

# SRN29 Water Resources Strategic Water Resource Options (SROs) Enhancement Business Case

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Version 1.0



from  
**Southern  
Water** 

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## Glossary

Term	Definition	Notes
BSA	Bulk Supply Agreement	Contract between two water companies to trade water
CAP	Competitively Appointed Provider	The entity that will own and deliver the assets of a DPC scheme
DPC	Direct Procurement for Customers	
HWTWRP	Hampshire Water Transfer and Water Recycling Project	A 90 MI/d transfer from Budds Farm waste treatment works via a water recycling plant and Havant Thicket Reservoir to the Otterbourne water treatment works
LTDS	Long term delivery strategy	A component of the PR24 business plan
MDO	Minimum Deployable Output	One of the drought scenarios assessed in our WRMP
PDO	Peak Deployable Output	One of the drought scenarios assessed in our WRMP
SESRO	South-East Strategic Reservoir Option	A large new reservoir near Abingdon being developed by Thames Water on behalf of Thames, Affinity and Southern Water
SIPR	Significant Infrastructure Project Regulations	Government regulations that can designate important infrastructure to follow bespoke regulations.
SRO	Strategic Resource Option	One of a number of large-scale new water resource options being administered by RAPID.
T2ST	Thames to Southern Transfer	A 120 MI/d pipeline from the vicinity of SESRO to Winchester, Kingsclere and Andover in Hampshire
WfLH	Water for Life - Hampshire	Southern Water's multi-AMP programme for remedying a supply-demand deficit in our West Hampshire water resource zones
WRMP	Water Resource Management Plan	Our WRMP19 was based around being resilient to a 1:200 year drought. WRMP24 has increased the requirement to a 1:500 year drought.
WRSE	Water Resources South-East	The regional planning group that covers London and the south east
WRP	Water recycling plant	Advanced treatment to purify water

WRZ	Water Resource Zone	An area treated as distinct within the WRMP
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## Executive Summary

Southern Water is participating in three Strategic Resource Options projects that are in the RAPID gated process:

- the Hampshire Water Transfer and Water Recycling Project (HWTWRP);
- the Thames to Southern Transfer (T2ST); and
- the South-East Strategic Reservoir Option (SESRO).

The Hampshire Water Transfer and Water Recycling Project is the largest component of a multi-AMP programme known as Water for Life – Hampshire (WFLH). The programme aims to remedy an overall supply-demand balance deficit of c.190MI/d in a severe drought (a 1:200 year event) from a set of needs identified in our WRMP19.

The HWTWRP is intended to deliver 90MI/d of raw water to help to remedy the deficit, and this is the primary benefit of the project. In addition the project will enable considerable environmental benefits as the intention is to protect two iconic chalk streams, the Rivers Test and Itchen, by reducing water abstraction from these chalk sources. The project is planned to move from development to construction in AMP8. The scheme is due to be in service by December 2034. DPC will be the delivery route for the large majority of the project. It is selected in the least cost and best value dWRMP plans in all situations.

The Thames to Southern Transfer and the South-East Strategic Reservoir are planned to combine to form the basis of a large new north to south flow of potable water into West Hampshire. Both have been identified by Water Resources South East (WRSE) to meet new needs in the draft WRMP24. The new needs arise from planning to be resilient to a higher drought standard 1:500 year drought, and the requirements to meet the environmental direction set by Defra and the EA. The transfer project will deliver 120 MI/d of potable water in addition to the 90 MI/d, making 210 MI/d of new sources in total). The Abingdon reservoir (SESRO) is the most likely source of water for the Thames to Southern Transfer. The two schemes need to be developed in parallel. T2ST and SESRO are selected in our best value dWRMP plans in all situations from 2040 onwards.

Our dWRMP strategy for our Western area confirms we have selected<sup>1</sup>:

- a bulk import (up to 21MI/d) from Portsmouth Water to Otterbourne Water Supply Works from 2031-32 following the construction of Havant Thicket Reservoir;
- a bulk import (up to 90MI/d) from Havant Thicket Reservoir to Otterbourne Water Supply Works from 2035-36 following the delivery of Hampshire Water Transfer and Water Recycling Project;
- a bulk import (up to 120MI/d) through Thames to Southern Transfer from 2039-40.

This case covers only the Southern Water costs for the three SRO schemes. Other AMP8 costs for the Water for Life Hampshire programme are contained in the Water Resources – Supply enhancement case.

Where applicable, this document references to submissions already made through the RAPID process. Key additional information provided in this submission includes:

<sup>1</sup> Revised Draft Water Resources Management Plan 2024, Technical Report, 31 August 2023, p 15,

- For HWTWRP, an updated view on development costs required for AMP8, and views on expected costs for the CAP.
- For T2WT and SESRO, a focus on development costs required for AMP8.
- For SESRO, the proposal for Southern Water to take a more active partner role in AMP8, with 30% of development costs for SESRO in AMP8 included in our plan.

Summary of Enhancement Case	
Name of Enhancement Case	Strategic Resource Options
Summary of Case	<p>The case contains the totex required to develop HWTWRP in AMP8. DPC is the expected delivery route and we expect to appoint a Competitively Appointed Provider (CAP), expected in 2027. From this point it is anticipated that there will be no payments to the CAP until assets are in commission in AMP9. There are small amount of costs incurred by Southern Water after the cap is commissioned, for work that is outside the DPC scope.</p> <p>It also contains the totex required to develop T2ST during AMP8 via the RAPID process or its successor, and a 30% share of the totex required to develop SESRO in AMP8. The other partners in the project are Thames Water and Affinity Water.</p>
Expected Benefits	<p>HWTWRP will deliver up to 90MI/d of water in a severe drought to c800,000 customers in our West Hampshire WRZs. It will also support the protection of the rivers Test and Itchen. It is the 'best value' option that can generate environmental and social benefits in addition to the new water supplied.</p> <p>SESRO and T2ST will deliver an additional volume of 120MI/d of potable water to the West Hampshire WRZs, making them resilient to a 1:500 year drought. The schemes in combination will also enable the Havant Thicket Reservoir and water recycling plant to be available after c.2040 to support transfers to Portsmouth Water customers, and to our customers in the North Sussex zones. The reservoir and water recycling plant could become regional resilience assets for more than one company's customers once T2ST and SESRO are commissioned.</p> <p>All the options are selected in our "best value plan" and deliver environmental and social benefits in addition to new supply.</p>
Associated Price Control	Water resources, Water Network Plus, storage and transport
Enhancement TOTEX	<p>HWTWRP: £100.6m                      T2ST: £77.8m                      SESRO: £53.4m                      Total: £231.8</p> <p>Note: costs incurred by the CAP are expected to be £283.0m in AMP8 and £424.5m in AMP9, giving a total of £707.5m</p>
Enhancement OPEX	None

<p>Enhancement CAPEX</p>	<p>HWTWRP: £100.6m                  T2ST: £77.8m                  SESRO: £53.4m                  Total: £231.8m</p>
<p>Is this enhancement proposed for a direct procurement for customer (DPC)?</p>	<p>Yes. HWTWRP has passed control point B of the DPC process and is expected to go to market in AMP8. DPC is the likely delivery route of T2ST and DPC or SIPR the likely delivery route for SESRO. The latter two schemes are due to go to market in AMP9.</p>

# 1. Introduction and Background

As a result of abstraction licence changes on the rivers Test and Itchen, and the risk that long-term reliance on drought permits and drought orders could pose to their rare and protected habitats and species, we have entered into an operating agreement with the Environment Agency under Section 20 of the Water Resources Act, 1991 (the Section 20 agreement) to enable us to continue to meet our water supply duty until we develop alternative water resource solutions. As part of the agreement, we have committed to implementing the long-term scheme for alternative water resources set out in our final WRMP19, as may be revised by future WRMPs.

Our WRMP19 was prepared to meet supplies in a drought with a 1-in-200 year return period (1:200 year drought), which forecast an overall water resource deficit in the Western area of around 192MI/d during peak periods up to 2029-30. We planned to meet this deficit through leakage and demand reduction and through the development of several new supply solutions across the Western area, including a long-term and large-scale water resource solution.

## Strategic Resource Options (SROs)

The long-term water resource solution identified in the WRMP19 preferred strategy was a 75MI/d desalination plant on the West Southampton Coast. As WRMP19 was an adaptive plan, we also said we would progress alternative options in parallel with our preferred option. Our principal alternative to the West Southampton Coast desalination scheme was an indirect water recycling scheme using the lower River Itchen as an environmental buffer.

Following the Price Review 2019 (PR19) Final Determination and the creation of the gated process by Regulators' Alliance for Progression of Infrastructure Development (RAPID), we were required to consider further alternative schemes not included in WRMP19, such as recycling options involving the use of an environmental buffer (new lakes and wetlands to store treated water) near our Otterbourne Water Supply Works (WSW). One option included using the Havant Thicket Reservoir, being developed by Portsmouth Water, to store highly treated recycled water from a new water recycling plant before transferring it to Otterbourne WSW for further treatment via a new direct raw water pipeline.

Our SRO Options Appraisal Process included a review of environmental, planning, social and value-based criteria, legal and policy obligations and strategic objectives. We tested these options (the West Southampton Coast desalination scheme and the alternative schemes, which included additional desalination options) and considered their performance and delivery against one another. We also considered known risks to our supply-demand balance, we undertook a Future Needs Assessment and we considered the impacts of not receiving bulk supplies we had previously expected to be available. It was determined that a scheme capable of delivering up to 90MI/d into our Otterbourne WSW, in drought conditions.

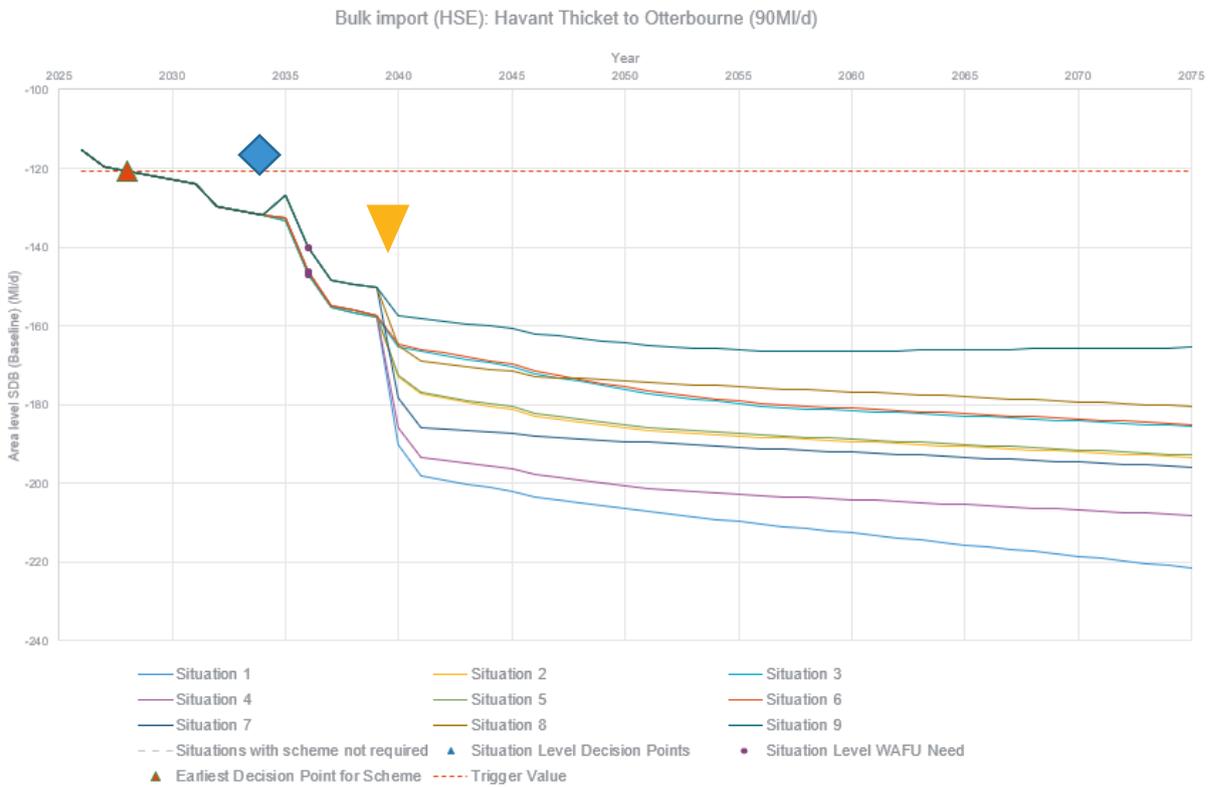
Our WRMP24 identifies a new need in West Hampshire, with further supply-demand balance deficits in the relevant water resource zones, as well as deficits in our North Sussex region. The new deficits arise because of the move to resilience in a 1:500 year drought, and the further abstraction reductions required to meet the environmental direction set by the EA and DEFRA. These deficits would be addressed by a large new transfer pipeline from Thames' region to ours, the Thames to Southern Transfer ("T2ST"). New sources of water are needed to supply this pipeline. The most likely candidate is the Abingdon reservoir, or South East Strategic Reservoir Option ("SESRO"). These two projects in combination will add an additional 120 MI/d of water to West Hampshire via a new pipeline.

There is the possibility that the Severn-Trent Transfer options could be used as a direct source of water, but our dWRMP assumes that the T2ST is only operable via a "supported" transfer, i.e. either SESRO or the Severn to Thames Transfers are commissioned and in operation. This business case and WRSE modelling assumes that there is a direct connection to SESRO.

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 consistency 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 such as the SESRO reservoir proposal which is selected at a size of 150 million cubic metres of storage (Mm<sup>3</sup>) in the revised draft regional plan and in individual company plans.

Both options are essential components of our plan to meet our water supply needs and must be in place by the early 2040s. Once in place, our dWRMP and the WRSE modelling identifies that the Havant Thicket Reservoir and water recycling plant could then be re-purposed. The system could to supply raw water to Portsmouth Water and our North Sussex region, making it into a regional resilience asset supporting the needs of more than one company.

**Figure 1 Illustration of the supply demand deficit in the West Hampshire zones**



◆ HWTWRP – 90 MI/d

▼ T2ST 120 MI/d

Figure 1 illustrates the dWRMP24 supply and demand balance deficit over time on our West Hampshire Water resource zones. It shows that in drought conditions there is already a substantial deficit in the period

2023 – 2035, and that without action it will worsen considerably by 2040.<sup>2</sup> This is because of the move to resilience in a 1:500 year drought resilience standard compared to 1: 200 today, and further abstraction reductions driven by the ‘environmental directions’ required by the water resource planning guidelines. The original deficit was identified in WRMP19, and HWTWRP is expected to deliver 90 MI/d, due to be in place by 2034.

The Havant thicket reservoir is intended to support an additional bulk supply from Portsmouth to Southern of 21 MI/d. This bulk supply is not part of this enhancement case. The relevant information on costs we will incur to enable this 21MI/d transfer can be seen in data table CW3 (“Havant Thicket - payments to Portsmouth Water – opex”).

The remainder of the deficit is planned to be addressed by a wide range of other schemes including leakage and demand reduction, other new water sources and source protection schemes. T2ST will help to address the larger deficits that are forecast from about 2040 onwards.

### Links to data tables

The cost associated in this business case can be identified in data table CW8. HWTWRP costs are on [line CW8.16 (“Import:Havant Thicket – Otterbourne direct raw water transfer 90 MI/d” and on CW8 line CW8.59 “Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (60 MI/d)”

Costs for SESRO are on CW8.18 “New reservoir – SESRO 150 Mm<sup>3</sup> and for T2ST on CW8.32, “T2ST Planning and Development.

### Links to PCs

The schemes will indirectly contribute to achieving our PC targets on water supply interruptions and river water quality. The primary purpose of all the schemes is not to deliver particular PCs however. It is to enable us to meet our statutory obligations to supply sufficient high-quality water to our customers, including during severe and extreme drought, and to enable us to deliver the large new water sources required in our dWRMP24. Consequently, we have not explicitly calculated the indirect impact of these schemes on our PC targets.

### Customer protection

We assume that all the SROs will continue to be part of the RAPID gated process. The regular checkpoints in a process involving all of the key regulators assess option selection, agree that options will continue in development or discontinue, with appropriate funding allocated. The gates will monitor deliverables during development and efficiency of spending, returning money to customers in the event of inefficient spend or discontinuation of the options. Hence price control deliverables are not required for SRO schemes.

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<sup>2</sup> Source dWRMP24, Annex 10, Baseline Supply-Demand Balance Situations., August 31 2023.

## 1.1. Hampshire Water Transfer and Water Recycling project

Figure 2 The transfer from Budds Farm to Otterbourne including WRP and reservoir



The location of the proposed scheme is at the north end of Langston harbour near Portsmouth. A waste treatment works (WTW) will supply water to a water recycling plant (WRP), which transfers recycled water to the Havant Thicket Reservoir, being built on our behalf by Portsmouth Water. The water is then supplied via a direct pipe to Otterbourne Water Supply Works near Winchester.

Elsewhere in our PR24 plan this is information on the continuation of our plans to connect the two works directly together, via a two-way transfer main, which will greatly improve the supply resilience of the region.

The reservoir is intended to support a transfer from Portsmouth to Southern of 21 MI/d. The water will be delivered to Otterbourne via Portsmouth’s existing network. The capital costs of the reservoir are not part of the SRO project. They are incurred by Portsmouth Water and payments are made by us to them under a bulk supply agreement signed by the two companies in 2021. This bulk supply is not part of this enhancement case. Payments to Portsmouth under the BSA are in table CW3 at £89m.

The Hampshire Water Transfer and Water Recycling Project aims to create greater resilience, especially during dry weather and drought periods. Once complete, it will enable protection of the River Test and River

Itchen, two iconic chalk streams, by permanently reducing the water abstracted from them in dry periods. It will add a further 90 MI/d of water that can be delivered to Otterbourne, in addition to the 21 MI/d from the bulk supply agreement.

The project is in two parts. The first part is the pipelines required to take treated water from Budds Farm to the WRP for further treatment and the pipelines required from there up to the Havant Thicket Reservoir. The second part is the pipeline taking water from the reservoir to the existing water treatment works at Otterbourne. Some work is necessary within the Budd's Farm and Otterbourne works to enable this solution, but these costs are also excluded from this case as the work is not part of the definition of the SRO.

As shown in the map, the project enables treated wastewater from Budds Farm to be processed at a new fully advanced water recycling plant into purified recycled water. At present the water from Budd's farm is returned to the environment via the long sea outfall. The recycled water will then be transferred via a pipeline and combined with water from a spring source to the Havant Thicket Reservoir. Another new pipeline is then constructed to transfer the water from the reservoir to our Otterbourne Water Supply Works. The springs, water recycling plant and reservoir are together able to support an additional flow of up to 90 MI/d to Otterbourne.

The assets will be primarily a drought resilience system. Nevertheless, it is planned to be in operation continuously, providing a sweetening flow of 20 MI/d from the water recycling plant to Havant Thicket Reservoir and from there supplying both our Otterbourne Water Supply Works.

The SRO is part of our core pathway for LTDS<sup>3</sup> and is selected in all of the nine best value "situations" in our dWRMP. This means that the AMP8 expenditure is part of our 'no regrets' and 'low regrets' strategy described in the core pathway of our LTDS.

### 1.1.1. Key assets

The SRO comprises the construction, operation, and maintenance of the following components:

- A proposed WRP in the vicinity of Budds Farm WTW with a total peak output of approximately 60MI/d of recycled water. The WRP may be built in two phases. The initial phase would receive approximately 26MI/d of treated wastewater from Budds Farm WTW to produce a peak output of approximately 20MI/d of recycled water. The second phase would increase the proposed WRP capacity to receive a total of approximately 80MI/d of treated wastewater to produce a total peak output of approximately 60MI/d of recycled water. During normal operation, the output of the proposed WRP is expected to be approximately 20MI/d as a result of the sweetening flow. There are three proposed pumping stations at the site of the proposed WRP including the High Lift Pumping Station (HLPS).
- Proposed underground pipelines between Budds Farm WTW and the proposed WRP to accommodate approximately 80MI/d peak transfer volumes in each direction.
- A proposed underground pipeline to transfer at peak operation approximately 60MI/d of recycled water from the WRP to Havant Thicket Reservoir. The underground pipeline would either be located within a single continuous tunnel from the proposed WRP to Havant Thicket

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<sup>3</sup> See section 7.2 of the [SRN12 LTDS Technical Annex](#)

Reservoir, or within two separate tunnels from the WRP to Havant Thicket Reservoir with a connection between the two tunnels at Bedhampton Springs.

- Proposed underground pipeline to transfer at peak operation approximately 90MI/d of water from Havant Thicket Reservoir, via the proposed High Lift Pumping Station in the vicinity of Budds Farm, to Otterbourne WSW. The pipeline would transfer at least 20MI/d of water from Havant Thicket Reservoir to Otterbourne WSW.
- Proposed additional above ground plant: intermediate pumping stations (IPS) and break pressure tanks (BPT) located along the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW.
- Use of the Havant Thicket Reservoir for the additional storage of recycled water.
- Use of the existing Eastney Transfer Tunnel, Eastney Pumping Station and Eastney Long Sea Outfall for the release of reject water.
- A Distribution Network Operator connection to the WRP / High Lift Pumping Station.

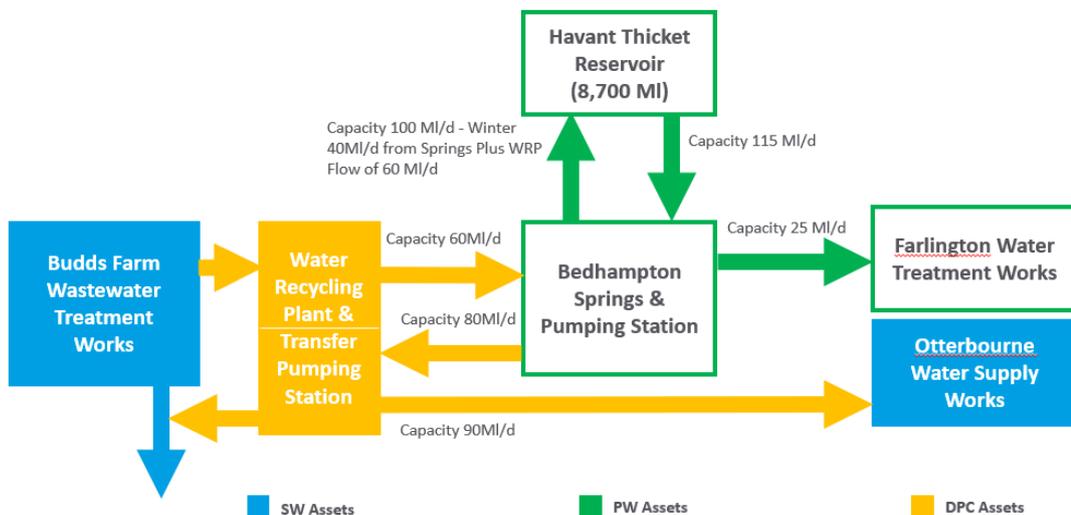
### 1.1.2. DPC scope

The majority of the SRO will be delivered by the DPC method. It is a “late DPC” model so Southern Water is responsible for development, planning consent, land acquisition and some other work. The construction of the SRO will largely be carried out by the Competitively Appointed provider, or CAP.

The diagram below gives a simple representation of which work will be carried out by Portsmouth, Southern Water and the CAP.

**Figure 3 Illustration of DPC scope**

**Preferred scope schematic and interaction of assets**



The following assets are in scope for DPC:

- The water recycling plant and associated pumping stations.
- The underground pipelines between Budd's farm and the WRP.
- The underground pipelines between the WRP and the reservoir.
- The pipeline from the reservoir to Otterbourne, including the high lift pumping station, intermediate pumping stations and break pressure tanks.
- Our base case assumes that all the functions of design, build, operate, finance and maintain will be in scope for DPC. We are currently exploring whether the project would be better delivered with operations out of scope for DPC.

### 1.1.3. Cost and delivery time opportunities from a shared tunnel

Southern Water and Portsmouth Water are in the process of agreeing with Ofwat to a change in the design of both projects to include a shared tunnel from the vicinity of the site of the proposed WRP.<sup>4</sup> The shared tunnel will be built by Portsmouth and will carry both Portsmouth's pipe containing spring water and ours containing the recycled water to the reservoir. There are substantial net cost savings achievable for Southern's customers and delivery time savings on the Southern SRO that can be realised by delivering the combined system this way. The cost incurred by the CAP described in section 4 reflect the original design where the CAP Southern and Portsmouth would build two separate tunnels. These costs will be updated once the revised design has been completed but do not materially affect the costs we will incur in AMP8.

The diagrams below provide more detail on which assets are in scope for DPC and which will be the responsibility of Portsmouth, with and without the shared tunnel. The diagrams also shows the delivery route of the 21Ml/d bulk supply provided through Portsmouth's network, which is not part of the SRO.

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<sup>4</sup> This site is known by Southern Water as Site 72, a reference to its place in the list of sites searched out to identify the optimum location. Southern Water does not yet own this land and the majority of the cost of buying it are included in this case.

Figure 4 Original configuration between Portsmouth and Southern

### HWT WRP – Interfaces (Separate Tunnels)

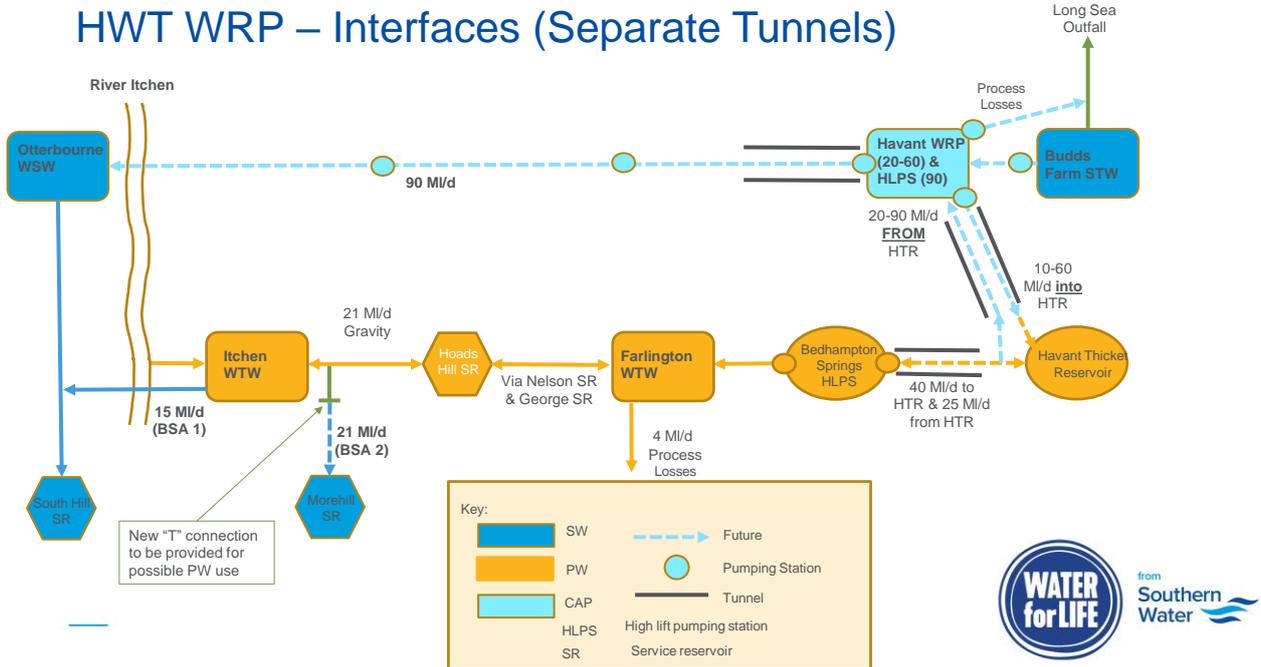
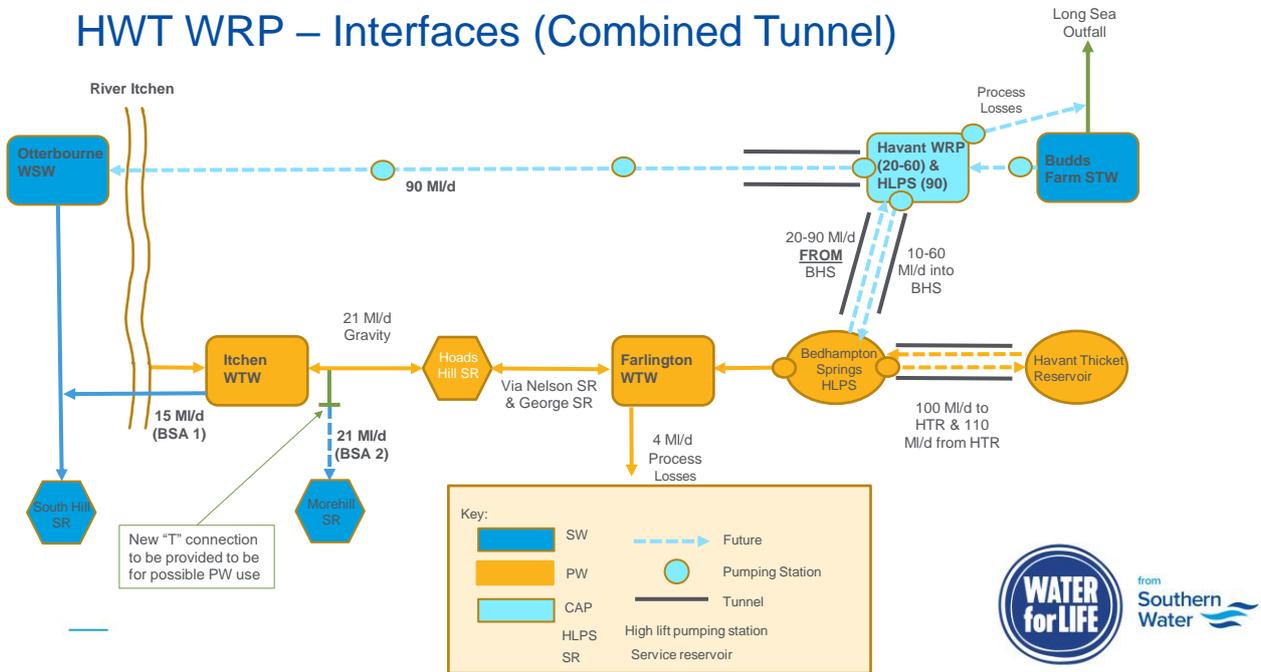


Figure 5 Configuration between PW and SW using shared tunnel

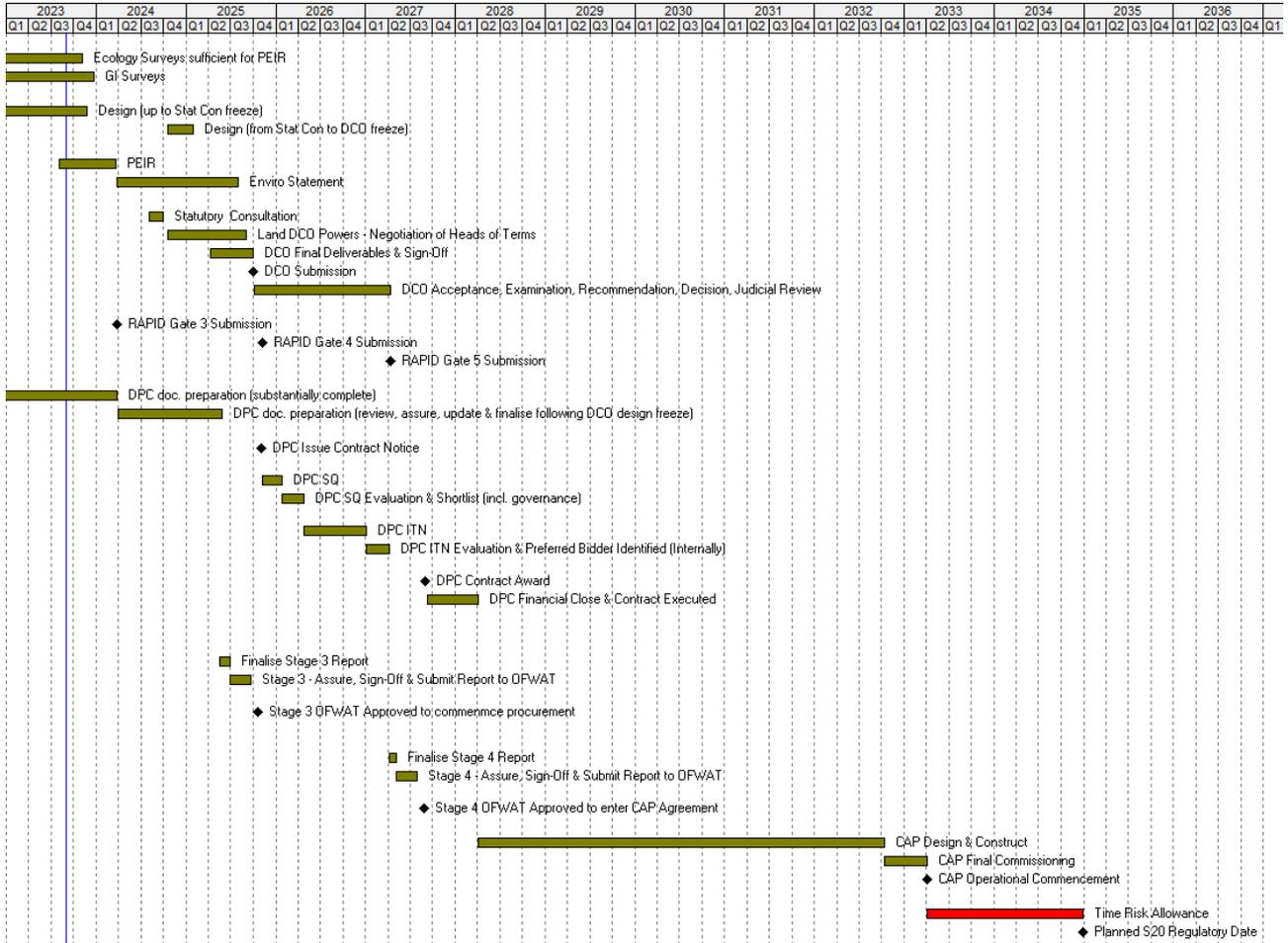
### HWT WRP – Interfaces (Combined Tunnel)



### Delivery time frame

A simplified delivery timetable is shown in the table below. The delivery date is consistent with the in-service date used in the revised dWRMP of Q4 2034. We are examining ways to bring forward delivery to 2033.

Figure 6 Delivery timetable for HWTWRP



## 1.2. Thames to Southern Transfer

Figure 7 Schematic of the Thames to Southern Transfer



The Thames Water to Southern Water Transfer (T2ST) is a long-term resilience option that could form a key strategic link within the South East region, enabling water from the proposed reservoir SESRO and / or the Severn to Thames Transfer in Thames Water’s Swindon and Oxfordshire water resource zone (WRZ) to be transferred to Southern Water’s Hampshire WRZs. The transfer would address forecast supply demand deficits in Southern Water’s WRZs arising from abstraction reductions, climate change and growth forecast within the Water Resources South East (WRSE) draft Regional Plan. The transfer would also connect to our planned north-south trunk link main, enabling new sources of water to be distributed across the Hampshire WRZs, with significant resilience benefits.

WRSE and our WRMP process have considered three options for this transfer: 50MI/d, 80MI/d and 120MI/d potable water transfers, with two alternative routes, B & C, illustrated in the diagram above. These options and the process of selecting the preferred ones, are described in the Gate 1 and Gate 2 submissions to RAPID<sup>5</sup>. The current proposal in the dWRMP is for the 120MI/d version, selected in all of 9 possible ‘situations’, or future states of the world in the best value plan (See Section 3).

### Key assets

Both options comprise a water supply works at the point of abstraction from SESRO and/or STT on land near Drayton. Following treatment near the source water, potable water would then be transferred to the Southern Water Hampshire supply network through a ductile iron or welded steel pressure pipeline. We

<sup>5</sup> [Water transfer from Thames Water to Southern Water](#) RAPID gate submissions for T2ST

determined the treatment processes required for water treatment for T2ST in accordance with the ACWG Water Quality Risk Framework methodology.

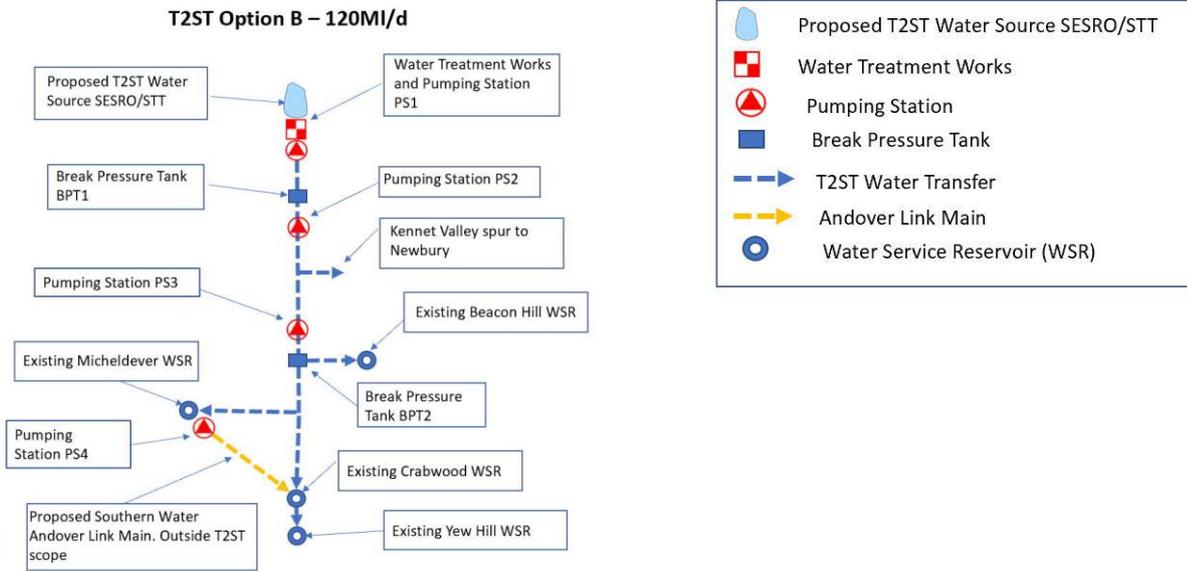
A summary of infrastructure requirements for option B, including above ground assets and pipe lengths, is shown in Figure 3. For simplicity just the assets for option B are shown in the figure below. Further information on solution design, including Option C, can be found in the RAPID Gate 2 submission.<sup>6</sup>

At 120MI/d capacity, a high lift pumping station would be required at the water treatment works site (PS1) with a further three intermediate pumping stations (PS2, PS3 and PS4). Two break pressure tanks would also be required (BPT1 and BPT2). The total number and length of major pipeline crossings (tunnelled sections for roads, railways and rivers) is also shown. Pumping Station 4 is part of the SRO, while the diagram shows it connecting to Southern's proposed Andover Link main, which is not.

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<sup>6</sup> See above reference for link to Gate 2 submission.

Figure 8 Assets in the Thames to Southern Transfer



We and Thames Water proposed at RAPID Gate 2 that we would take over as lead developer for the transfer whereas up to that point Thames Water was in that role. We therefore need to include the development expenditure for AMP 8 in our business plan. The figures shown in this case represent 100% of the expected development cost. We include development costs in AMP8 for this option as it is a key component of our LTDS core pathway, with this option in future being selected in more adverse pathways.

### 1.3. South-East Strategic Reservoir Option

Figure 9 Schematic of the South-East Strategic Reservoir Option



The South East Strategic Reservoir Option (SESRO) is a raw water storage option in the upper catchment of the River Thames. It will store surplus water from the Thames, which could in turn be supplemented by the Severn to Thames Transfer and is expected to have a capacity of 150 Mm<sup>3</sup>. It will provide a resilient supply of raw water to the River Thames during periods of low flow. The current SESRO partners, Thames Water and Affinity Water, have worked collaboratively to review this proposal. The resource from SESRO could supply Thames Water customers both locally and in London, Affinity Water customers in the Central Region via the Thames to Affinity Transfer and Southern Water customers in Hampshire, through integration with the Thames to Southern Transfer. Descriptions of the project can be found in the RAPID gate 1 and 2 submissions.<sup>7</sup>

For this reason, it is proposed by all parties that Southern Water takes a more active role in the development of the reservoir, as it would provide clear and necessary benefits to our customers via improved drought resilience after the early 2040s. In combination with T2ST, it is an essential component of our core pathway in our LTDS.<sup>8</sup> It is selected in all out of the 9 situations in our dWRMP2 (see section 3 of this case). The AMP 8 development expenditure on both SROs is necessary to keep these options open, and forms part of our AMP8 core pathway in our LTDS. Hence our share of the development costs for SESRO are included in our PR24 business plan.

<sup>7</sup> [New reservoir in Abingdon | Water resources | Thames Water](#) Gate 1 and 2 submissions for SESRO

<sup>8</sup> [SRN12 LTDS Technical Annex Section 7.2](#)

## Key assets

The key components or assets required to deliver the scheme are as follows:

- Provision of a fully bundled raw water storage reservoir in Oxfordshire, 5km southwest of Abingdon.
- Pumping station at the toe of the embankment (on the north-east side of the reservoir) including both inflow pumps and outflow energy-recovery turbines.
- Conveyance tunnel to transfer flows via the pumping station to and from the intake / outfall structure on the River Thames near Culham.
- Auxiliary drawdown channel (ADC) linking the reservoir siphons to the River Thames, to allow drawdown of the reservoir in emergency scenarios. This could also form a navigable channel and as plans progress for the SESRO scheme there is an opportunity to engage with the promoter of any rehabilitation of the Wilts & Berks Canal for an ADC to form part of their scheme.
- Main access road into the site and diversion of the existing main road.
- Temporary rail siding to facilitate delivery of certain construction materials by freight train.
- Public access, parking and recreation facilities, public education facilities, landscaping and creation of aquatic / grassland habitats.
- Local stream channel diversion to both the east and the west of the reservoir and construction of compensatory floodplain.

Modelling by WRSE and our own dWRMP is clearly demonstrating that in a range of scenarios we will rely on this transfer and a source of water in drought conditions in the early 2040s. The three parties to the reservoir propose that Southern Water takes on a more formal role in supporting the development of the reservoir. Agreements between the three companies need to be formalised, but the expenditure presented in our plan represents 30% of the total for SESRO. This share consistent with the share of consumption that WRSE modelling results show, taking demand from Thames, Affinity and Southern together.

## 2. The Need for the Enhancements

### 2.1. WRMP19

The need for large scale new infrastructure investments in our Hampshire WRZs was first identified during the development of WRMP19. In 2017 the EA served a notice under Section 52 of the Water Resources Act 1991 informing us of changes to the licences which determine how much water we can take from the River Test and the River Itchen. The purpose was to contribute to restoring sustainable abstraction on two rare chalk streams that contain many protected habitats. Following a Public Inquiry in 2018 an agreement under section 20 of the Act (the “Section 20 agreement”) was entered into between the EA and Southern Water and the licence changes were implemented in March 2019, with immediate effect.

The changes to the licences included conditions which require SW to cease abstraction when river flows fall to below specified levels in order to protect the river environments downstream of the abstraction points. These flow constraints significantly reduced the reliability and yield (Deployable Output) of these abstractions under drought conditions.

On the River Itchen, the licence changes imposed a “hands-off flow condition” of 198MI/d flow in the Itchen as measured at Allbrook and Highbridge gauge just downstream of Otterbourne. If flows fall below this, then we cannot abstract at all.

On the River Test, the new licence imposes a hands-off flow condition at the Testwood abstraction set at 355MI/d for the period up until 2027, and at 390MI/d after 2027. The pre-2027 hands off flow means that in a 1-in-200-year drought, the Testwood abstraction<sup>9</sup> will be completely unavailable meaning SW cannot abstract at all and the Deployable Output is zero. The post-2027 hands off flow conditions are more stringent, and so while the Deployable Output will remain zero, the hands-off flow will be approached more frequently, and alternative supplies will be required to replace Testwood as a source of water more often. The table below shows the change in deployable output before and after the changes to abstraction licences.<sup>10</sup>

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<sup>9</sup> [REDACTED]

<sup>10</sup> Source: Southern Water RAPID Gate 1 submission, Annex 2, WRMP Supply and Demand Risk Assessment

**Table 1** - Available deployable output before and after licence changes

MI/d	Otterbourne Surface Water (R. Itchen)	Otterbourne Groundwater (R. Itchen)	Twyford (R. Itchen)	Total R Itchen	Testwood R. Test)	Total
<b>Deployable Outputs prior to licence changes of 2019</b>						
Normal Year MDO	45.0	54.8	20.5	120.3	105.0	225.3
1 in 200-year drought MDO	45.0	36.7	19.6	101.3	105.0	206.3
<b>Deployable Outputs following licence changes of 2019</b>						
Normal Year MDO	0.8	54.8	20.5	76.0	79.8	155.8
1 in 200-year drought MDO	0.0	21.0	19.6	40.6	0.0	40.6
<b>Changes</b>						
Normal Year MDO	-44.3	0.0	0.0	-44.3	-25.2	-69.5
1 in 200-year drought MDO	-45.0	-15.7	0.0	-60.7	-105.0	-165.7

There are two different definitions we use to model differences between supply and demand in critical periods. The Minimum Deployable Output (MDO) generally occurs in autumn when the river flows are at their lowest. The Peak Deployable Output (PDO) generally occurs in summer when demand is highest.

After taking all additional factors into account as well as the reductions in abstraction, WRMP19 identified a supply – demand deficit of 186MI/d in the MDO scenario and 192MI/d in the Peak Deployable Output scenario (PDO). For convenience the deficit has been referred to as c.190MI/d. Table 2 details the baseline supply-demand balance, the capacity delivered by the solutions in the Preferred Strategy and the resulting final supply-demand position.

WRMP19 developed a “preferred” plan for addressing this deficit. It contained a wide range of supply and demand measures, summarised in the table below.

**Table 2 - The supply-demand balance in WRMP19**

Factor		MDO	PDO
		Supply	Deployable Output
Losses due to water quality	-49		-53
Sustainability reductions	-56		-64
Climate change (+ve value = DO increase)	+2		+2
Outage allowance	-6		-6
Process Losses	-11		-12
Existing inter-company transfers	+5		+5
Baseline Supply	+19		+38
Demand	Baseline Demand	-205	-229
<b>Baseline supply-demand balance</b>		<b>-186</b>	<b>-192</b>
<b>Supply demand excluding water quality losses</b>		<b>-138</b>	<b>-138</b>
Preferred Strategy schemes	Catchment management	+49	+53
	Demand reduction	+20	+28
	Test and Itchen Enhancements	+4	+7
	Bulk transfer schemes	+50	+50
	Other new supply	+10	+10
	Desalination	+75	+75
<b>Total New supply</b>		<b>+207</b>	<b>+222</b>
<b>Resulting supply demand balance (+ve = surplus)</b>		<b>+21</b>	<b>+31</b>

The baseline supply and demand deficits of -186MI/d and -192MI/d for MDO and PDO respectively are those shown for the 50th centile in the published WRMP19 data tables. The table also shows the broad categories of solutions selected in the WRMP preferred plan for our Western area. The solutions included a 75MI/d desalination plant at Fawley on Southampton Water. <sup>11</sup>

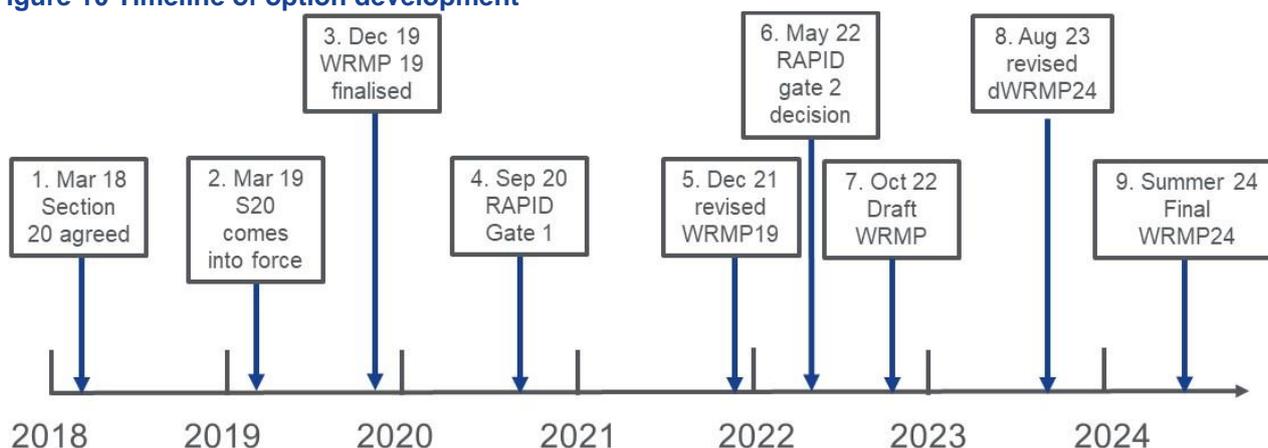
## 2.2. Option development

The original desalination option selected in WRMP19 option was changed to a new option that became HWTWRP after a detailed and rigorous option selection process described in our RAPID gate 1 and gate 2 submissions (see Section 3). The figure below shows the milestones that have resulted in the new option being confirmed as the most appropriate to continue to construction.

<sup>11</sup> Source: Southern Water RAPID Gate 1 submission, Annex 2, WRMP Supply and Demand Risk Assessment



Figure 10 Timeline of option development



A Description of the main events is as follows:

1. The Section 20 agreement under the Water Resources Act 1991 was agreed with the Environment agency after a public enquiry. It introduced large reductions in the amounts of water we are allowed to take from the rivers Test and Itchen when the flows in the rivers are low.
2. The agreement came into force.
3. Our WRMP19 was approved for publication, and the preferred strategy for Hampshire to remedy the resulting supply deficit was the approved way of remedying the deficit. A 75Ml/d desalination plant at Fawley was the largest single component of this plan.
4. The Fawley option presented a wide range of practical, regulatory and environmental difficulties. At Gate 1 of the RAPID process 10 options were evaluated side by side. The comparison used a wide range of criteria including cost, environmental benefits and social benefits. Desalination options were found to perform poorly against the criteria while a newly identified transfer from Havant Thicket reservoir performed the best.
5. At an interim update between gate 1 and 2, the analysis confirmed that desalination was not practical at that location at that time and would be discontinued. WRMP19 was updated via the annual review process to confirm the new option. The Havant Thicket transfer has been part of a confirmed WRMP since that date.
6. At Gate 2 of the RAPID process the transfer plus the recycling plant were both confirmed as being appropriate to proceed to Gate 3. We increased size of the transfer from a planned 75Ml/d to 90 Ml/d, to allow for the loss of some other components of the preferred plan in WRMP19.
7. The updated draft WRMP24 selected HWTWRP in the then best value plan.
8. The revised draft WRMP24 and WRSE modelling selected the transfer in all situations in the best value plan. Southern Water will re-consult on the draft WRMP.
9. The final approved plan will not be available until 2024.

Our plan is based on our dWRMP24 which has not been approved by the EA and 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 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.

The next sections give some more detail on the process for identifying the new best value option.

## 2.3. dWRMP24

Since the publication of draft WRMP24, a number of material factors have meant that we have had to announce we are no longer able to meet the original delivery date of 2027. This is described in section 2.4.2. Our revised dWRMP was submitted to regulators only on 31 August 2023, while our Statement of Response and associated annexes were published on our website. This is because further work is needed to take account of uncertainty of the delivery dates of the Havant Thicket SRO.

The WRSE and dWRMP processes have confirmed that HWTWRP continues to be selected in the best value plans, notwithstanding the delay to delivery. The WRMP24 process is showing that we need further new capacity in the 2040s, in addition to the HWTWRP. The best value plans select the Thames to Southern Transfer supported by the SESRO reservoir to meet these new needs.

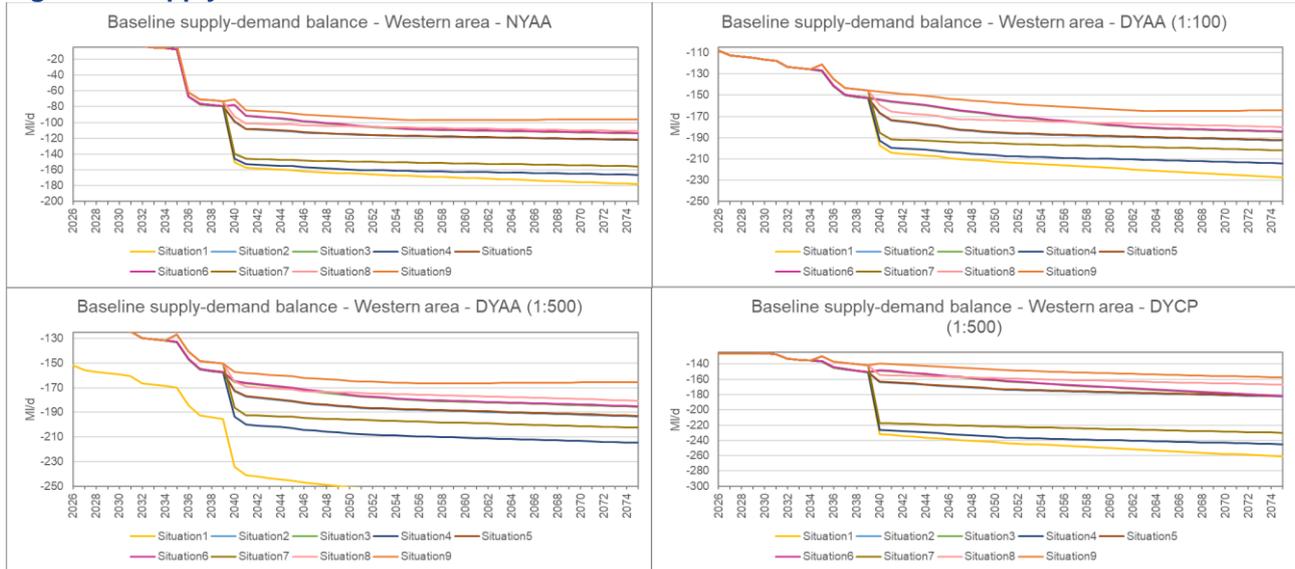
The way we have identified supply and demand balances in our dWRMP24 is set out in section 5 of our revised dWRMP24<sup>12</sup>, Future supply and demand requirements are taken into account via a rigorous development process followed by WRSE and ourselves.

The resulting supply/ demand balances are forecast, in conjunction with WRSE, for nine 'situations'. For regional planning and through our supply and demand forecasts we looked at six growth scenarios, twenty eight climate change scenarios and five Environmental Destination scenarios. In order 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 in consultation with the member companies of WRSE. The range of possible outcomes for growth, environmental destination climate change and supply are set out in section 5.2 and 5.3 of the revised dWRMP technical report. The needs overall are driven by a progressive move to being resilient to a 1:500 year drought by 2040. The figure below show the resulting supply-demand balances before taking further action. Our WRMP24 includes nine situations, or possible future states of the world. The situations describe different outcomes for drivers such as demand growth and climate change. Situation 9 is the most benign and situation 1 is the most adverse.

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<sup>12</sup> Revised Draft Water Resources Management Plan, Technical Report, 31 August 2023, pp62-95

Figure 11 Supply-demand balance in dWRMP24



Key: NYAA Normal year annual average.  
 DYAA Dry year annual average in a 1:100 and 1:500 year event.  
 DYCP Dry year critical period.

The supply-demand balance in West Hampshire continues to deteriorate after 2030, with a material worsening in most situations after 2040. Without remedial action we would be unable to meet our obligation to supply water in all circumstances up to and including a 1-in-500-year drought.<sup>13</sup>

Our dWRMP considers all available options methods to fix the deficit, including ambitious programmes of leakage and consumption reduction, and targeted use of measures such as Temporary Use bans ahead of needing drought orders and drought permits. The supply-demand deficit identified by WRSE and our revised dRWMP is sufficiently large that investment in new water sources and transfers is inevitable for our Hampshire WRZs. Even in a normal year (not a drought) a supply-demand deficit of c.80MI/d is expected by 2035 and by 2040 this has increased to c100-180 MI/d, depending on the situation. The SROs in this case are the largest components of our plans to remedy these deficits.

We note our dWRMP is yet to be approved by the EA.

## 2.4. Selected options

### 2.4.1. HWTWRP

We published our 2021 Annual Review of WRMP19 in December 2021. This confirmed we would change the desalination option to the then version of the HWTWRP, in a form that will transfer approximately 90MI/d during peak demand conditions, with a WRP of at least 15MI/d and up to 60MI/d capacity.

<sup>13</sup> Source for figure: revised dWRMP24, Annex 10 Supply Demand Balance Situations, 31 August 2023

In line with the consenting strategy for our selected option submitted at Gate 2, the Secretary of State gave the Direction in May 2022 to use the Development Consent Order route for our planning application. The selected option is now moving into the consenting and delivery phases, and we are currently in the early stages of the pre-application process for our DCO, including consultation and engagement.

The project received the RAPID gate 2 decision in May 2022. Our plan contains 100% of the development costs for this SRO for AMP8.

### 2.4.2. Scheme delay

Our dWRMP24 selected the HWTWRP from 2031. We have continued to optimise the schedule in order to achieve delivery as soon as possible. As the scope of the HWTWRP has matured, testing of the delivery schedule has been conducted, including a Quantitative Risk Analysis (QSRA) which has enabled a greater understanding of the project. This analysis has concluded that a 2030 delivery date is not achievable given the level of risk now understood in key areas of the programme. The analysis has indicated greater confidence in delivering the HWTWR project by 2035 with benefit from the option first achieved in 2036 (i.e. 01/04/2035). This assessment is based on some key assumptions (i.e. that the preferred water recycling plant location can be secured and customers have greater acceptance of recycled water challenges). Additional factors that have contributed to the decision include:

- Revisions to the size of the water recycling plant required
- Potential delays to the DCO process due to any legal challenges
- Potential delays to the Direct Procurement for Customers (DPC) process
- Interface and consenting risks due to combination of Havant Thicket reservoir with HWTWRP.

We are in discussions with regulators around the delay and have developed a contingency plan to mitigate the impacts of the delay in delivering this scheme. We continue to develop these mitigation plans and they include accelerating the programme to bring the delivery date of the SRO forward to 2033. The results cited from the revised WRMP reflect the assumption of the later delivery date. We intend to reconsult on our dWRMP in 2024 including earlier delivery of the SRO, and that is likely to include changes to some of the results used in this case.

### 2.4.3. Thames to Southern Transfer

Another SRO option that we are investigating jointly with Thames Water is the 'Thames to Southern Transfer' (T2ST), a transfer from Thames Water into our Western Area. This strategic pipeline could move up to 120Ml/d and is dependent on Thames Water developing new sources of water, options which are also being investigated through the RAPID gated process. This SRO is not anticipated to deliver water resources into the supply network until around 2040 and it is dependent on other new sources of water sources. This scheme is being selected in addition to HWTWRP. In agreement with Thames Water we have assumed that the source of water for this transfer is SESRO.

The project received the RAPID gate 2 decision in June 2023. RAPID left the funding shares at 50:50 but both Southern water and Thames Water intend that Southern to become the lead developer in future. Our plan contains 100% of the development costs for this SRO for AMP8.

The selection process is discussed in Section 3.

### 2.4.4. SESRO

The South-East Strategic Reservoir option is the most likely source of water for the Thames to Southern Transfer. It is intended to supply future needs of Thames Water, Southern Water and Affinity Water. The option being selected by WRSE and our DWRMP is the capacity of 150 Mm<sup>3</sup>.

The project has been developed by Thames and Affinity and received the RAPID gate 2 decision in June 2023. Funding continues to be 50:50 shares between Thames and Affinity in AMP7 but it is proposed that



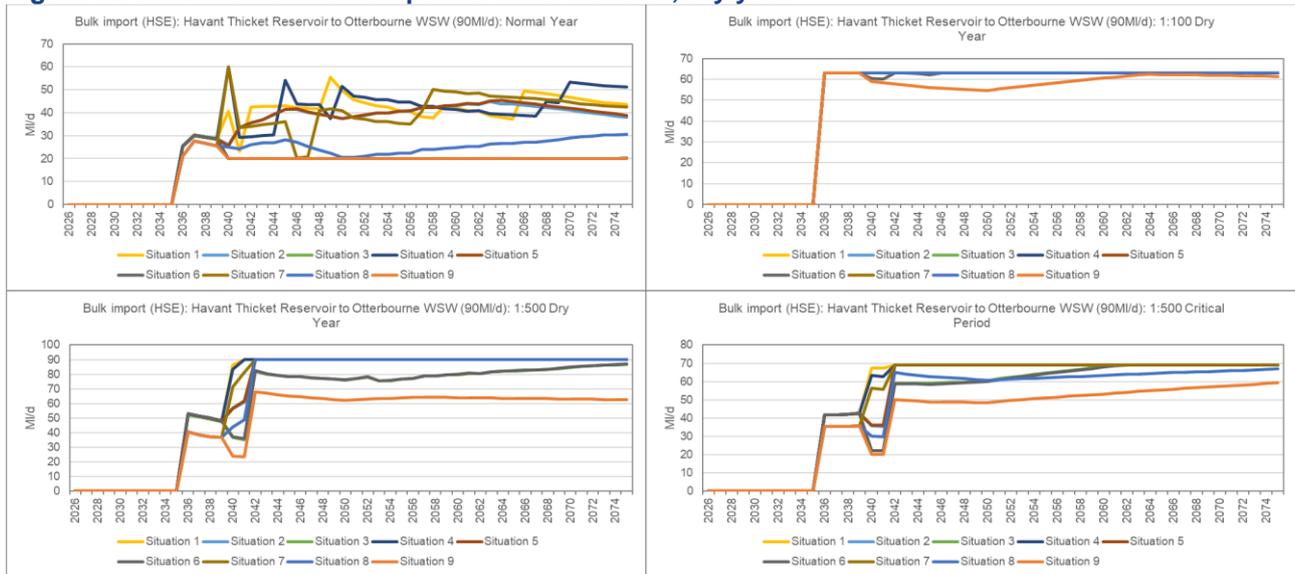
Southern becomes a more active partner. Our plan contains 30% of the development costs for this SRO for AMP8.

## 2.5. Selection of options in the dWRMP

### 2.5.1. HWTWRP

This option is selected in all situations as soon as it becomes available in 2035/6. The maximum utilisation of this options occurs under the 1:500 DYAA scenario. <sup>14</sup>

**Figure 12 Utilization of the Hampshire water transfer, dry year**



The above figures shows that the transfer is in regular use in a moderately dry year (1:100 drought) in all situations and in use at maximum capacity in some situations.

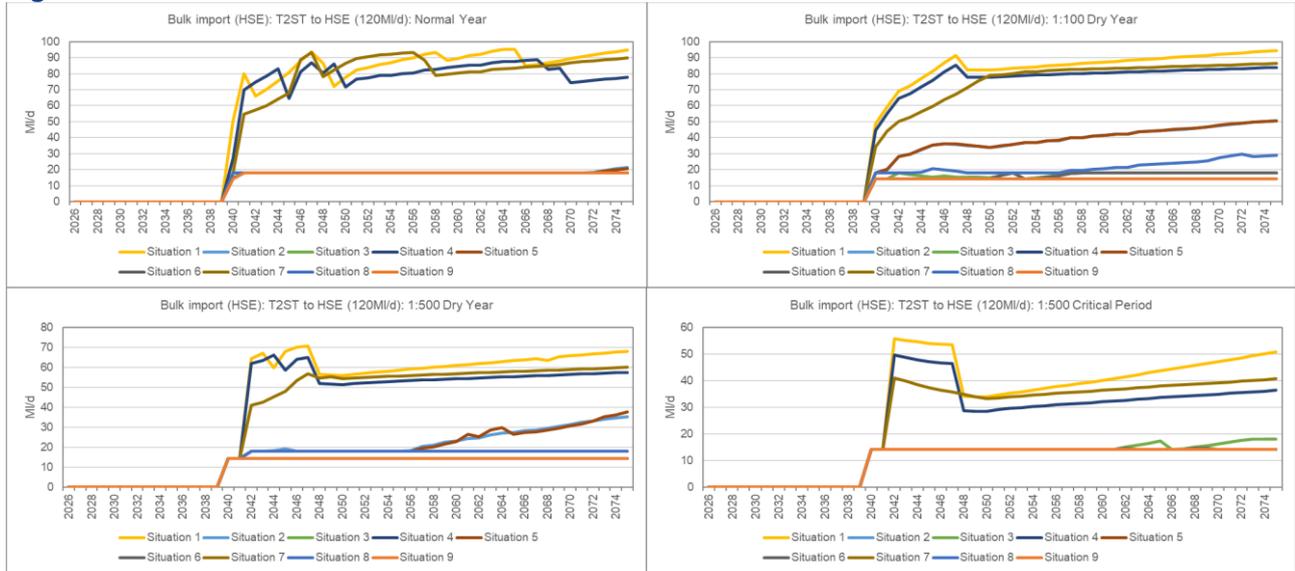
The enhancement case for HWTWRP is a continuation of the work carried out in AMP7, with funding provided by the RAPID process. The costs included in AMP8 cover all the development work needed up to and including the signing of a DPC contract. After that point, we assume that the Competitively Appointed Provider will incur all costs for work that is in scope for the DPC project. We will continue to incur AMP8 costs on development and construction work outside this scope, at the Budds Farm wastewater treatment works and the Otterbourne water supply works. The DPC process and costs of construction are described in section 5.

### 2.5.2. 2035-2050 Thames to Southern Transfer and SESRO

The bulk import Thames to Southern Transfer (T2ST) of 120MI/d capacity is first selected from 2040 The figure below shows that the transfer is selected as soon as it is available in a moderately dry year (1:100 drought) at 80MI/d or more in a number of situations.

<sup>14</sup> Revised rWRMP, August 2023, table 7.31

Figure 13 Utilization of the Thames to Southern transfer



The case for T2ST and SESRO includes our share of the continuing AMP8 costs. The case includes 100% of the costs for T2ST and 30% of the costs for SESRO. In AMP7 these costs were funded through the RAPID process. In both cases, the options are essential components of our WRMP from 2040 onwards. We need to keep these options available, so the development costs are included in our LTDS core pathway. This case represents the AMP8 component of those costs. No funding for any of the SRO options will be provided by the botex framework.

## 3. Customer and Stakeholder Consultation

We have consulted extensively with customers and stakeholders over their understanding and appreciation of water scarcity and the possible solutions of demand and supply measures.

We have consulted specifically on the HWTWRP via a non-statutory consultation preparing for the development consent order, and via stakeholder engagement carried out for Water for Life–Hampshire. We have consulted with customers on all the SRO and other options included in dWRMP24. We have also consulted customers and stakeholders through our PR24 customer research programme and the consultation on our draft Long Term Priorities Statement carried out in 2022.

### 3.1.1. HWTWRP DCO Non-statutory consultation

In summer 2022 we carried out a non-statutory consultation with customers and stakeholders as part of the DCO application process<sup>15</sup>. It gave us fuller insights into how customers and stakeholders viewed on needs case for HWTWRP and its proposed solution. We asked customers and stakeholders for views on the following:

- Water transfer and water recycling as the proposed solution to Hampshire’s water supply deficit and the options appraisal process we went through to select it.
- The location of the water recycling plant and the process we went through to select it.
- Our preferred pipeline corridors and the process we went through to develop them.
- The identified zones for potential above-ground infrastructure.
- Whether you thought there were any areas where construction works would be particularly challenging.
- Our consultation approach and any other views on the Project.

Specifically on the water recycling plant the feedback summarised was:

*The use of recycled water prompted some concerns about the quality of drinking water and potential changes to its taste or smell.*

*Those in favour of water recycling highlighted the need to safeguard the ecologically important chalk stream rivers in Hampshire and felt that water recycling was the most environmentally sustainable solution to address the county’s water shortage.*

*Of those who did not support our options appraisal process to arrive at water transfer and water recycling as the preferred solution, some did not give their reasons or felt there was a lack of awareness and publicity around the Project. Others said they were unclear on the reasons why desalination was no longer the preferred option.*

*Our proposal to use the Havant Thicket Reservoir to store the recycled water prompted some concerns from people who felt the reservoir should only be fed by spring water. The potential environmental impacts of recycled water on biodiversity, wildlife and ecology were also raised as a concern by some respondents.*

<sup>15</sup> Hampshire Water Transfer and Water Recycling Project Summer 2022 public consultation, summary of feedback, January 2023 [Consultations \(southernwater.co.uk\)](https://www.southernwater.co.uk/consultations)

*The majority of respondents were from the Havant area, where there is strong support for the Havant Thicket reservoir plans and, understandably due to the nature of the proposed source water for the Project, concerns about perceived impact on water quality in the reservoir.*

Our response sets out our next steps in addressing these views. We are conducting a continuous campaign to raise awareness of the need for water recycling and to support its future use as a healthy and appropriate source of water, enabling us to take less water out of the environment.

### 3.1.2. WRMP

For our dWRMP we have carried out a long-running process of consultation on Southern Water's Water Resources Management Plan (WRMP) 2024. We have consulted jointly with Portsmouth Water. The first consultation on the proposed HWTWRP was held by Southern Water as a back-up option in the consultation on the West Southampton Desalination option, from 8 February until 16 April 2021. This was followed by a second public consultation, held from the 5 July to 16 August 2022, on the proposed HWTWRP.

Consultation documents and feedback reports from these previous exercises are published on the Southern Water website.<sup>16</sup> This consultation on the two company Water Resource Management Plans ran for 14 weeks from the 14th November 2022 to the 20th February 2023. The proposed changes to the way water is supplied to Southern Water and Portsmouth Water customers in Hampshire has prompted many questions and some concerns from customers of both water companies. This document is a response to these questions and concerns, but does not include information on every aspect of the plans. Annex 6 of our Statement of Response for the revised dWRMP sets out our approach to the consultation and our response to it.<sup>17</sup> The Annex groups the issues raised via the consultation into 11 themes:

- The supply-demand balance challenge
- The options appraisal process
- The option selected
- The history and development of the Hampshire Water Transfer option
- The water treatment process in the option
- The costs of the option
- International precedents for using recycled water
- Releases of treated wastewater into the environment
- Impact on customer bills
- The consultation process itself
- The involvement of Portsmouth Water

In the annex we respond in detail to each of the themes raised. An overall summary is provided in our dWRMP Statement of response to feedback received from all consultees.<sup>18</sup>

Some respondents have opposed our use of HWTWRP to fill Havant Thicket Reservoir. The areas of concern include uncertainty around delivery dates, benefits and environmental impacts. There were also concerns that alternative options have not been adequately explored. We have considered more than 300

<sup>16</sup> [www.southernwater.co.uk/our-story/our-plans/water-for-life-hampshire/consultations](http://www.southernwater.co.uk/our-story/our-plans/water-for-life-hampshire/consultations).

<sup>17</sup> [sor-annex-6-water-for-life-hampshire-1.pdf \(southernwater.co.uk\)](https://www.southernwater.co.uk/our-story/our-plans/water-for-life-hampshire/consultations/sor-annex-6-water-for-life-hampshire-1.pdf)

<sup>18</sup> [statement-of-response\\_water-resources-management-plan-2024.pdf \(southernwater.co.uk\)](https://www.southernwater.co.uk/our-story/our-plans/water-for-life-hampshire/consultations/statement-of-response-water-resources-management-plan-2024.pdf)

feasible options during our WRMP options appraisal. In addition we are considering mitigation options to address the delay in delivering the project and hence the delay of the water resource and environmental protection benefits it will deliver.

The selection of the innovative HWTWRP in our plan is primarily driven by the changes to our abstraction licences for the rivers Test and Itchen which significantly reduce the amount of water we can take from these rivers. We are making these reductions to support environmental improvements in these catchments. We are no longer planning to build a desalination plant in the Solent because of its environmental impacts so this water recycling scheme is the only option large enough to maintain customer supplies whilst making such significant reductions in abstraction.

It will also help to protect chalk streams by allowing us and Portsmouth Water to reduce our groundwater abstraction impacts on these unique habitats across Hampshire and West Sussex beyond the changes already made to our abstraction licences in Hampshire.

We will use global best practice for HWTWRP with a multi-barrier approach and monitoring to ensure high water quality when transferred to the Havant Thicket Reservoir. We will monitor the quality of treated effluent from the Budds Farm waste treatment works at the water recycling plant and will shut it down if for any reason water cannot be treated to the required standards. The recycled water will also have a lower nitrate level than the spring waters, due to the treatment at Budds Farm waste treatment works.

We also have a range of studies and investigations continuing as part of the consenting process for the HWTWRP. We will prepare a preliminary Environmental Information Report (EIR) which will form part of our next stage of public consultation in 2024. We will report the preliminary findings on any likely significant environmental impacts of the project based on the information available at the time. We have designed this work to inform consultees' responses to the next HWTWRP consultation which we plan to run in 2024.

We are currently carrying out a full EIA for the HWTWRP as part of the Development Consent Order (DCO) process. We will share this as part of the public consultation for that consent. We are working with Portsmouth Water to support the identified mitigations and compensation, together with other environmental benefits, brought via the proposed scheme.

Notwithstanding the issues raised in the consultations, for a legally compliant plan, we are required to maintain supplies under drought year conditions. Without this scheme we cannot maintain supplies during droughts without resorting to drought permits and orders and it remains the best option for customers. Our approach to identifying the best option is described in the next section.

## 4. Best Value Option for Customers

There are two phases to our work in identifying the best option for customers to remedy the supply-demand balance deficit in West Hampshire. The first is the work done to replace the original desalination option, the base case option of WRMP19, once it was demonstrated that this option was not deliverable at that time and at the particular location concerned. This work is summarised in Section 4.1 and was carried out as part of the RAPID process, in particular RAPID Gates 1 and 2. The second phase is the work carried out as part of our WRMP24 process, including the extensive work done by WRSE to identify the best value options for water resources at a regional level. This work is summarised in section 4.2.

### 4.1. Selection of HWTWRP option

At RAPID Gate 1 in September 2020 eight options in addition to the then base case were presented. The base case from WRMP19 was a 75MI/d desalination plant at Fawley, and the largest component of the preferred plan for West Hampshire in WRMP19, now known as Water for Life – Hampshire. In our RAPID Gate 2 submission in December 2021 the HWTWRP option was selected as the revised main component of WRMP19 after a detailed and thorough option selection process. This recommendation was accepted by RAPID in their Gate 2 decision and the transfer option plus a back-up option continued for development. Other options were discontinued.

The option selection was based on a Multi-Criteria Decision Analysis supported by a large volume of external evidence. The process, the evidence and the results are described in full in our Southern Water Gate 2 Annex 5: Options Appraisal Process – Future Needs Update.<sup>19</sup>

A summary of this process was used in our public consultation on the option that ran for 6 weeks in July and August 2022<sup>20</sup>. The description that follows draws mainly on that summary.

It was important that the option selection was robust. Amongst other critical considerations, the options selection process would be essential in supporting a future planning application enquiry. The process was developed in consultation with stakeholders and was undertaken by qualified individuals. The process was iterative, and it comprised:

- Site and route selection
- Consenting evaluation
- Multi-Criteria Decision Analysis
- Assessment against legal and policy objectives
- Assessment against Water for Life Hampshire strategic objectives
- Interim Business Evaluation
- Future Needs Assessment
- Final Business Evaluation.

<sup>19</sup> [Technical documents \(southernwater.co.uk\)](https://www.southernwater.co.uk/technical-documents)

<sup>20</sup> Scheme Development Summary, Public Consultation 2022, [southernwater.co.uk/media/7374/hampshire-wtwrap-2022-scheme-development-summary-v2.pdf](https://www.southernwater.co.uk/media/7374/hampshire-wtwrap-2022-scheme-development-summary-v2.pdf)

#### 4.1.1. Multi-Criteria Decision Analysis' options appraisal process

Economic appraisal helps decision-makers to consider how well an investment or intervention performs when considering its impacts on 'economic wellbeing' or 'public value' from the perspective of customers, the wider UK population (individuals, households, businesses) and the environment (collectively referred to as 'economic benefits'), relative to the costs of delivering that investment or intervention. These impacts can be measured in either monetary or non-monetary terms, in line with best practice guidance from our regulators and from the UK Government. The Water Resources Planning Guidelines defines a best value plan as one that:

- Considers factors alongside economic cost and seeks to achieve an outcome that increases the overall benefit to customers, the wider environment and overall society;
- Is efficient and affordable to deliver, legally compliant and accounts for the range of legislation that applies to it; and
- Where the outcome of increased benefits will be typically measured relative to the 'least cost' programme that delivers the minimum requirements to meet supply duties.

We used the multi-criteria decision analysis to inform our assessment of the relative performance of the options against best value as part of the overall options appraisal process. The aim of the multi-criteria decision analysis was to provide an overall ranking of options.

The methodology used for the Multi-Criteria Decision Analysis comprised of three key strands of activity:

- Consideration of best practice guidance on the economic appraisal of resilience plans and infrastructure investments against best value, and specifically the appraisal of different types of customer, environmental, social and cost impacts associated with major infrastructure projects;
- Development of a comprehensive best value appraisal framework which, using 23 best value criteria, enabled a consistent assessment of the relative performance of the options in terms of their Net Social Impact, their cost to deliver, and the balance between these two factors; and
- Extensive scenario analysis to consider the sensitivity of the results to different views on the relative importance (weighting) of the different criteria within Southern Water's best value appraisal framework, based on HM Treasury Green Book guidance on switching values, considering the different factors within net social impact, cost, and again the balance between the two.

Following the development of the 23 best value criteria, and the application of the relative importance weighting to them, the sub criteria were summarised into five best value 'lenses'. These five lenses are:

- Best Value Ranking 1: Whole life cost;
- Best Value Ranking 2: Average affordability;
- Best Value Ranking 3: Net social impact;
- Best Value Ranking 4: Net social impact relative to whole life cost; and
- Best Value Ranking 5: Net social impact relative to affordability.

The six remaining options at Gate 2 were tested using the Multi-Criteria Decision Analysis framework.

The outcomes of the multi-criteria decision analysis provided a ranking of the options against these five best value lenses. A breakdown of how the six remaining options performed against each best value lens is shown in Table 4.

**Table 3 – Initial best value ranking at RAPID Gate 2**

Best Value ranking 1 = best					
Option	1. Whole Life Cost	2. Average Affordability	3. Net Social Impact	4. Net Social Impact Relative to Whole Life Cost	5. Net Social Impact Relative to Affordability
A.1	5	5	5	5	5
A.2	5	5	6	6	6
B.2	3	3	4	4	4
B.4	2	2	3	2	2
B.5	4	4	2	3	3
D.2	1	1	1	1	1

Key	
Option	
A.1	75 MI/d DO desalination at Fawley direct to Testwood WSW (Base Case)
A.2	61 MI/d DO desalination at Fawley direct to Testwood WSW
B.2	61 MI/d DO recycled water sent to new environmental buffer lake and treated at Otterbourne WSW. WRP supplied by Budds Farm WTW
B.4	15 MI/d DO recycled water sent to Havant Thicket Reservoir and 75MI/d transferred to and treated at Otterbourne WSW
B.5	75 MI/d DO recycled water (indirect) sent to new environmental buffer lake and treated at Otterbourne WSW (WRP supplied by Budds Farm and Peel Common WTW)
D.2	61 MI/d DO – raw water transfer from HTR to Otterbourne WSW

We then applied a series of further tests, the first being the ability of each option to deliver our legal and policy objectives. We eliminated the two desalination options, as they were found to be the worst options from this lens as we had strong evidence that the two options were very unlikely to gain planning consent at the chosen location at that time.

We developed three strategic objectives to ensure the success of its programme:

- **Best value:** Southern Water will deliver solutions which provide the best value to its customers whilst discharging Southern Water’s ‘all best endeavours’ legal obligation in the Section 20 agreement and all other legal and policy requirements and obligations.
- **Net zero carbon –** Southern Water will deliver solutions which ensure that it can continue to make progress towards meeting, and to support and contribute to, Water UK’s commitment to become net zero carbon by 2030.
- **Adaptability:** Southern Water will ensure that all projects within the Programme are sustainable by being flexible and adaptable, including in terms of their:
  - Capacity and scalability;
  - Ability to contribute to strategic reinforcement of the regional and national network;
  - Ability to rely on appropriate transitional measures to manage risks around delivery timescales; and
  - Ability to allow for technological innovation.



After this test the options involving the Havant Thicket reservoir, were ranked 1<sup>st</sup> and 2<sup>nd</sup> and the two desalination options were formally discontinued at our RAPID interim update of 27 September 2021.

As part of the ‘Future Needs Assessment’ and at the time the analysis was carried out we already knew that the resilience standard would move from 1:200 to 1:500 year drought events. We had also confirmed that one of the original options in the preferred WRMP19 plan for Hampshire, a 20MI/d new bulk supply from South West Water, would not be able to go ahead. We therefore needed to replace this capacity. The need was adjusted to test the ability of the options to meet this increase. Further modelling had shown that the need had risen from the original 75MI/d to 87MI/d given the loss of the potential new bulk supply.

An assessment was undertaken to establish whether the options could meet the needs of a larger supply deficit given the water supply challenges faced in Hampshire. This tested whether the required capacity of the options could be expanded to meet a supply deficit of 87MI/d.

The table below outlines a revised ranking of the options when this updated capacity requirement was applied to the options that progressed from the interim business evaluation stage of the process.

**Table 4 – Revised best value ranking at Gate 2 allowing for higher capacity**

Option		Overall ranking
B.4	15 MI/d recycled water sent to Havant Thicket Reservoir and up to 90MI/d transferred to and treated at Otterbourne WSW (WRP supplied by Budds Farm WTW)	1
B.5	Up to 90 MI/d recycled water sent to new environmental buffer lake and treated at Otterbourne WSW (WRP supplied by Budds Farm and Peel Common WTW)	2
B.2	61 MI/d recycled water sent to new environmental buffer lake and treated at Otterbourne WSW (WRP supplied by Budds Farm and Peel Common WTW)	3=
D.2	61 MI/d DO – raw water transfer from HTR to Otterbourne WSW	3=

In the final evaluation we ranked Option B.4 first, the option including the water recycling plant and transfer to and from Havant Thicket Reservoir. This was due to its lower cost relative to Option B.5, its excellent continued scalability to meet future needs and the flexibility from the integration of Havant Thicket Reservoir and water recycling working in tandem. It is also the best option to create a regionally resilient solution that supports both Southern Water customers and in future could support Portsmouth Water customers.

We ranked option B5, involving creation of a new wetland at Otterbourne, second overall on account of its relatively higher cost, its lower flexibility in scalability terms and its lesser ability to act as a regional asset that benefits both Southern Water and Portsmouth Water customers. Both options were submitted as candidates for the WRSE and WRMP option selection process. The backup option B5 was not selected in DWRMP24 and work on it has been discontinued.

## 4.2. WRSE and WRMP option selection for HWTWRP and T2ST

### 4.2.1. WRMP decision making process

Our adaptive planning approach sets out the supply-demand challenge across each of the nine adaptive planning situations which reflect the range of uncertainty in future population growth, climate change and the amount of abstraction reduction required to protect and enhance the environment. Our options appraisal then sets out the potential range of feasible new water resources and water efficiency strategies we could employ to meet those supply-demand deficits into the future and the Best Value planning metrics we will use to decide between them.<sup>21</sup> These are:

- Strategic Environmental Assessment Score (+ve or -ve)
- Natural Capital
- Biodiversity Net Gain
- Customer Preferences
- Resilience metrics (adaptability, evolveability and reliability)
- Programme costs
- Carbon costs

This section describes our selection of options to maintain supply-demand balance in the future following a Best Value planning methodology, consistent with the regional planning approach, to derive our preferred plan. 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 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, 1:100 DYAA, 1:500 DYAA and 1:500 DYCP). 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 project supply-demand deficit.

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 nine adaptive pathways. When deciding on inclusion of an option, the IVM assesses whether it is economic to defer investment until after 2030 and only includes investment in the 2025-30 period if it is economic to do so once all 2030 and 2035 branch points are considered.

The IVM was run multiple times to examine the potential sensitivity of the plan to changes 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.

<sup>21</sup> This section is a summary of Section 7 of our revised dWRMP Technical Report, submitted to regulators on 31 August 2023

- Best Value model runs to examine the trade-off between programme cost and best value metrics.
- Policy and sensitivity assessments which include different programmes based on policy choice. These included:
  - Sensitivity assessment on the timing of achieving 1-in-500 year (1:500) drought resilience
  - Optimising on Environmental and Social Value metrics
  - Optimising on maximising plan Resilience
  - Sensitivity of the plan to changes in the availability, performance or cost of specific options.

#### 4.2.2. Least Cost Plan methodology

To provide an initial baseline to the Best Value Plan (BVP), a Least-Cost Plan (LCP) was developed to meet the projected supply-demand deficit in each supply-demand balance situation, under each planning scenario. For this planning approach, the IVM optimised only on lowest economic cost, expressed in terms of Net Present Value (NPV). Although the best value metrics were not optimised on at this stage, the options used to develop the LCP still have scores for these metrics against each situation.

There are two versions of the LCP:

1. **Regional LCP (RLCP):** This version of the LCP has updates to all inputs from all WRSE companies since the dWRMP24.
2. **Southern Water LCP (SLCP):** This version of the LCP is the one included in our dWRMP

**Table 5 – Earliest selection of options in the Southern Water least cost plan**

Option	Supply-demand balance situation								
	1	2	3	4	5	6	7	8	9
Havant Thicket to Otterbourne 90 MI/d	2036	2036	2036	2036	2036	2036	2036	2036	2036
T2ST to Hampshire South East 120 MI/d	2040	2040	2040	2040	2040	2040	2040	2040	2040

The Havant Thicket transfer is selected in all situations as soon as it is available. T2ST is selected in all situations from 2040.

We note that our dWRMP has yet to be approved by the EA.

#### 4.2.3. Best Value Plan methodology

The development of the revised BVP has involved the following steps:

- Develop revised LCP: IVM was used to develop the revised LCP, optimising on cost only. No restrictions or constraints were imposed in order to develop a least-cost regional solution.
- Test sensitivity of the revised LCP: Additional IVM runs were carried out see the changes in revised LCP with various restrictions and constraints applied. This included testing sizes and timings of schemes, excluding some schemes, and testing the robustness of the demand management strategies and government interventions.
- Determine thresholds for the best value metrics: Using the revised LCP as the starting position, IVM was run to incrementally improve the best value metrics, to identify the threshold at which it was not possible to increase the best value metrics any further. This step resulted in a candidate revised BVP.



- Testing the candidate revised BVP: The candidate revised BVP was tested to see the changes in response to various restrictions and constraints applied. This included developing a Best Value Resilience Plan (BVRP) and the Best Value Environmental and Social Plan (BESP), based on the BVP threshold identified in the previous set of runs.
- Finalising revised BVP: Selection of the revised BVP was based on the outcome of the BVP threshold runs and BVP sensitivity runs. Final RBVP was selected using the IVM runs as decision-support tool in overall programme appraisal. Programme appraisal based on evidence from IVM runs.
- Deriving company BVP: Once the revised BVP is finalised, company specific BVP is a subset of the revised BVP.

**Table 6 – Earliest selection of options in the Southern Water best value plan**

Option	Supply-demand balance situation								
	1	2	3	4	5	6	7	8	9
Havant Thicket to Otterbourne 90 MI/d	2036	2036	2036	2036	2036	2036	2036	2036	2036
T2ST to Hampshire South East 120 MI/d	2040	2040	2040	2040	2040	2040	2040	2040	2040

The Havant Thicket transfer are T2ST are also selected in all situations in the best value plan.

#### 4.2.4. Regional resilience asset

Modelling from WRSE shows that once the T2ST is available, it is possible to re-purpose the Havant Thicket reservoir and the WRP. Instead of moving water east to our Hampshire customers, water could be supplied to these customers by T2ST, and the water in the reservoir moved east to supply our customers in North Sussex and in some WRMP situations the customers of Portsmouth Water. This change would require building of new connections to move water to the east but would enable the Havant Thicket reservoir to serve the customers of more than one company, and it could become an important regional resilience asset in future.



## 5. Cost Efficiency

The table below shows a summary of the totex forecast for the three SRO schemes, allocated to the relevant price controls. The costs for the HWTWRP are only those that will be incurred by Southern Water, with an allowance for payments made to Portsmouth Water. The design and construction costs for the part delivered via DPC will be incurred by the CAP once the DPC process has reached financial close. This is expected to occur in 2028. The remaining SRO scope will be delivered by Southern Water, including land purchase.

**Table 7 – Totex costs for the SRO options**

£k 2022/23 prices	25/26	26/27	27/28	28/29	29/30	Total
<b>Water resources price control</b>						
HWTWRP	57,694	17,307	12,588	6,489	6,489	100,567
T2ST	0	0	0	0	0	0
SESRO	12,597	12,677	12,757	10,228	5,171	53,430
<b>Total</b>	<b>70,291</b>	<b>29,984</b>	<b>25,345</b>	<b>16,717</b>	<b>11,660</b>	<b>153,997</b>
<b>Water network plus price control</b>						
HWTWRP	0	0	0	0	0	0
T2ST	17,682	17,682	11,594	15,416	15,416	77,790
SESRO	0	0	0	0	0	0
<b>Total</b>	<b>17,682</b>	<b>17,682</b>	<b>11,594</b>	<b>15,416</b>	<b>15,416</b>	<b>77,790</b>
<b>Total</b>						
HWTWRP	57,694	17,307	12,588	6,489	6,489	100,567
T2ST	17,682	17,682	11,594	15,416	15,416	77,790
SESRO	12,597	12,677	12,757	10,228	5,171	53,430
<b>Total</b>	<b>87,973</b>	<b>47,666</b>	<b>36,939</b>	<b>32,133</b>	<b>27,076</b>	<b>231,787</b>

The cost associated in this business case can be identified in data table CW8. HWTWRP costs are on line CW8.16 “Import: Havant Thicket – Otterbourne direct raw water transfer 90 MI/d” and on CW8 line CW8.59 “Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (60 MI/d)”.

Costs for SESRO are on line CW8.18 “New reservoir – SESRO 150 Mm<sup>3</sup> and for T2ST on CW8.32 “T2ST Planning and Development.”

## 5.1. HWTWRP

The table below shows a breakdown of the costs of the project, focusing on the AMP8 component to be incurred by Southern Water. The table also shows an estimate of the capex costs that would be incurred by the Competitively Appointed provider, expected to begin in 2028. Southern Water will begin payments to the CAP on completion of construction in AMP9.

**Table 8 – Cost breakdown of the Havant Thicket Transfer**

£k 2022/23 prices	25/26	26/27	27/28	28/29	29/30	Total
Budds Farm and Otterbourne work	█	█	█	█	█	█
Purchase of preferred site (site 72)	█	█	█	█	█	█
Land costs for Otterbourne pipeline	█	█	█	█	█	█
Power costs	█	█	█	█	█	█
Planning consent	█	█	█	█	█	█
Legal costs	█	█	█	█	█	█
Cost of DPC process and procurement	█	█	█	█	█	█
Programme management	█	█	█	█	█	█
<b>Total Costs for SW</b>	█	█	█	█	█	█
Capex costs incurred by the DPC operator			█	█	█	█
<b>Total AMP 8 Costs for SRO</b>	<b>57,694</b>	<b>17,307</b>	<b>12,588</b>	<b>147,989</b>	<b>147,989</b>	<b>383,567</b>

The CAP construction period is forecast to be five years. This covers the final three years of AMP8 and the first two years of AMP9. The table above shows the AMP8 phasing. The CAP will develop the construction schedule detail as part of their tender and delivery. Prior to this, we have assumed costs will be flat profiled (equally phased between years). The total cost estimate for the CAP component of the SRO is £708m. This estimate will be updated as part of the DPC process as the CAP component proceeds to DPC stages 2 to 4. The table contains an amount for purchase of the preferred site for the location of the water recycling plant. Early purchase of the site will secure better value for customers, as the site currently has planning permission for an industrial estate. If purchase it delayed it will be more expensive as occupants would need to be relocated. There would also be a reduced likelihood of gaining compulsory purchase powers via the Development Consent Order with later purchase, due to the disruption the occupants would experience.

All construction projects follow a process of progressively developing the level of detail on the chosen solution. In general terms, the more precise the detail, the more certain the estimates of cost, time and functionality will be. Developing certainty can be time consuming and expensive. Therefore, it is not practical nor valuable to develop all solutions, and solution options, to the highest possible level of certainty before decisions are made. The nature of SRO schemes means that they are relatively higher cost, higher value and more complex. It is with this context that the RAPID gated process aims to govern and safeguard value. The SRO has been following a RAPID process for some years prior to our PR24 submission. Indeed, Southern Water were on an accelerated RAPID process aimed at safeguarding delivery of this critical solution in a timely manner. As such, the SRO does not follow the standard PR24 costing methodology. The complexity and scale of the solution combined with the earlier work required by RAPID means that the SRO is significantly more progressed. The scope is more certain, alongside our understanding of forecast cost outturn reflecting risk and opportunity. In short, we have a more developed cost estimate for the SRO than the cost estimating process used to develop much of the rest of our PR24 plan. However, the engineering

design and cost estimates have been produced by our Engineering and Technical Solutions (ETS) and Cost Intelligence Team (CIT) teams that have also developed the majority of our PR24 plan. This includes support from specialist engineering consultancies such as [REDACTED] for design and [REDACTED] for cost estimates. [REDACTED] support our CIT with specialist in-depth cost estimating expertise.

It is important to note that developing the solution may not always reduce the scale of risk. Development increases understanding, including hazards/opportunities and their potential impact. It is for this reason that the general approach to risk used elsewhere in our PR24 does not apply to the SRO. We have a greater understanding of risk than the general PR24 approach would provide. The SRO maintains a detailed risk register with assessment of risk/opportunity impact and management plans. We have used this to form a risk estimate the corresponds with the specific details of the SRO.

The SRO has now been developed over several years with a dedicated team and engagement with RAPID. This has included interface with suppliers including those providing water recycling technology, development of procurement strategy, identification of land parcels and dialogue on purchase, liaison with Portsmouth Water on adjustments to bulk supply arrangements and many other such aspects. The SRO is significantly more developed than any other solution utilising water recycling technology. We have a productive dialogue with our peer water companies on water recycling technology, particularly given our more advanced understanding of it. We have reviewed the cost information for water recycling solutions being developed by our peers, particularly through the WRMP submissions. However, none of our peers' solutions are comparably as developed as ours. Given we have much greater understanding and certainty on our SRO compared to our peers our cost estimates are more robust, reliable and accurate.

The project sources all formal supplier input through our competitively tendered framework agreements. This has been the case for all development costs incurred to date and will be the case for all future costs with the exception of distinct aspects which will be competitively procured through new procurement competitions (e.g. the CAP appointment). All supplier costs have been subject to competition which safeguards value for money.

Our current assumptions on DPC contract scope mean Southern Water will incur the capital costs for work at Otterbourne Water Supply Works and Budds Farm Wastewater Treatment Works. The construction phasing detail will be significantly development by construction contractors once appointed, as part of their tender and beyond. As such, we have flat forecast these construction costs at this time (they are equally phased by value each year).

We have a very well-established understanding of project development costs, which will form part of PR24 price controls. This includes our established programme and project management capability alongside engineering and design, and stakeholder management. Our cost estimate of development costs reflects the project functions that will continue at a reasonably stable annual rate. We have established the resource requirements, with costs, for development work to date. While we continue to progressively pursue increases in efficiency, we have a very well evidenced project cost base with which to accurately predict annual development costs. These costs are formed directly from our demonstrable cost evidence.

The costs allowed at PR19 were development only and did not include any construction. Construction costs were subject to review and approval by RAPID. No funding has previously been provided for any of the activities identified to progress the project to completion in AMP8 and AMP9.

We are currently collaborating with Portsmouth Water on the reservoir and HWTWRP. We expect to apply for the costs and make appropriate payments to Portsmouth. The Havant Thicket reservoir is built for Southern Water customers by Portsmouth Water. It is not in the scope of this SRO. No costs for the reservoir itself are included in this case. The costs incurred by Portsmouth Water are governed by the Havant Thicket price control. Portsmouth Water customers do not pay for the reservoir via bills. Instead, the funding is raised from our customers and we make appropriate payments to Portsmouth Water under the terms of a bulk supply agreement, visible in table CW8.

## 5.2. T2ST and SESRO

Costs of T2ST are derived from the RAPID Gate 2 submission. The RAPID Gate 2 submission for T2ST was developed jointly between us and Thames Water. The case contains 100% of the development costs for AMP8 presented via that submission. Costs were developed using good industry practice and reflect RAPID guidance.

We were not yet a partner in the SESRO scheme up to Gate 2, as it was developed jointly between Thames Water and Affinity Water. The AMP8 development costs have been prepared by Thames Water and Affinity Water and have been jointly agreed by all three companies. Costs were developed using good industry practice and reflect RAPID guidance.

## 6. Direct Procurement for Customers (DPC)

### 6.1. HWTWRP

Ofwat directed us to consider using the DPC route for this project in the PR19 final determination. DPC has been the preferred delivery route at RAPID Gate 1, Gate 2 and the Gate 2 interim update. The project is not yet designated as a DPC project though it has passed the Control Point B stage. The project is expected to be designated between the new Stage 2 and Stage 3 processes. As part of this process we will carry out a full quantitative value for money assessment in accordance with Ofwat's guidance. This will take account of expectations that the competitive process will introduce savings for customers through innovation, improved efficiency of operation and potentially lower costs of financing.

A full value for money assessment will be carried out prior to launching the DPC process. This will use market engagement to test out the benefits of using the DPC route compared to in-house delivery, to demonstrate value for money on behalf of customers. The total costs we estimate the CAP would incur (based on the procedures we use for identifying in-house delivery costs) are shown in the table below. We expect the project to be formally designated by Ofwat as a DPC project in 2024 and we expect financial close of the DPC contract in Q4 2027.

At this stage the costs include the construction of a tunnel between the recycling plant and the Havant Thicket Reservoir. When it is formally agreed that Portsmouth Water will carry out this work, the estimated costs to be incurred by the CAP will be adjusted. Southern Water will pay the costs incurred by Portsmouth in carrying out this work. We have assumed equal annual phasing of costs incurred by the CAP, for simplicity.

**Table 9 – Capital cost estimates of the scope to be delivered by the CAP**

£k 2022/23 prices	27/28	28/29	29/30	30/31	32/33	Total
	AMP8	AMP8	AMP8	AMP9	AMP9	
CAP construction costs	141,500	141,500	141,500	141,500	141,500	707,500

### 6.2. T2ST and SESRO

It is expected that the delivery route for T2ST is DPC and this is set out in the Gate 2 RAPID submission. Thames Water has recommended in its Gate 2 submission that SESRO is developed under the Specified Infrastructure Project regulations (SIPR).

Award of the CAP contract for SESRO is expected late in AMP8. Award of the CAP contract for T2ST is expected in AMP9. The reason for the differing times is in part due to the longer construction time for the reservoir.

## 7. Customer Protection

The schemes relate to a number of long term PCs that relate to security and availability of water supply. They are essential components of our WRMP24, and we expect to protect customers in the event of late delivery or capacity being less than planned.

### HWTWRP

This option has been subject to the RAPID gated process and at the time of plan submission has passed RAPID gates 1 and 2. The RAPID gates involve assessment of the appropriate option or options to continue to future gates, and review of the spend incurred to date. In the event of inefficient spend or discontinuation of the option for any reason, RAPID will return money to customers.

The DPC approach provides another source of protection to customers. Payments to the CAP are not expected to commence until AMP9, ensuring customers do not pay until the service is available. Ofwat's stage process, requires us to gain their consent at each stage, whereby consent is needed to proceed with DPC. This includes a test that it will offer better value for money for customers compared to the traditional in-house delivery route. By the time the DPC process is completed, we will have demonstrated that is the best value for money option.

Using the DPC route provides additional benefits for deliverability and affordability. The CAP will carry out the construction of the contract and manage the assets over a contract life of possibly 25 years. We will not have to carry out the delivery of the project, freeing up capacity for other deliverables. The process also defers totex spend into AMP9, as it is expected that payments to the CAP will not commence until the assets are in service. This will reduce customer bills in AMP 8.

### T2ST and SESRO

T2ST and SESRO have also been part of the RAPID gate process. This allows for quality penalties if a submission is inadequate, an assessment of efficient spend at each gate, and return of unspent money at the end of the AMP. We assume this approach will continue, and hence that direct customer protection vi price control deliverables is not needed for these projects.

## 8. Conclusion

The three SRO schemes described in this enhancement case are all essential parts of our plans to enhance resilience in our West Hampshire Region. They protect water supplies in Hampshire which will be increasingly subject to scarcity driven by population growth, climate change, environmental ambition and future abstraction reductions to protect our chalk streams. The innovative HWTWRP, being developed in collaboration with Portsmouth Water, will gain planning consent and start construction in AMP8. The majority of the project 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.

All three SROs are selected in our least cost and best value revised dWRMP plan dated August 31 2023. T2ST and SESRO are essential components of our plans after 2040, and the development costs for AMP8 are included in our core pathway of no regrets and low regrets options.