further 13 schemes that need to be developed in AMP8 in order to deliver benefit in AMP9.	12
Need for Enhancement Investment	We face a significant loss of WAFU under drought conditions due to abstraction license changes and climate change. This twinned with increasing demand, impacted by high levels of growth means that there is a risk that under some drought scenarios, demand will outstrip supply. Investment is required to ensure supply side options that reduce this deficit are implemented.	29
Best Value for Customers	WRMP24 is a best value plan. We have worked with WRSE to develop an adaptive planning approach that enables us to develop a plan that is resilient to different future outcomes, particularly on population projections and the future impacts of climate change. Supply side options have been selected through a robust optioneering process, to ensure they are the right option for our customers and delivered at the right time.	48
Cost Efficiency	WRMP24 Supply side option costing has been completed in line with regional planning. The schemes selected represent the best value. Costs have been reviewed in line with the PR24 costing methodology to ensure appropriate multipliers have been applied.	57

Customer Protection	Customers will be protected through a PCD that covers the Ml/d benefit of the schemes identified in this business case. It is important customers are protected from capacity being less than planned and therefore a deficit in supply remaining	65