# RAPID Gate Three
# Strategic Resource Option – Hampshire Water Transfer and Water Recycling Project

## Strategic regional water resource solutions: detailed feasibility and concept design

July 2024

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# 1. Executive Summary

As presented at Gate Two, the Hampshire Water Transfer and Water Recycling Project (HWTWRP) was confirmed as Southern Water's (SW) preferred Strategic Resource Option (SRO) (Figure 1-1). It is a major part of SW's' Water for Life – Hampshire (WfLH) programme[1] created to address forecast supply-demand balance deficits, specific to Hampshire, as identified in SW's Water Resources Management Plan (WRMP) 2019 - WRMP19[2], the upcoming revised draft WRMP24 and the Water Resources South East (WRSE) revised draft Regional Plan. The forecast water shortages are planned to be mitigated by investing in new water sources for the region whilst simultaneously protecting the health of the county's chalk streams by reducing how much water is abstracted from them. This solution was known as Option B.4. at Gate Two.


*Figure 1-1 - Transfer from Budds Farm WTW to Otterbourne WSW via WRP and HTR*

The HWTWRP consists of:

- A Water Recycling Plant (WRP) located near SW's Budds Farm Wastewater Treatment Works (WTW);
- Transfer pipelines between Budds Farm WTW, the WRP site and Havant Thicket Reservoir (HTR); and
- A direct water transfer from HTR to Otterbourne Water Supply Works (WSW) that will enable the onward transfer of water to SW customers.

A detailed description of the project scope can be found in Section 2.3. The HWTWRP is dependent on the completion of the HTR project and must operate in conjunction with other assets such as Budds Farm WTW and Otterbourne WSW, outside of the SRO scope. A summary of the solution description can be found in Table 1-1.

Following an informal Gate Three submission in March 2024, ahead of the agreed April deadline the initial feedback provided by RAPID has been reflected on and any amendments required incorporated into this formal submission. For all data purposes, March 2024 should be considered as the Gate Three submission milestone,

[1] Water for Life – Hampshire
[2] Southern Water's Water Resources Management Plan 2019

including costs and activities which were frozen at the end of March as agreed with RAPID on 10th July 2024. Delivery activities completed since March 2024 (such as the DCO Statutory Consultation) are considered part of the Gate Four activities and will be reported at the Gate Four submission and in routine meetings with RAPID and other stakeholders.

*Table 1-1 - Summary of solution description for Preferred Tunnel Option*

| Item | Details |
|---|---|
| Scheme type | Production of recycled water and direct water transfer |
| Key assets | • Water Recycling Plant (WRP) Tunnel and Pipeline between the WRP site and Bedhampton and Havant Springs (BHS)<br>• High Lift Pumping Station (HLPS)<br>• Tunnel and Pipeline between the HLPS and Otterbourne WSW |
| 1 in 500-year Deployable Output (DO) | WRP Maximum Production Capacity is 60 Ml/d.<br>Transfer between the HLPS and Otterbourne WSW has a maximum transfer capacity of 90 Ml/d |
| Requirements met by the scheme | 1-in-500-year drought scenario, supplying up to 60 Ml/d of recycled water to HTR and transferring up to 90 Ml/d of water to Otterbourne WSW. |
| Plans in which the scheme features | Water Resources South East (WRSE) revised draft Regional Plan, SW's Water Resources Management Plan (WRMP19) and SW's revised draft Water Resources Management Plan (WRMP24) and Portsmouth Water's (PW) revised draft WRMP24. |
| Date by when the scheme is required | April 2034 (consistent with revised draft WRMP24) |
| Year the scheme can be first operated | 2034 |
| Max utilisation average incremental costs (AIC) (with sensitivity test figures) | WRP to HTR: 1.92 £/$m^3$<br>HTR to Otterbourne WSW: 1.05 £/$m^3$ |
| Carbon impact (Whole-Life Carbon) | 681,900 $tCO_2e$ |
| Proposed Gate Four submission date | September 2025 |
| Key project risks | • Failure to achieve the required regulatory approvals within the assumed timescales within the latest project schedule could result in increase in activity durations and therefore lead to the delay in delivering the scheme.<br>• The DPC procurement process fails to attract an acceptable bid (or any bid) leading to repeat/part repeat of the DPC procurement process or additional negotiation resulting in rework with associated time, cost and resourcing impacts.<br>• Encountering contaminated land over and above that assumed in the solution cost estimate may involve additional disposal increasing costs and delaying the groundworks. |

# 2. Solution Design

## 2.1 Introduction

Since Gate Two, the Secretary of State has confirmed the solution as being a project of national significance for which a Development Consent Order (DCO) is required. The HWTWRP is therefore progressing towards submission of a DCO application to the Secretary of State. Local planning authorities, statutory bodies, other companies, and stakeholders have been engaged through a series of working groups, briefings and bilateral meetings to assist and inform development of the solution to date. The solution is currently in the pre-application phase of the DCO process[3]. For further information on the work being undertaken on the pre-application process please refer to Chapter 6: Programme and Planning and Chapter 9: Stakeholder and Customer Engagement.

The HWTWRP is following the 7-stage design process from the All Company Working Group (ACWG)[4], incorporating the RIBA stage process. The current development is in line with the outcomes, deliverables and consenting milestones required of a project at Stage C of the design process, which is approaching Gate Three and in the pre-application phase of the DCO process. The bespoke ACWG design process is considered more relevant

[3] The process | National Infrastructure Planning
[4] All Company Working Group Design Principles and User Guidance March 2023

to the development of an SRO than the RIBA stage process[5] which was developed for the design of buildings going through the planning process under the Town and Country Planning Act 1990.

The HWTWRP and the interface with HTR is being developed in partnership with PW. The project requires HTR to be constructed and filled to be able to supply water. The solution has been selected in the WRSE revised draft Regional Plan[6] as part of the reported pathway which is consistent with SW's upcoming revised draft WRMP24 and PW's draft WRMP24.

The solution has considered all applicable requirements from Security and Emergency Measures (Water and Sewerage Undertakers and Water Supply Licensees) Direction 2022 (SEMD) requirements and will be kept under regular review during the delivery and operation of the HWTWRP. Regular engagement with the Drinking Water Inspectorate (DWI) has been maintained through dedicated working groups where advice and consultation on security matters for the HWTWRP will continue as the design matures. Security measures identified as part of project development can be found in Annex 2: Solution Design.

As the system control is further developed all applicable requirements from The Network and Information Systems (NIS) Regulations 2018 will be considered, with advice and guidance sought from the National Protective Security Authority (NSPA) (formerly Centre for the Protection of National Infrastructure (CPNI)) and National Cyber Security Centre (NCSC).

SW is actively engaging with the NSPA and are in the process of updating their policies and standards in line with the relevant guidance, including those from the Water UK Security Standards. The HWTWRP follows SW's Technical Specification Manual (TSM) and ensures compliance with the required standards that cover network protection and security. The project team are working with SW Information Technology (IT) and Operational Technology (OT) teams to comply with current and future offsite communications requirements. These requirements have been developed through engagement with the NSPA (formerly CPNI) and NCSC to ensure alignment with guidance and best practice.

The project design will be updated to account for any future changes and ensure compliance with the revised Network Architecture and associated security requirements. Annex 2: Solution Design sets out the current expectation around the overall control of the system and the various communication links and transfer of data that will be required.

## 2.2 Background and Objectives

In 2020 the National Framework for Water Resources identified that the South East region faces the greatest pressures in England to public water supplies. There are several challenges facing the South East that have been considered as part of SW's draft WRMP24 to ensure that the region can meet the supply demand challenges of the future; these include:

- Drought resilience – More water needs to be made available so that supplies last longer during severe drought events including those that occur once in every 500 years, meaning emergency supply measures are less likely to be needed;
- Population growth – An increase in population means more water is needed to supply customers and businesses;
- Climate change – Predicted changes in future climate will reduce how much water is available from water sources and when it is available. Droughts will also become more common; and
- Environmental protection and improvement – More water needs to be left in the environment, reducing the amount of water that can be taken from some existing sources.

SW's WRMP24 is being developed in accordance with the Water Resources Planning Guidelines[7] (WRPG) as set out in the water resources planning process as part of the National Framework for Water Resources[8].

For several planning cycles, SW has been involved in developing regional plans in conjunction with WRSE to combine national, regional and company approaches to water planning and deliver an optimised Regional Best Value Plan[9][10]. For further detail as to the approach and considerations, see Annex 2: Solution Design.

At Gate Two, a range of options were proposed to meet the forecast supply demand challenges of Hampshire and the wider South East region. These options, incorporating the HWTWRP, were included within an unconstrained list of supply and demand solutions that were fed into SW's options appraisal process.

[5] RIBA Plan of Works
[6] WRSE Revised Draft Regional Plan August 2023
[7] Water resources planning guideline April 2023
[8] National Framework for Water Resources
[9] WRSE Method Statement: Best Value Planning December 2022
[10] WRSE Developing our 'Best Value' multi-sector regional resilience plan February 2021

The appraisal process refined this list into a short list of options that can provide water resource, drought resilience and wider benefits in accordance with best value screening criteria. This options list has then been included as part of the WRSE Regional Investment model which has determined a regional Least Cost Plan and Best Value Plan across nine specific future demand planning scenarios. Further detail of this process is described in Annex 2: Solution Design as well as part of both WRSE revised draft Regional Plan and revised draft WRMP24.

The WRSE model appraised more than 4000 options were submitted by water companies and some third parties from across the region. This considered both supply and demand options that were either under construction or new, ensuring that the benefit provided by the options had not already been included within the baseline forecast.

The HWTWRP has been selected across all planning scenarios considered by the WRSE revised draft Regional Plan as one of the optimal new water supply solutions that would meet the supply demand challenges of the future. As an optimal new water supply solution, this solution has been included in the WRSE revised draft Regional Plan and the upcoming revised draft WRMP24 as the preferred solution option.

The HWTWRP has continued to be developed since Gate Two to ensure that it remains compliant with regulatory requirements (and legislation) and continues to align with SW's Strategic Objectives for the SRO.

## 2.3 The Preferred Solution Option

### 2.3.1 Overview of the HWTWRP

The HWTWRP is part of a total engineering solution and requires interaction of assets that are inside and outside of scope for the SRO to enable water to be provided to the South East Region (Figure 2-1).

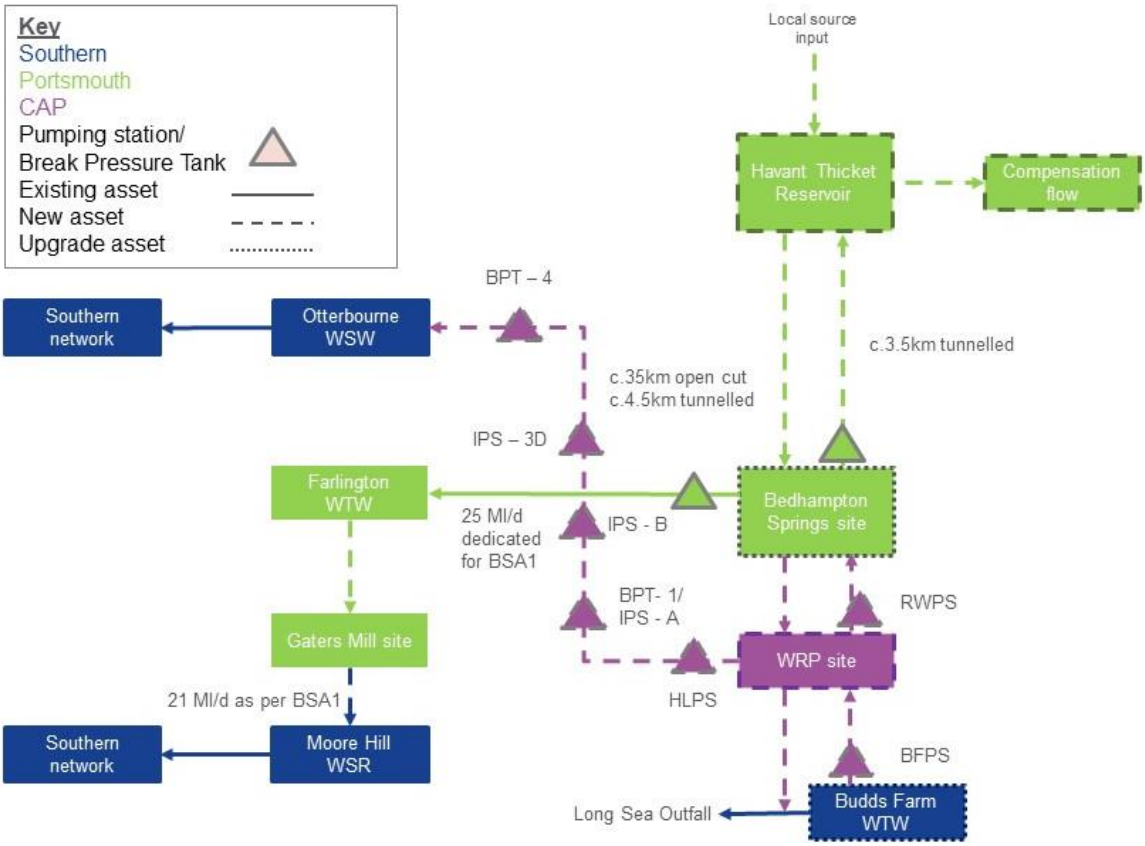


*Figure 2-1 - Overview schematic of the HWTWRP and associated assets for Preferred Tunnel Option*

The HWTWRP includes the construction, commissioning, operation and maintenance of the following components:

- Connection to the final effluent stream at Budds Farm WTW and Budds Farm Pumping Station (BFPS);
- Underground pipelines between Budds Farm WTW and the WRP site;
- A WRP with a maximum output capacity of 60 Ml/d of recycled water;
- Three pumping stations at the WRP site which include a Recycled Water Pumping Station (RWPS) to transfer flows from the WRP site to BHS or HTR, a High Lift Pumping Station (HLPS) to enable the onward transfer of water from HTR to Otterbourne WSW and a Waste Stream Pumping Station (WSPS) to transfer waste stream flows into the Eastney Transfer Tunnel;

- A tunnelled pipeline to transfer recycled water from the WRP site to HTR. Two tunnel options are currently being developed as described later;
- For each tunnel option, a parallel pipeline will enable flows to gravitate back from HTR to the HLPS (at the WRP site), transferring a maximum capacity of 90 Ml/d (at peak operation);
- An underground pipeline between the HLPS to Otterbourne WSW to transfer a maximum capacity of 90 Ml/d (at peak operation); and
- Intermediate Pumping Stations (IPS) and Break Pressure Tanks (BPTs) located along the underground pipeline between HTR and Otterbourne WSW.

The construction and operation of these components will be supported by associated development and ancillary matters, such as temporary compounds and landscaping. It is anticipated that demolition works will not be required. No major high risk utility diversions are not anticipated for the linear sections of pipeline.

The HWTWRP will require change in operational use of the following assets which are out of scope for the SRO:

- PW HTR asset for the storage of recycled water, to provide the capacity to provide water through the extent of a 1-in-500-year drought; and
- The existing SW Eastney Transfer Tunnel (TT), Eastney Pumping Station and Eastney Long Sea Outfall (LSO) for the release of reject water to the Solent. Further construction activity is not anticipated to be undertaken on these assets.

### 2.3.2 Option Evolution

Since Gate Two, the HWTWRP has been updated to meet revised supply demand challenges for the South East Region. This section sets out the key design changes that have occurred to the overall system and the principal assets that make up the HWTWRP.

The models that have been used to determine the supply demand requirements for SW and PW supply areas are:

- The high-level WRSE Regional System Simulator (RSS) model, used by all companies in WRSE; and
- A more granular Pywr model which better represents the detailed networks, river, and groundwater constraints.

These models have been amended to include updated source data, used to determine baseline calculations, and to account for the impacts of a 1-in-500-year drought scenario. This has revised the timing of investment and utilisation of the HWTWRP that is being presented at Gate Three.

To accommodate the need to achieve a 1-in-500-year drought scenario and meet the updated supply demand deficit that would be a result of an adverse environmental destination, the models tested the WRP at 20 Ml/d, 40 Ml/d and 60 Ml/d to determine which, if any, would be required.

Modelling these scenarios identified the need for the maximum production capacity of the WRP to be 60 Ml/d so that the deficit could be offset. Furthermore, to meet the requirements of a 1-in-500-year drought, the maximum production capacity would be required within 5 years of becoming operational. This has resulted in the need for the WRP to be in a single phase, as opposed to the scalable approach proposed at Gate Two.

The Future Need Statement set out at Gate Two[11] considered the key elements that would impact the supply demand balance. This included the needs envelope of 75 – 95 Ml/d, along with the requirements to meet a 1-in-500-year drought, PW's supply needs, the impacts of the future environmental destination and a review of the modelled supply demand.

The Future Need Statement showed that the SRO should be capable of producing 90 Ml/d of raw water to meet the modelled future need of 87 Ml/d. By evolving the SRO to meet these requirements, it would be capable of satisfying the Future Need as stated by SW modelling, as well as aligning to WRSE draft results, to a 2040 horizon. The maximum capacity of the HWTWRP is a 90 Ml/d transfer from HTR to Otterbourne WSW which aligns with the current WRSE modeling.

In addition to this, the minimum transfer capacity (sweetening flow) of the HTR to Otterbourne WSW transfer has also been uplifted from 7.5 Ml/d to 20 Ml/d. This has been driven by water age requirements during the transfer as described later in Section 2.3.10.

These modelling results have been incorporated into the WRSE investment model, which has been used to inform the WRSE revised draft Regional Plan, PW's draft WRMP24 and SW's upcoming revised draft WRMP24.

### 2.3.3 System Design and Operation

[11] HWTWRP RAPID Gate Two Submission Supporting Technical Report Annex 12: Outline Option Evolution Plan

Several key design criteria have been updated as a result of the required solution changes and to further refine solution requirements for progression at Gate Three (Table 2-1). This includes a revision of the transfer capacity of the pipelines between the WRP, HTR and Otterbourne WSW as well as the pumping stations and BPTs required to transfer the water along these pipelines. These amendments must accommodate both a minimum and maximum flow for the range of scenarios described in the water resource modelling and acknowledge the interaction of the HWTWRP with the future Thames to Southern Transfer (T2ST) SRO[12], due to be constructed by 2040 (See Annex 2: Solution Design for further details). The operating scenarios modelled have been selected to simplify and reflect the variation in flows expected.

*Table 2-1 – The HWTWRP transfer requirement changes between Gate Two and Gate Three*

| Transfer Requirement | Units | Operating Scenario | Gate Two Specification | Gate Three Specification | Comments |
|---|---|---|---|---|---|
| WRP to HTR | Ml/d | Minimum Flow | 7.5 | 10 | Change in recycled water production capacity and turndown capability for the WRP to reflect the change in strategy for the HWTWRP at Gate Three. |
| | Ml/d | Average Flow | 7.5 | Pre T2ST - 30<br>Post T2ST - 60 | Change in recycled water production for the WRP to reflect the change in strategy for the HWTWRP at Gate Three. The requirements will be impacted by T2ST. |
| | Ml/d | Maximum Flow | 15 | 60 | The maximum recycled water output required from the WRP was increased from 15 Ml/d to 60 Ml/d, reflecting a change in the level of service from 1-in-200 year to 1-in-500-year drought operation across SW's and PW's asset base. |
| HTR to Otterbourne WSW | Ml/d | Minimum Flow | 7.5 | 20 | To reflect min transfer to meet water age requirements for preferred system design – see further discussion in Section 2.3.10. |
| | Ml/d | Average Flow | 7.5 | 30 | Increase in BAU flows to reflect strategic modelling. |
| | Ml/d | Maximum Flow | 75 | 90 | The maximum raw water output required from HTR was increased from 75 Ml/d to 90 Ml/d, reflecting a change in the level of service from 1-in-200 year to 1-in-500-year drought operation across SW's and PW's asset base. The requirements will be impacted by T2ST. |

The system is being designed to operate both in a normal year and to provide additional resilience in a 1-in-500-year drought. During a normal year, the transfer to Otterbourne WSW will need to be matched by transfers from the WRP and BHS on an annual basis. Whereas in a drought situation there is a need to achieve the highest flows possible from the WRP so that the storage capacity within HTR can be fully utilised.

There are two controlling factors (triggers) for operation: the current demands within SW network and the future PW network, (recognised as a demand at Otterbourne WSW and Farlington WSW respectively) and the level in HTR. The level within HTR drives the demand on:

- any available flows from BHS, noting this first supplies PW Farlington WSW; and then
- the WRP, noting the minimum flow of 10 Ml/d, being transferred to HTR.

The annual aim is for HTR levels to be maintained near winter period levels. The operational philosophy has influenced the design and these updated requirements have supported the revision and updates of the key design criteria for the required transfers at Gate Three.

### 2.3.4 Details of Principal Components

Key design criteria used for the illustrative design of the pipelines and Above Ground Plant (AGP) set out in the following sections, adhere to SW design and industry standards. They have been developed in accordance with the guidance of Stage C as set out by the ACWG Design Principles[4].

### 2.3.5 Water Recycling Plant (WRP)

The revised strategy for the HWTWRP requires the maximum production capacity of the WRP to increase from 15 Ml/d to 60 Ml/d and to be delivered in a single phase. This has required the design of the WRP to be revised for a minimum production flow of around 10 Ml/d. This will enable the operator to adjust recycled water production in increments of 10 Ml/d between minimum and maximum flow controls.

[12] Thames to Southern Transfer Strategic Resource Option Gate 2 Submission

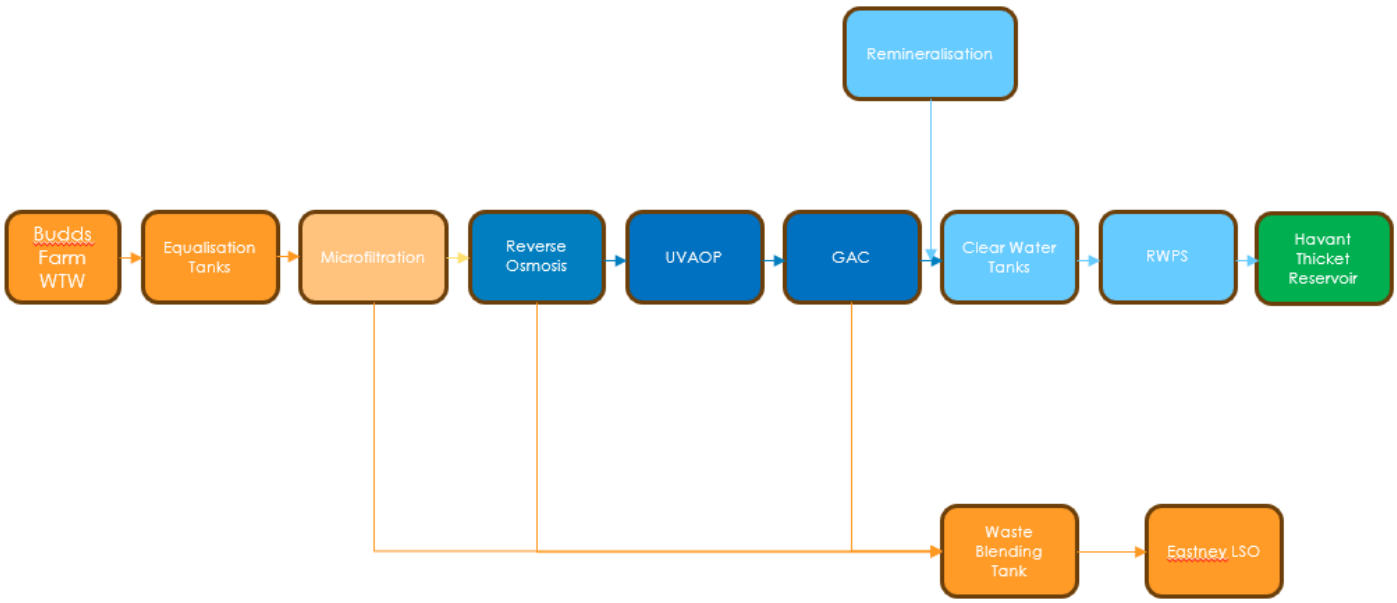


*Figure 2-2 - Process flow diagram of WRP Design at Gate Three*

The proposed treatment train for the WRP as reported at Gate Two remains unchanged. The multi-barrier treatment process will continue to include micro/ultrafiltration (MF/UF), reverse osmosis (RO), an ultraviolet light advanced oxidation process (UV-AOP), granular activated carbon (GAC) adsorption, and remineralisation (Figure 2-2). A summary of the process design changes made between Gate Two and Three, with justification for each and a more detailed process design, can be identified in Annex 2: Details of Principal Components.

### 2.3.6 WRP Site Layout

Between Gate Two and Three the proposed WRP site layout has been developed taking account of:

The increase in production capacity of the WRP from 15 Ml/d to 60 Ml/d, which gives rise to an increased plant footprint;

- An assessment of existing and new geo-environmental data for the site; and
- The surrounding landscape.

These considerations have been developed into an illustrative layout to inform the maximum parameters of the preliminary Environmental Impact Assessment (EIA) and were the basis for preparation of materials for Statutory Consultation in the summer of 2024. This illustration and further detail as to assessment undertaken can be found in Annex 2: Details of Principle Components and an update regarding the acquisition of this site can be found in Chapter 6: Programme and Planning.

### 2.3.7 The HWTWRP Transfers

Since Gate Two, further optimisation of the HWTWRP system design has resulted in the HLPS being moved to the WRP site instead of at HTR. By relocating the HLPS, the transfer benefits from the static head on the suction side of the HLPS' due to it being gravity fed from HTR as well as reduce environmental and residential impacts by co-locating the HLPS with other key assets. This has provided opportunity to reduce operational costs by reducing pumping requirements and provide a more efficient solution.

In addition, development of the site and route selection has resulted in a change to the proposed configuration for the connection from the WRP site to HTR as set out in Annex 2: Solution Design. This updated configuration was presented as part of the Non-Statutory Consultation in summer 2022 and detailed in the supporting Scheme Development Summary[13].

The BFPS is also required at Budds Farm WTW to transfer final effluent to the WRP and then a return WSPS to transfer waste stream flows into the Eastney TT. There are associated micro tunnels to accommodate the pipelines for these transfers.

### 2.3.8 Pipeline Details Between WRP Site and HTR

[13] HWTWRP Scheme Development Summary Public Consultation 2022

Based on the PW proposal, discussions have been held with RAPID and Ofwat to explore an alternative option with the potential for significant savings. This has led to the development of two potential tunnel options to transfer flows from the WRP site to HTR.

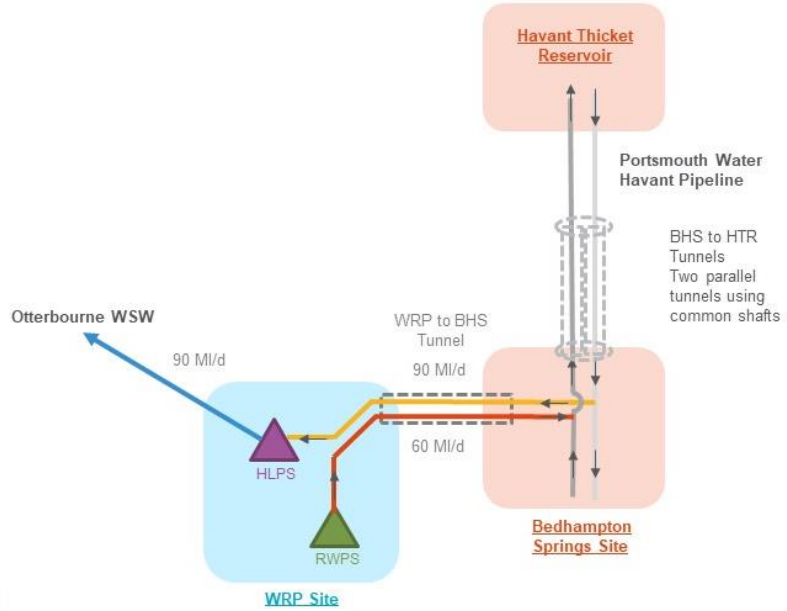


*Figure 2-3 - Preferred Tunnel Option system design*

The **Preferred Tunnel Option** would require SW to install a single micro tunnel to house the inlet and outlet pipelines between the WRP site and BHS site to transfer a maximum capacity of 60 Ml/d to BHS and return a maximum capacity of 90 Ml/d from BHS to the WRP site (Figure 2-3).

The option would then utilise the PW transfer between BHS and HTR. The tunnel and associated assets between BHS and HTR would be out of scope for the HWTWRP and will be delivered by PW, subject to securing the necessary planning permission.

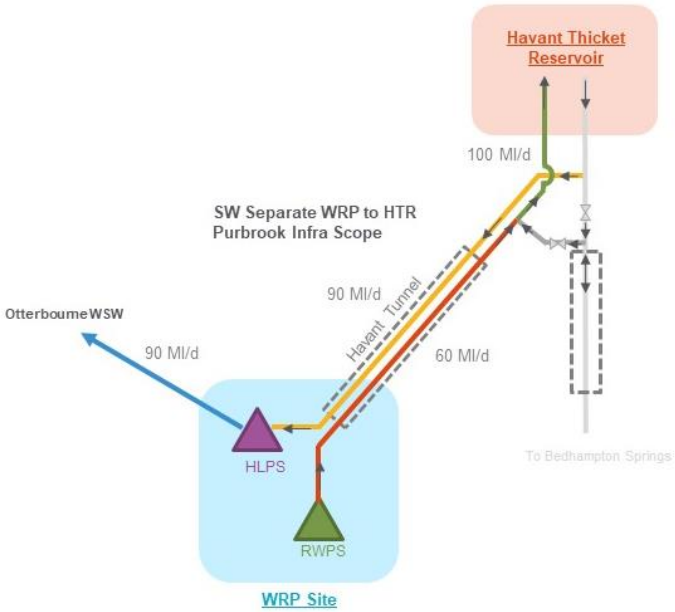


*Figure 2-4 - Backup Tunnel Option system design*

The **Backup Tunnel Option** would require SW to install a single segmental tunnel, co-locating the inlet and outlet pipes between the WRP site and HTR (Figure 2-4) as presented at Gate Two. The SW inlet pipeline will transfer a maximum capacity of 60 Ml/d of recycled water from the WRP and connect to an inlet pipeline at HTR. A maximum

capacity of 40 Ml/d of spring water will be supplied by PW from BHS, which will also connect to an inlet point at HTR, combining with the flows from the WRP, resulting in a maximum transfer capacity of 100 Ml/d into HTR.

PW would revert to its previous revised pipeline design to progress a single bi-directional trenchless pipeline solution, subject to the necessary planning permission. SW would consent its segmental tunnel between the WRP site and HTR, including the inlet pipeline, separately through the DCO process.

The Preferred Tunnel Option is anticipated to have less impact on customers in the vicinity of the tunnel works, reduced project costs (in comparison to constructing two separate tunnels) and greater environmental benefits. This solution is dependent on the approval of a separate planning application for a twin micro tunnel option between BHS and HTR, to be submitted by PW. The Backup Tunnel Option is being developed in parallel in case the Preferred Tunnel Option does not materialise or secure the necessary planning permission, thus ensuring delivery of the HWTWRP remains in line with the “operational ready” date as set out in Chapter 6: Programme and Planning.

### 2.3.9 Pipeline Route Between the WRP Site and HTR

Both tunnel options follow a similar pipeline route as set out in Annex 2: Solution Design. Each option has been assessed to determine the key crossings:

- The Preferred Tunnel Option – SW’s single micro tunnel between the WRP site and BHS (Figure 2-4) will encounter three key crossings which include the A27 and the Bedhampton Stream. It is not expected that the tunnel will have an interaction with these crossings due to its depth. The tunnel will interact with a Source Protection Zone (SPZ) at BHS; however, the impact on the SPZ will be minimised by laying a short section of overground pipeline between the tunnel shaft and the connection to BHS ;
- The Backup Tunnel Option - this splits the asset into four key components (Annex 2: Solution Design), with several key crossings including the A27, the West Coast Mainline Railway and the PW HTR inlet and outlet pipework. This option is unlikely to have significant interaction with these crossings as the tunnel will be approximately 20m deep. The tunnel passes through a SPZ, close to PW’s abstraction locations at BHS.

The environmental and water quality impacts of the SW pipelines in both tunnel options are being considered as part of the assessments required for the DCO application process. Further design information and an explanation of the pipeline route, crossings and key technical information can be found in Annex 2: Solution Design.

### 2.3.10 Pipeline Details Between HLPS and Otterbourne WSW

SW’s Gate Two submission assumed a 72-hour transfer between HTR and Otterbourne WSW. At Gate Three, the water age associated with the transfer has been modelled to assess and understand the concerns of low dissolved oxygen and biofilm release that could occur.

To mitigate against these concerns, water quality assessments in the pipeline determined that the maximum allowable water age for the transfer from HTR to Otterbourne WSW should be reduced from 72 to 24 hours. Several alternative solutions were also considered, such as roughing filters at the start of the transfer, the construction of a large reservoir of approximately 220 Ml at the end of the transfer, spray aeration, cascade aeration and injection aeration, but a reduction in the water age from 72 to 24 hrs was the preferred solution.

The 24-hour threshold does not take into account the effect of pumping stations, BPTs or aeration measures at HTR for water quality. The 24-hour threshold will be revisited following the output of more detailed water quality modelling being conducted as part of the DCO application process. There is no water age concern for the recycled water from the WRP filling the HTR due to the high level of water treatment from the WRP.

To achieve the reduction in the allowable water age between HTR and Otterbourne WSW, multiple system design options have been considered (Annex 2: Solution Design) and it was identified that the simplest and most cost-effective solution is to increase the minimum flow to 20 Ml/d between these sites. In addition, the maximum flows would also be required to increase from 75 to 90 Ml/d, to accommodate future need, as set out in Section 2.3.11.

Following these key design criteria and route changes, a hydraulic optioneering report was undertaken to determine the preferred system design, based upon the Preferred and Backup Tunnel Options, including the revised allowable water age between the HTR to Otterbourne WSW transfer. This, in turn, has enabled the determination of the solution’s operating strategy.

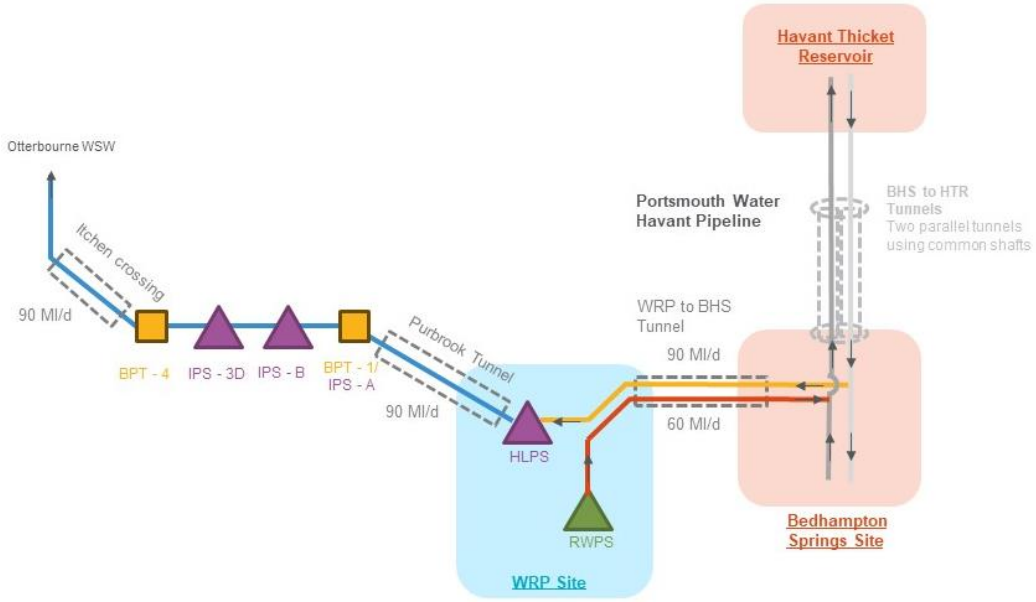


*Figure 2-5 - HLPS to Otterbourne WSW Transfer schematic*

This has resulted in a revised system design and confirmation of the HLPS to Otterbourne WSW transfer (Figure 2-5) consistent with key design criteria (see Annex 2: Solution Design). This requires three IPSs and one BPT (as a minimum) to ensure that the water age and maximum flow criteria can be achieved. There is the potential for a second BPT (BPT-4) between IPS-3D and Otterbourne WSW which would mitigate potential surge issues and would provide an additional benefit by reducing OPEX costs in the long term as the downstream pipeline would operate under gravity.

The IPSs are essential for the higher flow volumes (>30 Ml/d) to be achieved, however this does mean that they will not always be utilised (see Section 2.4). At BAU flows, none of the IPS's are required and flows can gravitate from BPT-1 to Otterbourne WSW.

### 2.3.11 Pipeline Route Between HLPS and Otterbourne WSW

The pipeline between the HLPS and Otterbourne WSW has been assessed in sections to enable micro-siting of the route (see Annex 2: Solution Design). Each section has been identified based on Local Planning Authority boundaries and each pipeline section has been assessed to consider key interfaces. This takes into consideration an assessment of the following key components:

- Environmentally sensitive crossings – sensitivity analysis has been undertaken for watercourse crossings and other environmentally sensitive areas with trenchless construction or reduced working width methods proposed where appropriate to mitigate potential impacts;
- Statutory Undertakers and Utilities – interfaces with statutory undertakers and utility providers along the proposed pipeline routes have been identified and engagement is ongoing to agree preferred crossing locations, construction methodology and any required protective measures; and
- SPZs - a Hydraulic Impact Assessment is being undertaken to determine the potential risk to water quality and flows. These sites include the BHS and Otterbourne WSW.

Consultation with the relevant statutory bodies has been maintained throughout the development of the HWTWRP, agreeing assessment requirements, and ensuring appropriate mitigation measures are being identified and incorporated into design and future impact studies. Further detail as to the approach and considerations that are being made for the pipeline interfaces can be found in Annex 2: Solution Design.

### 2.3.12 Above Ground Plant (AGP)

The AGP applies to the three IPSs (A, B and 3D) and two BPTs (1 and 4) which are situated along the HLPS (at the WRP site) to Otterbourne WSW transfer route (Table 2-2). These assets are required to enable the transfer of flows. An illustrative site layout has been developed for each of the AGPs required along the route in accordance with the ACWG Design Principles[4] which can be found in Annex 2: Solution Design.

Each design identifies the mechanical, electrical, and hydraulic requirements for each asset including the site general arrangements. Using these designs, an estimate of the land that would be required to facilitate the assets has been determined (see Annex 2: Solution Design). These land parcel estimates will continue to be refined and

potential impacts will be further assessed as design develops towards Gate Four and submission of DCO application.

*Table 2-2 - AGP Site Information*

| AGP Site | Section | AGP Land Parcel ($m^2$) | Current Illustrative Design land take within site security fencing ($m^2$) |
|---|---|---|---|
| IPS-A/ BPT-1 | E | 5580 | 4180 |
| IPS-B | F | 5580 | 3344 |
| IPS-3D | G | 5580 | 3344 |
| BPT-4 | K | 4340 | 4320 |

### 2.3.13 Site Selection Process

A site and route selection process has been reported on at Gate Two[14] and in the Scheme Development Summary Report[15] that was published as part of the summer 2022 Non-Statutory Consultation. Since then, a more detailed site and route selection has been undertaken which was presented at the summer 2024 Statutory Consultation (Chapter 6: Programme and Planning).

The options appraisal, site and route selection has followed a multi-stage criteria and selection process (Figure 2-6). At Stage 1 and Stage 2 of this process, multiple options were assessed which were not subsequently progressed, as presented at Gate Two[14]. Further detail in relation to these options, and their deselection can be found in Gate Two, Annex 5: Options Appraisal Process[16].

### 2.3.14 Stage 3: Development from Gate Two to the summer 2022 Non-Statutory Consultation

Following Gate Two, further site and route selection was undertaken for the principal components of the HWTWRP. The potential routes that were identified at Gate Two for the HLPS to Otterbourne WSW transfer, were expanded into pipeline corridor sections to allow for micro-siting and refinement of the pipeline route. This has taken account of local constraints for later stages of the process. An environmental and planning evaluation has been undertaken by subject matter experts (SMEs) to identify a preferred 'chain' of pipeline sections (See Annex 2: Solution Design). AGP zones were also identified through hydraulic modelling and have similarly been evaluated. This process has informed the principal components of the HWTWRP.

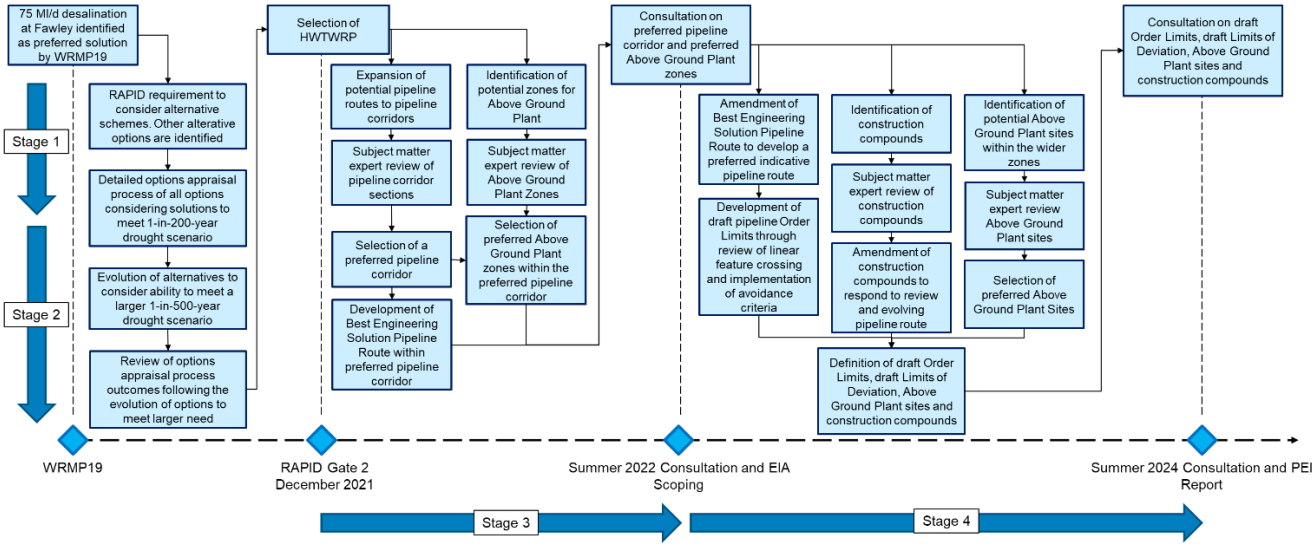


*Figure 2-6 - Site selection and option appraisal process.*

A number of pipeline sections and AGP zones have not progressed as they intersected with the South Downs National Park and would result in greater consenting risks. Significant construction challenges were also identified for some pipeline sections, especially those within populated areas, and therefore these were not progressed, or alternative routes and construction methodologies considered.

[14] HWTWRP RAPID Gate 2 Submission
[15] HWTWRP Summer 2022 Public Consultation | Summary of Feedback
[16] HWTWRP RAPID Gate 2 Submission Annex 5: Options Appraisal Process

The preferred pipeline corridor and preferred AGP zones were consulted on during the summer 2022 Non-Statutory Consultation, alongside a Best Engineering Solution Pipeline Route (BESPR) which represented a hydraulically optimal route.

### 2.3.15 Stage 4: Development from the summer 2022 Non-Statutory Consultation to the summer 2024 Statutory Consultation

Following the summer 2022 Non-Statutory Consultation, consultation feedback, coupled with other engagement feedback and a further understanding of the environmental and planning constraints, was used to refine the BESPR and identify more specific AGP sites within the wider AGP zones. This process sought input from environmental, land, planning and engineering SMEs to ensure robust site selection and route refinement.

The WRP site selection that was undertaken prior to Gate Two was also reviewed at this stage, as part of a continuous review process, to ensure that the outcomes were robust and responded to any changes in local circumstances since the initial site selection. As the project progresses towards submission of a DCO application, the selection of proposed sites will continue to be reviewed to ensure that decision making remains robust in the light of feedback and ongoing assessments.

### 2.3.16 Independent Technical Reviews

During the development of the solution, independent technical reviews have been undertaken, where appropriate and proportionate, to inform the decision-making. Predominantly, these focused on two main areas:

- Full Advanced Treatment Process - Independent SMEs in the UK and US have been consulted and have reviewed the mass balance and agreed with the process unit sizing and configuration prepared for the Gate Three WRP design. The guidance provided has been incorporated in an iteration of the mass balance documentation; and
- Hydraulic Optioneering – Following the changes reported (Table 2-1), a number of hydraulic options were investigated, the main configurations of which are presented in Annex 2: Solution Design. A hydraulic optioneering report was undertaken to select the preferred system design. The output of this report has been independently reviewed, as well as being reviewed by SW technical leads. The conclusions of the Hydraulic Optioneering Report have been agreed and confirmed by all parties.

### 2.3.17 Project Vision and Design Principles

Acknowledging the value of good design, preliminary design principles (see Annex 2: Solution Design) have been developed to guide scheme development to date, underpin the PEIR and inform Statutory Consultation. These outline a broad design aspiration to ensure the project design is landscape-led, integrated into surrounding networks and beneficial to nature and communities, whilst ensuring safety and function.

To inform detailed design post DCO consent, these preliminary design principles are now being developed into general design principles, that would apply broadly to detailed design across the project, and site-specific design principles for each individual component (such as the WRP, AGP sites and pipeline route). This will follow an iterative process to take stakeholders on the design journey from inception to submission of DCO application and beyond into the delivery phase, ensuring clarity of approach and outcomes. The DCO application will secure these design principles in a control document within which the detailed design brought forward post DCO consent would need to be in accordance.

Given the nature and spatial extent of the project, the scale of AGP involved, and the general desire by key stakeholders to minimise visual impact, it is considered that independent design review is not appropriate in this instance. It is SW's aspiration that development of the detailed design approach is a collaborative exercise with local authorities and other relevant parties to ensure local integration and support.

The approach to design will continue to ensure that any design principles reflect and support the project vision, which captures the primary objectives of the project as follows:

*"We're transforming the way we source, treat and supply water across Hampshire. Creating a new, resilient and sustainable water supply will protect and enhance the county's rare and sensitive chalk streams, while maintaining supplies for our communities and the local economy".*

### 2.3.18 Digital Twin Strategy

SW has implemented different categories and maturity levels of digital twins to aid with the development of the solution. The digital twin technology currently being used as part of the project development is at a sufficient maturity to inform the Stage 1 planning, consenting and contracting requirements (See Annex 2: Solution Design). This stage of project development would inform the DCO application and Gate Four submission.

The development and implementation of a digital twin replicating the WRP process will be undertaken by the CAP and would enable the development of a digital twin that would be representative of the final process, following

design completion. The approach seeks to develop an integrated water and wastewater network that would support holistic system thinking. The HWTWRP aligns with SW's central digital twin strategy and, should a suitable technology become available in advance of design completion, be tested through this. Further detail in relation to the development of an SRO digital twin strategy and broader considerations around developing a suitable digital twin can be found in Annex 2: Digital Twin Strategy.

## 2.4 Utilisation

### 2.4.1 The Role of the HWTWRP in the WRSE revised draft Regional Plan

The HWTWRP is a key component of WfLH, creating and providing up to 60 Ml/d of additional water to feed into HTR. This allows up to 90 Ml/d to be supplied from HTR into Otterbourne WSW so that the supply demand challenges of the future can be met (Figure 2-7).

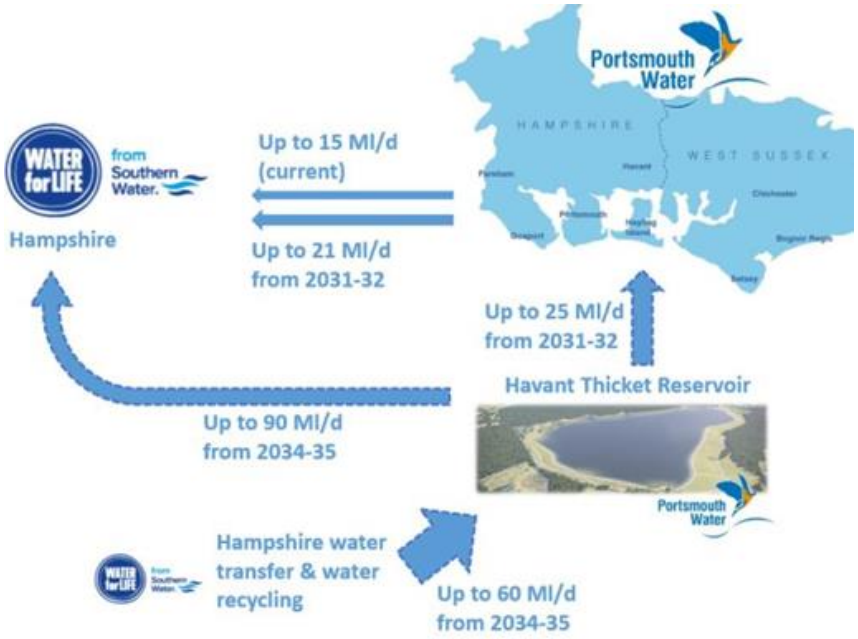


*Figure 2-7 - The role of the HWTWRP in the WRSE revised draft Regional Plan*

The HWTWRP has been identified as a key regional supply scheme as part of the WRSE revised draft Regional Plan, along with other additional key supply schemes across the South East, for the period 2025 to 2035 (Annex 2: Solution Design). These schemes have been determined as 'least regret' options required under all of the future scenarios that have been modelled, and their selection allows for adaptation of the Regional Plan so that future scenarios beyond 2035 can be achieved.

The WRSE revised draft Regional Plan for 2035 to 2075 includes the development of additional SROs including the South East Strategic Reservoir Option (SESRO) and T2ST. These options have been selected to further support the Hampshire Water Resource Zones (WRZs) with a current first benefit date of 2039-2040 (Annex 2: Solution Design). These schemes have been selected to both meet the supply demand challenges of each future scenario whilst ensuring the South East region can achieve increased drought resilience by 2040 and realise the environmental destination by 2050.

As described earlier, the capacity of the WRP has been increased to produce a maximum output of 60 Ml/d to align with the revised regional modelling. This will enable SW to meet the deficit that is anticipated in the Hampshire WRZs, Sussex WRZs and Portsmouth Water supply area as a consequence of the modelled environmental destination and the change in requirement to a 1-in-500-year drought resilience. The resource need is now greater than the initially modelled demand requirements presented at Gate Two. This is covered in more detail in Annex 2: Solution Design.

### 2.4.2 Water Resource Modelling

The WRSE regional resource model[17] considers the supply demand needs of all member companies across a range of future scenarios. To better represent the detailed network, river, and groundwater constraints for both SW and PW, the companies have developed a more granular Pywr model in conjunction with WRSE.

The latest Pywr modelling results have been produced for 2038, 2042 and 2051. These dates have been chosen as they best represent the situation prior to the introduction of the T2ST SRO, in 2040 (shown by the 2038 results) and situations following T2ST implementation (shown by the 2042 and 2051 results). This modelling includes the predicted impacts of the abstraction reductions and the greater drought resilience requirements without using Temporary Use Bans (TUBs) and Non-Essential Use Bans (NEUBs) across the region.

*Table 2-3 - Utilisation of the HWTWRP and associated infrastructure for a normal and drought year in 2038, pre-T2ST.*

| Asset Component | Normal Year Operational Average | | | 1-in-500-year Drought Event | | |
|---|---|---|---|---|---|---|
| | Minimum | Mean | Maximum | Minimum | Mean | Maximum |
| HTR Volume (Ml) | 10000.00 | 10000.00 | 10000.00 | 8683.19 | 9619.71 | 10000.00 |
| HTR to Otterbourne WSW (Ml/d) | 23.08 | 33.08 | 50.68 | 23.08 | 44.02 | 71.24 |
| WRP (Ml/d) | 10.00 | 31.57 | 54.32 | 28.44 | 48.57 | 60.00 |
| BHS to HTR (Ml/d) | 0.00 | 3.69 | 28.54 | 0.00 | 0.00 | 0.00 |

The utilisation rates for the dry year annual average (DYAA) and the normal year annual average (NYAA) have enabled the determination of the operational utilisation of the HWTWRP, for 2038 (Table 2-3), 2042 and 2051 scenarios. The results for 2042 and 2051 can be found in Annex 2: Solution Design which demonstrate the maximum output that will be achieved through the use of the HWTWRP.

There are various risks and assumptions associated with the utilisation figures which have been produced using the Pywr model, these include:

- The risks in the simplifications of representing the network;
- The inputs from SW and PW groundwater models are based on different approaches;
- The representation of the interaction between surface and groundwater is represented in a very simple way and is limited to spring discharge and depletion of river flow in response to groundwater abstraction. BHS are represented as a time series of flow input to the model. River flow depletion is represented by subtracting a seasonally varying proportion of a groundwater abstraction from a model node representing the affected river reach;
- The cost values applied, normally used to determine the most cost-effective transfer of water, do not necessarily have a relationship with financial cost. They are considered parameters to control (by biasing or weighting) the behaviour of the model ensuring the model does not behave in unexpected, or unwanted, ways when parts of the system are changed;
- The initial model runs for 2038, 2042 and 2051 were used to validate the outputs of the WRSE investment model. This was used to test the plausibility of the WRSE utilisation rates at smaller (daily) timesteps, while providing a more detailed representation of the network. The costs used in the model were adjusted to fit as closely as possible the WRSE results. However, these may not reflect an optimised situation or the way the system operates in practice; and
- The model set up enforces sweetening flows on some of the transfers but not across the network. This creates a risk of representing higher demands in some areas of the model than have been accounted for using the worst-case scenario (DYAA).

See the detailed explanation in Annex 2: Solution Design for further detail in relation to these risks and how they are being mitigated through the ongoing modelling work being undertaken. Further modelling is planned to better explore and understand system optimisation in advance of submission of the DCO application.

### 2.4.3 Asset Management Plan

To ensure effective operation of the solution, the asset management plans (AMPs) are being developed and tested within both the high level WRSE Investment Model and within the Pywr model to ensure alignment. The key underlying principles are as follows:

- HTR should be full at the end of the winter season e.g. each March;
- BHS sources should be maximised, when available, to fill HTR; and
- During a normal year, the transfers out of HTR should be equivalent to the inflow, this can be averaged over the year, and typically can be assumed to be a maximum of the WRP e.g. 60 Ml/d.

[17] WRSE Method Statement: Investment Programme Development and Assessment July 2010

These principles are being modelled in partnership with PW to ensure the availability of HTR during normal year operation and through a drought period. In addition, there are a number of other operational boundaries that influence the operation of the system, the key ones are as follows:

- The minimum flow of the WRP is 10 Ml/d and it works in 10 Ml/d steps to a maximum of 60 Ml/d;
- It is assumed that any maintenance of the WRP would either be during the wetter periods, e.g. winter, or when BHS would be able to supply water to HTR. However, 50% of the WRP would be expected to be operational during this time;
- Transfer from the HLPS to Otterbourne WSW has a minimum flow of 20 Ml/d and max flow of 90 Ml/d; and
- Due to the assumed reduction in abstractions in Hampshire in a normal year, there would be limited ability to shut down the pipe transfer to Otterbourne WSW for maintenance, until T2ST is commissioned.

The points above will be included as part of the bulk supply agreement (BSA) and DPC contract that are currently under early-stage development (see Chapter 7: Procurement and Operation Model).

## 2.5 Water Resource Benefit

The need for the HWTWRP has been determined through the WRSE regional modelling that has assessed the scale of the water resource challenges across the South East region. The model has developed a series of future pathways that considers impacts of population growth, climate change and environmental destination as well as different demand scenarios as required by WRPG, known as adaptive planning[18] (Figure 2-8).

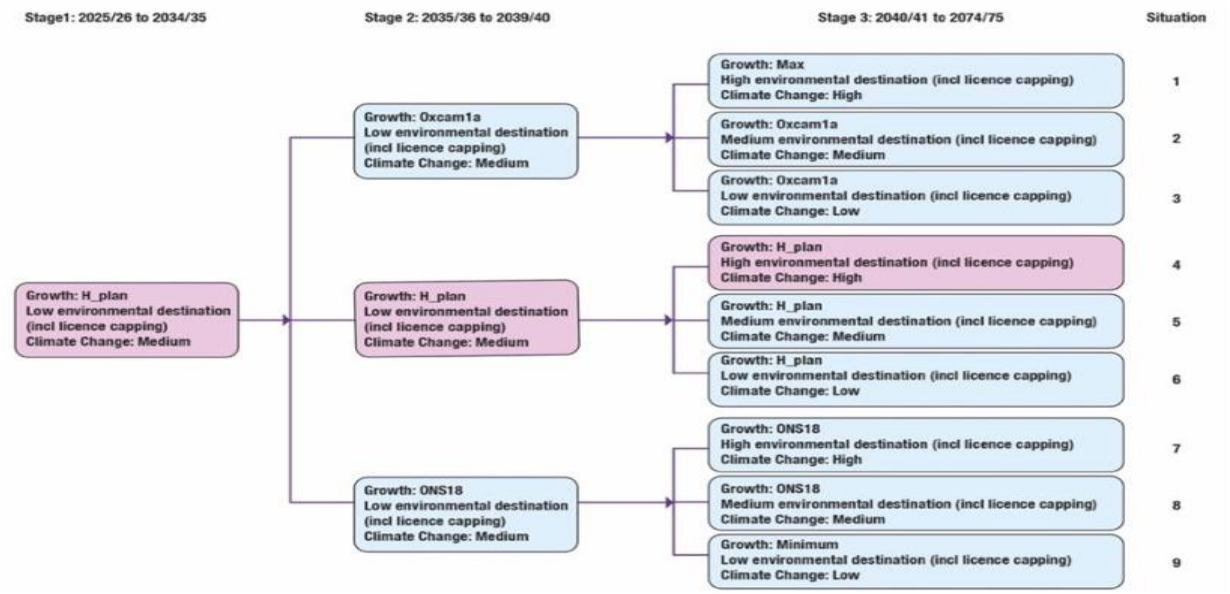


*Figure 2-8 - WRSE Adaptive Planning Pathways.*

The water resource benefit that would be provided by the HWTWRP is consistent with the upcoming revised draft WRMP24 and WRSE revised draft Regional Plan. The HWTWRP will be available from water resources year 2034-35 with the ability to provide a maximum WRP capacity of 60 Ml/d and the transfer to Otterbourne WSW of 90 Ml/d. Regional modelling indicates that maximum capacity will not be required until 2039-40 as consistent with the reported pathway, Situation 4, highlighted pink in Figure 2-8.

The HWTWRP has been selected across all the adaptive planning pathways providing a high-level of confidence in the need for the water resource benefit (Annex 2: Solution Design).

### 2.5.1 The HWTWRP Deployable Output (DO)

As described previously, for the benefit of the HWTWRP to be realised, it must operate in conjunction with HTR. The WRSE regional model has selected both elements of the HWTWRP included in the model i.e. the WRP (Table 2-4) and HTR to Otterbourne WSW transfer (Table 2-5) to be utilised from the first date available. The HWTWRP has been identified in all adaptive planning scenarios that have been modelled, demonstrating the importance of this solution as a future water resource option.

[18] WRSE Technical Annex 1: The challenge we face and how we prepared our plan November 2022

*Table 2-4 - Maximum utilisation (Ml/d) from WRP to HTR under each planning scenario.*

| Planning Scenario | Supply-demand balance situation | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| NYAA | 60.00 | 60.00 | 31.09 | 60.00 | 60.00 | 30.11 | 60.00 | 35.71 | 27.62 |
| 1:100 DYAA | 60.00 | 58.86 | 32.97 | 60.00 | 57.82 | 20.00 | 56.50 | 40.00 | 20.00 |
| 1:500 DYAA | 60.00 | 60.00 | 41.14 | 60.00 | 60.00 | 26.09 | 60.00 | 39.96 | 20.00 |
| 1:500 DYCP[19] | 20.00 | 21.62 | 21.42 | 20.00 | 20.51 | 20.00 | 20.00 | 20.00 | 20.00 |

*Table 2-5 - Maximum utilisation (Ml/d) from HTR to Otterbourne WSW under each planning scenario*

| Planning Scenario | Supply-demand balance situation | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| NYAA | 55.53 | 44.89 | 30.44 | 60.00 | 45.46 | 30.11 | 60.00 | 30.69 | 27.62 |
| 1:100 DYAA | 63.00 | 63.00 | 63.00 | 63.00 | 63.00 | 63.00 | 63.00 | 63.00 | 63.00 |
| 1:500 DYAA | 90.00 | 90.00 | 86.78 | 90.00 | 90.00 | 87.01 | 90.00 | 90.00 | 67.95 |
| 1:500 DYCP[19] | 69.00 | 69.00 | 69.00 | 69.00 | 69.00 | 69.00 | 69.00 | 66.85 | 59.31 |

The supply-demand balance calculations for Situation 4, have been used by WRSE and its constituent companies as the reported pathway for the BVP plan. This has been selected as it meets the WRPG growth forecast requirements, incorporates environmental destination, and takes account of potential climate change impacts. WRSE reviewed the potential pathways with regulators and WRSE's strategic leadership team approved Situation 4 as being the most appropriate reported pathway for the plan.

WRSE continues to work closely with the HWTWRP team throughout the WRMP planning process to ensure the model best reflects the latest understanding of the solution and that both the WRSE regional investment model and Pywr water resources models are aligned.

### 2.5.2 Water Resource Zone (WRZ) DO

To demonstrate the benefit that would be received by the conjunctive use of the HWTWRP and HTR, a summary DO baseline for each WRZ in the region was developed to determine the supply demand requirements of each WRZ until 2075 (Table 2-6). The model assesses the requirements across a range of drought scenarios to determine the Minimum Deployable Output (MDO), Average Deployable (ADO) and Peak Deployable Output (PDO).

*Table 2-6 - Summary of baseline for MDO and PDO at WRZ level.*

| WRZ | DO by return period (DYAA/MDO) – Ml/d | | | | DO by return period (PDO) – Ml/d | | | |
|---|---|---|---|---|---|---|---|---|
| | 1:500 | 1:200 | 1:100 | 1:2 | 1:500 | 1:200 | 1:100 | 1:2 |
| **Hampshire Andover** | 22.86 | 22.86 | 22.86 | 22.86 | 24.80 | 24.80 | 24.80 | 24.80 |
| **Hampshire Kingsclere** | 8.75 | 8.75 | 8.75 | 8.75 | 9.28 | 9.28 | 9.28 | 9.28 |
| **Hampshire Winchester** | 22.52 | 22.52 | 22.52 | 22.52 | 24.40 | 24.40 | 24.40 | 24.40 |
| **Hampshire Rural** | 10.35 | 10.35 | 10.35 | 10.35 | 10.35 | 10.35 | 10.35 | 10.35 |
| **Hampshire South East** | 20.49 | 32.46 | 45.65 | 77.97 | 41.00 | 58.38 | 78.36 | 108.42 |
| **Hampshire South West** | 0 | 0 | 0 | 73.54 | 0 | 0 | 11.85 | 78.8 |
| **Isle of Wight** | 23.96 | 25.89 | 26.07 | 26.58 | 30.54 | 34.09 | 34.33 | 34.65 |

These estimates of DO have been determined using physical-based ground and surface water modelling that estimate hydrological yield, utilising stochastically generated, but historically plausible, synthetic time series of weather to enable the consideration of resource availability for drought conditions. Combining this information with models for aquifers, rivers, reservoirs and supply networks has enabled the DO for each WRZ to be determined. A visual representation of these WRZs can be found in Annex 2: Solution Design.

[19] The model has allowed for Drought Orders to be used in 1-in-500-year drought scenarios, which has resulted in the reduction in flow requirements for DYCP. In practice, the WRP would be at maximum flow of 60 Ml/d.

The primary WRZ benefited by the HWTWRP will be Hampshire South East, receiving 60 Ml/d average and a peak of 90 Ml/d. This water will then be transferred from this zone onto Hampshire South West and north to Hampshire Winchester.

To ensure alignment of the supply forecasts and consistency with option appraisal used for the investment modelling, SW have worked with the regional group to ensure that outputs for the entire region are updated and maintained as a single consistent source, reflective of regional and company plans. This has ensured the upcoming revised draft WRMP24 maintains consistency with the revised draft WRSE Regional Best Value Plan[6].

### 2.5.3 Overview of Modelling Approach

RSS and water company hydrological modelling have been conducted at a range of levels to understand the available sources of supply which include surface water and groundwater sources (Annex 2: Solution Design). This data has been applied as follows:

- Surface water modelling – Hydrological models derived using the EA catchment modelling that covers SW's Sussex and Kent WRZs and is consistent with the approach set out in WRSE 2021 methodology;
- Groundwater modelling – SW's Hampshire WRZs are groundwater dominated and have been simulated using a regional groundwater model. Due to the complexity of ground water modelling, a Groundwater Framework was established and agreed between all six members of the WRSE to determine the hydrogeological modelling approach for each groundwater source. SW's sources which were dynamically simulated within the Regional RSS model are the River Itchen, Twyford and Pulborough.

These models, combined with the latest climate data for the WRSE region, have been optimised to determine the Deployable Output (DO) for the region. This approach has enabled company-level estimates to be integrated into a single regional DO determination, providing the baseline DO assessments and the future, yet uncertain, impacts of climate change and environmental destination.

These outputs have been overlayed with the projected demand profiles for the region, updated to reflect the recent patterns of consumption, which have enabled the determination of the latest supply-demand deficits for each future scenario. The upcoming revised draft WRMP24 and WRSE revised draft Regional Plan set out the approach and methodology used for the modelling to determine and understand the water resource requirements and utilisation required of the solution; this is outlined further in Annex 2: Solution Design.

### 2.5.4 Levels of Service

As required of the WRPG, a key principle of the water supply system is that it is resilient to severe drought events, and its robustness should be assessed against a range of drought scenarios up to, and including, low probability (extreme) droughts (such as a 1-in-500-year return period with an annual probability of 0.2%).

The upcoming revised draft WRMP24 and the WRSE revised draft Regional Plan have been developed to ensure that the supply system can be resilient to droughts of up to 1-in-500-year severity by 2039-40. This target is a step change since WRMP19s 1-in-200-year severity and is a requirement of WRPG[7] to ensure secure water supplies even in extremely rare drought events. It is therefore a consideration that is included in the modelling that underpins the WRSE revised draft Regional Plan.

SW describes level of service in terms of the expected frequency of restrictions i.e. TUBs and NEUBs that customers are willing to accept, as well as the frequency of drought permits and orders and ensuring compliance with regulations of the DWI Water Safety Plan (WSP)[20], and Ofwat's Standards of Service[21]. These are described in more detail in Annex 2: Solution Design.

SW's' Section 20 agreement with the EA specifies the phasing of TUBs, and NEUBs in affected WRZs in the Western area (Hampshire South and Hampshire South West). TUBs are required before implementation of a River Test Drought Permit and partial implementation of NEUBs is required before the River Test or River Itchen supply side Drought Orders are implemented.

The assessment of flows on the River Test for the Drought Plan suggest that a Drought Permit would need to be applied for around once every four to five years whilst developing the long-term water resource solution (including the HWTWRP) to offset the impact of the 2018 abstraction licence changes.

This risk continues to be communicated by SW to its customers in Hampshire and remains one of the drivers for the HWTWRP. Until this solution is delivered, and the benefit realised, stated actual levels of service will be less than target.

### 2.5.5 Outages

[20] Water safety plans - Drinking Water Inspectorate
[21] Standards of service - Ofwat

Planned outages are required to undertake maintenance or improvement works and are managed via the Asset Management Plan to ensure the required level of service is maintained. A risk-based assessment of outage is included in the baseline supply forecast within the WRSE modelling, derived from statistical modelling of previous source and WRZ performance. Typically, this is a fixed volume for the duration of the planning period unless there are specific schemes to reduce outage (e.g. works rebuild). This is consistent with the approach adopted by the WRSE member companies ensuring alignment within the Regional Plan. Otterbourne WSW can be used to support within the region following the delivery of the HWTWRP. Further detail of this approach can be found in Annex 2: Solution Design.

### 2.5.6 Scenario Planning and Modelling Uncertainties

The water sector deals with a percentage of uncertainty through a planning factor, known as headroom, this has been used consistently across all the WRSE member companies. There are several uncertainties inherent within modelling the water companies and WRSE have undertaken, the primary one relates to uncertainty in the future which has been mitigated by modelling multiple different scenarios:

- 5 different population growth scenarios (maximum, H_plan, OxCam, ONS18 and minimum[18]);
- 29 climate change scenarios (28 different scenarios and the median); and
- Environmental destination scenarios (BAU+, High, Medium and Low)

These risks have then been further mitigated using adaptive planning whereby the aspects common to all pathways are actioned and then as time progresses the water companies will move to a pathway of solutions which best represents the most likely future (Figure 2-8).

As set out above, the agreed and preferred pathway is Situation 4 which will be subject to review in line with the WRMP planning cycles. Further information on how the pathways work can be found in Annex 2: Solution Design, and WRSE Technical Annexes[22].

There are additional uncertainties in the modelling around:

- Non-Household Demand;
- Demand Management;
- Process Losses;
- Outage; and
- Future Legislation Requirements.

Further details on how these considerations and uncertainties and how they have been incorporated into the planning situations can be found in the Annex 2: Solution Desing and in the WRSE supporting documentation[22].

## 2.6 Long Term Opportunities and Scalability

### 2.6.1 Wider and Additional Benefit from 3rd Party Options

The Best Value Planning approach has been developed in conjunction with WRSE. It requires a consideration of the wider benefits that an option, put forward for inclusion in the Regional Plan, would provide beyond the primary goals of increasing drought resilience. A comprehensive list of the metrics can be found in the WRSE Best Value Plan methodology and summary of the value metrics considered is in Annex 8A: Solution Costs and Benefits.

HTR is an integral part of the HWTWRP solution that is being constructed and whilst the HWTWRP has defined benefits consistent with the best value metrics, the value of the solution should be considered as part of the broader HTR solution. Negotiations with PW are ongoing and seek to develop a revised BSA to secure the necessary prioritisation of supply needs. For further detail on the timeline and summary of BSA development, see Chapter 7: Procurement and Operation.

As set-out in the WRSE revised draft Regional Plan reported pathway, Situation 4, and reflected in both company's WRMP24 documents, SW and PW customers are sole beneficiaries SW and PW customers are the sole beneficiaries of the new water resource that is being provided by the WRP by supplementing HTR and ensuring a 1-in-500-year drought resilience. This solution is part of the broader options that are being considered within the Regional Plan that will ensure the supply demand deficits of the South East can be solved and provides a long-term benefit for the South East by enabling flexibility and adaptability of water transfers through its interaction with other major projects within the region (i.e. T2ST). The assets of the HWTWRP do not provide direct third-party benefits.

The WRSE revised draft Regional Plan has established a best value planning process that has enabled the determination of solutions to solve the water deficit whilst producing the best value for nature, multi-sector use and customers. This plan includes several multi-sector options required by water companies to work with other sectors

[22] WRSE supporting documents

on shared solutions that provide multiple benefits and options, that if modified, could provide water for other sectors[23]. The benefits that would be provided by this solution are discussed in Chapter 8: Solution Costs and Benefits.

The opportunity for benefit from the HWTWRP is considered within the broader social and environmental benefits that which HTR provides. There are multiple opportunities for benefits, including increased supply resilience, human health, reduced materials and resource use, and air and climate benefits[24]. There are also opportunities to provide amenity and conjunctive use benefits for the public.

### 2.6.2 Scalability and Critical Components

As discussed, the WRP has been designed to its maximum capacity, the limitations of which have been explored at Gate One, Technical Annex 5: Water Recycling[25]. These limitations are driven by the capacity of Budds Farm WTW within a dry period, the daily diurnal flows that can be achieved and the issues transferring final effluent. Alternative solutions have been proposed, such as the introduction of effluent from Peel Common WTW, however these alternatives were excluded through the options appraisal process reported on at Gate Two[16].

The transfer from HTR to Otterbourne WSW is limited by the current production capacity of Otterbourne WSW which is undergoing capital delivery improvements (out of the HWTWRP scope). The HWTWRP team is working closely with the Otterbourne WSW project team to align schedules to enable maximum capacity to be achieved as and when required.

The engineering design at Gate Three offers' opportunities for offsite fabrication of modular treatment units at each treatment stage:

- Strainers, Cartridge Filter Housings, MF/UF Skids, RO Trains, and UV Reactors: suppliers typically adopt standardised modular units which are fabricated at a centralised facility for subsequent dispatch and installation on site; for larger MF/UF and RO units, these systems could be dispatched in sections, requiring some assembly on site;
- Granular Activated Carbon (GAC) Contactors: the diameter of the GAC contactors was constrained to enable off-site fabrication and transport to site by road; and
- Chemical Storage and Clean in Place (CIP) Tanks: with the possible exception of lime silos, all chemical storage tanks are sized to enable transport to site by road; this includes the vacuum insulated liquid $CO_2$ storage tanks which are sized for international shipping.

As described previously, the HWTWRP requires the delivery of HTR by PW. The HWTWRP team is working closely with PW to remain updated on project delivery and ensure successful management of this key dependency.

### 2.6.3 Risk of Flooding and Coastal Erosion

A Preliminary Flood Risk Assessment (PFRA) has been prepared in accordance with the National Planning Policy Framework (NPPF) and the Flood Risk and Coastal Change Planning Practice Guidance (PPG). This PFRA considers the entirety of the pipeline route and the initial assumed locations of permanent AGP. The PFRA is intended as a 'living' document, is being continually updated to reflect the evolving project design and will be finalised prior to submission of the DCO application. The final version of the PFRA will include detailed, stand-alone Flood Risk Assessments (FRAs) for each of the permanent AGPs. Annex 2: Solution Design provides detail of the flood risk associated with each of the HWTWRP asset groups and demonstrates the ongoing process and assessment that will be updated to effectively manage the flood risk.

### 2.6.4 Potential Wider Flood Risk Management Benefits

A Feature Manipulation Engine (FME) routine is being developed to identify suitable parcels of land that, as part of the reinstatement of the pipeline route post construction, could be used to deliver nature-based solutions to provide a) attenuation of flood waters; b) phosphorus removal from river waters; and c) biodiversity enhancements/Biodiversity Net Gain (BNG).

The short-listed land parcels will need to meet a strict rule set including being currently greenfield; located within the Draft Order Limits for the route; not be of existing significant ecological value such as a Site of Special Scientific Interest (SSSI) and will need to interact with Flood Zones 2 or 3, or the surface water flood risk zones, and/or include a Main River or Ordinary Watercourse.

SW will collaborate with landowners, Risk Management Authorities including local councils, the Lead Local Flood Authority (LLFA), the Environment Agency (EA) and Natural England (NE) in order to identify whether these benefits can be realised and if they can. This will form part of the documentation supporting DCO application.

[23] WRSE Revised Draft Regional Plan August 2023 (Section 12.62, page 121)
[24] Strategic Solution Gate 2 Submission: Havant Thicket – Detailed Feasibility and Concept Design Report, Section 3.7.3, Page 18
[25] WfLH Technical Documents

# 3. Drinking Water Quality

## 3.1 Chapter Summary

This chapter presents an update on the key activities undertaken in support of the Drinking Water Safety Plan (DWSP) development for the HWTWRP. The following progress between the Gate Two and Three submissions has been made:

- The Drinking Water Quality (DWQ) Working Group was established by PW and SW to ensure DWSP development for the relevant supply systems is undertaken collaboratively, with outputs validated by both organisations;
- The DWQ Working Group has agreed the shared development plan for the DWSP for the HWTWRP (Figure 3-1);
- GHD Group Pty Ltd (GHD) has been appointed to develop water quality projections for the water supplied by HTR and modelling is underway for a defined suite of determinands using the combined input data issued by the DWQ Working Group; and
- Water Research council (WRc) Group has been appointed to develop a shared DWSP assessment methodology and reporting structure and to undertake the initial implementation of this methodology. DWSPs are subject to iterative changes and regular contact with the DWI will be maintained as updates are made available.

## 3.2 DWQ Working Group and DWSP Development Plan

This section sets out the approach that is being taken to delivering a well-developed DWSP in accordance with DWI guidance. SW and PW have established a technical DWQ Working Group that includes process science/engineering representatives for the SRO, water quality and water risk teams from both water companies as well as third party subject matter technical experts, GHD and WRc. The DWQ Working Group meets regularly to discuss key deliverables, to deliver specific investigatory scope, track progress, assess ongoing water quality risks, share feedback from various sources (DWI, customers, stakeholders, schedule amendments etc.) and plan next steps. The group has established the following core objectives:

- To collaboratively develop a robust, shared DWSP to assess and mitigate any public health risk associated with the HWTWRP and the associated asset sub-systems (abiding by the Water Industry Act 1991 and Water Supply (Water Quality) Regulations);
- To provide evidence that underpins a robust customer engagement plan that addresses customers / stakeholders concerns about their drinking water due to the introduction of a new source water; and
- To provide progress updates to stakeholders, including regulators, residents living near the reservoir, and customers of both water companies, to increase confidence in the proposed design and operation of the HWTWRP.

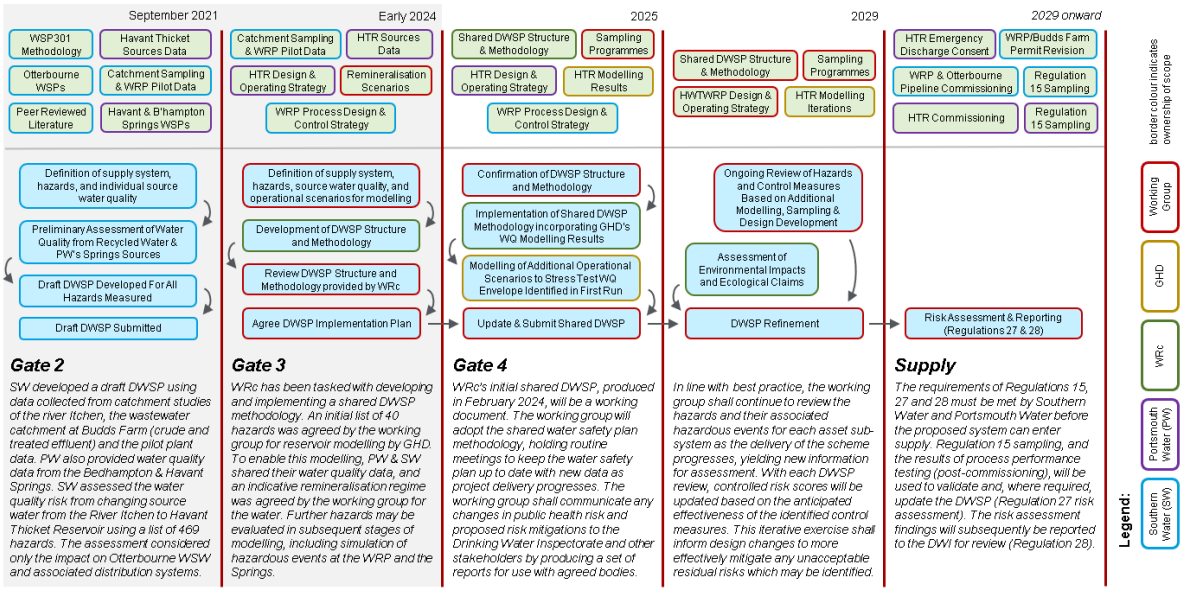


*Figure 3-1 - Overview of DWSP development methodology*

The DWQ Working Group has agreed a collaborative approach to DWSP development (Figure 3-1) building on the work previously presented at Gate Two. An expanded graphic of the DWSP development schematic can be found in Annex 3: Drinking Water Quality and Environmental. This timeline of this activity is set out in Chapter 6: Programme and Planning, noting key schedule dependencies that would impact delivery.

The DWSP for HTR, as a source water for PW and SW, will be a 'live' document. This will be periodically updated by both water companies in accordance with the shared methodology agreed by the DWQ Working Group and will abide by the requirements of Regulations 27 and 28[26].

## 3.3 Gate Three Sampling Activities

Since December 2021, a large number of samples for laboratory analysis have been taken at Budds Farm WTW to provide a robust year-round dataset characterising final effluent quality, to provide a basis for the design of the WRP, inform the DWSP, and to support environmental permitting. This includes:

- Catchment and routine sampling programmes (ongoing) – samples collected at monthly intervals for the routine sampling programme and seasonally for the catchment sampling programme, as detailed in the Gate One and Gate Two submissions[25]. Laboratory analysis has been conducted to evaluate concentrations of an extensive suite of determinands, including Schedule 1 and 2 parameters from the Water Supply (Water Quality) Regulations 2016 (as amended) (Water Supply (Water Quality) Regulations), and other Contaminants of Emerging Concern such as Polyfluroalkyl Substances (PFAS). This will inform the development of the DWSP and environmental permitting. Detailed assessment of the data shows no significant variation in the parameters tested over the last 4 years at Budds Farm WTW (influent and treated effluent); and
- Pilot plant sampling programme (September 2020 - April 2023) – pilot trials of a process consisting of MF, RO, and UV-AOP were undertaken at Peel Common and Budds Farm WTWs (details provided in the Gate One and Gate Two submissions[25]). Samples to assess treatment efficacy were taken multiple times per week at the inlet and outlet of each process.

## 3.4 Reservoir Modelling Exercise

GHD are engaged in developing water quality projections for the water supplied from HTR, to evaluate mixing and stratification in the reservoir, updated as the HTR project matures in its construction. Additionally, water resources modelling will evaluate long-term changes in the fractions of the individual sources in the reservoir. The findings of this modelling exercise shall be incorporated into future DWSPs and will also be used in a quantitative microbial risk assessment (QMRA) and quantitative relative chemical risk assessment (QRCA) exercise.

The scenarios being modelled by GHD include a 'Classic' and a 'Blended' water scenario.

- Classic – reflects the operation of HTR as storage for surplus winter flows from BHS (plus rainfall and catchment run-off), with abstracted flows feeding Farlington WSW; this will present a baseline risk condition based on the original approved proposal for the design and operation of the reservoir;
- Blended – reflects the proposed operating regime for HTR under the HWTWRP, showing the additional inflow from the WRP, and abstraction to supply Otterbourne WSW.

The original results from the water quality model are being updated by GHD using the most up to date bathymetry data for HTR (incorporating the recent HTR redesign) and this will be included in the updated DWSPs for the scenarios. The DWQ Working Group will use the output from the DWSPs to assess the impact the two input water sources in the reservoir (during filling and at steady state) may have on public health and water environment risk attributed to any of the hazards modelled, against multiple situations (or operating conditions).

## 3.5 Shared DWSP Methodology Development

WRc is engaged in the development and implementation of a shared DWSP methodology, encompassing existing PW and SW assets together with the proposed new assets for PW and SW. The scope of the shared DWSP has been developed as a flow diagram of interconnecting asset sub-systems, some of which are already in existence, and some are proposed (theoretical) assets (Figure 3-2).

[26] The Water Supply (Water Quality) Regulations 2016

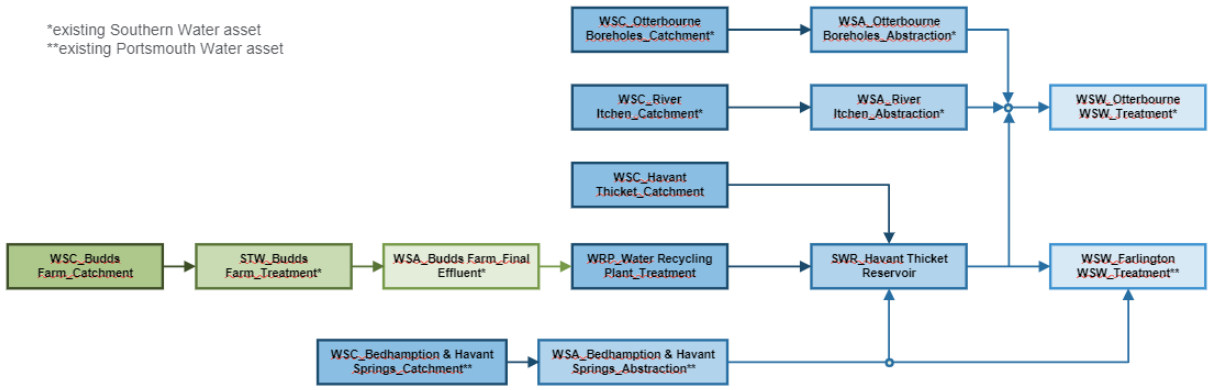


*Figure 3-2 - Schematic of DWSP asset sub-systems encompassed by HTR and WRP.*

It should be noted that some of the assets are not within the SRO HWTWRP scope (such as SW's Otterbourne WSW), however, due to the criticality of the interconnections between the different assets (deemed separate projects), the DWSP methodology encompasses all assets from source to tap to ensure the system wide impact is understood and demonstrates that any identified risks are mitigated through the various treatment stages to protect the end consumer. Chapter 2: Solution Design sets out the asset ownership of the different components encompassed by the HWTWRP.

## 3.6 HTR Water Quality Assessment

As described in the Gate Two submission[27], the abstraction point of HTR is the new water source in this combined supply system, containing a variable blend of groundwater from BHS, recycled water produced by SW's WRP, plus rainfall and surface run-off from the reservoir's drainage catchment. Both SW and PW will be required to fulfil the requirements of Regulation 15 of the Water Supply (Water Quality) Regulations before HTR can be brought into supply, more information is included in section 3.12. QMRA and QRCA processes were used to assess the risk associated with recycled water due to biological and chemical factors, influencing the DWSP.

As the recycled water will be blended in an open body of water, a QMRA will be performed following modelled data from GHD. The water treatment works downstream of the HTR are designed to remove biological loading and include competent disinfection processes (detailed in Chapter 2: Solution Design).

A comprehensive QRCA has been undertaken to identify contaminants of potential concern in the recycled water following the pilot trial at Peel Common WTW. An additional investigation is planned for the Budds Farm WTW pilot data and reservoir modelling data from GHD. The QMRA and QRCA outputs will feed into the updated DWSP.

The QRCA quantified the chemical risks associated with using the recycled water from the Peel Common WTW pilot trial as a source of supply to a water supply works. A chemical risk profile had also been prepared for the existing river water source at the Otterbourne WSW to evaluate the impact of recycled water on the baseline risk for the system. The analysis centres around the idea that if a compound's dose (in mg analyte/kg body weight/day) is below its risk threshold (also in mg analyte/kg body weight/day), it will not cause an adverse health impact. The threshold reference doses were gathered from World Health Organisation (referred to as total daily intake or TDI) and United States Environment Protection Agency (referred to as Reference Dose or RfD). Threshold doses which can be defined using different terminologies such as No Observed Effect Level (NOEL), No-Observed Adverse Effect Level (NOAEL) or Lowest Observed Adverse Effect Level (LOAEL) define the limits of doses resulting in toxic effects.

A Monte Carlo analysis of the water quality data from the pilot sampling programmes and catchment, including data for 305 analytes, was performed. The key findings of this work include:

- Chemical risks associated with recycled water were lower than for the river source that has been used as a baseline for comparison. This demonstrates that these risks can be effectively mitigated against by the treatment processes in place at the downstream water supply works;
- The four highest risk analytes for the river source were: nitrate, nitrite, fluoride, and caffeine. These analytes were amongst the threshold-based risk contributors for the recycled water, but were found in lower or comparable concentrations, demonstrating that the recycled water does not increase the risk baseline; and

[27] HWTWRP RAPID Gate Two Submission Technical Annex 2: Water Recycling Section 2.2.11.7

- Six analytes were identified in the recycled water which were not measured in the existing river source: copper, boron, nickel, chlorite, dichloromethane, and acetaminophen. It should be noted however that no analytes were detected in the river source or the recycled water at high enough concentrations to exceed the adverse effects threshold. This provides confidence that the use of recycled water would therefore not cause a deterioration in the supplied water quality. The water quality will continue to be reviewed as the solution develops.

The recycled water was found to reduce the overall chemical risks compared to the river source. However, there are additional mitigations which could be used to further reduce risks associated with those analytes with higher concentrations than the river source:

- Copper, boron, nickel are all metals that may be associated with trade discharges. While these compounds did not exceed risk thresholds, an enhanced source control program to limit discharges of these metals into the wastewater collection system could lower their incoming concentrations;
- Chlorite and dichloromethane are disinfection by-products. The extremely low concentrations of these compounds are likely derived from sodium hypochlorite used for membrane maintenance and cleaning. Optimising the operating protocols for membrane systems could lower concentrations of these disinfection by-products. Again, they did not exceed the risk threshold concentration; and
- Acetaminophen originates from wastewater and, while it was not present at concentrations that exceeded the risk threshold, the compound can be further mitigated through use of granular activated carbon (GAC). GAC adsorbers are included in the WRP design as a polishing stage after UV-AOP; as such, this residual risk from acetaminophen will be mitigated.

Several analytes had higher concentrations in the recycled water than in the river source, but these analytes were not above their respective risk threshold concentrations, so further mitigating actions were discounted at this time. These analytes will be kept under review as sampling continues to further assess the risk and incorporate mitigating actions where identified.

## 3.7 Recycled Water Remineralisation

Design decisions concerning remineralisation of recycled water were made with consideration of the ‘DWI Information Letter 03/2023’. These decisions were discussed with the DWI during a collaborative progress meeting in September 2023.

To develop suitable remineralisation scenarios, a suite of corrosion indices has been evaluated to indicate the likely aggressiveness of the recycled water when in contact with various materials commonly found in distribution networks and domestic plumbing. Projections were prepared for various degrees of remineralisation. These include the extremes of minimal remineralisation achieving basic stabilisation of the recycled water and maximum remineralisation, targeting the existing high hardness and high alkalinity water sources at Otterbourne WSW.

The DWQ Working Group agreed an intermediate scenario will be carried forward for GHD’s modelling. This scenario was perceived to balance the water quality and environmental risks associated with insufficient / too much remineralisation with the operational complexity, cost, and carbon impact of the chemicals consumed in the process.

Bench-scale remineralisation and pipe loop testing and network water quality modelling will further evaluate the network water quality risks under different remineralisation conditions and provide a basis for finalising the remineralisation strategy. Conclusions drawn from this work will be shared with the DWI when completed and fed into the DWSP process.

## 3.8 WRP Design for Control of Water Quality Risk

Water quality risk management is an integral part of the WRP design, and where risks associated with process performance, asset condition, and general operational challenges have been identified, mitigating solutions have been developed. A preliminary water quality control strategy was developed as part of the WRP design, identifying water quality monitoring provisions at each stage of the multi-barrier treatment process, and detailing the automated responses by the WRP control systems to implement corrective actions following process performance deviations, or to initiate run to waste or plant shutdowns to prevent downstream contamination.

The operational risk management strategy proposed for the WRP is multifaceted, including:

- Engineered resilience – suitable levels of redundancy have been included at each stage of treatment to maintain suitable water quality and production volumes in the event of process unit failures;
- Run to waste – run to waste facilities at critical water quality control points, automatically activated on detection of off-specification water, to maximise response and recovery whilst preventing downstream contamination;

- Residence time – long residence times[28] within the system provide a larger buffering capacity across the WRP and HTR to ensure safe water quality is supplied to the Otterbourne WSW and Farlington WSW;
- Real time control – use of real time process control systems which use online monitoring to automatically identify and implement corrective actions to quickly rectify any identified deviations from the defined operating envelope, thereby maximising response, and recovery;
- Routine sampling – routine sampling and laboratory analysis of water quality across the system will validate the efficacy of the process and provide evidence for the removal of contaminants within final effluent; and
- DWSP – routine risk assessment, reporting and mitigation of public health risks across the supply system in line with regulatory requirements and industry best practice from the wastewater catchment through to abstraction at Otterbourne WSW via the WRP and HTR.

The control strategy described was presented to the DWQ Working Group and the DWI in a workshop in September 2023, and continues to be a working document with progression of DWSP development and further input from key project stakeholders.

## 3.9 Recycled Water Production Capacity

The design capacity of the WRP is for 60 Ml/d of recycled water production for supply to HTR and the transfer from HTR is designed for 90 Ml/d of source water supply to Otterbourne WSW; this is consistent with the WRSE revised draft Regional Plan and the upcoming revised draft WRMP24. This is covered in detail in Chapter 2: Solution Design.

## 3.10 Review of Requirements for Regulation 31 Approved Products at the WRP

At Gate Two, SW and PW had identified that Regulation 15 of the Water Supply (Water Quality) Regulations applies from the HTR abstraction point, and from the DWI Information Letter 03/2023[29] it is understood that the WRP shall not require Regulation 31 approved products to be used given that the recycled water shall discharge to HTR (an environmental buffer), upstream of where the water is abstracted from the environment.

Due consideration shall be given to the use of Regulation 31 approved products for the water recycling process, recognising the function such approved products serve in minimising water quality impacts on the water undergoing treatment. Furthermore, where no Regulation 31 approved products are available (e.g., RO membranes), suitable certifications from other regulators will be considered to help minimise the impact on water quality. Engagement will be maintained with the DWI as part of DWSP activities.

Prior to flow entering the reservoir from the WRP it will be subject to intensive sampling and testing. This will include a full GC-MS scan of recycled water to assess for any substances that may have leached into the water not previously recorded as hazards.

## 3.11 WSW Water Quality Assessment

The work to assess the final treatment stages at Otterbourne WSW (SW) and Farlington WSW (PW) to ensure safe drinking water is supplied to customers is undertaken by SW and PW respectively, to ensure that the individual companies are compliant with all DWI requirements in water supplied to customers. As the two WSW's fall out of scope for the SRO the ongoing activities are not detailed in this submission however, the DWSP process follows a source to tap assessment which includes the final treatment stages, so they are assessed as part of the round.

The WSW assessments include the two HTR scenarios (Classic and Blended) under various conditions (drought etc.) to ensure that the WSW treatment is capable of removing any perceived hazards from the source water not previously mitigated upstream.

- Otterbourne WSW is undergoing a significant programme of works (in addition to receiving a new water source from HTR) and SW are ensuring that removal of perceived hazards from HTR source water is incorporated in the proposed treatment designs as part of the DWSP at Otterbourne WSW; and
- PW are carrying out the assessment activities at Farlington WSW.

[28] The HTR modelling exercise detailed in section 3.4 shall evaluate mixing within the reservoir and quantify the long-term source apportionment and stored water volume in the reservoir; this data can subsequently be used to determine the minimum effective residence time for recycled water in the overall supply system.

[29] DWI Information Letter 03/2023

This work will continue as part of the iterative DWSP process, utilising the outputs from the DWQ Working Group for the HTR source water to ensure alignment of approach.

## 3.12 Review of Regulation 15 Requirements for the HWTWRP

The abstraction from HTR is a new source which has not previously been used for the purpose of drinking water supply. SW and PW will comply with the sampling requirements defined under Regulation 15 before HTR is used as a water source (see Chapter 6: Programme and Planning). SW and PW will develop a framework to include sampling and data from online instruments to update the DWSPs from both sources supplying HTR when it is used as source water to supply their respective water supply zones. The sampling regime from the time of filling HTR from the BHS sources, the addition of recycled water, to the point of supplying Farlington WSW and Otterbourne WSW, is being developed jointly and analytical testing will be based on hazards identified in the DWSP developed by WRc in the first instance. The DWSP for HTR is a 'live' document and hazards will be re-evaluated as more data is collected during the sampling programme.

The existing sources to Otterbourne WSW are the River Itchen intake and groundwater sources. If these sources are not used for a period of six months preceding the date on which the proposed supply of water will begin, due to construction or commissioning, these sources will be sampled, and risk assessed in line with requirements stated in Regulation 15 before the source can enter supply.

## 3.13 Customer Perception and Engagement

As well as a joint technical DWQ Working Group, PW and SW are working collaboratively to develop strategic stakeholder and customer engagement activities for both PW's and SW's customers. Details of the engagement activity that has been conducted to date, customer feedback and the plan for continued engagement is set out in Chapter 9: Stakeholder and Customer Engagement. The DWQ Working Group continues to actively work with WRSE to engage consumers collectively and collaboratively on SROs in the south east of England. The customer and stakeholder engagement team are supported by the technical, environmental, water quality and other relevant teams to ensure queries are investigated and answered by the appropriate discipline.

Following the Gate Two submission, SW held a six-week public consultation (Non-Statutory Consultation) focussing on the HWTWRP's proposed pipeline corridors and to provide insight into the proposed water recycling technology. Many of the respondents were from the Havant area, where there is strong support for the HTR plans. Those in favour of water recycling recognised and highlighted the importance of the need to safeguard the ecologically important chalk stream rivers in Hampshire and the wider environment, recognising that this solution was the most environmentally sustainable solution to address the country's water shortage.

Use of recycled water has prompted some concerns on both the quality of drinking water and potential changes to taste. Furthermore, there were concerns from people who felt that the reservoir should only be fed by spring water due to perceived environmental impacts of recycled water on biodiversity, wildlife, and ecology. These insights will be used to inform future engagement activities as set out in Chapter 9: Stakeholder and Customer Engagement.

SW and PW are committed to providing customers with wholesome water, meeting strict drinking water standards established under the Water Supply (Water Quality) Regulations. From the activities conducted to date and the international application of water recycling to provide drinking water supplies, it has been demonstrated that recycled water will not adversely impact the drinking water supplied to customers. It is however recognised that further engagement is required with customers and stakeholders to reinforce this message and provide reassurance in relation to perceived impacts. This will be achieved through the engagement plan as set out in Chapter 9: Stakeholder and Customer Engagement and will be further detailed with key milestones into Gate Four and through to operational delivery, as set out in Chapter 6: Programme and Planning.

# 4. Environmental

This chapter reports on the status of assessments in relation to the Water Framework Directive (WFD), Habitats Regulations Assessment (HRA), EIA, BNG and Landscape & Visual Impact Assessment (LVIA). It is supported by Annex 6: Programme and Planning which provides a programme of the environmental surveys completed as of January 2024 and those planned up to Gate Four.

Annex 3: Drinking Water Quality and Environmental sets out the programme of activities and environmental surveys as discussed within this chapter. These assessments have been completed following the Gate Two submission and are presented within the EIA Scoping Report[30] that was submitted to the Planning Inspectorate (PINS) on 21 July 2023. It also includes a description of assessments completed in readiness for the Preliminary

[30] Documents | Hampshire Water Transfer and Water Recycling Project (PINS case reference WA010002)

Environmental Information Report (PEIR), consulted on as part of the Statutory Consultation. An update on each of the assessments undertaken is given in the following sections. The key milestones in relation to the Environmental workstream are detailed in Annex 6: Programme and Planning.

## 4.1 Water Framework Directive (WFD) Assessment

A Water Environment Regulations (WER) Compliance Assessment will be undertaken in accordance with the Water Environment (Water Framework Directive (WFD)) (England and Wales) Regulations 2017. This will consider the extent to which the HWTWRP could impact on the current and future target WFD status of water bodies within a defined study area. As consent for the HWTWRP is being sought through a DCO, the assessment approach outlined in Planning Inspectorate (2017) Advice Note Eighteen: The Water Framework Directive, (Version 1), will be followed. Other relevant guidance from the EA, including Clearing the Waters for All (2023), will also be adhered to. The WER Compliance Assessment will be used to inform the EIA and will help identify effects which could prevent WFD objectives from being met and therefore, require mitigation.

The proposed approach to the WER Compliance Assessment has been set out in the EIA Scoping Report. This approach is deemed to have been accepted by the Planning Inspectorate as no specific comments were received on the methodology as part of the Scoping Opinion (published by the Planning Inspectorate on 31 August 2023).

The initial consideration provided within the EIA Scoping Report concluded that water body status will be maintained or improved by the HWTWRP. However, the ongoing impact assessment and design processes will continue to avoid or mitigate impacts and therefore avoid potential for status deterioration. Therefore, the derogation test relating to water body status set out in Regulation 19[26], is not anticipated to be applicable for the HWTWRP. These positions will continue to be scrutinised by the full WER Compliance Assessment process in consultation with the EA. The conclusions from the WER Compliance Assessment will be outlined within the Environmental Statement (ES) and submitted as part of the DCO application.

Evidence to support the WER Compliance Assessment, and to provide certainty for the assessment and conclusions drawn, will be collected and examined by surveys and assessments, including: a Hydrogeological Impact Assessment (HIA), baseline geomorphological surveys, ground investigation, ecological surveys, water quality modelling within HTR, assessment of invasive species risk and marine dispersion modelling related to the reject water discharge. An update on the emerging findings of these investigations was provided during the summer 2024 Statutory Consultation, the programme of which can be found in Chapter 6: Programme and Planning. The scope of surveys has been discussed and agreed with relevant statutory bodies through EIA Working Groups and Environmental Technical Working Groups (TWG).

The WER Compliance Assessment will consider a full range of receptors and their potential impacts. Table 4-1 provides an overview of some of the emerging challenges from the assessment, including details of how these are proposed to be addressed and where appropriate mitigated.

*Table 4-1 - Key challenges emerging from WER Compliance Assessment*

| Challenges | Proposed assessment approach, progress and next steps |
|---|---|
| Changes to reject water discharge from Eastney LSO. | No physical modifications are anticipated to the Eastney LSO. However, operation of the WRP will require use of the Eastney LSO to discharge reject water changing the existing permitted Budds Farm WTW discharge conditions. Dispersion modelling has therefore been completed to understand what effects the reduction in treated wastewater discharge flows and addition of the reject water to the discharge may have on the marine environment. A summary of the dispersion modelling will be discussed through the EIA Working Group and presented in the PEIR. SW is currently engaging with the EA on the Environmental Permit requirements for the new discharge, including a sampling regime. |
| Changes to HTR water quality and associated compensatory flow. | Water quality modelling is currently underway to assess potential impacts of blending recycled water with spring water in HTR and the associated compensatory flow to Riders Lane stream (which continues to Langstone Harbour via the Hermitage Stream). A high level summary of the preliminary findings of this modelling was presented in the PEIR, and at EIA Working Groups prior to Statutory Consultation. A dedicated DWQ Steering Group has been established with PW to discuss the outcomes of ongoing modelling and assessment. |
| Crossing major Rivers and potential impacts of pipeline impacting groundwater flows and supported habitats. | A preliminary HIA has been drafted and submitted to the EA for comment. The project development process is considering the outcomes of this assessment and a water features/geomorphology survey of the study area. An updated HIA was submitted and presented within the PEIR and engagement undertaken with the EA as part of the Environmental TWGs (see Section 4.3 for further detail) in advance of the Statutory Consultation. |

## 4.2 Habitats Regulations Assessment (HRA)

A HRA is being carried out as set out in the Conservation of Habitats and Species Regulations 2017 (the 'Habitats Regulations') and will follow the approach outlined within Planning Inspectorate (2022) Advice Note Ten: Habitats Regulations Assessment relevant to nationally significant infrastructure projects[31].

As HRA is a staged process, a draft project level Stage 1 HRA was issued to NE in early 2024. This was based on the description of the HWTWRP presented within the EIA Scoping Report and was drafted during a period of engagement with NE, the EA and the Marine Management Organisation (MMO). Comments from NE have been received and included within the finalised Stage 1 HRA. This assessed relevant species/habitat and Ramsar designated sites:

- within 5km of the HWTWRP;
- with hydrological connections to the HWTWRP, including source and receiving waters; and,
- within 10km of the HWTWRP (or greater where buffers identified for specific sites were above 10km) in the case of Special Area of Conservation (SACs) designated specifically for bats.
- No possible SACs, potential Special Protection Areas or proposed Ramsar sites were present within 5km of HWTWRP.

At Stage 1 HRA Screening, mitigation measures proposed for the purpose of avoiding or minimising risk to a European site are not considered. Therefore, in the absence of mitigation, the Stage 1 HRA concluded that there is the potential for a Likely Significant Effect (LSE). Consequently, in-combination with the National Site Network sites detailed below, the following sites will be assessed as part of the Stage 2 HRA:

- River Itchen SAC;
- Chichester and Langstone Harbour Special Protection Area (SPA);
- Chichester and Langstone Harbour Ramsar;
- Solent Maritime SAC;
- Portsmouth Harbour SPA;
- Portsmouth Harbour Ramsar;
- Solent and Dorset Coast SPA;
- Solent and Southampton Water SPA;
- Solent and Southampton Ramsar;
- South Wight Maritime SAC;
- Solent and Isle of Wight Lagoons SAC; and,
- River Meon Compensatory SAC Habitat.

Three National Site Network sites identified as part of the Stage 1 HRA process were found to have no credible potential pathway for effect and therefore no potential for a LSE, so will not be progressed to the Stage 2 HRA. These sites are:

- Briddlesford Copses SAC;
- Mottisfont Bats SAC; and
- Singleton and Cocking Tunnels SAC.

The Stage 2 HRA for the 12 identified sites, will be informed by further assessment including modelling of hydrological and hydrogeological effects of designated watercourses and air quality changes as a result of construction activities along the HWTWRP route. Additionally, extensive work has been carried out to avoid and minimise impacts. This has been achieved through close collaboration between the HWTWRP and EIA Technical Disciplines and has resulted in a route through the landscape that is considered as consentable within the context of the HRA. The Stage 2 HRA will identify any remaining potential mitigation measures that would need to be incorporated into the HWTWRP and presented within the DCO.

A key HRA risk is potential impact on wintering and breeding birds that are qualifying features of the coastal SPA and Ramsar sites (both in terms of direct impacts on the birds while present in the sites themselves and while they are within functionally linked land i.e. the Solent Wader & Brent Goose Strategy sites). Mitigation approaches are currently under consideration to reduce this risk and will be included in the Stage 2 HRA.

A draft Stage 2 HRA report will be prepared in advance of the DCO submission, as set out in Annex 6: Programme and Planning. A period of engagement is planned throughout the development of the Stage 2 HRA with NE, the EA and the MMO as part of the existing Environmental Technical Working Groups (TWGs). This will ensure feedback can be received on the Stage 2 HRA approach, the initial outcomes of the assessment including any proposed

[31] PINS Advice Note 10: Habitats Regulations Assessment relevant to nationally significant infrastructure projects

mitigation measures and how the measures will be implemented. All feedback received will be reflected within the version issued to NE.

Following Statutory Consultation, the draft Stage 2 HRA will be updated to incorporate changes in the design of the HWTWRP. The finalised Stage 2 HRA will be included as part of the DCO submission. Where mitigation measures are required, they will be agreed with relevant stakeholders in advance of the DCO submission.

## 4.3 Environmental Impact Assessment (EIA)

A statutory EIA is currently underway in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, the EIA Scoping Report, Scoping Opinion (Planning Inspectorate, 2023) and relevant Planning Inspectorate Advice Notes. The EIA includes an assessment of the following topics: air quality and odour, archaeology and heritage, terrestrial, freshwater and marine biodiversity, carbon and climate change, land quality, land use and agriculture, landscape, noise and vibration, resources and waste management, traffic, water, socioeconomics and major accidents and disasters. The preliminary findings of the EIA are presented within the PEIR, published as part of the Statutory Consultation exercise and report on baseline conditions (including results of available surveys) and provide a preliminary assessment of LSEs and emerging proposals for mitigation.

The EIA and Scheme Development processes will have regard to feedback from both statutory consultees, as defined in the Planning Act 2008, and the local community through an extensive programme of engagement and consultation. Environmental TWGs have been established with the EA, MMO and NE to discuss aspects of relevance to these bodies, for example scheme development, watercourse crossings or survey methodologies. Further to this, five EIA Working Groups have been set up to facilitate engagement with statutory consultees, i.e. Local Planning Authorities, the EA, NE, Historic England (HE) and the MMO. Five rounds of meetings have been held with these groups, as of January 2024, to discuss and agree the scope of surveys, assessment methodologies and matters regarding EIA scoping. This engagement will continue to support the EIA process by enabling feedback to be provided on an ongoing basis on scheme development, baseline data, assessment methodology, impact significance, potential mitigation measures and monitoring requirements. Numerous regular meetings have also been held with the Planning Inspectorate to provide project updates, summarise emerging findings from scheme development and EIA and to ensure compliance with the DCO process.

## 4.4 National Parks, The Broads and Areas of Outstanding Natural Beauty

The strategy for assessing and addressing any impacts arising from the HWTWRP within National Parks and Areas of Outstanding Natural Beauty (AONB) are to be directed through the EIA process which includes an embedded LVIA. This will consider any impacts that would arise from construction, operation and decommissioning of the HWTWRP on landscape receptors, and the statutory purposes for which the areas are designated. Appropriate mitigation measures will be identified to minimise potential impacts.

Site and route selection ensures that the HWTWRP is not located in any nationally designated areas, however, indirect effects on the South Downs National Park (adjacent to sections of the HWTWRP) and Chichester Harbour AONB (750m east of the eastern end of the HWTWRP) will be considered within the LVIA and EIA. The Broads are located approximately 240km north-east of the HWTWRP and is therefore out of scope of the LVIA and EIA. The relevant legislation, planning polices and guidance which underpins the LVIA and EIA methodology are outlined in the EIA Scoping Report submitted on 21 July 2023[30].

As detailed in the EIA Scoping Report, the landscape character within the LVIA study area has been considered in detail from national to local scale. Local Landscape Character Areas (LLCA) have been defined as part of the LVIA process and will be used to provide additional detail and a consistent scale against which to assess the effects of the HWTWRP and to inform design development. This has included identifying opportunities to deliver environmental net gain by strengthening and enhancing the existing green infrastructure network. Maps and schedules of the LLCA have been issued to local planning authorities for comment and have been confirmed prior to preparation of the PEIR.

‘Zones of Theoretical Visibility’ have been used to help identify groups of visual receptors within the LVIA study area. Initial winter fieldwork was conducted between February and April 2023 which has identified representative viewpoints that will be used for these receptors. Subsequent winter and summer fieldwork is planned to capture photography to support the LVIA and EIA. The imagery will be used to illustrate relevant viewpoints in the ES, to inform the emerging design and enable assessment of the likely effects of the HWTWRP in all seasons. The PEIR chapter will not include a completed LVIA, however, it will include a preliminary appraisal of landscape baseline and effects, and visual baseline and effects.

Comments received in response to the EIA Scoping Report, on-going statutory stakeholder engagement through the Historic Environment and Landscape EIA Working Group and public consultation will be used to inform the ongoing LVIA and EIA. The LVIA will be used to determine mitigation requirements which, where possible, will be designed to realise additional benefits including BNG. Mitigation proposals will be captured in the mitigation register and managed accordingly to minimise visual impacts of the HWTWRP through ongoing design development. Final reporting will be presented in the ES, which will be submitted as part of the DCO application.

## 4.5 Other Environmental Considerations

This sub-section should be read in conjunction with Chapter 2: Solution Design, namely Design Principles which outlines the project vision and preliminary design principles for the project.

SW has committed to contribute to and enhance the natural environment by providing meaningful net gains for biodiversity. Landscape design proposals will seek to deliver the best outcomes for biodiversity and achieve the greatest proportion of the project-level BNG commitment as practicably feasible. To help deliver BNG, a strategy will be developed to align with wider SW ambitions considering any national and local policy requirements. Biodiversity and environmental net gain are included within the principles for design and have underpinned the maturity of the HWTWRP since the Gate Two Submission. An Outline Environmental Masterplan showing potential zones for biodiversity and environmental enhancement was presented as part of the Statutory Consultation.

A mitigation hierarchy approach is applied throughout the development process. In the first instance, avoidance is considered to ensure that losses are minimised, particularly in relation to protected habitats and species, and habitats of very high value and distinctiveness. Phase 1 Habitat Surveys and National Vegetation Classification Surveys undertaken along the HWTWRP route have been used to guide the development process to Statutory Consultation. The outcome of surveys completed to date will be presented within the PEIR and will continue to be used to assess potential losses and therefore identify and inform mitigation measures required to reduce any impacts. The information from these surveys will also help inform the Outline Environmental Masterplan.

The Outline Environmental Masterplan will set out the broader constraints, potential mitigation and enhancement opportunities which exist within the HWTWRP. This could include, for example, the wetland habitats that line the river corridors and existing areas of chalk grassland on Portsdown Hill. This will ensure the requirements of the Environment Act 2021 and any national and local planning policy requirements set out in the National Policy Statement for Water Resources Infrastructure (NPSWRI) and/or framework[8] are fully considered.

As part of the commitment to biodiversity and environmental net gain, the HWTWRP will aim to deliver the following:

- Avoiding or minimising wherever possible the loss of Very High and High distinctiveness habitats, including Habitats of Principal Importance;
- Avoiding or minimising wherever possible, direct and indirect impacts on statutory designated sites and irreplaceable habitats;
- Seeking to restore habitats where possible to achieve like-for-like or better; and
- Targeting habitat types that locally achieve like-for-like or better when offsetting biodiversity.

A key aim is compliance with good practice in BNG delivery throughout the project life cycle. This includes adherence to the mitigation hierarchy approach whereby impacts to biodiversity are avoided or minimised, and on-site areas of biodiversity are retained and enhanced wherever possible. Where BNG cannot be delivered on-site, the net gain requirement shall be delivered off-site (offsetting). Where offsetting is required, the focus will be on identifying any Local Nature Recovery Strategies, Biodiversity Opportunity Areas (BOAs) and partnering with existing organisations including wildlife groups and local councils to ensure needs of the local area are met in accordance with any local strategies in place at the time.

Stakeholder engagement on biodiversity and environmental net gain will be undertaken via existing engagement forums including the Environmental TWGs and EIA Working Groups set up with both local planning authorities and other environmental regulators. This specific engagement has taken place in advance of Statutory Consultation and will continue up to the submission of the DCO. These engagement activities will help identify and provide opportunities for partnership working, building upon existing enhancement initiatives and ensuring that any enhancements proposed do not conflict with existing projects within local authorities. Opportunities for wider benefits such as carbon sequestration and reducing flood risk will be considered, as well as utilising existing SW partnerships where possible.

## 4.6 Environmental Regulators: Statutory Planning Consultee Roles

The EA and NE are statutory consultees within the planning system and therefore, as part of the EIA process, engagement with these consultees has been and continues to be undertaken. Bespoke advice as part of the HWTWRP in accordance with the pre-application advice agreement has been welcomed as well as attendance at

Environmental TWGs which are held monthly, and at the EIA Working Groups at key stages within the EIA Programme. The key milestones for environmental activity can be found in Chapter 6: Programme and Planning which have been reviewed and consulted upon by statutory consultees.

The EA has also provided bespoke advice on Environmental Permitting in accordance with its pre-application services in relation to the WRP and its associated Environmental Permit requirements. Engagement with the EA has been ongoing since Gate Two and will continue throughout the development of the WRP Environmental Permitting process.

Advice provided by environmental regulators on any environmental information used to support the RAPID gated process has been given on a 'without prejudice' basis to any future advice they provide in fulfilling their statutory planning consultee roles or in determining any other regulatory consent, environmental permitting applications or other licence requirements. SW is working collaboratively with environmental regulators to ensure that any environmental information requirements are addressed principally through the DCO consenting process.

# 5. Carbon

## 5.1 Carbon Assessment

The HWTWRP has the potential to deliver significant water security benefits, however, this involves activities through its construction and operation which will have associated carbon emissions.

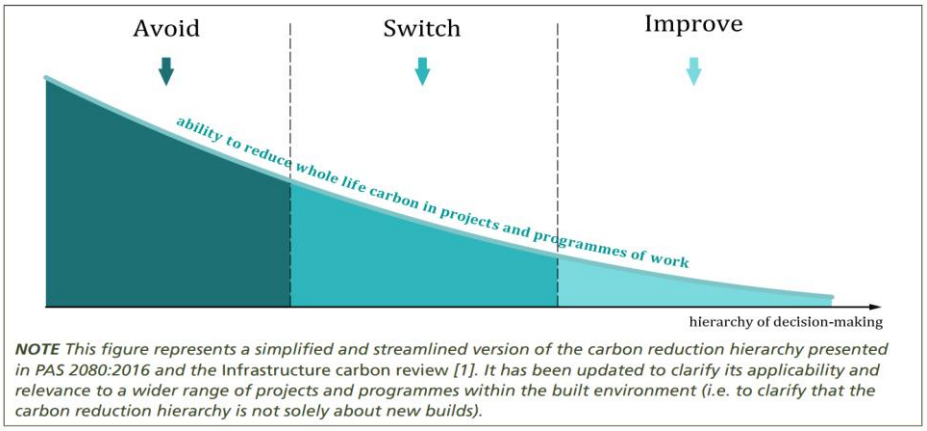


*Figure 5-1 - PAS2080:2023 Carbon Reduction Hierarchy*

The carbon assessment undertaken for the HWTWRP has been informed by RAPID's Strategic Water Resource Solutions Guidance for Gate Three[32], the NPSWRI[33] and broadly followed industry guidance such as PAS2080:2023[34] (see Annex 5: Carbon Management Overview). The decarbonisation reduction hierarchy (Figure 5-1) has been followed to identify opportunities to mitigate carbon impacts of the scheme, as well as focussing efforts on reducing emissions before offsetting them[35].

Decarbonisation efforts have been split into two areas:

- Short-term opportunities directly under the control of the project team, including areas which can reduce emissions through design decisions that can be embedded and costed into the scheme; and
- Longer term opportunities where the scheme and sector can influence external systems and supply chains to decarbonise major components of the scheme. These mitigation opportunities have been covered by a collaborative project commissioned by the ACWG[36] which has identified a consistent view across SROs of how these external systems can be decarbonised in the future.

It is acknowledged that the majority of capital and operational carbon emissions associated with the HWTWRP are considered to be Scope 3 emissions (as described in Annex 5: Carbon) and outside of the direct control of the water companies and the project team. However, it is also acknowledged that there are opportunities to work with

[32] RAPID Strategic Regional Water Resource Solutions Guidance for Gate Three Version 3 January 2024
[33] National Policy Statement for Water Resources Infrastructure Defra April 2023
[34] Carbon management in infrastructure and built environment 2023 – PAS 2080
[35] The GHG Management Hierarchy, as detailed by the Institute of Environmental Management and Assessment (2020 version), is a framework organisations can use to guide the scoping and strategic planning of their energy and carbon management activities.
[36] ACWG Carbon Ambition December 2022

the project supply chain (prior to scheme delivery) to support accelerated decarbonisation of external systems and supply chains to help reduce the carbon impact. For example, incorporating the use of low-carbon pipe materials (that meet performance requirements) into project design which requires engagement and commercial arrangements with the supply chain. It is recognised that the selection of such materials cannot be directly controlled through delivery but will be influenced through examples such as the selection of design parameters or contractual mechanisms.

Carbon management goals for the HWTWRP and the broader WfLH programme are to:

- Ensure alignment with SW's net zero ambitions;
- Establish a capital, operational and whole life carbon baseline assessment using the latest design information developed for Gate Three, ensuring it is aligned to latest guidance[32] and emissions factor sources quoted in the RAPID guidance. The aim is to ensure the assessment transparently follows guidance on emissions factors, scope boundaries and use of assumptions to fill gaps consistent with PAS2080 guidance (for example, the appropriateness of using spend-based intensity factors when tackling uncertainty within the scope). The results of this assessment are presented in this chapter;
- Review differences between the baseline carbon assessment produced for the Gate Two submission and the updated baseline assessment produced for Gate Three;
- Draw insights from the Gate Three updated baseline assessment to communicate major emissions hotspot sources with relevant stakeholders;
- Establish an approach to renewable energy generation and offsetting;
- To maintain communication with stakeholders and customers, actions that have already been incorporated into the design to mitigate emissions;
- Communicate future recommendations to design teams to further mitigate emissions at later stages;
- Establish a stakeholder engagement plan that demonstrates how the HWTWRP (in future stages) could influence external systems (e.g. supply chain) to support carbon reduction ambitions, whilst acknowledging these will remain outside of the project team's control;
- Highlight uncertainties in decarbonisation potential and cost impacts of implementing decarbonisation technologies and how these uncertainties will be monitored over time;
- Collaborate with the value chain to inform a best value approach when considering the climate resilience of the scheme; and
- Explore approaches for monitoring carbon emissions throughout project implementation.

In the next stages of design development, the HWTWRP team will continue to evaluate carbon mitigation opportunities in line with sector and national net-zero commitments and to ensure alignment with SW's net zero ambitions. This will involve assessing the feasibility of mitigation opportunities previously identified (see Annex 5: Carbon) against various metrics (e.g. cost, commercial availability, performance etc.).

### 5.1.1 Uncertainty in Carbon Estimates

There is inherent uncertainty in carbon estimating due to the developing maturity of carbon accounting practices and associated data. Additionally, by the nature of the HWTWRP being in its development stages, there is further inherent uncertainty. An example of this is the level of design information available at given stages within the project lifecycle.

Currently, there is no standardised or established guidance on how to assess uncertainty in carbon estimates in a consistent manner. Directly applying a range of cost estimates and including optimism bias would likely overstate the level of uncertainty. Consequently, uncertainty estimates will be reviewed and refined at future stages of design development to build on any maturing industry wide efforts in the area of carbon accounting to better assess uncertainty in carbon estimating.

## 5.2 Whole-Life Carbon

The outputs from the capital and operational carbon assessments (as set out in Annex 5: Carbon) have been used to inform a whole-life carbon assessment of the HTWWRP. To align with the HWTWRP whole-life cost estimates, whole-life carbon has been assessed over 80 years as per ACWG guidance[37]. The 80-year period for carbon calculations has been divided into the following key periods:

- A four-year planning period prior to construction (2025-2028);
- A five-year construction period (2029 – 2033) for which the initial construction period capital carbon emissions have been included. It is currently assumed that the total capital carbon is split evenly between these five years; and

[37] Cost Consistency Methodology: Technical Note and Methodology, ACWG February 2022

- A 71-year operation period (2034– 2104) for which the replacement capital carbon emissions as set out in the ACWG asset class life categories and the annual operational carbon emissions have been assessed.

While capital carbon associated with asset replacements has been considered (Annex 5: Capital Carbon) the quantified assessment does not include an estimate of the potential impact of decommissioning the scheme. Given the expected operational life duration assumption, it is considered that systems in place to re-use, recycle or dispose of assets could be different to present day.

A summary of the estimated whole life carbon emissions for the HWTWRP tunnel options as described in Chapter 2: Solution Design, has been calculated (Table 5-1). This indicates that over the 80-year period, the capital carbon emissions of the scheme account for ~14-16% of the whole life emissions, with a further 6% associated with capital replacement of the assets.

The 'Operational carbon – non-power' category includes emissions associated with chemicals, operational maintenance and operational transport, and is assumed to be constant each year for the purposes of this analysis (see Annex 5: Carbon for more detail).

*Table 5-1 - Summary of whole-life carbon emissions over an 80-year period as defined by PAS 2080:23[34].*

| Category | Preferred Tunnel Option | | Backup Tunnel Option | |
|---|---|---|---|---|
| | $tCO_2e$, whole-life period | % of $tCO_2e$, whole-life period | tCO2e, whole-life period | % of $tCO_2e$, whole-life period |
| Capital Carbon | 100,800 | 15% | 115,900 | 17% |
| Capital Replacements | 42,600 | 6% | 42,300 | 6% |
| Operational carbon - power | 14,600 | 2% | 14,600 | 2% |
| Operational carbon - non-power | 529,000 | 77% | 529,200 | 75% |
| **Total** | **687,100[38]** | **100%** | **702,100[38]** | **100%** |

The 'Operational carbon – non-power' category includes emissions associated with chemicals, operational maintenance and operational transport, and is assumed to be constant each year for the purposes of this analysis (See Annex 5: Carbon). Capital carbon emissions are driven by the installation of either tunnel option and the pipeline between HTR and Otterbourne WSW.

The majority of whole-life carbon emissions are associated with the chemical dosing at the WRP, accounting for approximately 75-77%. Furthermore, the capital carbon emissions account for 15-17% of the total whole-life carbon emissions. The emissions associated with asset replacement total approximately 6% of the whole-life carbon emissions, and the emissions associated with power consumption (of the WRP, HLPS and IPSs) account for the remaining 2%.

Whole-life carbon emissions of these solutions is a key component of the Best Value Planning[10] approach incorporated into options appraisal as part of the WRSE revised draft Regional Plan and as set out in Chapter 8: Solution Costs and Benefits. A comparison of the changes in whole life carbon emissions from the estimate at Gate Two and the monetised carbon costs of both tunnel options are detailed in Annex 5: Carbon.

## 5.3 Carbon Reduction Opportunities

### 5.3.1 Carbon Mitigation Opportunities Currently Under Review

The Preferred Tunnel Option design demonstrates the greatest opportunity to minimise capital carbon whilst delivering project core objectives. This option has been identified through collaboration with PW and includes the development and delivery of the Preferred Tunnel Option containing the associated pipework that can be used by both companies. By progressing the Preferred Tunnel Option, a net reduction in carbon emissions of approximately 15,100 $tCO_2e$ is expected (equating to ~13% of Preferred Tunnel Option total capital carbon emissions), as the construction of a second tunnel can be avoided.

To mitigate operational carbon, the HWTWRP team are analysing the prospect of installing a small solar farm adjacent to the WRP, which ongoing analysis suggests may provide 2MWh/year (6% and 4% reduction in annual power operational emissions, pre- and post-T2ST respectively). However, if implemented, further analysis would be required as to the potential impacts of land use change. Furthermore, the HWTWRP team are also investigating remineralisation targets that recycled water would be required to achieve to ensure compliance with ecological

[38] $tCO_2e$ have been rounded to the nearest 100 and therefore totals presented may result in variance +/-200 $tCO_2e$.

water quality standards. Optimising how these targets are met would provide the potential to reduce the type and/or quantum of chemicals required for remineralisation and thus minimise the operational carbon footprint of the WRP. Emissions associated with chemical transportation may also be reduced by balancing and optimising both chemical delivery frequency with on-site storage. These future opportunities will be considered as part of the DCO application and ongoing optimisation will be incentivised through the contract tender process.

### 5.3.2 Future Carbon Mitigation Opportunities

Multiple carbon hotspots have been identified for both operational and capital carbon emissions (as set out in Annex 5: Carbon). To identify any additional opportunities for carbon management, 'mitigation workshops' have been organised to focus on hotspot areas. A sample of the opportunities identified which will inform future strategic priorities as the design continues to be developed have been identified (Table 5-2).

*Table 5-2 - Examples of carbon reduction opportunities*

| Scheme Hotspot | Aspect | Carbon Mitigation Opportunity | Carbon Reduction Hierarchy Category | Carbon Emissions Type |
|---|---|---|---|---|
| Pipelines | Design / Materials | Explore low-carbon pipe materials | Switch | Capital |
| Pipelines | Construction plant | Low-carbon construction plant (Hydrotreated Vegetable Oil (HVO) / hydrogen / electric) | Switch | Capital |
| Pipelines | Design / Construction method | Utilising the reuse of as-dug material | Improve | Capital |
| Tunnels | Design | Continue to review requirement for intermediate shafts ('avoid' construction of a shaft if not necessary) | Avoid | Capital |
| Tunnels | Materials | Alternative use for tunnel spoil (e.g., flood defence), rather than disposal | Improve | Capital |
| Tunnels | Design / Materials | Explore low-carbon precast segments / rebar | Switch | Capital |
| AGP | Design / Materials | Continue to optimise BPT cell size | Avoid | Capital |
| WRP | Design / Operation | Continue to look at optimising remineralisation targets, potentially reducing carbon-intensive chemical use | Avoid | Capital and Operational |
| WRP | Materials | Low carbon materials for roads / building frames | Switch | Capital |

It is recognised that identified carbon mitigation activities will need to be delivered by the CAP in conjunction with SW. These measures are to be considered as part of the procurement and commercial strategy being developed for DPC (Chapter 7: Procurement and Operation).

Solution costs and carbon estimates have been aligned with the carbon mitigation measures already assessed for feasibility and viability being included within the estimates presented for Gate Three. However, most carbon mitigation measures are still progressing through a design viability assessment, and if confirmed, will be accounted for in future solution costs and carbon estimates. This design viability assessment process will include considering the cost impact of mitigation measures alongside other metrics and constraints.

A RACI matrix has been developed to define responsibility for carbon mitigation opportunities in scheme development (Annex 5: Carbon). In order to successfully minimise emissions, the asset owner, designer, constructor and suppliers involved in the HWTWRP will need to take some level of responsibility, rather than each opportunity measure being attributed to one stakeholder.

Forecast whole-life carbon emissions associated with the HWTWRP will continue to be monitored and quantified in greater detail as the design progresses. This will be performed in accordance with PAS2080:2023 and the carbon management principle of continuous improvement (Clause 11)[34]. In the approach to the DCO application, the approach to quantification of emissions reported in this submission will be reviewed and built upon, with limitations being highlighted to inform future carbon management activities.

### 5.3.3 Risks to Carbon Mitigation

Reduction of carbon emissions requires continued movement away from traditional business-as-usual approaches to delivering infrastructure. This will require engagement with a wide range of stakeholders and the supply chain to

generate new ideas and overcome barriers to mitigation measures (for example, assessing performance requirements of low-carbon pipe material).

As stated in the ACWG Carbon Ambition study[36], the use of low carbon fuel for construction will require early engagement with the supply chain. Manufacturers of construction plant may be reluctant to invest in alternative fuel technology until there is a clear demand for its use as well as confirming a secure source of alternative fuels.

In this regard a commitment to use low carbon earth moving equipment for the duration of construction provides a stronger business case for manufacturers to invest in lower carbon vehicles and plant. There is opportunity to seek collaboration across the WfLH programme and other infrastructure stakeholders to identify further opportunities and benefit from economies of scale.

As noted in the ACWG study[36], fuel supplies are also a constraint. HVO is not produced in reliable enough supplies nor is green hydrogen readily available on the market. A commitment to purchase sizeable volumes across a 4–5-year construction programme could provide the economic stimulus for suppliers to meet demand but requires engagement well in advance of construction start. A scheme of this size could be seen as an opportunity to test a sample of alternative vehicles, if full deployment does not become technically or commercially feasible at the point of construction start, in order to deliver lessons learnt for future schemes.

Low carbon pipeline materials will require early engagement with suppliers. Suppliers of pipeline materials will want confidence that contractors will approach them during bidding stage to procure low carbon materials. The construction contracts will need to incentivise prospective contractors to engage with their suppliers to source low carbon alternatives. Asset owners can play a key role through incentivising these low carbon materials (not only for the example of pipelines given here, but also other assets, e.g. tunnel wall material), whilst designers should ensure that the use of low carbon materials is not prohibited.

Overall, engagement with the supply chain and policy makers will help to develop an environment and marketplace where low carbon alternatives are prioritised, and collaborative efforts are made to ensure the implementation of these alternatives is cost-effective.

# 6. Programme and Planning

## 6.1 Project Plan

The project plan details optimised project activities to ensure delivery of the solution to achieve regulatory dates, as set out in the upcoming revised draft WRMP24. To achieve this the HWTWRP needs to consider key dependencies and risks, which are used to inform the project schedule and ensure forecast benefits can be realised.

This chapter sets out the project schedule and key project milestones at Gate Three, demonstrating risks and mitigation activities that have been used to inform the HWTWRP delivery and progress made. It provides an overview of the planning strategy, land procurement activity and key outcomes the project plans to achieve as it proceeds towards DCO submission.

### 6.1.1 Project Schedule

At Gate Two, the HWTWRP adopted a deterministic schedule development methodology. This followed a ‘rolling wave’ process of iteratively refining the schedule using the best information available at that time. This enabled the HWTWRP to develop an estimate of each activity's duration, then engage the supply chain to seek their input, and finally to contract those services. This provides progressively better information at each stage of the scheduling process, with each stage further refining the schedule.

Since Gate Two, the HWTWRP has matured its approach from deterministic to probabilistic scheduling, in accordance with best practice for the management of major projects[39]. This has been achieved by integrating the project schedule with the risk register. In doing so, the impact of each risk can be modelled against each of the schedule activities. This enables a Monte-Carlo type, Quantitative Schedule Risk Analysis (QSRA) to be performed. The output of this analysis produced a range of delivery dates, with associated modelled probabilities of achievement. The outcome of the QSRA provides “operational ready” (project completion) dates ranging between 2032 and 2036, contingent on a range of modelled likelihoods. Further detail on this process can be found in Annex 6: Programme and Planning.

[39] ISO 31000 — Risk management

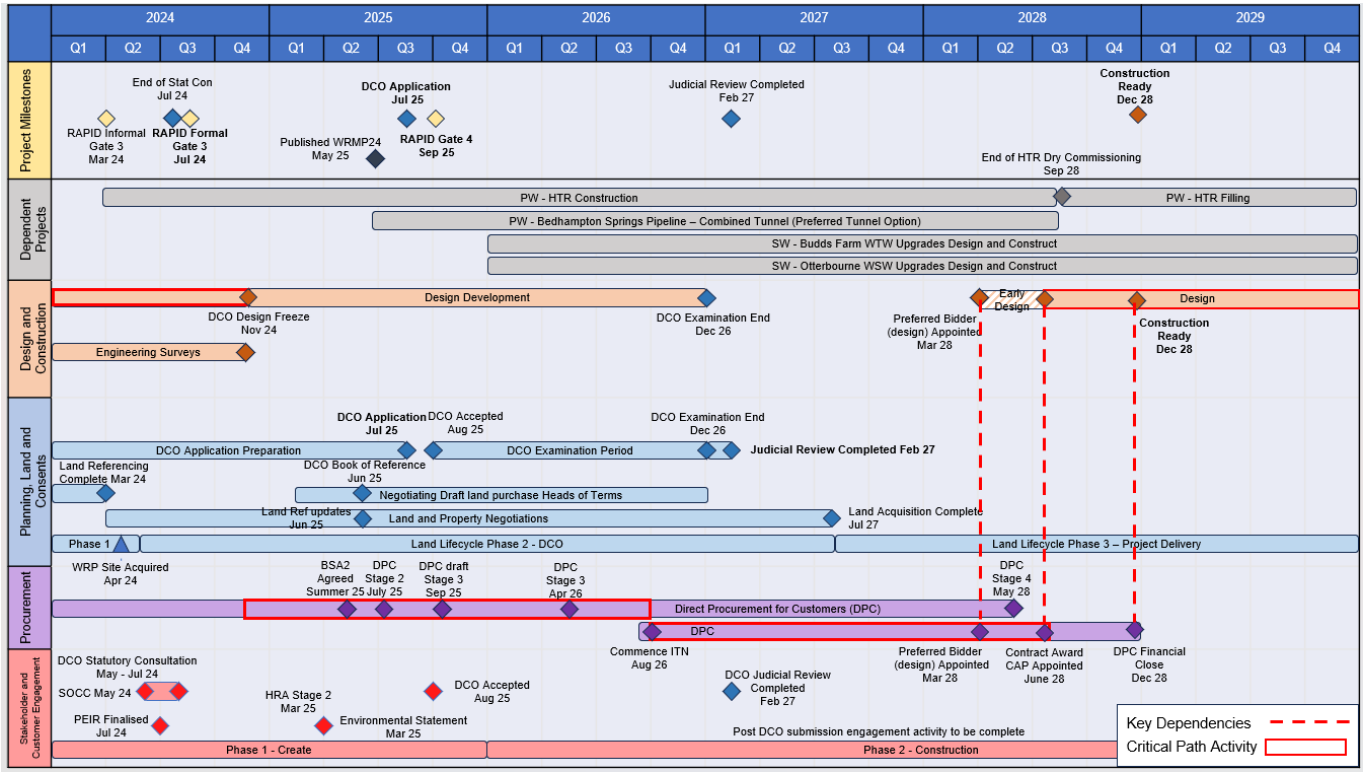


*Figure 6-1 – The HWTWRP P80 Programme Schedule to construction ready date.*

For the Gate Three submission, “construction ready” and “operational ready” dates presented in Figure 6-1 will be the primary dates referred to. Probabilistic dates have been shared with RAPID through regular checkpoint meetings, explaining the associated likelihood, risks and mitigations that drive them. Until planning approval is secured, the project timeline considers both the Preferred and Backup Tunnel Option within the schedule as set out in Chapter 2: Solution Design.

The current risk-weighted project schedule “construction ready” date is forecast as December 2028 with an “operational ready” forecast of March 2034. The “operational ready” date will allow SW to achieve the regulatory date as set out within the upcoming revised draft WRMP24 and in accordance with the WRSE revised draft Regional Plan. These dates are determined through the QSRA model runs, which identified that in 80% (P80) of the model runs, these dates would be achieved. These dates are established as the baseline for the “operational ready” milestone within the schedule.

The HWTWRP team are working to a mitigated project schedule, which would enable the achievement of an earlier “construction ready” date resulting in an alternate “operational ready” date of April 2033. However, these dates are only achieved in 50% (P50) of the model runs and is therefore being used only as an internal stretch target for the HWTWRP teams. Progress against this date will be provided to RAPID through regular checkpoint meetings and the quarterly liaison meeting.

To achieve the “construction ready” and “operational ready” dates identified, successful mitigation of the key risks identified in Section 6.2 must be realised. These risks are being actively managed by the HWTWRP team, and the schedule updated to reflect successful implementation of risk mitigation plans.

The project schedule at Gate Three (Figure 6-1) has been developed using the probabilistic forecasting approach and is used to inform project delivery, focussing on the mitigation of critical risks identified. The schedule represents key project activities, key dependencies and the critical path for delivery. This project schedule is a live document which is continually under review and updated at least monthly by the delivery team. A project schedule is provided in Annex 6: Programme and Planning which sets out the project activities required to achieve the key milestone dates.

### 6.1.2 Planned Construction Activities

Since Gate Two, construction contractors have been commissioned to independently create an indicative design, construction, and commissioning plan. This has enabled the development of a detailed delivery plan that has been supporting the preparatory works towards the DCO application and has validated current activity durations within the schedule (Annex 6: Programme and Planning). This has been further supported by industry experts, through

the development and validation of the assumed PEIR development, Statutory Consultation, CAP market engagement, CAPA drafting, BSA negotiation tunnelling, WRP construction, WRP commissioning, durations. This assurance has further increased the robustness of the project schedule and the forecast P80 “operational ready” date of March 2034.

The project design will be frozen prior to DCO application to provide a consistent design through the DCO examination period. The design may be subject to minor amendments in response to queries of the DCO examination, however this design will make up that which is provide to the CAP, once appointed, without further amendments post examination.

### 6.1.3 Progress Against Plan

As regularly communicated to RAPID, the HWTWRP continues to deliver to the revised plan presented in the Gate Two Interim Update (Annex 8C: Solution Costs and Benefits) so as to achieve the upcoming revised draft WRMP24 dates. Key project milestones as presented at Gate Two (Table 6-1), have been updated to reflect movements that have occurred due to solution evolution, changes in water resource modelling requirements (described in Chapter 2: Solution Design) and the maturing from a deterministic to a probabilistic schedule approach. These changes have been predominantly driven by the WRSE revised draft Regional Plan and upcoming revised draft WRMP24 to ensure availability of the solution at the time and volume required.

*Table 6-1 - Key Project Milestones compared to Gate Two*

| Key Milestones | Gate Two Deterministic Forecast | P80 Gate Three Probabilistic Forecast | Gate Three RAG Status |
|---|---|---|---|
| EIA scoping opinion to PINS | *February 2022* | *July 2023* | Complete |
| Gate Three submission | *December 2022* | *March 2024 informal*<br>*July 2024 formal* | G |
| DPC Stage 2 submission | *January 2023** | *June 2025* | A |
| DCO application submission | *November 2024* | *July 2025* | G |
| Gate Four submission | *January 2024* | *September 2025* | G |
| Construction ready | *May 2026* | *December 2028* | G |
| Operational ready | *November 2030* | *March 2034* | G |

As observed via the Table 6-1 RAG status, with the exception of the DPC Stage 2 submission, the updated Gate Three key project milestones are currently on track. DPC Stage 2 submission has been delayed as communicated with Ofwat and RAPID. This is a key area of risk and is being actively monitored to ensure no further delays to activity are realised. Further detail of DPC development and current progress is outlined in Chapter 7: Procurement and Operation Model.

### 6.1.4 Key Dependencies

Several key project dependencies must be overcome to ensure the HWTWRP can be delivered in line with the “operational ready” date. These include:

- HTR completion alongside associated tunnels and pipelines (HTR dry commissioning);
- The filling of HTR with spring water (wet commissioning) takes longer than the 3 winter seasons forecast.
- Upgrades at Budds Farm WTW and Otterbourne WSW. This is an internal dependency being managed by SW Capital Delivery; and
- The Distribution Network Operator (DNO) is required to upgrade the associated power infrastructure capacity to ensure that the tunnelled sections of the pipeline can be constructed, and the WRP and associated pumping stations can operate.
- Although not a true dependency, there is a link dependency between the DCO and the DPC processes which will inform market confidence and bidder appetite for the procurement of the CAP. CAP appointment is critical for construction to begin.

The HWTWRP team is engaging with the broader project teams within SW to ensure in-house activities are delivered on time. These dependencies are captured and monitored as part of the project plan, tracked within the risk register and some have been identified as being on the critical path to the HWTWRP delivery.

### 6.1.5 Outstanding Information

As part of the DPC process, a detailed understanding of the requirements between contract award and financial close are still to be developed. Market engagement has been held throughout Gate Three between SW and prospective bidders which has also informed elements of the project schedule (see Chapter 7: Procurement and Operation). For example, market engagement has driven a decision to increase the forecast duration for financial close from 3 to 6 months.

Further market engagement is planned to inform potential bidders of SW's HWTWRP expectations and in return get an even better understanding of how long will be required for this activity. This will also explore the potential for activities such as development of detailed design that could be undertaken in parallel with the aim of further accelerating the schedule and/or mitigating the risk of additional delays (see Chapter 7: Procurement and Operation).

As discussed in Chapter 3: Drinking Water Quality, a revision to HTR bathymetry modelling is required to reflect changes in HTR design. This modelling data is a critical component of the water quality assessments that are taking place, which need to be complete so that the DWSP can continue to be developed. Updated modelling and outputs of the iterative DWSP process will be shared and discussed with the DWI as part of the routine water quality meetings covering the shared methodology between SW and PW.

## 6.2 Key Risks and Mitigation Measures

### 6.2.1 Key Scheme Risks

Key risks to solution progress are set out below. These are actively managed within the HWTWRP risk register and are consistent with quarterly dashboards presented to RAPID (most recently in June 2024). Risks are identified at both WfLH programme and scheme level and have been used to shape current design and procurement activities. The prioritisation of risk is determined by the impact that each would have on the HWTWRP delivery date, if realised (Table 6-2). Those risks deemed significant to the end Operational Ready date are deemed Key Risks as shown below. The HWTWRP risk management approach is set out in Annex 6: Programme and Planning.

*Table 6-2 - Key Scheme Risks prioritised by impact to the HWTWRP delivery date.*

| Risk Category (and ID) | Risk Description | Score | Mitigation Action | Score |
|---|---|---|---|---|
| Planning, Consents and Stakeholder Approvals - 006 | Failure to achieve the required regulatory approvals within the assumed timescales within the latest project schedule could result in increase in activity durations and therefore lead to the delay in delivering the scheme. | 21 | Ensure direct consultation with the relevant stakeholders to respond to the points raised in Non-Statutory Consultation, providing early sight of DPC activities, demonstrating how requirements are being met and proactively aligning Gate Four requirements with ongoing activity. | 19 |
| Procurement & Commercial - 064 | The DPC procurement process fails to attract an acceptable bid (or any bid) leading to repeat/part repeat of the DPC procurement process or additional negotiation resulting in rework with associated time, cost and resourcing impacts. | 22 | Continue engagement with market and stakeholders to develop a contracting and funding mechanism that meets the needs of all parties. SW Resource planning at programme level. | 18 |
| Construction: Ground and Environmental Condition - 150 | Risk of encountering contaminated land over and above that assumed in the solution cost estimate, which may involve additional disposal. This could increase cost and delaying the groundworks. | 22 | Targeted Ground Investigation surveys to localise extent of contaminated ground | 16 |
| Legal - 062 | A judicial review is raised on the lawfulness of any DCO consent granted by the Secretary of State, leading to delay to detailed design and project construction. | 18 | The HWTWRP will maintain legal compliance with the required procedures and processes to align with best practice. These processes with be documented and recorded to demonstrate that they have been followed. Ongoing legal advice sought to ensure a robust process is being followed for submission and through examination to consent. | 15 |
| Planning, Consents and Stakeholder Approvals - 007 | Insufficient DNO capacity to provide power for construction and operations at the Water Recycling Plant and associated Pumping Stations, and tunnelling activities. This will lead to additional upgrade costs and a programme extension to provide back up solutions for construction and operational power. | 24 | Investigate and agree initial single supply in time for construction using TBMs, with backup provided in time for commissioning<br>Investigate the potential for using Transition Funding route in the event that SSE are able to accelerate | 15 |
| Bulk Supply Agreement - 184 | Bulk Supply Agreement. There is a risk that a Bulk Supply Agreement (BSA) is required by the SRO but is not in place via the DPC process. | 22 | Continued discussions with relevant stakeholders, including legal and technical advice on timing and negotiation requirements. | 15 |
| Reputation and Public Perception - 185 | There is a risk that specific areas of challenge arise over water quality concerns. Customers in the receiving area do not find the source of water acceptable | 22 | Specific stakeholder management around water quality using existing modelling data and similar schemes in operation . Benchmarking research shows that customers are generally accepting of water recycling. | 15 |

| Risk Category (and ID) | Risk Description | Score | Mitigation Action | Score |
|---|---|---|---|---|
| Land - 089 | Compensatory habitats are assumed not be required in relation to the WRP. Should this assumption prove to be incorrect additional costs and potential delays may be incurred depending on the habitat required. The DCO Limits would need to be changed due to the additional land required for net gain or compensation requirements and landscape mitigation / enhancements. | 18 | Continue to develop the HRA using the support of a specialist consultant and engagement with regulators and key stakeholders on its development. This will confirm the extent to which compensatory habitats might be required, and provide a more definitive cost estimate where necessary. | 10 |
| Land - 037 | SW requires consent and assistance (removal of livestock, etc.) from landowners to access their land, for environmental and engineering surveys. Some consents will be short-term, with others being longer term to allow seasonal monitoring to be performed, with access needed for equipment decommissioning and recovery at the end of the surveys. If Land Access contracts are not in place for phase 3C - Ground Investigation, then surveys will be delayed, with a consequential delay to the Environmental Statement | 19 | Ensure robust, proactive and early engagement with all stakeholders and landowners to reduce risk of impact. Statutory powers notices for access through external party contract. | 9 |
| Planning, Consents and Stakeholder Approvals - 019 | Should objection to the scheme other than that currently assumed, not be managed effectively between the Statutory Consultation and DCO submission, this could result in programme delay. | 18 | Undertake detailed land referencing work to identify landowners to enable engagement to take place. Mobilise additional staff to support analysis and triage of feedback to inform future stakeholder engagement. Effectively demonstrate a robust site selection process. Ensure robust pre-application engagement. | 6 |
| Procurement & Commercial - 093 | The schedule relies on a member of the CAP group commencing detailed design ahead of a contract signature.<br>It is assumed, following discussions with Ofwat and market engagement where this was identified as standard practice, that CAP will agree to this, without assurance that SW will refund costs if financial close is not achieved. | 25 | Identify additional funding mechanisms to support activity scope that would be required ahead of contract signature. Negotiate position with CAP to agree handling of instance when financial close not achieved. Agree method to fund CAP for nugatory work. Call out as Preferred bidder (design) in the schedule for parallel activity. | 0 |

### 6.2.2 Key Risks to Cost and Benefit

The solutions costs at Gate Three are presented in Chapter 8: Solution Costs and Benefits, demonstrating the considerations to determining cost and the considerations and inclusions made for the risks that would otherwise impact that cost.

The HWTWRP benefit is intrinsically linked to the delivery of the HWTWRP schedule, the delivery date included in this submission and in the upcoming revised draft WRMP24 is considered realistic and achievable, with an appropriate level of risk factored in. However, should the realisation of more risks occur, resulting in delays to the HWTWRP delivery, and the regulatory date identified here and in the upcoming revised draft WRMP24 no longer be considered achievable, alternative water supply options would need to be identified and agreed with regulators.

## 6.3 Proposed Gate Four Activities and Outcomes

In accordance with the RAPID Gate Four guidance v1 (January 2024) the HWTWRP Gate Four submission date is set for 56 days after the forecast DCO application submission date (Figure 6-1). The plan up to Gate Four focuses on achieving the following outcomes and associated activities:

Delivering the Statutory Consenting Requirements:

- Preparing for and undertaking Statutory Consultation, including any necessary revisions to the design of the HWTWRP resulting from the iterative DWSP process or the consultation process and wider stakeholder feedback (See Chapter 9: Stakeholder and Customer Engagement);
- Completion of the Environmental Statement;
- Land requirements including land referencing and securing necessary land and rights over land; and
- Preparing and submitting the DCO application documents to the Planning Inspectorate which will include necessary SW governance and Board approval.

Procurement and Commercial Arrangements:

- (Gate 3 DPC Stage 2 completion)
- Finalising the BSA2 with PW;
- Drafting a CAP agreement;
- Drafting DPC tender documentation;
- Market Engagement and consultation;

- Preparation of draft submission of DPC Stage 3 to Ofwat; and
- Contract notice and commencement of Selection Questionnaire (SQ) phase to shortlist potential bidders.

SW continues to develop a strategy for the implementation and use of a digital twin within project design. A smart water and wastewater network for SW is being developed as part of a holistic systems thinking approach that supports the efficient development and operation of its assets. See Chapter 2: Solution Design for further detail.

### 6.3.1 Penalty Clauses

To assess the potential penalty clauses that could be proposed the HWTWRP team has reviewed against the following criteria:

Delivery timing

- The HWTWRP is on SW's upcoming revised draft WRMP24 reported pathway, Situation 4. SW is already subject to significant obligations in the Section 20 Agreement which relate to delivery of supply schemes in the Western Area WRZs which are on the reported pathway.
- The schedule included within the Gate Three submission is based upon quantitative schedule risk analysis (QSRA) which enables activity risk to be factored into future schedule scenarios. In 80% of QSRA modelled scenarios, the HWTWRP was delivered on or before the operational date provided in this submission. A significant number of the risks identified are beyond either SW's or PW's control. At Gate Four the timings will be updated against more mature risk assessments.

Drinking Water Quality Regulation and DWSP preparation

- SW and PW are committed to full compliance with Drinking Water Quality Regulations. A statutory regime is in place for enforcement by the DWI of these regulations for which significant penalties and other sanctions can be applied for non-compliance.
- In relation to bringing into supply the HWTWRP as a new source, early engagement with customers is being undertaken, and further planned for, to mitigate any acceptability issues. Plans are in place for early engagement with sufficient time to reassure customers about any potential changes to the taste and odour of their drinking water. A full DWSP will be available prior to the HWTWRP being available for beneficial use as a new source.

Financial impact

- RAPID guidance for Gate Four makes it clear that any overspend on gated activities to meet the requirement lie with the SRO partners.
- It is recognised, in accordance with the Gate Four Guidance, that any costs associated with rejection of SW's DCO application and any subsequent rework to reach a successful application (i.e. acceptance by PINS) will not be funded by Ofwat even if gated allowance remains.

Dependency on non-SRO projects

- Delivery of HTR is recognised as a key dependency on commissioning of the HWTWRP, but timing for HTR's delivery is not within the HWTWRP team's or SW's control. Collaborative working between PW and SW has been and will continue to identify and minimise any potential HTR delays which could potentially impact the timescales for the delivery of the HWTWRP.
- Non-SRO related work at the Otterbourne WSW site is scheduled for completion prior to HWTWRP being available; this is and will continue to be closely monitored to ensure alignment of both project schedules, whilst pursuing any time and cost efficiency opportunities identified between the two projects.

## 6.4 Planning and Land

### 6.4.1 Consenting Route

Consistent with the Gate Two submission, the DCO route remains the preferred approach for consenting the HWTWRP project as per Section 35 direction granted by the Secretary of State on 31 May 2022[40] and the HWTWRP has continued to progress through the early pre-application stages of the DCO process.

Since May 2022, the HWTWRP has evolved as described in Chapter 2: Solution Design. This includes the need for a WRP with a maximum capacity of 60 Ml/d to be constructed in a single-phase, and the pursuit of the Preferred Tunnel Option between BHS and HTR, as an alternative to SW's single tunnel proposal (Backup Tunnel Option). A variation to the Section 35 direction is planned to be applied for to ensure the DCO consenting route reflects the optionality for two potential tunnel solutions between the proposed WRP and HTR, i.e. the Preferred and the Backup Tunnel Options.

### 6.4.2 DCO Application Progress

[40] HWTWRP: Section 35 Direction, Planning Act 2008

The following key consent milestones and Gate Three activities have been achieved:

- A Section 35 direction was given for the HWTWRP in May 2022;
- Non-Statutory Consultation (6 weeks in duration) launched in July 2022; and
- An EIA scoping opinion was received from the Planning Inspectorate in August 2023.

### 6.4.3 Project Development

Project development and refinement since Gate Two as a key part of the consenting process, has aided minimising potential environmental and socio-economic impacts and associated land requirements. It has enabled the HWTWRP to progress from the initial concept design stage at Gate Two, through key consent stages of the summer 2022 Non-Statutory Consultation (see Chapter 9: Stakeholder and Customer Engagement for further information and details) and August 2023 EIA scoping opinion. This has allowed the HWTWRP to move towards a further public Statutory Consultation which was launched in summer 2024 ahead of the DCO application submission (see Figure 6-1 and Table 6-1).

The scheme development process, building on that presented at Gate Two in Annexes 2, 3 and 5, has required options for AGP and underground pipelines to be identified and assessed. It has also included an ongoing review of key sites and consideration against stakeholder feedback to ensure robustness of site and route selection – key to minimising risk of challenge and objections to the consenting process. It will provide a firm foundation for a design proportionate for a DCO project of this nature. An extensive programme of environmental surveys and ground investigations (Annex 6: Programme and Planning) is ongoing and continues to inform decision making on route and site selection work. This is in addition to environmental and other assessments which are needed to support both Statutory Consultation and the DCO application.

### 6.4.4 Environmental Impact Assessment

To confirm the scope and approach to the EIA, a scoping opinion was provided by the Planning Inspectorate (August 2023). The initial findings of the EIA, alongside a preliminary assessment of LSEs and emerging mitigation proposals, will be set out within a PEIR. The PEIR was consulted on during the summer 2024 Statutory Consultation, following this a full ES will be prepared to support the DCO application. Further details on environmental assessment associated with Gate Three deliverables can be found in Chapter 4: Environmental.

### 6.4.5 Non-Statutory and Statutory Consultation

A six-week Non-Statutory Consultation was held in summer 2022 to present the selected the HWTWRP solution and to gather feedback on the emerging proposals at an early stage to help communicate progression of development and design. Consultation documentation[41] included details on the need for the HWTWRP, preferred sites and corridors for plant and pipelines respectively, as well as the methodologies used to select them and next steps in the consenting process. The Scheme Development Summary report[13] presented as part of this provides a thorough account of the development process to support the proposals within the consultation. A further iteration of this report was produced for the summer 2024 Statutory Consultation that informed stakeholders of the comprehensive methodology design.

A Summary of Feedback Report[15] was published on the SW website in January 2023 summarising feedback received and how this will be considered as the HWTWRP develops. Further details on this feedback can be found in Chapter 9: Stakeholder and Customer Engagement.

As set out in the project schedule for Gate Four (Figure 6-1), the summer 2024 Statutory Consultation included consultation on the PEIR and primarily sought feedback on the emerging HWTWRP design, including proposed sites for AGP (e.g. WRP, pumping stations inc. IPSs, BPTs), the proposed pipeline routes and locations for temporary construction compounds and other works.

### 6.4.6 Stakeholder Engagement

Engagement with key technical stakeholders, including statutory environmental bodies and Local Authorities, has been structured to ensure that acknowledged interests are given appropriate opportunities to both be informed of the HWTWRP progress, and to update on development during the DCO pre-application period. Further information in relation to this engagement is set out in Chapter 9: Stakeholder and Customer Engagement.

Taking account of feedback received both through public consultation and ongoing stakeholder engagement is a key part of the consenting and solution development process. All feedback received has and will continue to be considered in shaping the emerging HWTWRP proposals and plans. Whilst not all feedback will lead to changes, the feedback received and how this has or has not influenced development of the HWTWRP has and will continue to be clearly reported at each public consultation and within the DCO application.

[41] WfLH Consultations

A key objective for engagement throughout the consenting process is to ensure that all interested parties understand the need for the HWTWRP and how it might affect them. This is being delivered through a staged approach to consultation and engagement reflective of the development of the HWTWRP. It is recognised that not all parties will support the HWTWRP, and there may be some potentially unavoidable impacts and disruption arising from construction and operation, but understanding and awareness is key, and effective dialogue is paramount in managing issues.

### 6.4.7 Other Permits, Licences and Consents (PLCs)

Since Gate Two, the need for other PLCs remains under review and engagement is underway with relevant statutory bodies. This will confirm the most appropriate timing for such authorisations, taking into account the nature of the DCO consenting approach, and the approach to procurement of project construction and operation. The proposed strategy for achieving other PLCs will be set out in the DCO application, confirming which authorisations are sought within the DCO itself and which will be sought through an alternative authorisation route. Any PLCs required at the application stage will be applied for in parallel with or as part of the DCO itself, otherwise they will be deferred to the appointed delivery contractor to manage post-DCO consent. Annex 6: Programme and Planning sets out an update to the table presented at Gate Two.

The NPSWRI confirms that DCO consent should not be refused based on regulated impacts unless there is good reason to believe that any necessary permits, licences or other consents required to deliver the project will not subsequently be granted. SW is confident that the necessary authorisations, or necessary statements of no impediment to securing such authorisations, can be obtained before or during the examination of its DCO application, and does not deem there to be any other permits, licences and consents that represent a major risk to consenting the HWTWRP.

### 6.4.8 DCO Application Documents

The preliminary list of application documents provided at Gate Two has been updated and will continue to be reviewed ahead of DCO application document production, due to commence shortly after the completion of Statutory Consultation in the summer of 2024 (see Annex 6: Programme and Planning). This workstream and its activities remain on track, aligned to the DCO application process intended prior to Gate Four as seen in the project schedule (Figure 6-1). Outputs of the Statutory Consultation will be made available as part of the Gate Four activities and are not reported on within this submission.

### 6.4.9 Approach to Acquisition of Rights and Interests in Land

The land lifecycle strategy has been developed into three distinct phases, aligning with key project milestones: Phase 1 Solution Development, Phase 2 DCO, and Phase 3 Project Delivery. A detailed project plan summarising the activities that take place in each of these phases can be found in Annex 6: Programme and Planning). Furthermore, the timeline of the phases is demonstrated in the overall project plan (Figure 6-1).

To support the efficient and effective delivery of the land lifecycle, SW are being supported by an external service provider. This ensures that adequate systems and resources are available for delivery of activity plus provides access to subject matter expertise with experience in delivering DCO and provide support tendering and negotiating.

### 6.4.10 Land Acquisition and Common Methodology

The general approaches that can be implemented for securing rights and interests to the land required for HWTWRP are set out in Annex 6: Programme and Planning.

The acquisition of land and rights is governed by legislation, case law and guidance which requires a common methodology to be adopted across infrastructure promoters. RAPID's letter to SW (25 May 2023 *Land and Property Purchase Costs*) has set out an expectation that a common methodology be developed in conjunction with other SROs and neighbouring water companies to ensure consistency and transparency. SW will adapt its land purchase strategy to ensure the sharing of knowledge and best practice of similar projects when an industry methodology becomes available.

Option agreements will be sought for the rights and interests required for the proposed pipeline routes and associated land parcels following Statutory Consultation. It is anticipated that negotiations with landowners will continue throughout the DCO preparation and examination period. SW preferred approach is to secure rights by mutual agreement, however one of the benefits of the DCO process is that it provides powers of compulsory acquisition. These will only be employed as a last resort.

Currently, SW has identified 146 titles against which SW will be seeking rights. SW anticipates commencing negotiations with interested parties in Q1 2025 (following completion of Statutory Consultation and the subsequent updated DCO Design Freeze) and will approach negotiation in batches to manage the volume of agreements.

### 6.4.11 Land Activity Completed to Date

Throughout the projects lifecycle several potential routes and land parcels have been identified as potential locations for the required asset components for HWTWRP. This has followed an iterative process that has been refined alongside the solution design. The following activity has been completed:

- Land Referencing of route corridors, identifying and engaging with Persons with Interest in Lands (PILs);
- Arranging access to land for environmental and ground investigations;
- Referencing Red Line Boundaries and issuing Land Information Questionnaires; and
- Supporting Non-Statutory Consultation to address PILs issues and concerns.

In addition, significant progress has made regarding securing a suitable land parcel to accommodate the required WRP. The land parcel footprint size need was informed by examining existing operational sites in other countries who use the same or similar water recycling technologies. Although it would have been ideal to locate the WRP at Budds Farm WTW itself, investigation determined that without significant investment to relocate existing in-use assets coupled with unrelated, future wastewater (storm overflow) enhancement plans, the only available land parcel here was too small.

Engagement with PILs will be maintained throughout the project's development, actively seeking to address and mitigate issues raised and support the Statutory Consultation. Further detail of the activity completed to date can be found in Annex 6: Programme and Planning.

### 6.4.12 Cost Estimate for Land Acquisition

A breakdown of the estimated cost for the acquisition of land rights and the likely timing of this expenditure can be found in Chapter 8: Solution Costs and Benefits.

### 6.4.13 Risks and Mitigation

Key planning and land risks are highlighted in Table 6-2 . These risks are being actively managed, in accordance with SW's Risk Management Process and their forecast impact included in the project schedule forecast.

## 6.5 Programme Management

### 6.5.1 Process Management

To progress effectively through the consenting and land acquisition processes, the HWTWRP has been set up and resourced accordingly, establishing key disciplines, leads / supporting resources, and benefitting from the experience of acknowledged industry experts. Technical disciplines include planning, land, environment, consultation, engagement, design/engineering and procurement, engaged through to delivery of DCO consent.

Various working groups have been established as part of the HWTWRP (as set out in Chapter: 9 Stakeholder and Customer Engagement), to ensure effective integration of the numerous workstreams and establish appropriate channels of communication to facilitate effective decision-making and project delivery. Furthermore, a dedicated internal DCO Strategy Group has been established, providing oversight and support for a number of other workstream-level working groups. See Annex 6: Programme and Planning (Section 9) for a diagram of how the HWTWRP has been structured to support DCO delivery.

A number of systems have been established to support DCO delivery, with project collaboration, integration, and information management being achieved using platforms such as SharePoint, Projectwise and Moata (Arc GIS). Moata in particular allows for comprehensive data collection and provides access to key external stakeholders to enhance information sharing and project understanding.

### 6.5.2 Managing The Customer Journey

To ensure a positive customer journey and a good experience throughout the project lifecycle, early, open, and honest engagement with customers has been prioritised. This has created a platform to clearly explain the likely impacts of the HWTWRP and gain understanding of the issues and concerns of individuals. This direct approach has enabled those concerns to either be addressed directly, or a consideration to be made and incorporated into design activity. Where those concerns cannot be addressed, clear expectations are set with the individual and engagement managed appropriately going forward. Further information on the approach for stakeholder and customer engagement is found in Chapter 9: Stakeholder and Customer Engagement and supporting annexes.

# 7. Procurement and Operation Model

Following the informal Gate Three submission, the DPC Stage 2 plan has been revised and will continue to be regularly tested with Ofwat to accelerate the current timescales. Major milestones between Gate Three and Gate Four can be seen in Figure 6-1 with further milestones including:

- Minimum of monthly reviews with Ofwat Major projects team;
- Test commercial principles & Market Engagement with Ofwat (Oct 24);
- Market Engagement 3 (Oct 24);
- DPC Stage 2 submission (June 25)
- DPC Stage 2 Ofwat approval (July 25); and
- Market Engagement 4 (Aug 25);
- Ofwat designation (pre Sept 25)
- DPC Stage 3 draft submission to Ofwat (Sept 25).

Regular engagement with Ofwat (and RAPID) will continue to demonstrate progress towards DPC Stages 2 and 3 in parallel to the RAPID Gate Four activities and then onwards with the Ofwat Major Projects team to support delivery of the project in line with DPC guidance and requirements. Please note that the SW Board have specifically called out their commitment to the DPC Stage 2 in their Board statement (see Chapter 10.2).

## 7.1 Components of HWTWRP

A full description of the assets that make up the HWTWRP is provided in Chapter 2: Solution Design. Gate Two concluded that most of these assets should be procured by DPC which has influenced the development of the delivery strategy by using the latest DPC model. Entering the Gate Four phase of development, the fully integrated solution (HTR and the HWTWRP) is intended to be delivered through a combination of SW, PW and the DPC Competitively Appointed Provider (CAP). A high-level illustration of delivery accountability of the various key components of both HTR and the HWTWRP (as the two projects are interlinked for operational purposes as discussed), setting the assets within Scope for the CAP is shown in Figure 2-1.

## 7.2 Direct Procurement for Customers (DPC)

In the PR19 final determination[42], Ofwat has directed SW to consider using the DPC route for delivery of this SRO. This was reconfirmed at Gate Two. It is a 'late DPC' model so SW is responsible for solution development, securing all necessary planning consents, land acquisition and some other enabling work. Construction of the core HWTWRP scope will largely be carried out by the CAP.

Although not yet designated as a DPC project, in 2022 (within the Gate Three period), the HWTWRP passed Ofwat's DPC Control Point B. It is expected that the HWTWRP will be designated by Ofwat between the new Stage 2 and Stage 3 milestones, and financial close of the DPC contract is expected in December 2028 (Figure 6-1). As part of this process, a full quantitative value for money assessment will be carried out 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. It will also 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 following assets are in scope for DPC:

- Underground pipelines between Budds Farm WTW and the WRP (including the return pipelines for WTW process losses that are directed to the LSO);
- The WRP, associated pumping stations and connection to BHS; and
- The pipeline from BHS to the WRP site and onto Otterbourne WSW, including the HLPS, IPS and BPTs.

In the event that the Backup Tunnel Option be pursued, the pipeline from WRP to HTR will be in scope for DPC.

## 7.3 Commercial Structure

The HWTWRP is continuing to develop in line with the DPC process and Ofwat guidance[43], taking account of project specific requirements that have been identified. An initial overview of the proposed commercial principles has been shared with Ofwat (December 2023), demonstrating alignment with the latest guidance. To enable completion of heads of terms for the CAP Agreement (CAPA), key commercial positions are required to be further developed. As agreed, this information will be shared with Ofwat and updated for both the DCO application and Gate Four submission (see Chapter 6: Programme and Planning).

The CAPA structure is proposed to follow relevant precedents such as the DPC project procured by United Utilities for the Haweswater Aqueduct Resilience Programme (HARP)[44]. This will be amended with appropriate project specifics, including the greater significance of Operation and Maintenance (O&M) of the solution, and the proposed

[42] Southern Water PR19 Final Determination
[43] Ofwat Guidance for Appointees delivering Direct Procurement for Customers project March 2023
[44] United Utilities The Haweswater Aqueduct Resilience Programme

pricing model will be (broadly) fixed price rather than target cost on the basis of a single CAP. The CAPA is therefore expected to be structured like a standard form of Private Finance Initiative (PFI) contract rather than the HARP project agreement.

## 7.4 Pricing Model

The current working assumption is that CAPA construction pricing should be mostly fixed. Additional reopeners for certain risks outside of the contractor's control, including unforeseen ground conditions and inflation are also being considered. This assumption will be discussed further with Ofwat, as part of the DPC Stage 2 development and may be subject to market engagement. It is recognised that there is a possibility that bidders may seek further reopeners. Should this be the case, they would be subject to detailed scrutiny and only agreed to if there is a strong value for money or bankability imperative. Robust market engagement is essential for this model, as the amalgam of assets on this project are not typical for the UK water industry, with different risk profiles for different types of assets, notably relating to the WRP. Further discussions will be held with Ofwat to agree to the approach of appointing one or two CAPs to deliver the scope of works.

## 7.5 Initial Draft Heads of Terms (HOTs)

The HOTs are being developed accordingly, as many commercial challenges in the CAPA will flow from this. This will include the following key aspects:

a) Indexation

Given the inflationary environment, and the length of the construction period, it is not expected that bidders will accept that the CAP (and therefore their sub-contractors) should bear indexation risk. Therefore, a specific reopener is being developed in the CAPA, which would allow for:

- The fixed construction price to be adjusted using a range of established ways of measuring price inflation;
- A mechanism for the unitary charge to be re-calibrated (at least in part) upon completion of construction. Ideally the extent of any increase to the unitary charge (and therefore in funding required by the CAP) to be allowed for by the CAP to be set out in its initial financing agreements. This would avoid the complexity of the CAP having to seek additional funding on completion of construction. Extra funding requirements may have an impact on the CAP's credit rating, which would be required to be maintained at an investment grade credit rating; and
- Certain elements of the unitary charge relating to variable O&M costs to be subject to indexation.

b) Operations and Maintenance

The base case assumes that all the functions of design, build, finance, operate and maintain (DBFOM) will be in scope for DPC. During summer 2023, SW undertook a value-based assessment of the full DBFOM model, which is the Ofwat default. The assessment tested different scope and operational control variants against the full DBFOM, DBFM and DBF potential CAP agreements; 10 options were tested in total. The outcome of the analysis concluded that full scope in a DBFM model (with Operations being delivered in-house) provided an understanding of risk to SW and its customers. As of February 2024, discussions with Ofwat on a move from the default model were yet to conclude to enable the Stage 2 submission to enter the final stages.

Unless an agreement is reached to move to a DBFM model, the base case will remain with the CAP operating and maintaining assets on a day-to-day basis, with SW acting as the 'system controller'. Here SW would, for example, direct the CAP regarding the required output from the WRP into HTR and the volume of water to be transferred through the direct pipe to Otterbourne WSW. This will ensure oversight and direction are maintained by SW, given the statutory and regulatory duties to supply water in all circumstances including in severe droughts.

c) Term

The current assumption is that the contract will have a life of 25 years; 5 years of construction followed by 20 years of operation. The optimal term for the CAPA duration will continue to be explored in the pre-application phase of DCO process. Subsequently, this will entail further market engagement to better understand supply chain appetite.

Additional terms where positions are being finalised include incentivisation of on-time delivery, arrangements for revenue commencement (e.g. should there be separate payment streams for any assets which start at different times), the appropriateness and size of an end of concession payment, calibration of availability and volumetric payments to the CAP and associated hand back requirements.

SW are working with Ofwat building on the strategy work carried out since Gate Two, ensuring positions are developed which reflect input from the wider team of advisers (including financial and legal) and are translated into appropriate risk allocations within the CAPA.

### 7.5.1 Market Engagement

SW has conducted a series of market engagement exercises with the objective of:

- Generating market appetite with appropriate investors and contractors;
- Gauging interest and testing acceptability of the proposed contracting structure and provisions;
- Capturing and collating feedback from the construction supply chain, to test the assumptions related to solution design, interfaces and associated risks and issues;
- Testing availability of relevant organisations to deliver the project; and
- Testing potential construction methodologies and programming, including seeking opportunities to expedite and/or de-risk the programme.

Market engagement in 2019 requested market feedback relating to variants of Ofwat's DPC DBFOM models, which was followed in 2020 and 2021 by seeking views on desalination and water recycling assets, coupled with taking opportunity to inform the market on the project. Since then, further market engagement activities have been undertaken within the Gate Three period (Figure 6-1).

*Table 7-1 - Market Engagement Activities*

| Engagement exercise | Timing | Topics considered and purpose |
|---|---|---|
| Formal Engagement 1 (ME1) | February 2022 | A "town hall" event attended by representatives from over 50 organisations, including a mixture of contractors, investors, technology suppliers and advisors, demonstrating a strong interest in the project. One-to-one meetings were additionally held. |
| Technical market engagement | Throughout 2022 | SW's technical teams engaged with suppliers of key elements and components of the proposed solution, including (but not limited to), RO membranes, MF membranes, Strainers / cartridge filter packages, UV-AOP, pumps, flow meters, mixers, tanks, valves, Motor Control Centre (MCC), HV switchgear, transformers, ring main units and chemical dosing. |
| Ground risk – Targeted Market Engagement exercise | October 2022-March 2023 | Targeted market engagement exercises were undertaken articulating the proposed approach to ground investigations and seeking market views. |
| Formal Engagement 2 (ME2) | November 2022 | As ME1, this was a "town hall" event attended by representatives from over 50 organisations, including contractors, investors, technology suppliers and advisors, demonstrating a strong interest in the project. One-to-one meetings were also held. |

Following the October 2022 to March 2023 exercises, broad support was provided for the proposed approach, but feedback indicated that the market would prefer a greater amount of ground investigations along the open cut pipeline route. This feedback led to SW undertaking more of such work within the Gate Three period. Other examples of how market feedback has been used to de-risk the programme have been identified (Table 7-2).

*Table 7-2 - Examples of SW Response to Market Feedback*

| Market Feedback | The HWTWRP response to de-risk the programme |
|---|---|
| A Pre-Qualification Questionnaire (PQQ) period of 7 weeks was too short for a project of this size and complexity | Proposed PQQ time was increased from 7 to 10 weeks to allow for a better-quality submission and to allow for governance of consortia entities |
| SW's proposed inclusion of a 'down selection' stage to reduce the bidder cohort from 5 to 3 could deter some of them due to reduced likelihood of success and increased bidder costs. Additionally, the market stated that lenders were more likely to engage with projects they consider are likely to submit a final bid, meaning engagement would be unlikely to occur until bidders had gone past the down-selection stage. The market suggested that going straight to three bidders would be a more attractive option. | The procurement process has been revised to remove a 'down selection' stage, now with a plan to take three bidders forward from the pre-qualification stage |
| The market felt that SW's initial proposed procurement timelines were too short and would make it challenging for bidders to secure funding within the timescales provided | The revised procurement model allows more time for bidders to engage with banks (such as financial closure process being extended to 6 months). |
| The market questioned SW's initial proposal for a short 3-month financial close and suggested that a 6-month duration would be more realistic | Financial duration has been provisionally increased to 6 months within the plan, pending further analysis |

The third and fourth phases of market engagement are planned for 2024 and 2025 to provide clarity of approach for bidders and lenders to ensure “no surprises”, allow bidders to provide alternative viewpoints and ideas and give SW clarity on bidder form (consortiums, partners etc) to ensure our DPC offering is attractive to the market. The topics of engagement will be informed by further project development. SW currently intend to hold a Bidder Information Day once the contract notice is published (but ahead of PQQ submission) to walk the market through the project tender documents and provide any relevant clarifications to include a consultative approach going forwards.

### 7.5.2 Third Party Involvement

Alongside development of the DPC HOTs, SW and PW are working to develop the principles of a BSA. Arrangements for procurement of additional assets which will sit alongside CAP assets and are a part of the wider network, are also progressing.

The enhanced use of HTR means a change to its original expected use under the initial vision (for a 21 Ml/d supply via Farlington WSW and BSA1, refer to Figure 2-1). Consequently, the reservoir is expected to play a central role in meeting the overall supply requirements of the Hampshire region (Chapter 2: Solution Design). Both SW and PW recognise that in order to address the changing use of the reservoir and the introduction of the WRP and transfer pipeline, it will be necessary for the parties to agree terms of a new bulk supply agreement (BSA2) which is currently underway.

These discussions commenced between the parties in autumn 2023 and HOTs are currently being negotiated. SW is targeting the BSA2 to be agreed and signed with PW in advance of any CAP being awarded with work to develop and agree HOTs between the parties in advance of Gate Four. It is possible the terms of BSA2 will need to be amended (if agreed by both parties) to take account of any issues and/or opportunities that may arise in the CAP contract after its completion.

### 7.5.3 Alignment Works

To progress integration of the HWTWRP with HTR, two commercially focussed agreements have been put in place between SW and PW:

- The ‘Collaboration Agreement’ predominantly facilitates PW, on SW’s behalf, to conduct feasibility and concept design activities associated with enhancing the original HTR design to incorporate pipework and flows associated with the WRP. Given the subsequent expected changes in reservoir water chemistry, and public perception of recycled water, this agreement also permits PW to undertake revisions to water quality modelling activities (for the DWSP) as well as certain stakeholder engagement activities. PW expenditure in these areas is all RAPID related and discussed in the (See Chapter 8: Solution Costs and Benefits). PW provide costs on an agreed basis of PW being ‘no better, and no worse’ as a result of progressing these early-stage alignment works. The agreement will be extended as required through Gate Four, at which point it will end; and
- In summer 2023, following discussion with PW on the opportunity to progress the Preferred Tunnel Option (See Chapter 2: Solution Design), a second agreement with PW was formally made. Referred to as the ‘Alignment Works Agreement’, this differs from the Collaboration Agreement in that SW provided separate funding for detailed design, planning application and construction-related activities considered by SW not to be RAPID funded, as under the Backup Tunnel Option, such activities would have been considered DPC-funded. This agreement has been extended until May 2024, after which all related further costs are to be included in PW’s second Cost Adjustment Mechanism (CAM) submission, which is hoped to be concluded alongside PW’s PR24 final determination.

## 7.6 Southern Water In-House Delivery

The DPC eligibility assessment undertaken for Gate Two concluded that construction work required at SW owned sites e.g. Budds Farm WTW and Otterbourne WSW, to enable commissioning of the HWTWRP did not meet the discreteness test for DPC suitability. This activity will therefore be carried out in-house by SW Capital delivery. These activities (see Table 7-3) are required to enable the HWTWRP to connect to and operate with the SW network at Budds Farm WTW and Otterbourne WSW.

*Table 7-3 - Construction activities to be delivered in-house*

| Work Package | Rationale |
|---|---|
| Connection to the final effluent channel at Budds Farm WTW | These works will necessarily be undertaken on existing, operational assets at Budds Farm WTW. It is considered |

| | |
|---|---|
| | that it would introduce additional complexity and risk for the CAP to undertake works at Budds Farm WTW. |
| Waste connection back into the Long Sea Outfall (LSO) from WRP | It may be inefficient to introduce a logistical challenge and additional contractual complexity between SW and the CAP, and so for this reason, SW intends that asset ownership will change at the boundary of the operational sites (Budds Farm WTW and Otterbourne WSW). |
| Reception connection at the boundary of Otterbourne WSW to receive the incoming water transfer. | |

It is recognised that the delivery of the DPC solution is dependent upon the delivery of the out-of-scope elements which are required to enable operation with the SW network. These activities will involve interfaces between the CAP and appointee-controlled assets. The timing of delivery and interfaces with these works will be further investigated as the project develops and greater detail will be set out in future DPC submissions. Where the CAP will depend on availability of assets for its operation, suitable protection will be developed in the CAP agreement.

### 7.6.1 Frameworks

Construction activities are expected to be undertaken towards the end of AMP8. To ensure alignment with the scope of AMP8, new framework agreements have been developed. These agreements have been informed by extensive market engagement, analysis of the sector and the wider infrastructure market. The agreements have been compliantly procured in line with UCR 2016 and will be available for use with regards to the Budds Farm WTW and Otterbourne WSW upgrades (Table 7-4). A more detailed review will be conducted nearer the time on each package's scope, terms and conditions, and any legal procurement risks associated with using the framework.

*Table 7-4 - Framework agreements*

| Subject | Commentary |
|---|---|
| **Supplier Agreements** | **New AMP 8 framework contracts**<br>The overarching operating model relies upon effective contracts for Capital Delivery, Engineering and Asset Management, Advice, and Repair and Maintenance services. These commercial arrangements will be achieved through call-offs in the form of works contracts.<br>**Capital programmes (Budds Farm WTW and Otterbourne WSW upgrades)**<br>Two Capital Programme frameworks have been established, to be able to create an available, diverse, and robust supply chain to deliver these capital programmes:<br>- Strategic Delivery Partners (SDPs): SW are seeking at least three SDPs to work across the Asset Lifecycle Process (ALP).<br>- Low Complexity Delivery Route: SW are seeking suppliers focused on infrastructure design and build projects<br>**Professional Services**<br>A Professional Services Framework agreement covering both routine and *ad-hoc* requirements are being secured. The services will span technical advisory capabilities, project management and asset management of the upgrade activity.<br>**Network Services**<br>The provision of O&M activities for non-DPC scope is being considered through the Network Services framework. This framework will include routine inspection, test, and maintenance and will manage emergent repairs and will have the option for preventative maintenance. The breadth and depth of the delivery partners will:<br>- Reduce the risk of delivery schedule thus ensuring that this element of the programme does not slow down the overall deliverability of the SRO<br>- Foster healthy competition, driving supplier performance and value for money for the customer.<br>**Commercial model**<br>The new AMP 8 Frameworks set out above have commercial models aligned to delivery of SW's strategic priorities. The strategic priorities have been set out with in a balance score card against which the framework suppliers can be measured and incentivised. |
| **Supplier Relationships** | **Proactive supplier onboarding**<br>To ensure all the required frameworks in place at least 12 months before the commencement of AMP8, a proactive approach to the framework procurement process is being taken. This will allow for a smooth transition from legacy agreements and enable the new suppliers to be operating at full capability prior to the commencement of the AMP.<br>**Early scoping and assessment**<br>The SDPs and Professional Services Advisors will be involved in early scoping and assessment of projects to provide advanced and improved estimating of site condition and likely costs. This will help mitigate the risk of later scope changes and price inflation.<br>Early involvement with the market during the procurement process will also help to build market appetite for the planned projects, create a better understanding of realistic affordability, help to better understand |

| | |
|---|---|
| | the market's appetite for risk and reward, and give SW access to data that will help to determine the health of the supply chain during the current economic uncertainty.<br>**Integrated Teams**<br>SW will continue to leverage the 'Integrated Teams' approach, a cross-functional SW team managed by the SRO Programme Manager consisting of SW employees, consultants and specialist suppliers. |
| **Asset Lifecycle Process (ALP)** | The ALP will be followed to deliver the upgrades through typical delivery partner routes. The ALP process will guide the planning, designing, building, operating, maintaining and decommissioning of SW assets. It will help improve the process to make effective decisions around risks and outcomes.<br>The ALP will be governed by five investment decision points which enable early decision making and prevent lengthy design phases and rework.<br>SW intend to undertake ongoing supplier performance and relationship management that incentivises delivery of outcomes. |
| **Governance and Performance Management** | The Programme Management Office (PMO) will continue to provide programme management across all frameworks, including planning and scheduling, reporting and preparation for Programme Review Boards, risks and issues management, benefits tracking, change management and lessons learned. |

# 8. Solution Cost and Benefits

## 8.1 Introduction

This chapter sets out the revised solution costs since Gate Two, the benefits the solution would provide as consistent with the WRSE Best Value Plan and upcoming revised draft WRMP24. Gate Three costs have changed since Gate Two was published, as the SRO scope and gated timescales have moved to meet updated requirements of the RAPID process and WRMP modelling. Annex 8A contains further detail on the breakdown of costs. Annex 8B contains the ACWG template for full project costs through to completion and the RAPID Efficiency of Expenditure breakdown for Gate Three and Four whilst Annex 8C is an interim update which details movement from Gate Two to May 2023 (mid Gate Three) in detail.

This chapter covers the costs for both tunnel options identified in Chapter 2: Solution Design for transparency.

## 8.2 Solution Cost Estimating (ACWG template)

### 8.2.1 Overall Cost of Construction and Operation

Since Gate Two, additional work has been undertaken analysing the feasibility and viability of the HWTWRP. This has enabled solution cost estimates to be provided for both the HWTWRP Preferred and Backup Tunnel Options (Table 8-1). These demonstrate overall costs of construction and operations for each tunnel option to be considered at Gate Three. The solution costs have been updated to reflect the changes to solution scope which include:

- The WRP maximum capacity has increased from 15 Ml/d to 60 Ml/d;
- Two tunnel options are being developed for the transfer between the WRP and HTR;
- The HLPS is now located at the WRP site;
- The transfer capacity from HTR to Otterbourne WSW has increased from 75 Ml/d to 90 Ml/d;
- The associated pipeline route and HLPS has developed;
- The length of tunnelling has increased from circa 1km to circa 6km; and
- The number of IPS's has increased from 1 to 3.

To provide a robust cost estimation and demonstrate the solutions flexibility, the operating expenditure (OPEX) values have been calculated for a range of flow scenarios. These scenarios represent the maximum DO, minimum DO and an average flow regime (which assumes average DO flows for 99% of the time and maximum DO (drought period) flows for 1% of the time) for the WRP and HTR. Two flow time periods have also been modelled: before and after the T2ST project is implemented. Net Present Value (NPV) and Average Incremental Cost (AIC) values have also been calculated for the minimum and maximum DO scenarios.

NPV and AIC estimates have been calculated over an 80-year period, comprising 4 years for planning, 5 years for development and construction followed by 71 years of operation, consistent with approach to calculating carbon costs as set out in Chapter 5: Carbon and consistent with the ACWG guidance[37]. Initial CAPEX, capital replacement costs and OPEX forecasts (both fixed and variable costs) have been profiled over the 80-year analysis period. For these calculations it is noted that:

1. Separate NPC and AIC values are presented for each of the two tunnel options as each transfer (WRP to HTR and HTR to Otterbourne WSW) has different minimum and maximum flows.

2. Values in Table 8-1 (Opex, NPV, AIC) are for the minimum, average and maximum flows listed (which have been modelled to occur prior to commissioning of the T2ST in 2040).
3. The costs relating to alignment works within Portsmouth Water's contracts for the Preferred Tunnel Option, are £81.7m (22/23 PR24) and included within the CAPEX estimate.

Further details of the approach and assumptions used for preparation of the CAPEX, OPEX and capital replacement for the HWTWRP are set out in Supporting Annex 8A: Solution Cost and Benefits.

*Table 8-1 – The HWTWRP Gate Three solution costs (2022/23 prices)*

| Tunnel Option | Transfer | Operating Regime | Flow (Ml/d) | CAPEX (£m) | OPEX (£m/year) | NPV (£m) | AIC (£/m$^3$) |
|---|---|---|---|---|---|---|---|
| Preferred | WRP to HTR | Min | 10 | 599.6 (including 81.7m for PW) | 5.51 | 646 | 1.48 |
| | | Average | 30 | | 8.25 | | |
| | | Max | 60 | | 15.05 | 839 | 1.92 |
| | HTR to Otterbourne WSW | Min | 20 | 628.3 | 3.66 | 533 | 0.81 |
| | | Average | 30 | | 4.79 | | |
| | | Max | 90 | | 11.21 | 685 | 1.05 |
| Backup | WRP to HTR | Min | 10 | 663.1 | 5.56 | 687 | 1.57 |
| | | Average | 30 | | 8.30 | | |
| | | Max | 60 | | 15.10 | 880 | 2.01 |
| | HTR to Otterbourne WSW | Min | 20 | 720.2 | 3.82 | 601 | 0.92 |
| | | Average | 30 | | 4.96 | | |
| | | Max | 90 | | 11.37 | 754 | 1.15 |

### 8.2.2 Detail of Expenditure

The CAPEX estimate has been prepared following an iterative assessment of individual activities, considering revised design scope, comparison with existing industry estimates for the principal components and including an estimation for both risk and Optimism Bias (OB) (Table 8-2). A full explanation of the process undertaken to prepare CAPEX estimates for Gate Three can be found in Annex 8A: Solution Cost and Benefits.

*Table 8-2 - Detailed CAPEX expenditure for the HWTWRP estimated at December 23 and adjusted to 2022/23 Price Base*

| Cost Item | Preferred Tunnel Option (£m) | Backup Tunnel Option (£m) |
|---|---|---|
| CAPEX Subtotal | **855.75** | **952.25** |
| Risk | 242.18 | 287.46 |
| Optimism Bias | 204.52 | 227.59 |
| Option project costs (Subject to AACE Class 4 Accuracy Range) | 1302.45 | 1467.29 |
| Indexation to align with PR24 22/23 Base (-5.7% from December 2023) | **1227.95** | **1383.36** |

### 8.2.3 Optimism Bias

SW has followed the HM Treasury Green Book Supplementary Guidance: Optimism Bias[45] as well as updated guidance from the ACWG for determining OB. OB has been applied once to each tunnel option, rather than being applied to each activity within each tunnel option, individually. Annex 8A: Solution Cost Benefits provides further detail on the project type and OB percentages selected.

*Table 8-3 - OB percentages applied at Gate One, Gate Two and Gate Three*

| Tunnel Option | Gate One (OB) Percentage (Water Recycling) | Gate Two Risk Adjusted (OB) Percentage | Gate Three Risk Adjusted (OB) Percentage | Gate Three Risk Adjusted (OB) Value (£m) |
|---|---|---|---|---|
| Preferred | 39.8% | 32.9% | 23.9% | 204.52 |
| Backup | 39.8% | 32.9% | 23.9% | 227.59 |

OB accounts for 23.9% of the base estimate total cost for both the Preferred and Backup Tunnel options representing a reduction from the position at Gate One and Gate Two (Table 8-3). This is owed to a shift of value from OB into the quantified risk register and increasing levels of information, improving confidence in delivery.

While the Green Book recommends applying optimism bias to operating costs and benefits as well as to CAPEX, the Supplementary Green Book Guidance does not provide recommended upper and lower bound adjustment factors for OPEX as there was insufficient data to do so. In the absence of other data to inform what the OB adjustments for OPEX should be, the Supplementary Green Book Guidance recommends using sensitivity analysis to test the materiality of OPEX assumptions for investment decisions. Hence, the OPEX values presented in this report do not include OB.

### 8.2.4 Costed Risks

Further development of the scope, design, and supporting information of each tunnel option has resulted in greater understanding of the HWTWRP risks and their potential impact to the solutions cost. The risks and associated financial exposure have allowed a Quantitative Cost Risk Analysis (QCRA) to be conducted for the solution options presented at Gate Three. This has enabled a consideration of the financial impact of risk for each tunnel option (Table 8-2). The details of the risks to cost and the values used to determine the CAPEX estimate are set out in Annex 8A: Solution Costs and Benefits.

### 8.2.5 Assumptions and Exclusions

A detailed list of the assumptions and exclusions in deriving estimated costs is detailed in Supporting Annex 8A: Solution Cost and Benefits. As the solution design underpinning the estimates remains at an early level of maturity, the estimates are deemed to be of Association for the Advancement of Cost Engineering (AACE) Class 4 accuracy (+30% / -5%). There is a risk that design development may identify alternative solutions and / or methodologies which may have significant cost impact both positively and negatively. As such the current accuracy envelope can only cater for fluctuations in cost of the current solution. Any changes to estimated solutions would require a reassessment of the estimate and confidence level.

For consistency with the PR24 submission all costs have been indexed to average 2022/23. The price base is the average of 12 months of index, with a mid-point of end September. The factors for each year are April – March averages. Ofwat changed the basis of indexation in April 2020 to Consumer Prices Index including owner occupiers' housing costs (UK) CPIH.

## 8.3 Best Value and Solution Benefits

### 8.3.1 Best Value Metric and Option Appraisal Process

The choice of whether a solution is progressed through the RAPID gated requirements is linked to the progression of the project through the WRMP process. SW's upcoming revised draft WRMP24 has been developed following the WRPG[7] in conjunction with the WRSE regional planning process, to develop a Best Value Plan.

Due to the scale and complexity of water resources planning for the South East, SW and WRSE have supported the use of advanced decision-making methods to ensure that a robust solution is reached[18]. The final options progressed in the Best Value Plan have been identified using a decision process that is completed through from the collation of ideas, options and solutions in line with government policy, plans, aspirations and consultation with customers and stakeholders. This collation of solutions produced an unconstrained list of options that are then reviewed through a best value criteria screening process (more information regarding this process will be set out in SW's upcoming revised draft WRMP24[1]). This process[910] details how SW, working with WRSE and other member companies has allowed for the development of a mutual set of best value planning (BVP) objectives, that considers

[45] HM Treasury Green Book Supplementary Guidance

a broad range of factors (not exclusively financial cost), to ensure statutory and policy requirements are met, and no differences in methodology resulted between SW and the WRSE planning. These BVP objectives include to:

- Deliver a secure and wholesome supply of water to customers and other sectors;
- Deliver environmental and social benefit;
- Increase the resilience of water systems; and
- Deliver at a cost that is acceptable to customers.

These objectives are underpinned by a set of supporting environmental and social metrics, that included beneficial environmental outcomes, enhancing resilience, technical feasibility, option construction flexibility (phasing or modular) whether the option could provide regional or water resource benefits, will the option meet customer and regulator expectations, the cost and capacity of the option and the risk profile that can be optimised at the investment modelling stage.

Furthermore, pre-determined metrics are applied as constraints within the model, setting targets by which the options selected, must achieve when a plan is created. These metrics include meeting the supply-demand balance, reducing leakage by 50% by 2050, achieving levels of abstraction reduction and increasing resilience to a 1-in-500-year drought event. The remaining criteria are used to help compare how different water resource programmes perform so that they identify the options that deliver the best value to the region. These metrics have been developed in consultation with stakeholders and with the National Framework for Water Resources and WRPG.

Following the identification of the unconstrained collation of options for SW, the options are subject to further assessment to determine a preferred options list. At each assessment stage the options details are developed and explored further in relation to the best value screening criteria to provide sufficient evidence for progression or rejection. All of the options on the final constrained options list are considered to be viable, deliverable and are, therefore, made available for selection in the WRSE investment modelling process. The options therefore selected by the investment model, under various planning scenarios in each WRZ, form the list of 'preferred options' in SW's WRMP. The list of options that underwent review and those that were rejected will be provided as part of SW's upcoming revised draft WRMP24.

The preferred options list is then incorporated into the WRSE database for incorporation in the modelling process. This allows the options to be compared on a regional scale to ensure the best value programme of solutions is developed for the region.

### 8.3.2 Determination of the Preferred Option

The HWTWRP is being delivered through an innovative partnership between PW and this solution has been selected within the reported pathway (Situation 4) of both companies WRMP's and the WRSE revised draft Regional Plan as a best value option. The option appears in SW's upcoming revised draft WRMP24 as a change to the option, reflecting the matured scope of the HWTWRP (Chapter 2: Solution Design).

The HWTWRP has been assessed against the same best value metric criteria as all other options progressed through from the unconstrained list (Table 8-4). The solution has progressed due to the assessments outcome scorings and is consistent with that presented in WRSE revised draft Regional Plan and the upcoming revised draft WRMP24 and has been selected in each of the nine planning scenarios presented (Figure 2-8). The two component options making up the HWTWRP both provide social and environmental benefits, however, are considered as part of HTR. There are multiple opportunities for benefits, including increased supply resilience, human health benefits, reduced material and resource used and air and climate benefits. There are also opportunities to provide amenity and conjunctive use benefits for the public. A detailed list of the best value metrics and the scores associated with the HWTWRP can be found in Annex 8A: Solution Cost and Benefits.

*Table 8-4 - Summary of Best Value Plan metric scores for the HWTWRP.*

| Component | Best Value Planning Metric | Unit | Score |
|---|---|---|---|
| WRP to HTR Transfer (60 Ml/d) | Biodiversity Net Gain | BNG Unit | -122.7 |
| | Natural Capital | £/year | -54.86 |
| | SEA Benefit Effect | Score (0 to 99) | 9 |
| | SEA Negative Effect | Score (-99 to 0) | -54 |
| HTR to Otterbourne WSW Transfer (90 Ml/d) | Biodiversity Net Gain | BNG Unit | -180.8 |
| | Natural Capital | £/year | -468.84 |
| | SEA Benefit Effect | Score (0 to 99) | 8 |
| | SEA Negative Effect | Score (-99 to 0) | -28 |

## 8.4 Efficiency of Expenditure (RAPID template)

During the preparations for Gate Two (submitted in December 2021) a project delivery schedule was prepared with the activities for Gate Three however, detailed guidance for the Gate Three requirements were not available at this time so an estimation was made, based on PR19 requirements. After Gate Two submission the Gate Three v1 Guidance (August 2022) was published and the deliverables and requirements for Gate Three were reviewed against the project delivery schedule to determine the impact on the Gate Three period of activity. This reset the window of time for the Gate Three activities which included realignment of cost forecasts, discussed with RAPID in Checkpoint meetings.

In parallel, several changes were made to the scope of the SRO during Gate Three, to maintain alignment with the upcoming revised draft WRMP24 (detailed further in Chapter 2: Solution Design). These changes and their impact on costs compared to Gate Two have been communicated and discussed with RAPID during checkpoint calls and in the Gate Three Interim Update (see Annex 8C: Interim Update) shared with RAPID in May 2023.

Additional assurance has been undertaken during Gate Three in relation to cost forecasts on behalf of Ofwat (by Jacobs) to ensure forecasts were relevant to and appropriate for the work required for Gate Three. This work has led to a revised Gate Three allowance of £40.6m. A full breakdown of costs is provided in Annex 8B: RAPID Efficiency of Expenditure.

Prior to Gate Two SW had requested an early start on some Gate Three activities, commencing work prior to December 2021 (Gate Two submission date) which were shared as part of the Gate Two submission. The values of Gate Three expected spend (with actual values to December 2023 and forecasted values for January - April 2024) have been provided in Table 8-5. The forecasted values will be updated with actually incurred costs confirmed post Gate Three when financial reports are available from SW and PW.

Table 8-5 - Summary of Gate Three for the HWTWRP in 2017/18 prices

| RAPID Category | Early Gate Three Costs (pre-Dec 2021) | Gate Three Costs (Dec 21-Mar 24) | Total Gate Three Costs |
|---|---|---|---|
| 1. Programme and Project Management | £745,051 | £8,987,045 | £9,732,097 |
| 2. Finalised Feasibility and Developed Design | £939,439 | £6,803,321 | £7,742,760 |
| 3. Environmental Assessment | £15,276 | £5,296,591 | £5,311,867 |
| 4. Data Collection, Sampling, and Pilot Trials | £1,251,720 | £6,030,822 | £7,282,542 |
| 5. Commercial and Procurement | £284,003 | £2,103,723 | £2,387,726 |
| 6. Planning and Land | £112,577 | £3,168,008 | £3,280,584 |
| 7. Stakeholder Engagement | £7,752 | £501,157 | £508,909 |
| 8. Legal | £154,704 | £2,413,040 | £2,567,744 |
| 9. Other | £6,623 | £578,243 | £584,866 |
| **Forecast Total** | £3,517,144 | £35,881,951 | £39,399,095 |

## 8.5 Gate Four Spend (RAPID Template)

During the second half of Gate Three it was identified that some of the project delivery activity was better described as early Gate Four activity (such as key stages of the preparation for DCO application e.g. PEIR and DCO Statutory Consultation preparations) which was agreed with RAPID in a routine Checkpoint meeting in October 2023. The Gate Four guidance v1, published in January 2024, clarified that these activities were Gate Four related.

To calculate the Gate Four forecast, the project delivery schedule was initially reviewed against the PR19 Gate Four requirements to determine when the activities required would be completed, therefore determining when the gate would fall. With the receipt of the Gate Four v1 guidance, the project delivery schedule was revisited against the published RAPID requirements and deliverables.

The funding request for the early spend relating to Gate Four activities will be included as part of the Gate Four submission, together with a breakdown of all Gate Four costs. Forecasted early Gate Four and total Gate Four spend has been included (Table 8-6). See also Annex 8B.

The current allowance for Gate Four is £10.8m (2017/18 prices) however, as reflected in SW's PR24 data tables, it has already been indicated that this is not sufficient funding to achieve the maturity of planning required for a DCO application (a major deliverable for Gate Four). With the changes of the SRO description and scope from Gate One to Three, SW will continue to work with RAPID (and Ofwat through the PR24 process) to confirm a revised allowance for Gate Four for the HWTWRP.

Table 8-6 - Estimated Gate Four values in 2017/18 prices

| RAPID Category | Early Gate Four (pre-3 April 2024 Gate Three submission) | Gate Four Total (post 3 April 2024 - end August 2025) | Total Gate Four Forecast |
|---|---|---|---|
| 1. Programme and Project Management | £888,816 | £5,459,749 | £6,348,564 |
| 2. Developed Design | £552,699 | £2,829,423 | £3,382,122 |
| 3. Environmental Assessment | £1,360,272 | £4,468,911 | £5,829,183 |
| 4. Data Collection, Sampling, and Pilot Trials | £927,700 | £1,431,608 | £2,359,308 |
| 5. Commercial and Procurement | £89,684 | £1,065,759 | £1,155,443 |
| 6. Planning and Land | £505,058 | £2,123,299 | £2,628,357 |
| 7. Stakeholder Engagement | £59,616 | £122,515 | £182,131 |
| 8. Legal | £0 | £4,181,671 | £4,181,671 |
| 9. Other | £0 | £259,746 | £259,746 |
| **Total** | **£4,383,844** | **£21,942,681** | **£26,326,525** |

## 8.6 Solution Progression

The SRO as described in Chapter 2: Solution Design, is the same solution and option as are detailed in the upcoming revised draft WRMP24 and WRSE revised draft Regional Plan and therefore it is recommended that it progresses to Gate Four with funding to progress investigation, consultation and development.

# 9. Stakeholder and Customer Engagement

## 9.1 Public Perception and Acceptability

As with all water recycling schemes planned across the country, ensuring public confidence in the use of recycled water as a drinking water source is key to the successful delivery of the HWTWRP. Since the Gate Two submission, SW has continued to engage with customers, stakeholders and regulators on water recycling. This has included co-chairing (with Severn Trent Water) a national Water Recycling Communications Group, established to bring a coordinated national approach to improve consistency in messaging for water recycling engagement. In addition, SW has sponsored events such as the 'Adapting to Change' conference hosted by the Centre for Aquatic Environment at the University of Brighton which specifically considered the potential of water recycling technology that might be used in the near and mid future to address the UK's water scarcity challenges.

Engagement being undertaken is aimed specifically at addressing customer acceptability concerns of receiving recycled water, improving public awareness, knowledge and understanding of the project's WRP and water recycling generally. Activity in this area will evolve and increase as the HWTWRP proceeds towards Gate Four and will remain informed through ongoing discussions with the DWI regarding the engagement with customers and stakeholders on new water sources.

## 9.2 Strengthening Customer Support

More than 5,000 customers have been directly involved in research for SW's overarching WfLH programme and the use of water recycling, alongside tens of thousands from more than 150 reports from water companies across the wider UK industry. In addition, the development of WRSE's revised draft Regional Plan and WRMP24 has enabled SW to gain further insight into public opinion on water recycling through engagement using a range of deliberative approaches, interacting with more than 3,000 customers and stakeholders in its development.

Through this research, completed prior to Gate Three, customers shared that they expect a blend of both demand and supply solutions for water resources. They support the use of water recycling for the challenges in Hampshire. Whilst some are concerned on potential impact to quality, whilst initial reassurance mitigated many immediate concerns, this engagement demonstrated the need for a clear future engagement plan. Customers want to ensure the use of water recycling is scalable to protect future generations, and options need to consider the environmental and affordability impacts. Future customers were particularly supportive of water recycling, expecting companies to already be doing this. Those with more individual needs (such as businesses using water for their end-product) require tailored engagement on some of the specific details.

These engagement events included focus groups, in-depth interviews, longitudinal studies and workshops to maximise the level of coverage with customers and stakeholders. A range of techniques[46] have been used to ensure that engagement activities were able to reach households, businesses, stakeholders, future customers and harder to reach audiences, such as minority groups and vulnerable customers to hear to a wide range of customers' views.

Furthermore, SW carried out a targeted 'average person on the street' survey in January 2023, recruiting 102 customers to take part in a consultation along with several joint projects with PW that discuss drought planning with households, vulnerable customers, businesses, and stakeholders. These joint projects have included testing possibilities for water resource options and drought planning. Each of these engagement activities has continued to identify increasingly positive support for water recycling technology demonstrated in SW Drought plans[46] and WRMP24 submissions.

Wider customer and stakeholder engagement continues to show there is a clear preference for water recycling to be used as a source of water. However, some stakeholders and customers have raised concerns around a perceived adverse impact to water quality in the HTR from the addition of recycled water, which needs to be allayed.

Research at Gates One and Two, together with consultation on WRMP24, has demonstrated that customers are often surprised at future challenges of water scarcity, as water tends to be viewed as an abundant resource with limited experiences of shortages. The general perception is that it is '*always raining in England'* and '*being an island, we are surrounded by water*'. Through further exploration carried out as part of the consultations completed to date, customers understand the challenges of population growth, climate change, the need to leave more water in the environment to protect species and habitats and customers support that action needs to be taken to ensure a resilient water future for the South East. This reinforces the decision to proceed with the development of the HWTWRP, a critical infrastructure investment that will support the supply demand challenges of the future.

Since Gate Two, ongoing customer and stakeholder engagement has been further developed in parallel to engagement and consultation undertaken in respect of the DCO pre-application process (see Annex 9: Stakeholder and Customer Engagement). A summary of the customer and stakeholder engagement undertaken in advance of Gate Three includes:

- Non-Statutory Consultation July 2022 – August 2022;
- Water Recycling Pilot Plant Tours November 2022 – March 2023;
- Water Recycling Polling Survey; January 2024 – February 2024;
- Stakeholder Briefing Sessions January 2024 – March 2024;

## 9.3 Public and Stakeholder Engagement

### 9.3.1 Non-Statutory Consultation

In July 2022, as part of the DCO pre-application process, a six-week Non-Statutory Consultation[15] regarding the HWTWRP was held, focused on the HWTWRP's preferred pipeline corridors, sites/zones for AGP and shared information about the water recycling technology being proposed (Figure 9-1). The consultation was aimed at communities that could be impacted by the construction and/or operation of proposed infrastructure.

[46] Southern Water Drought Plans, Engagement and Consultation


*Figure 9-1 - Engagement approaches used for Non-Statutory Consultation*

Feedback was publicised in a Summary of Feedback[1] report, which sets out the responses received from interested parties. It collates and discusses views, opinions, and concerns through a series of questions that had been asked.

Over the course of the six-week consultation period:

- 9,169 people visited the consultation web pages;
- 878 people visited one of six public drop-in sessions;
- 69 people attended one of SW's public webinar events; and
- 571 consultation responses were received.

The feedback received identified some concerns regarding the use of water recycling technology, with the associated question having received the highest response (476 responses received). Here 42% of respondents support the proposed solution, while 48% did not (Figure 9-1).

Further discussions have identified that some respondents perceived that recycled water could have an adverse impact on aquatic ecology in the reservoir. SW is continuing to engage through the consenting process in collaboration with PW, to address these localised concerns.

### 9.3.2 Customer and Stakeholder Engagement

Since the 2022 Non-Statutory Consultation, public meetings and stakeholder briefings have taken place along with joint tours of a water recycling pilot plant at Budds Farm Wastewater Treatment Works (WTW) in Havant and the HTR site. These activities have provided opportunity for targeted and enhanced engagement, ensuring key stakeholders understand plans and processes being proposed and that communication could be maintained to directly address any concerns identified around water quality in the reservoir and water quality at tap.

SW continues to play an active role in PW's HTR Stakeholder Group – presenting updates on the HWTWRP at the regular meetings and ensuring that this group of stakeholders and community representatives are aware of the proposed enhancements to the already-approved plans for the reservoir and are assured that there will be no detrimental impact on the potential for leisure provision in and around the reservoir from the plans.

The more recent customer insight activities have continued to demonstrate support from stakeholders for the plans to develop water recycling as a future water resource in SW's region.

These activities were centralised around a polling study, launched with Yonder Consulting, that spoke to 1,750 customers from across the region. This poll consulted at least 250 customers from each location where water recycling would be an option for future resources. This engagement identified:

- 54% of all customers surveyed responded positively and 26% were neutral in support of drinking water that has been recycled. Around 20% are concerned with water recycling technology;
- 54% of those surveyed support the use of using recycled water for drinking purposes, 24% were neutral and 18% have disagreed; and
- 77% believe its use will benefit the environment, 6% disagree, 17% were neutral.

Whilst customers are largely supportive of water recycling technology, it is recognised that customer concerns remain. It is therefore essential that future engagement continues to reassure and address those issues. Feedback received will inform and help tailor future communications to reinforce customer confidence and alleviate concerns. The outputs of the Yonder survey supported the Statutory Consultation process.

Some of the engagement being carried out by PW is already helping build understanding and support - in a survey of 700 of its customers, 70% supported water recycling as a future source of water[47].

### 9.3.3 Water Recycling Pilot Plant

Since 2019, a Water Recycling Pilot Plant was jointly developed between SW and Brighton University, which replicates the proposed treatment processes. It was set up at Peel Common WTW and then relocated to Budds Farm WTW to demonstrate the plant's ability to purify treated wastewater from the intended source. The plant was also used as a destination for tours with stakeholders, which provided the opportunity to discuss the technology and to alleviate customer and stakeholder concerns as identified through previous engagement (Figure 9-2).


*Figure 9-2 - Budds Farm WTW Pilot Plant Tours*

More than 100 visitors representing regulators, local councils, environmental organisations and community groups joined a series of tours to observe the treatment process, and highly purified, recycled water being produced, first-hand. Group discussions were held before and after each tour, giving people the chance to put questions to the HWTWRP team and to share their views on the proposal.

The feedback from the tours was very positive, with stakeholders providing supportive comments that reflected them having gained a better understanding of the treatment process and, importantly, the drivers for the HWTWRP (Figure 9-3).

*"I was so impressed with the level of expertise we were privileged to spend the morning with. I learnt a lot."*

**Stakeholder tour attendee**

*"We need to manage water better and ensure a reliable water supply without impacting negatively on the rivers and environment. It makes sense to use the treated water generated (always a reliable source!!) in this efficient way."*

**Stakeholder tour attendee**

*"I think it is an excellent idea, forward-thinking and ingenious."*

**Stakeholder tour attendee**

*Figure 9-3 - Customer and Stakeholder feedback from Budds Farm WTW Pilot Plant Tour*

The pilot plant was decommissioned in 2023 following successful water quality assessment and testing. An information board outlining the water recycling proposals is set up at Budds Farm WTW to enable the continuation of discussions with visitors on tours of the wastewater treatment works about the water recycling plans.

Brighton University intend to publish a report including the results of the water quality assessments demonstrating the efficacy of water recycling and helping reassure customers that it is a safe and sustainable source of water. A link will be posted to this on the SW website when it becomes available as these results have been a central subject in ongoing engagement with stakeholders. They demonstrate the effectiveness of water recycling technology in removing the vast majority of remaining impurities from treated wastewater.

### 9.3.4 DCO Pre-Application Engagement

In total, more than 220 external briefings related to the HWTWRP have been held with key stakeholders since Gate Two. A number of specific working groups and forums have been established with key stakeholders in recognition of the importance of proactive engagement as part of the consenting process (see Annex 9: Working Groups). These include:

- EIA Working Group (local authorities, statutory environmental bodies);

[47] PRT03 Engaging and Understanding Our Customers and Communities

- Environmental Technical Working Group (EA, NE, MMO); and
- Joint Officer Group (local authorities).

They serve as a platform for technical discussions on the HWTWRP's development and for resolving project level issues. To facilitate collaboration, service level agreements have been established with statutory bodies where necessary.

The EIA Working Group specifically focuses on the approach to environmental assessments, looking at topics including community, historic environment and landscape, resilience, emissions and transport, biodiversity, and the water environment. The EIA Working Group has collectively met 14 times since its establishment in May 2022, offering a platform for sharing vital information, including survey protocols, assessment methodologies, impact significance evaluations, potential mitigation measures, and monitoring requirements.

Engagement with the Planning Inspectorate, landowners, statutory undertakers, other water companies, community groups, and other parties is undertaken on a tailored basis. Further details on the stakeholders that have been engaged and their involvement are provided in Annex 9: Stakeholder and Customer Engagement.

Going into Gate Four, these sessions will be maintained so that constructive engagement with these groups can continue to support the submission of the DCO. Working collaboratively in this way helps ensure that the HWTWRP remains aligned with regulatory requirements, concerns are addressed expediently wherever possible, and the HWTWRP development benefits from the expertise and insights of all stakeholders involved.

More recent engagement has taken place in January and February 2024 with a programme of briefings completed to support early awareness of the summer 2024 Statutory Consultation. In total, 17 briefings were conducted with more than 150 attendees from local planning authorities, parish councils and environmental groups. These briefings were used to update stakeholders on the latest developments in the HWTWRP, share the preliminary water quality assessment results from the water recycling pilot plant and signpost the Statutory Consultation. The briefings have complemented the broader programme of engagement undertaken before the Statutory Consultation, including the preparation of, and consultation on, the Statement of Community Consultation (SoCC) that sets out how SW will consult, what will be consulted on and how the community can provide feedback.

### 9.3.5 Informing Project Design

Feedback from the 2022 Non-Statutory Consultation and engagement feedback through 2022 to early 2024 has been utilised to support and inform project development (see Annex 9: Taking Account of Stakeholder Feedback for more detail). Feedback received has helped to ensure that:

- Impacts of pipeline construction on land holdings, residential areas and highways are kept to a minimum;
- The most appropriate and less invasive construction techniques in proximity to sensitive areas (e.g. rivers, woodland) are implemented;
- Location of the AGP has been selected to reduce visual impact; and
- Environmental assessments have been adapted to address additional concerns.

Further details of the work undertaken in response to issues raised at the Non-Statutory Consultation was published and made available at the summer 2024 Statutory Consultation as discussed later in Section 9.4. The document, ‘Summer 2022 Consultation, Response to Feedback’, outlines how feedback from the Non-Statutory Consultation has been taken into account in the development of the project. The same approach will be undertaken following Statutory Consultation with a summary of feedback report provided prior to submission of the DCO application setting out how feedback has been considered as part of the refinement of the project.

## 9.4 Future Public Engagement

### 9.4.1 Statutory Consultation

A further public consultation was completed in summer 2024 as part of the statutory requirements of the DCO pre-application process (see Chapter 6: Programme and Planning). All relevant statutory consultees, as listed in Schedule 1 of The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009[48], were notified of the Statutory Consultation as listed in Annex 9: Stakeholder Engagement.

Statutory Consultation was an opportunity to bolster engagement with stakeholders that have already been conducted on the HWTWRP as outlined in the DCO pre-application engagement and the Non-Statutory Consultation in July 2022. This engagement was a crucial step in refining and improving the HWTWRP's design by building dialogue to understand challenges and reduce the risk of further issues developing.

Statutory Consultation provided all interested parties additional opportunity to feed back on the latest HWTWRP proposals, which included proposed pipeline routes and sites for AGP. This also included initial findings of the

[48] The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

environmental impact assessments that are under way. The consultation was also aimed at those communities that could be impacted by the construction and operation of the infrastructure. As part of a thorough, accessible and effective consultation exercise, all responses to Statutory Consultation will be taken into account and outlined in a Response to Feedback report that will be published prior to submission of the DCO application (prior to Gate Four).

### 9.4.2 Further Customer Acceptability Engagement

Targeted engagement, more specifically on change of source, will be undertaken later in the programme, as part of "Phase 3 – Deliver" of the long-term engagement strategy (Table 9-1). A separate customer and stakeholder engagement plan on change of source will be developed nearer the time to ensure this sensitive subject is approached with care and consideration. This will include further discussion around the changes that will occur by the blending of the various water sources. Engagement on change of source will include broadcast communications via traditional, social media and partner organisations, including hard-to-reach and seldom-heard groups as well as directly contacting customers whose water supplies may incorporate this new source and seeking to address and resolve any concerns.

*Table 9-1 - Timeline and overview of long-term engagement strategy*

| 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **DCO pre-application process** | | **DCO examination** | | **Construction** | | | | | | | | **Launch** |
| *Phase 1 - Create* | | | | *Phase 2 - Construct* | | | | | | | *Phase 3 - Deliver* | |

As described at Gate Two, deliberative approaches[49] will continue to be used with customers to ensure they are informed about blending considerations to provide opportunity for response and feedback. This will involve a further round of specialist engagement with knowledgeable professionals (e.g. nutritionists, doctors, health professionals) so that expert insight can provide confidence to customers and stakeholders on the solution and help resolve their concerns.

SW and PW will continue to promote the HWTWRP and water recycling technology across Hampshire and the rest of the South East region as a safe, sustainable source of water. The priority through "Phase 1 – Create" of the engagement strategy continues to be a focus on building support for water recycling and engaging on the HWTWRP. This approach has been shared with regulators for consultation.

As the HWTWRP moves beyond the consenting process and into construction and delivery, ongoing engagement with stakeholders will be supported by the SW website (as the hub for information for customers) to provide updates on progress and milestones as well as continuing to demonstrate that the water recycling technology proposed will provide wholesome water and support long-lasting supply resilience for generations to come.

# 10. Board Statement and Assurance

## 10.1 Introduction

This chapter provides an overview of assurance processes followed for Gate Three, that builds on SW's Business As Usual (BAU) approach to assurance as well as the experience gained through Gate One and Gate Two submissions. It has included feedback from other SROs post Gate Two and incorporated changes to include the completion of non-priority actions and recommendations raised by RAPID at Gate Two. The chapter also provides a summary of the external assurance completed and is supported by a signed Board statement from both SW and PW.

[49] HWTWRP RAPID Gate Two Supporting Annex 9: Stakeholder and Customer Methodology

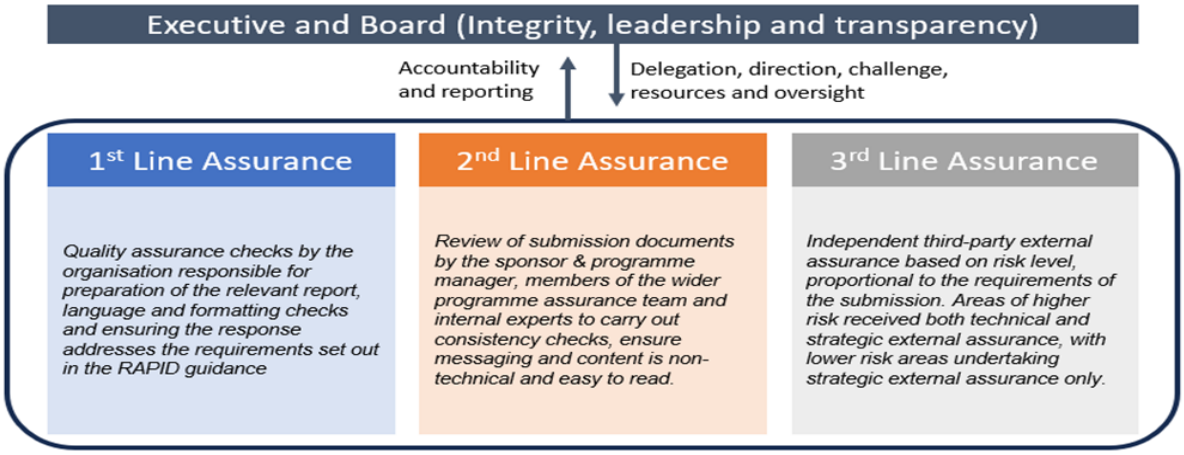


*Figure 10-1 – Three-line assurance process used at Gate Three*

SW's established risk-based assurance approach is consistent with that documented in the individual companies' statements of reporting risks, strengths and weaknesses and final assurance plans [50] [51] and is based on a three lines of assurance model (Figure 10-1). This mature governance structure is designed to allow challenge by owners, experts plus Board oversight of the assurance approach as well as providing confidence in the quality of published material. It is consistent with the assurance requirements laid out in RAPID guidance[32] and was augmented by experience gained through the PR24 assurance process and the sharing of best practice through the ACWG together with the accelerated and standard Gate Two learnings. Throughout the Gate Three period regular updates have been made to the Executive Directors at both SW and PW.

This approach provides an effective programme of assurance which considers areas that the HWTWRP team know are of prime importance to both customers and regulators or may have a significant financial value or risk. A detailed risk assessment has been completed and the components requiring third party (independent external) assurance were incorporated into a Request for Quote and issued via the SW procurement route on behalf of both companies.

Jacobs has been appointed as a joint independent external assurer. The assurance process was re-designed to ensure that feedback from Jacobs, potentially identifying any shortfalls in the submission, was addressed by the programme team prior to Jacobs issuing a final assurance report (see Annex 10: Board Statement and Assurance). This supports the completion of the non-priority actions and recommendations raised at Gate Two.

The third-line assurance statement from Jacobs confirms that, based on the evidence presented and the limitations and scope of the assurance activities, the submission is aligned to the RAPID requirements for a Gate Three submission (see Annex 10: Board Statement and Assurance).

Following the release of version 2 of the Gate Three guidance provided by RAPID in August 2023, it was formally agreed with RAPID in September 2023 that the requirement for PW Board to assure the whole submission was not required. Therefore, the approach taken has been similar to that taken at Gate Two whereby the PW Board have assured only areas relevant to their involvement in the HWTWRP SRO and SW has assured the whole submission.

## 10.2 Gate Three Board Statement

The SW Board has reviewed and discussed the overall strategy for the approach to Gate Three submission and is satisfied that both the submission and data assurance are appropriate.

- The Board supports the recommendations for solution progression made in the submission at Gate Three and the recommendations for which option within the solution should be progressed;
- The Board is satisfied that a realistic and achievable programme for the solution is in place, there are no insurmountable obstacles to the delivery of the solution in accordance with that programme and that progress on the solution at Gate Three in accordance with that programme is commensurate with the solution being "construction ready" for 2025-2030 and "operational ready" for 2030-2035;
- The Board is satisfied that all significant risks to the delivery of the solution in accordance with the programme and within current cost projections have been identified and that those risks are managed well;

[50] WfLH Statement of Risks, Strengths, Weaknesses and Draft Assurance Plan November 2023
[51] Portsmouth Water Data Assurance Summary 2022

- The Board is satisfied that the work carried out at Gate Three is of sufficient scope, detail and quality to ensure that applications can be made for DCOs, planning applications and other necessary statutory consents and permits in accordance with the programme and the work carried out at Gate Three is commensurate with the solution being “construction ready” for 2025-2030 and “operational ready” for 2030-2035;
- The Board is satisfied that expenditure has been incurred only on activities that are appropriate for Gate Three and is efficient and cost effective; and
- The Board is satisfied that the solution will be delivered to meet the needs of the region as set out in the upcoming revised draft WRMP24.
- In addition to the RAPID Gate Three requirements above, the SW Board acknowledges that further work is required to complete the DPC Stage 2 deliverables and provides assurance that this task will be given due attention to expedite completion.

The PW Board supports the continued joint working arrangements with SWS to further develop the HWTWRP through to RAPID Gate Four submission. At the same time PW Board supports the continued joint working with SWS to deliver HTR.

The Board assurance statements, provided and signed by both PW and SW are provided in Annex 10: Board Statement and Assurance, together with the assurance statement provided by Jacobs. Both the SW and PW Boards were engaged and consulted throughout the assurance process and the results of assurance work were made available to the Boards of both companies leading to the creation of each statement from the Board, covering the RAPID requirements.

# 11. Conclusions and Recommendations

Changes to SRO scope since Gate Two have been discussed with RAPID and Ofwat as the SRO progressed, and these are summarised in the submissions cover letter with full details described in Chapter 2: Solution Design.

There are no new solutions being proposed at this gate as the HWTWRP has been confirmed as the preferred option in both the upcoming revised draft WRMP24 for SW and the draft WRMP24 for PW as well as the WRSE revised draft Regional Plan with the scope changes being made to maintain alignment to the Regional Plan.

The Boards recognise that the timing of the revised draft WRMP24 may impact the DCO application process, and SW are working on a parallel need case to mitigate this risk.

It is recommended that a clear distinction is made between the Gate Three process and the DCO Statutory Consultation process to enable stakeholders to respond appropriately to the relevant process and body. The Gate Four guidance (version 1) addresses this going forwards as to the role of RAPID, however, with multiple concurrent statutory activities (WRMP24, PR24, Gate Three) both SW and PW acknowledge that this can be confusing and will make every effort to ensure clarity for stakeholders.

Both PW and SW Boards recommend progressing the HWTWRP solution to Gate Four and will continue to work collaboratively to accelerate delivery, wherever possible, to generate beneficial use of the SRO for customers and the environment in line with the WRMP24 process and WRSE Regional plans.