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Strategic regional water resource solutions: accelerated gate two draft decision for Water Recycling

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1. Introduction

The purpose of this publication is to set out our draft decision in respect of the Water Recycling strategic regional water resource solution submitted for the accelerated gate two assessment by solution owner Southern Water¹. This solution consists of two options, one of 61Ml/day and one of 75 Ml/day.

This publication should be read in conjunction with the draft decision letter issued to each solution owner. Both this document and draft decision letter have been published on our website today.

The assessment process is overseen by RAPID, with input from the partner regulators Ofwat, the Environment Agency and the Drinking Water Inspectorate. The Environment Agency together with Natural England have reviewed the environmental sections of the submissions, and provided feedback to RAPID. The Consumer Council for Water provided input to the assessment on customer engagement.

The solution owner and other interested parties can now respond to the draft decision. Representations are invited by email to rapid@ofwat.gov.uk and the representation period will close at 6pm on 12 April 2022. All representations will be considered before our final decision is published at 10am on 17 May 2022.

We will publish representations on our website at www.ofwat.gov.uk/regulated-companies/rapid, unless you indicate that you would like your representation to remain unpublished. We will also share representations with our partner regulators, Ofwat, the Environment Agency and the Drinking Water Inspectorate and with Natural England. Subject to the following exceptions, by providing a representation to this consultation you are deemed to consent to its publication.

If you think that any of the information in your response should not be disclosed (for example, because you consider it to be commercially sensitive), an automatic or generalised confidentiality disclaimer will not, of itself, be regarded as sufficient. You should identify specific information and explain in each case why it should not be disclosed (and provide a redacted version of your response), which we will consider when deciding what information to publish. As minimum, we would expect to publish the name of all organisations that provide a written response, even where there are legitimate reasons why the contents of those written responses remain confidential.

In relation to personal data, you have the right to object to our publication of the personal information that you disclose to us in submitting your response (for example, your name or contact details). If you do not want us to publish specific personal information that would

¹ Referred to in PR19 final determination as "River Itchen effluent reuse"

enable you to be identified, our [privacy policy](#) explains the basis on which you can object to its processing and provides further information on how we process personal data.

In addition to our ability to disclose information pursuant to the Water Industry Act 1991, information provided in response to this consultation document, including personal data, may be published or disclosed in accordance with legislation on access to information – primarily the Freedom of Information Act 2000 (FoIA), the Environmental Information Regulations 2004 (EIR) and applicable data protection laws.

Please be aware that, under the FoIA and the EIR, there are statutory Codes of Practice which deal, among other things, with obligations of confidence. If we receive a request for disclosure of information which you have asked us not to disclose, we will take full account of your explanation, but we cannot give an assurance that we can maintain confidentiality in all circumstances.

We would like to thank Southern Water for the level of engagement, collaboration and innovation that they have exhibited during this stage in the gated process.

2. Solution Summary

2.1 Solution summary

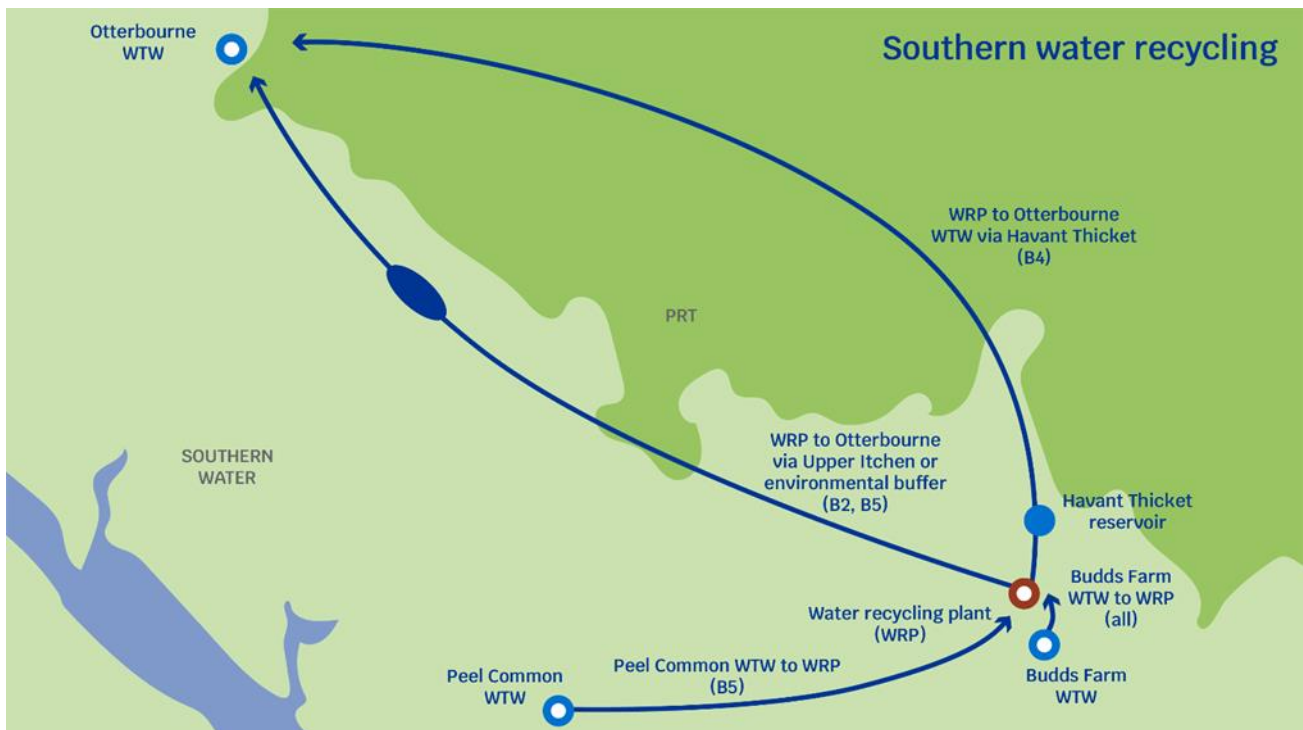
The recycling solution comprises the treatment of final effluent from a wastewater treatment works via water recycling plant (WRP) to an environmental buffer lake where it mixes with water from the River Itchen before being fully treated to potable standard at Otterbourne Supply Works (WSW) to provide a potable water supply.

The WRP will include the following treatment processes: ultrafiltration, reverse osmosis, ultra violet (UV) disinfection and remineralisation. The options investigated are listed below;

B.2: 61 Megalitres/day (Ml/d) Recycled water from Budds Farm wastewater treatment works to environmental buffer; treated at Otterbourne WSW;

B.5: 75 Megalitres/day (Ml/d) Recycled water from Budds Farm wastewater treatment works and Peel Common wastewater treatment works sent to environmental buffer; treated at Otterbourne WSW.

Figure 1. Water Recycling schematic



2.2 Solution context

A Section 20 agreement with the Environment Agency sets out how Southern Water will use “all best endeavours” to implement the long-term solution for alternative water resource in order to address deficits arising from reductions in the volume of water that can be abstracted on the River Test and River Itchen, which are reflected in changes to abstraction licences made in March 2019.

The alternative water resource will enable the company to no longer require drought orders from the River Itchen and the Candover boreholes and only to require a drought order or permit from the River Test in extreme drought events (1 in 500 year drought severity). Southern Water’s Water Resource Management Plan 2019 (WRMP19) sets out the proposals to deliver alternative water resource to meet the section 20 agreement which include: a 75Ml/d desalination plant at Fawley; water efficiency and leakage reductions; new bulk supplies from Bournemouth Water (20Ml/d) and Portsmouth Water (9Ml/d); construction of Havant Thicket reservoir and a further 21Ml/d bulk supply from Portsmouth Water; extensions to the existing water grid; and water quality schemes.

This solution is proposed by Southern Water as another potential option for addressing deficits arising from abstraction licence reductions on the Rivers Test and Itchen.

Southern Water have identified Option B5 as their back-up option and B4, which is included in the Havant Thicket Raw Water Transfer solution, as their selected option for development beyond accelerated gate two. This is in place of the desalination solution, which has been removed from the gated process and RAPID programme on the basis that it was not feasible at this location at the current time.

Further information concerning the background and context of the Southern Water Recycling can be found in the Water Recycling publication document on the [Southern Water](#) website.

2.3 Solution key risks and issues

Southern Water has identified the following key risks associated with this solution:

- No approved reverse osmosis membranes being available for the water recycling plant.
- Possibility of environmental and spatial constraints for the pipeline which could impact on planning and costs.
- Lack of power for the water recycling plant and associated pumping stations.
- Increased costs of construction materials.
- Customer perception of recycled water may lead to delays in the planning and consenting process whilst concerns are addressed.
- Customers do not consider recycled water to be wholesome and acceptable.
- Delivery date does not comply with the section 20 agreement delivery date of 2027.

We expect Southern Water to develop mitigations for risks as they are identified, including implementation of mitigation plans and assessment of residual risk. Where relevant, mitigation plans should be included in solution costs.

3. Assessment of progress against accelerated gate one remediation action plan

Southern Water received a 10% delivery incentive penalty for failure to make sufficient progress at accelerated gate one on the water recycling solution. This delivery incentive penalty was conditional on whether or not it took prompt action to address the issues we identified with its submission.

The company had the opportunity to mitigate the delivery incentive penalty by addressing priority actions identified and listed in the Appendix to the gate one decision that needed to be completed by 26 July 2021. If the company addressed all of the priority actions satisfactorily by this date then the 10% delivery incentive penalty in respect of this solution would not apply. If the company failed to address one or more of the issues by this date then the 10% delivery incentive penalty in respect of this solution will apply in full.

Southern Water published progress against their [remediation action plan](#) on 26 July 2021. We have assessed progress against the priority actions and find that some had been addressed satisfactorily but others have not. However, we have decided to exercise our discretion in not applying the accelerated gate one 10% delivery incentive penalty to support Southern Water in focusing on delivering its preferred and back-up solution.

Further details of our assessment are provided below.

Table 1: Assessment of remediation action plan

<p>Consider whether your WRMP19 needs amending and if so how. Explain the reasoning for this in light of potential changes to your best case plan, delivery times and costs for the solution.</p>	<p>Southern Water published its annual review of its WRMP19 on 3 December 2021, which set out a proposed change in the base case from desalination at Fawley to a recycling plant and transfer from Havant Thicket reservoir. Southern Water propose to update and consult on this change to their WRMP through their WRMP24.</p>
<p>Provide information about why the timeline for delivery has slipped beyond 2027. Provide a plan for recovering the programme slip, including a revised plan which mitigation measures to deliver alternative water resource by end 2027 This should include:</p> <ul style="list-style-type: none"> the measures that are needed to meet 2027 timescale 	<p>Southern Water has confirmed that it cannot deliver a solution by the end of 2027.</p> <p>The base case solution has changed from desalination at Fawley to water recycling and raw water transfer from Havant Thicket. Southern Water has published its annual review of its WRMP reflecting</p>

<ul style="list-style-type: none">• more detail of pre-construction activities and critical path activities (such as DWI engagement on membranes approvals and site location confirmation) and decision points• a clear statement to confirm any missing information and the potential impact this could have on the programme• consideration of solution delay impacts with reference to having an operational solution by the end of 2027• details of regulator engagement and review points• clarification of the date of tender award. Different dates have been shown in different areas of the submission	<p>this change. The earliest date provided for a solution delivery as documented by Southern Water is Q4 2028 / Q1 2029. Southern Water have stated that they cannot provide a programme to recover the slip but it will endeavour to minimise the overrun period.</p> <p>Southern Water is in discussion with the EA regarding mitigation measures it plans to put in place until a new source is operational.</p> <p>The concerns over availability of regulation 31 approved membranes are ongoing. There has been no update from the company regarding this other than verbal preference to use approved membranes at the WRP to eliminate risk of leachates from non regulation 31 approved membranes.</p> <p>Discussion is still ongoing regarding procurement route for this solution.</p>
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4. Solution assessment summary

At accelerated gate two, the solution should have been of a suitable standard for inclusion in a final WRMP. We are concerned that areas of the work are not yet at that standard, particularly in relation to identifying and mitigating environmental and drinking water quality risks. This therefore means that showstoppers could yet be identified, bringing potential delay or issues with consenting and permitting. There were also considerable quality issues through the submissions and areas of inconsistency between annexes. The issues with the quality of work completed to progress the solution and with the evidence presented in the submissions raises concerns regarding the assurance that has been provided by Southern Water's Board.

Table 2. Draft decision summary

Recommendation item	Water Recycling
Solution owner	Southern Water
Should further funding be allowed for the solution to progress to accelerated gate three?	Yes, but reduced because it is a "back-up" or alternative solution
Is there evidence all expenditure is efficient and should be allowed?	No
Delivery incentive penalty?	Yes, 10% applied to Southern Water's total gate two allowed efficient expenditure
Is there any change to partner arrangements?	No
Are there priority actions for urgent completion?	Yes

4.1 Solution progression and funding to accelerated gate three

The evidence suggests that the solution is aligned to any available strategic plans for water resources management (including plans in draft) and continues to need accelerated development and regulatory oversight and support. Based on our assessment of the potential solution costs and benefits we have concluded that the solution should progress through the gated process to accelerated gate three, and that further funding should be allowed. The reasons for this assessment are set out in the table below.

Table 3. Draft decision progression criteria

Progression criteria	Water recycling
Solution owner	Southern Water
Is the solution in a preferred or alternative programme in relevant regional plan or WRMP (where applicable) to be operable by end 2027?	Yes. This solution is chosen in Southern Water's annual review of its WRMP19 published on 3December 2021 and also in the emerging draft regional plan as an alternative solution. The solution will not be operable by end 2027 but it is the second candidate for completion as soon as possible should there be an issue with the selected solution (Havant Thicket Raw Water Transfer). It should continue to be explored.
Do regulators have any significant concerns with the solution's inclusion or non-inclusion in a WRMP or regional plan with any aspects that may impact its selection, to a level that they have (or intend to) represent on it when consulted?	On the evidence provided in the submission, the regulators do not have significant concerns. However, the solution owners have not developed the solution to the standard required for a final water resource management plan. Concerns may therefore emerge as the evidence is developed. For example, further evidence is required to demonstrate that water resource benefits input to regional modelling are robust and that scalability has been considered. There is also uncertainty about the companies' future needs and associated regional benefits from this solution.
Is there value in accelerating the solution's development to meet Southern Water's urgent requirement to address the supply deficit in its Hampshire area?	Yes. A solution needs to be delivered for 2027 or as soon as is practicable to negate the current deficit.
Does the solution need continued enhancement funding for investigations and development to progress?	Yes. Continued funding is required to develop a solution to be delivered for 2027 or as soon as is practicable.
Does the solution need the continued regulatory support and oversight provided by the Ofwat gated process and RAPID?	Yes. The solution will continue to benefit from the regulatory support and oversight provided by being included in the RAPID programme.
Does the solution provide a similar or better cost / water resource benefit ratio compared to other solutions?	Yes. The solution has been identified as a "back-up" or alternative solution to mitigate against deliverability risks arising with the preferred solution.
Does the solution have the potential to provide similar or better value (environmental, social and economic value – aligned with the Water Resources Planning Guideline) compared to other solutions?	Yes. While the water recycling solution is less cost beneficial than the selected solution the solution has the potential to be adapted and utilised to provide capacity beyond the immediate resilience requirement.
Does a regulator or regulators have "showstopper" type concerns that have not been addressed through the strategic planning processes taking into account proposed mitigation?	No showstoppers have been identified at this stage. However, the limited environmental evidence presented to date means that we have concerns that one or more showstoppers may yet emerge as further environmental and other assessments are undertaken and completed.

Southern Water has confirmed that it plans to take forward Option B5: 75 MI/d recycled water (indirect) sent to an environmental buffer, then fully treated at Otterbourne WSW, as the alternative solution to Havant Thicket Raw Water Transfer. Recycled water is supplied by both Budds Farm and Peel Common Wastewater Treatment Works (WwTWs).

We accept Southern Water's recommendation that this is a "back-up" solution. Funding will therefore be reduced to reflect reduced gate three activities, particularly in relation to moving towards securing planning and consenting and procurement. In its representation, Southern Water should propose what level of funding is required to deliver sufficient gate three activities to enable the solution to be an effective back-up.

4.2 Evidence of efficient expenditure

The PR19 final determination specified that any expenditure on activities outside the gate activities for the identified solutions (or solutions that transfer in) will be considered as inefficient and be returned to customers. We will consider whether gate activity is efficient by considering the relevance, timeliness, completeness, and quality of the submission which should be supported by benchmarking and assurance.

Our assessment of the efficient costs as spent on accelerated gate two activities results in an allowance for this solution of £4.14m (of £4.77m claimed). While Southern Water has claimed costs for early gate three activities, we have not assessed this expenditure at this time.

We have made adjustments to the accelerated gate two costs claimed totalling £0.63M, and we explain our reasons for these below.

Table 4. Accelerated gate two cost adjustments

Activity	Claimed expenditure	Allowed expenditure	Adjustment
Programme & Project Management	£621,000	£310,756	-£310,244
Legal	£270,000	£107,667	-£162,333
Data Collection, Pilot Trials, and Sampling Costs	£158,000	£0	-£158,000
Total	£1,049,000	£418,423	-£630,577

We have identified three areas where we consider submitted evidence has not been sufficient to justify efficient and allowed spend within the accelerated gate two programme of works. These are programme and project management, legal, and sampling costs.

In query response SRN003, Southern Water indicates it has claimed £621,000 in programme and project management costs for this solution (£92,000 for project management, £263,000 for Project Management Office (PMO) activities, and £266,000 for Southern Water senior delivery management).

We do not consider that enough evidence has been provided to show that these costs were incurred efficiently, indeed there is evidence to suggest significant duplication of work and

inefficiency. For example, costs have been incurred for "authoring support" or "submission development" of £151,000 (taken from Table 7 in Annex 6 and allocated on an equal basis across the three Southern Water solutions). According to query response SRN003, these costs do not include the costs of the actual technical content produced by the technical teams, and do not include the costs for developing the procurement and commercial analysis sections of the submission (a further £75,000 for each solution). Additionally, Table 7 of Annex 6 indicates that approximately £85,000 is incurred in assurance costs as a subset of PMO activities for each solution, which are separate to the £105,000 incurred for external assurance listed in query response SRN003. Furthermore, Table 7 of Annex 6 shows that £83,000 was spent on "programme sponsor support until interim update" and £34,000 on "programme sponsor support post interim update" (calculated by allocating the total amount listed in the table on an equal basis across the three Southern Water solutions). Given that the "post interim update" period was less than two months, this implies a large and unexplained increase in cost per time of programme sponsor support activities.

We find that an efficient benchmark for programme and project management costs for this solution are the costs for programme management and company activity incurred as part of the London Effluent Reuse gate one submission, totalling £310,756. We have selected this as a benchmark for all three of Southern Water's solutions because both the solutions that Southern Water proposes for progression include recycling within them and we therefore believe the complexity of the solutions is comparable. While we recognise these costs are for different gate activities, we do not believe the project and programme management costs for the solutions should show such a large step change between gates one and two. We replace the costs presented by Southern Water with the London Reuse figure, resulting in a downward adjustment of £310,244.

The second category in which we make adjustments to claimed costs is some of the legal costs.

In query response SRN003, the companies have indicated that £346,000 for legal activities described as legal advice inputting into the Gate 2 deliverables, reviewing and assisting with Interim Update and Gate 2 documents, attendance at peer review meetings, legal input into matters arising out of Gate 1 Final Determination. The gated allowances are for the purpose of developing the solutions – these activities form regulatory advice for Southern Water and do not relate to solution development. A further £1,000 is claimed for "attendance at RAPID meetings." In general, we do not expect companies to require external representation at meetings with RAPID.

Query response SRN003 also lists £93,000 for "strategic advice in relation to the consenting, regulatory approval, and delivery of the SROs." It is not clear what the purpose of this advice is; to the extent that it relates to the delivery of the solution (i.e., consenting, procurement, and contracting), we would expect it to have been allocated to one of the other categories of spend. There is an additional £47,000 listed for "attendance at project meetings." Again, it is not clear what the purpose of the attendance at project meetings is; to the extent that this is

to provide regulatory advice to Southern Water on their submissions to RAPID or otherwise, this is not expenditure on the delivery of the solution.

The total legal expenditure reported in query response SRN003 for the three Southern Water solutions for gate two is £810,000, or £270,000 per solution. The legal activities detailed above total £487,000 across the three Southern Water solutions. The water recycling share of this is £162,333 and we reduce the amount claimed for the Water Recycling Solution expenditure by this value. We note that query response SRN003 lists amounts for gate two and early start gate three expenditure against broad categories of spend (regulatory support, consenting, procurement and contracting, general and other) and does not provide an itemised breakdown for gate two expenditure for legal costs; thus, we treat all costs as gate two costs at this stage until separation for costs between gates is provided during the representation period.

The third category in which we make adjustments to claimed costs is data collection, sampling, and pilot trials. In query response SRN003, Southern have claimed £158,000 in costs for "specialised laboratory testing in the USA." We do not consider these costs efficiently incurred because testing for contaminants of emerging concern can be analysed in UK laboratories and no detail has been provided in the submission of any parameters which require overseas analysis thus we make a downward adjustment to the amount claimed of £158,000.

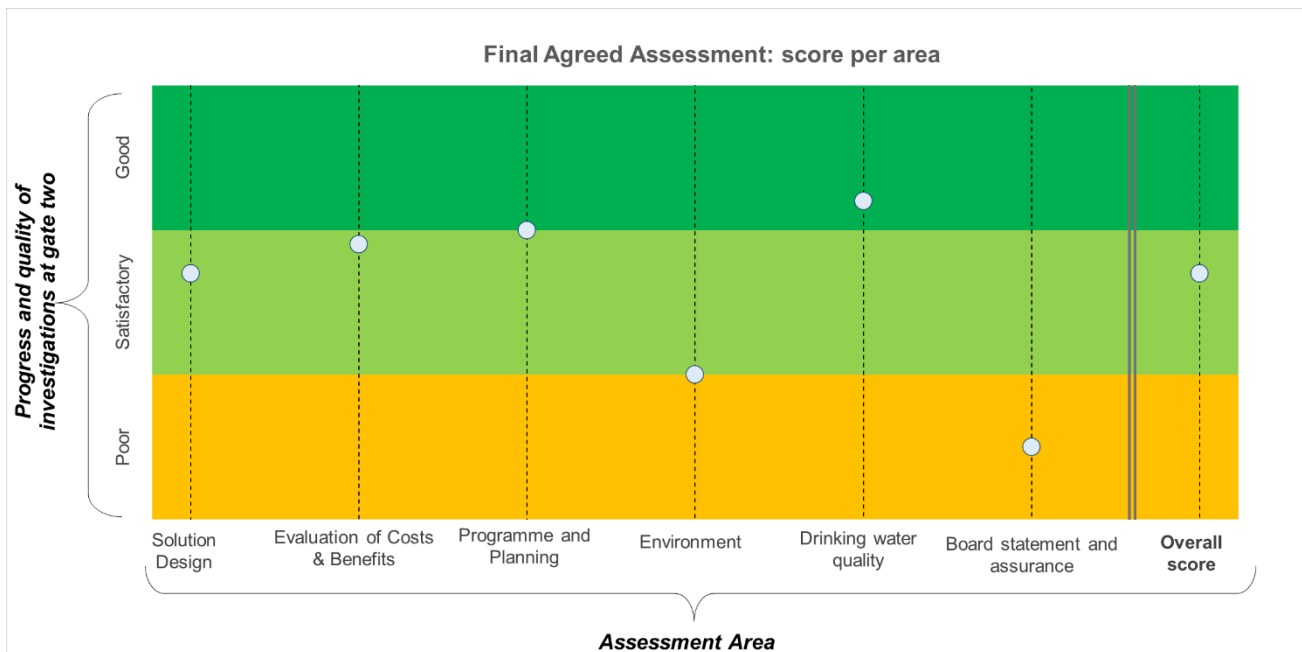
We also note that for future submissions, solution owners should provide evidence that there is no duplication of work between activities that could seemingly overlap, such as specialist planning resources and legal advice on planning and consenting obligations.

Our adjustments detailed above for project management, legal, and sampling/pilot trial costs reduce the amount claimed and allowed to £4.14m.

4.3 Quality of solution development and investigation

The aim of the assessment was to determine whether appropriate progress has been made towards delivery of the solution.

Figure 2 shows our assessment of the work completed on the solution, which was presented in the submission. Our assessment was made against the criteria of robustness, consistency, and uncertainty to grade each area of the submission as good, satisfactory, or poor in accordance with [accelerated gate two guidance](#) published on 22 February 2021 and updated in June 2021. We also assessed the Board assurance provided.

Figure 2. Assessment of progress and quality of investigation

Our overall assessment of the work completed on the solution as at accelerated gate two is that it is satisfactory overall, but it falls significantly short in some important areas and is not as developed as would be expected at this stage. We explain where we have found shortfalls in the progress made and work completed on investigating and developing the solution below.

Additionally, the submission and the associated annexes were difficult to navigate with a number of inconsistencies and inaccuracies identified throughout including conflicting deployable output figures, with further inconsistencies identified through the query process. We expect these issues to be resolved for accelerated gate three.

There was also an erroneous statement made regarding the Drinking Water Inspectorate's (DWI) approval process. Southern Water's submission suggested Southern Water were unable to meet their commitments under the section 20 agreement due to the Drinking Water Inspectorate's (DWI) approval processes (page 8 of the submission), which is not the case.

DWI manage the approval process for [regulation 31](#) which ensures that chemicals and construction materials used by water companies in treatment of drinking water and up to the customer tap do not compromise water quality or customer safety.

DWI held a meeting with representatives from Southern Water on 14 April 2021 to discuss the process for regulation 31 approval for manufacturers of reverse osmosis membranes used for desalination or direct reuse in the UK. There are currently no approved membranes in the UK as a previous membrane approval for potable use had lapsed. The solution owner was informed that there was no requirement for regulation 31 approved membranes as the

proposed solution design would constitute an indirect reuse source. However, Southern Water would need to ensure that all water provided for treatment at its water supply works meets the requirements of regulation 15. We clarify that the decision to remove direct reuse was made by Southern Water, and not DWI.

It is the solution owner's responsibility to ensure that the water it provides for any taste testing is representative of the water that it proposes to supply via the environmental buffer, and that it meets the requirements of the [Water Supply \(Water Quality\) Regulations 2016 \(England\) \(with 2018 amendments consolidated\)](#) in full. This should form part of customer engagement work which should also focus on customers who would be receiving water from the WRP as a component of their drinking water supply.

There was also a statement that agreement had been reached with the Environment Agency (EA) with regard to amending the section 20 agreement when that is not the case; discussions between the Agency and Southern Water are taking place to discuss mitigation until a new source is in supply.

4.3.1 Solution Design

Our assessment of the solution design considered the quality of the evidence provided on the solution and options; the anticipated operational utilisation of solutions; the interaction of the solution with other proposed water resource solutions and stakeholder and customer engagement. The assessment also considered whether information was provided on the context of the solution's place within company, regional and national plans, including plans in draft.

We consider that the progress and quality of the investigation completed by Southern Water in developing the solution design at accelerated gate two has been satisfactory (falls short of meeting expectations in some areas). There are some important areas where there are significant shortfalls.

Southern Water's assessment of utilisation in a 1:500 year drought was insufficient and did not adequately consider whether the volumes of effluent from Budds Farm WwTW would be able to provide sufficient flow to the WRP for it to produce the predicted deployable output under all weather scenarios.

In terms of stakeholder and customer engagement, there was an action for accelerated gate two on the company to undertake further engagement, which we do not believe Southern has completed. Engagement to date has been focused on desalination, which is no longer being progressed. There is an urgent need to focus on engaging those customers who will receive water from a changed source or recycled water as a component of their future supply, and to further engage with stakeholders. We acknowledge that there are plans in place, it is

important that these are now swiftly implemented and the outputs from this work made publicly available.

4.3.2 Solution costs

Our assessment of the costs of delivering the Water Recycling solution is that they are reasonable at this stage and cost changes from gate one to gate two have been sufficiently explained and justified. This solution is expensive if considered on the basis of cost per projected utilisation as it is a drought resilience asset. However, when considered on a capacity basis, solution costs are not unreasonable relative to internal benchmarks and over the medium- to long-term the solution can be adapted to provide capacity beyond the immediate resilience requirement. We will continue to scrutinise cost estimate changes from gate two to gate three.

4.3.3 Evaluation of Costs & Benefits

Our assessment of the evaluation of costs and benefits considered the quality of the information provided on the societal, environmental and economic cost and benefits, water resource benefits and wider resilience benefits. The assessment also considered whether evidence was provided on how the solution delivers a best value outcome for customers and the environment.

We consider that Southern Water's evaluation of the costs and benefits of the solution for accelerated gate two has been satisfactory (falls short of meeting expectations in some areas).

Areas requiring attention are the delivery of clear evidence of the water resource benefit and confirmation of resilience benefits for consumer

4.3.4 Programme and Planning

Our assessment of programme and planning considered whether Southern Water presented a programme with key milestones and whether its delivery is on track. The assessment also considered the quality of the information provided on risks and issues to solution progression, the procurement and planning route strategy and subsequent gate activities with outcomes, penalty assessment criteria and incentives.

We consider the evidence provided by Southern Water regarding the programme and planning, risks and issues and the procurement and planning route strategy for the Water Recycling Plant to be of satisfactory detail and quality for accelerated gate two.

Accelerated gate three work will need to include a detailed assessment of the relative ratios of spring water and recycled water of the output of the environmental buffer lake and ensure a "no surprises" approach with regulators.

4.3.5 Environment

Our assessment of environment considered the environmental assessment; the identification of environmental risks and an outline of potential mitigation measures; the detailed programme of work used to address environmental assessment requirements and the outline of how the solution will take into account the carbon commitments.

We consider that the progress and quality of the work presented in the accelerated gate two submission provided by Southern Water in this area was poor, and the submission fell considerably short of meeting expectations in many areas.

At gate one an action was raised to further develop Strategic Environmental Assessment, Habitats Regulations Assessment, Water Framework Directive assessment, Natural Capital Assessment, Environmental Social and Economic Valuation and Environmental Net Gain by gate two. The work completed by the solution owners is generally not developed to the stage that would be expected at accelerated gate two and largely consists of desk studies. Evidence of seasonal variability has not been presented. There has been insufficient environmental monitoring to allow for baselining and ground-truthing of data. As a result, it is not possible to draw conclusions in these assessments. It is important that future planned assessments include proper consideration of potential in-combination effects.

Southern Water have failed to sufficiently characterise the impacts of the eventual discharge of water, including in chalk catchments, or to consider the risk that the final effluent from the WwTW may be more concentrated than anticipated. They also have not provided supporting evidence for the conclusion reached in their assessment of Likely Significant Effects on Marine Conservation Zones from proposed routes. There needs to be justification for the shortlisting of the chosen potential pipeline routes. Furthermore, proposed pipeline routes need to be reviewed to identify the potential for impacts on Sites of Importance for Nature Conservation (SINCs) to demonstrate that they will not prevent delivery of mitigation measures, particularly at the channel crossing locations or where the pipeline is close to the river corridor, and to assess their impact on floodplain hydrology and associated ecology. Southern Water should also review their monitoring plans to ensure that they adequately address the need to capture seasonal variability and spatial variation requirements.

Accelerated gate three work will need to include detailed assessment of the ecological impacts of proposed pipeline route options and re-assessment of the habitat loss currently stated for the Biodiversity Net Gain and Natural Capital Assessments.

4.3.6 Drinking water quality

Our assessment of drinking water quality considered drinking water quality risk assessments; evidence that the solution has been discussed with the drinking water quality team and a plan for future work to develop Drinking Water Safety Plans (DWSPs).

We consider that the information provided in this submission on drinking water quality risks, stakeholder engagement and DWSPs for accelerated gate two was satisfactory. However, the submission fell short of expectations in some areas, including evidence on drinking water quality considerations and risks.

Sampling fell significantly short of expectation as it was not seasonally representative. It was therefore not possible to understand the seasonal variability of the effluent throughout the year. Southern Water has also failed to show equivalence between the final effluent at Peel Common WwTW and Budds Farm WwTW. This information is required to confirm suitability of the WRP, which treats final effluent from Budds Farm as well as Peel Common. We expect to see the company engaged with membrane manufacturers and the Inspectorate to determine level of approval required.

There is a statutory Notice (DWI ref: SRN 3698 V4) on Otterbourne WSW to upgrade the pre-treatment, disinfection and contact tank. Southern Water requested a change to the delivery date for the pre-treatment element of this work so that they could include a review of the pre-treatment to take into account any change in source water as a result of the new solution.

The DWI agreed to this date change on condition that the work to upgrade disinfection treatment and install a new contact tank was completed as originally planned. The [Notice](#) requires the company to provide design details of this pre-treatment by 31 December 2022, and for this to be operational by 31 December 2026 to allow the company to meet its section 20 agreement with the Environment Agency.

There is reference to a 'target date' for delivery of this pre-treatment in the technical annex (section 2.2.6 Pg 43). We remind the company that the upgrade work at Otterbourne WSW, including pre treatment is a statutory requirement due to be operational by 31 December 2026 to meet both the requirements of the Notice and to allow the company to meet the section 20 agreement. As this is not a solution specific activity, it should not receive funding under the RAPID programme.

4.3.7 Board Statement and assurance

The evidence provided relating to assurance has been assessed as poor.

Southern Water has provided assurance that:

- it supports the recommendation for a selected option, B4 (the Havant Thicket Raw Water Transfer with recycling solution) and the back-up option, B5 (water recycling from Budds Farm and Peel Common);
- it is satisfied that progress on the solution is commensurate with the solution being operable by 2030 in line with delivery schedule as shared with RAPID and the Environment Agency;
- it is satisfied that the activity carried out to date is of sufficient, scope, detail and quality as would be expected of a large infrastructure programme of this nature at this stage in the project development lifecycle;
- it is satisfied that expenditure has been incurred on activities that are appropriate for accelerated gate two and are efficient; and
- it is satisfied that any expenditure incurred for accelerated gate three activities have been clearly flagged and discussed with RAPID prior to submission. Expenditure is relevant to the "all best endeavours" requirement in the section 20 agreement and is efficient.

Southern Water has provided information regarding its governance structure and its board oversight of its obligations under the section 20 agreement, which was a requirement in our gate one final decision. It indicates that its full Board was accountable for this and that this was also considered by a sub-group of its Board to provide deeper oversight and challenge.

It is very disappointing, that Southern Water has been unable to provide assurance that one or more solutions will be in place and operating by the end of 2027. We allowed funding in our final determination at PR19 for solutions likely to provide Southern Water with supplies by the end of 2027 in order to support Southern meeting its environmental obligations under its section 20 agreement. The provision of this assurance was included as an action to be addressed in the gate two submission and we have taken its omission into account in our assessment of the assurance provided by Southern Water at gate two.

We expect the Board of Southern Water to ensure that the solution is delivered at the earliest possible date and that there is no delay beyond 2030. At future gates, we will expect the Board of Southern Water to provide assurance that progress on the solution is such that it will be delivered by the revised delivery date of 2030. We further expect the Board of Southern Water to continue to provide oversight of its obligations under its section 20 agreement.

Southern Water has put in place external technical assurance of its gate two submission documentation. The external assurance identified material issues with Southern Water's submissions in a number of areas, including in relation to its gate two expenditure, and there is no confirmation that the issues identified in external assurance have been addressed. We have also seen evidence within the submissions to suggest these issues were not resolved

prior to submission. For example, gate expenditure amounts for the three solutions in Annex 6: Efficiency of Expenditure are inconsistent across different tables in the document and also differ from those provided in query responses.

We are also disappointed with the quality of some of the aspects of the work done to gate two, in particular in relation to progressing environmental assessments and mitigations for gate two. Consideration should be given as to what changes should be made to the assurance process to ensure that shortfalls in the quality of the work are avoided at gate three.

We have not assessed expenditure at gate three; we will do this at the point of the gate three submission. We are, however, concerned that the statement includes reference here to all expenditure is being relevant to the "all best endeavours" requirement in the section 20 agreement and is efficient. All expenditure must be directly related to the investigation and development of a solution, expenditure on Southern Water's obligations under section 20 and/or expenditure on issues relating to Southern Water's WRMP is not appropriate expenditure of the gated allowance.

We do not agree that expenditure incurred for accelerated gate three activities have been clearly flagged and discussed with RAPID prior to submission. The gate three expenditure as a total across the solutions was discussed at an early stage, however the expenditure split out for each solution was only shared with RAPID on 26th November 2021, a few days before the accelerated gate two submission on 6 December 2021, despite an earlier request for this information during solution checkpoint meetings.

5. Delivery Incentive Penalty

We have decided to impose a delivery incentive penalty on this solution of 10%.

Our overall assessment for the solution submission at accelerated gate two is that it is satisfactory overall, but it falls significantly short in some important areas and is not as developed as would be expected at this stage. At accelerated gate two, the solution should have been of a standard suitable for inclusion in a final WRMP. We are concerned that areas of the work are not yet at that standard, particularly in relation to identifying and mitigating environmental risks.

We are particularly concerned that:

- there has been insufficient stakeholder engagement, particularly with customers who will receive water from a changed source or recycled water.
- there has been insufficient progress made in the work to carry out key environmental assessments including Strategic Environmental Assessment, Habitats Regulations Assessment and Water Framework Directive assessment.
- there is insufficient environmental monitoring data to understand environmental impacts and risks.
- there has been insufficient consideration of impacts of potential pipeline routes
- there is insufficient evidence of the impacts of the WRP on chalk catchments.
- there has been insufficient sampling to provide seasonally representative characterisation to inform Drinking Water Safety Plans (DWSPs).
- the equivalence between the final effluent at Peel Common WwTW and Budds Farm WwTW has not been demonstrated, this information is required to confirm suitability of the WRP, which treats final effluent from Budds Farm as well as Peel Common

We are also very concerned at the number of inconsistencies and inaccuracies identified in the submissions, with further inconsistencies identified through the query process. We note that the external technical assurance put in place identified material issues, which do not appear to have been resolved prior to submission.

In reaching our decision to impose a delivery incentive penalty, we have taken into account the extent to which solution owners have addressed priority actions and actions included in our gate one decision document. A number of these are incomplete as detailed in the table below. We have also taken into account the number of priority actions included in this document that relate to work that should have been completed at accelerated gate two; these are explained in section 7.

Table 5: Gate one actions incomplete at gate two

Action	Comment
Undertake site selection process as detailed in Annex 9.2 in consultation with the Environment Agency and Natural England, to meet gate two requirements and timescales.	Partially complete – Site selection process fell short of collaborative and "no surprise" commitment expected of solution owners.
Provide a clear summary of the water resource benefit (DO) of each option including the conjunctive use benefits. The operational and utilisation assumptions for each benefit should be clear. The assumed drought scenario used to calculate the benefits should be made clear including why you appear to present these for a 1-in-200 year scenario whilst your emergency drought order level of service is 1-in-500 year. The output of a solution for a 1 in 500 year scenario will need to be calculated to support achieving the 1 in 500 year emergency drought order level of service	Not complete - There was no conjunctive use assessment.
Provide summaries of the further development of Strategic Environmental Assessment, Habitats Regulations Assessment, Water Framework Directive assessment, Natural Capital Assessment, Environmental Social and Economic Valuation and Environmental Net Gain, that have been discussed and agreed with the Environment Agency and Natural England, to meet gate two requirements and timescales.	Not complete – Assessments have not progressed past desk studies in most cases. Therefore, do not meet gate two requirements.
Whilst use of historical sample data in this and other locations may serve to enable a continued planning progress, DWI would require evidence of the representativeness of these samples for the current project at gate two. We expect further development of the risks associated with differing effluent quality based on evidence gathered from future sampling surveys, particularly seasonal, as part of the gate two submission which should include information on viral and pathogen loading especially in light of well documented effluent sampling for CoVid-19.	Not complete – All sampling at Budds Farm was conducted October to November 21. Therefore, limited and not seasonally representative and equivalence with samples taken from Peel common not demonstrated.
Provide details of a monitoring programme for the effluent to ensure that a baseline is available to inform treatment requirements.	Not complete – Have not demonstrated the equivalence of sampling location to planned effluent. Monitoring programme was not seasonally representative.

<p>Develop a fuller risk assessment that explores the areas of uncertainty associated with this solution. This should include:</p> <ul style="list-style-type: none"> - a clearer relationship between mitigation measures and residual risks - greater clarity on the scoring criteria applied - more direct read-across to the dashboard risk <p>Full assessment of the upstream catchment, the effluent flow and mitigation, including emergency response, should the wastewater site be adversely affected in any way and should be reflected in the DWSP."</p>	<p>Partially complete – Due to insufficient environmental and water quality monitoring, there is a considerable risk that further risks are yet to be identified which would have been, had the monitoring standards been met.</p>
<p>Future plans for board engagement must provide for effective oversight of Southern Water’s obligations under the section 20 agreement and to ensure that one or more solutions are in place and operating by the end of 2027. We expect Board assurance for gate two to include a statement that the Board is satisfied that progress on solutions is commensurate with solutions being in place and operating by the end of 2027.</p>	<p>Incomplete – Southern Water has indicated that its full Board is accountable for oversight of its obligations under the section 20 agreement. Southern Water's Board has not, however, been able to provide assurance that one or more solutions will be in place and operating by the end of 2027.</p>

As explained in our final determination, the largest penalty across a company’s suite of solutions will be applied to the company’s total gate two allowed efficient expenditure.

6. Proposed changes to partner arrangements

There are no proposed changes to partner arrangements. Water recycling is a Southern Water only solution.

7. Actions and recommendations

Where the submission has not been assessed as ‘meeting expectations’ we have provided feedback on where we will seek remediation of the issues. We have also identified specific steps that solution owners should take in preparing for accelerated gate three.

We have categorised these remediation issues and steps into priority actions, actions and recommendations.

Priority actions are those that should have been completed at accelerated gate two and must now be addressed on a short timescale in order to make sure the solutions stay on track. They require urgent remediation in full and for this reason directly relate to the assessment of delivery incentives set out in this publication.

We have also identified actions that should be addressed in full in the accelerated gate three submission. The response to these actions will influence the assessment of the accelerated gate three submission.

Recommendations are issues where additional information or clarification could improve the quality of future submissions.

Fifteen priority actions have been identified for Water recycling which should be delivered no later than 30th June 2022. The solution owners should propose delivery dates for each priority action in their representation. The full list of priority actions, actions and recommendations can be found in the Appendix.

8. Gate three activities

The solution will continue to be funded to accelerated gate three as part of the standard gate track. However, given that this is a back-up solution funding will be reduced to reflect reduced gate three activities, particularly in relation to moving towards securing planning and other consents and developing procurement. In its representation, Southern Water should propose what level of funding is required to deliver sufficient gate three activities to enable the solution to act as an effective back-up.

There is reference to costing for a pilot trial of ceramic membranes for Otterbourne WSW in Table 20 - Accelerated gate two and accelerated gate three costs. This is part of the pre-treatment upgrade which is under DWI Notice and requires Southern Water to provide details of its pre treatment at this site by 31 December 2022. Therefore, as this element does not form part of this solution it should be removed from the gate three activities List.

For its gate three submission, we expect Southern Water to complete the activities listed in [PR19 final determinations: strategic regional water resources solutions appendix](#) as expanded on in Section 9 of its accelerated gate two submission and the actions listed in the appendix.

Southern Water have proposed a date for gate three of November 2022. We are concerned that this will be too soon for Southern Water to complete all of the gate three activities to the required standard. In their representation, we suggest that Southern Water discusses this with RAPID and proposes a later gate three, which should be justified based on their programme planning.

RAPID have provided the solution owners with a proposal for gate three incentives which takes account of Southern Water's suggestions in their submission. We will confirm the gate three incentives for all solutions in the gate three guidance or final decisions, whichever is earlier.

9. Next steps

Following publication of this accelerated gate two draft decision the solution owner and other interested parties are invited to respond to the draft decision. Representations, including evidence from solution owners that priority actions (identified in the Appendix) have been addressed, can be made by email to rapid@ofwat.gov.uk and will close at 6pm on 12 April 2022.

All representations will be considered before our final decision is published at 10am on 17 May 2022.

Appendix: Actions and Recommendations

Priority Actions – to be addressed by 30 June 2022		
Number	Section	Detail
1	Operational Utilisation	Confirm the volumes of effluent available from the wastewater treatment works under dry weather flows during future worst case scenarios and assurances that these can meet the required volumes (after process losses) for the WRP to produce the required flows to address the deficit.
2	Stakeholder Engagement	Provide a well-developed plan for detailed and focused customer engagement. This should include all demographics and well vs less informed consumers & types of engagement etc. Commence more focused consumer engagement particularly around water recycling & customer acceptability - distinct from environmental benefit/impact.
3	Interaction with other solutions	Explain how solution scalability to meet a needs envelope of 87 to 95MI/d (Annex 13 section 3.2.2) has been accounted for within initial regional modelling.
4	Water resource benefits	Confirm what the deficit is and what the solution is designed for and able to achieve. Confirm plan to investigate the volume of effluent available under various dry weather scenarios, including the worst case.
5	Resilience benefits	Confirm resilience benefits for consumers able to be supplied by this solution in 1 in 500 year drought scenario to help inform the viability of the solution.
6	Drinking Water Quality	Demonstrate equivalence between the final effluent quality at Budds Farm and Peel Common and confirm that the proposed WRP is able to treat this.
7	Drinking Water Quality	Ensure full compliance with responsibilities under the Regulations and where any associated risks may lay. We remind the company that water recycling technology, as with all treatment technologies, does not require regulatory approval, however it is the company's responsibility to ensure that any treatment process meets the requirements of the Water Supply (Water Quality) regulations in full.
9	Programme and Planning	Engage with the environmental regulators' site specific knowledge of constraints, risks, avoidance and mitigation measures and opportunities for delivery of net gain to help identify deliverable options. Method Statements for environmental assessments must be progressed rapidly beyond a focus on the process to the specific detail needed to undertake

		site specific work and detailed assessment to provide a sufficiently robust evidence base.
10	Environment	Provide further justification for the shortlisting of routes 3 & 4 as outlined in annex 3 sections 2.4-2.5. Clearly distinguish best practice from mitigation measures.
11	Environment	Present robust evidence to demonstrate that pipelines won't prevent delivery of mitigation measures, in particular at the channel crossing locations or where the pipeline is close to the river corridor
12	Environment	Include Sites of Importance for Nature Conservation (SINCs) in exclusion map data sources for review of pipeline watercourse crossings
13	Environment	Assess the impact of proposed pipelines on floodplain hydrology and any associated potential adverse impact on ecology.
14	Environment	Review with environmental regulators whether currently planned assessments adequately cover potential in-combination effects
15	Environment	Review with environmental regulators whether the current environmental monitoring programme proposals adequately address the needs to capture seasonal variability, spatial variation etc. to provide a sufficient database to support the required SEA, HRA and WFD.

Actions – to be addressed in accelerated gate three submission

Number	Section	Detail
1	Solution Design	Provide a clear explanation and rationale for the triggers to utilisation of the scheme.
2	Solution Design	Confirm consumer opinions of the options, in particular confirmation of consumer acceptability. Include the outputs of this research on the company website and as part of the accelerated gate three submission.

3	Evaluation of Costs & Benefits	Confirm the deficit and what the solution is designed for and able to achieve. Confirm plan to investigate the volume of effluent available under various dry weather scenarios, including the worst case, up to 1:500 year drought scenario at the two wastewater treatment works.
4	Evaluation of Costs & Benefits	Confirm resilience benefits for consumers able to be supplied by the options in 1 in 500 year drought scenario to help inform the viability of the water recycling solution.
5	Evaluation of Costs & Benefits	Undertake sensitivity testing around selected future needs horizon of 2040 to demonstrate best value of the option taken forward.
6	Evaluation of Costs & Benefits	Provide costs in All Company Working Group (ACWG) template. template.
7	Evaluation of Costs & Benefits	Confirm the solution will be able to meet the 1 in 500 year drought resilience including which upstream inputs will be used.
8	Programme and Planning	Provide a detailed assessment of the relative ratios of river Itchen water and recycled water from the water recycling plant of the output from the environmental buffer lake under a range of scenarios e.g. two successive dry winters.
9	Programme and Planning	Assess the risk of constraints on timing of construction activities to protect fisheries and ornithological interests extending the timescale for delivery of the solution.
10	Environment	Re-assess the temporary and permanent habitat loss currently stated for Biodiversity Net Gain and Natural Capital Assessments.
11	Drinking Water Quality	Complete effluent sampling to understand nature of the effluent throughout the year to confirm suitability of WRP which takes effluent from the two wastewater treatment works. Include details of chosen pre-disinfection design for Otterbourne as required by the DWI Notice (DWI ref: SRN 3698 V4) which is not within the scope of this solution.
12	Drinking Water Quality	Confirm differences and reasons between Recycling and Havant Thicket process designs for the WRP plant (i.e. Granular Activated Carbon vs Chlorine for quenching of Hydrogen Peroxide).

13	Drinking Water Quality	Provide further detail as to how the Out of Specification water shutdowns will operate to ensure that any upstream catchment pollution events or WWTW treatment failures will not overload the WRP plant. Include details of online monitoring points and parameters monitored and any fail-safes/auto-shutdowns in relation to the WRP.
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Recommendations – to be addressed in accelerated gate three submission

Number	Section	Detail
1	Solution Design	Work with Portsmouth Water to understand and update any changes to need and possible deficits following the modelling and revision to Portsmouth's WRMP19 planning tables.
2	Solution Design	Reassess and refine deployable output calculation for gate two up to 1 in 500 year drought resilience including uncertainties associated with future climate change using regional model outputs' as currently all of the options are only considering the resilience of the solution to drought and not climate change.
3	Solution Design	Reassess and refine conjunctive use assumptions for using regional modelling outputs.
5	Evaluation of Costs & Benefits	Provide sensitivity analysis to understand how costs increase or decrease when different future scenarios of the solution are considered.
6	Evaluation of Costs & Benefits	Mapping linked to the Local Nature Recovery Strategy and Biodiversity Opportunity Areas (BOAs) should be used to identify opportunities for net gain.
7	Evaluation of Costs & Benefits	Confirm with EA all mitigation measures already identified for WFD water bodies in order to consider mitigation for the scheme
8	Programme and Planning	Avoid inconsistencies throughout the submissions and associated appendices through quality assurance

9	Environment	Provide further details on the benefits that will be delivered from the renewable energy opportunities identified in respect of emission reductions, timings and costs. Provide further details of how you will seek to influence decarbonisation of supply chain emissions and ensure application of the carbon hierarchy to manage and mitigate the carbon impact.
10	Environment	Evaluate the potential benefits of cooperating with the catchment partnership's Test & Itchen INNS assessment.
11	Environment	Consider trenchless construction at water crossings for ordinary watercourses and other environmentally sensitive areas as well as the Main River.

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