

Representation Appendix C14.1 – Strategic regional water resources solutions

Wessex Water

August 2019

This appendix includes the joint proposal for strategic regional water resource solutions, developed jointly by Wessex Water, South West Water and Bristol Water, in consultation with Southern Water.

**Joint proposal for Strategic regional water resource solutions
August 2019**

1. Summary

In response to the *Strategic regional water resource solutions appendix* published by Ofwat in July and the email inviting further proposals from companies, the water company partners in the West Country Water Resources Group (South West Water, Bristol Water and Wessex Water) have developed an ambitious proposal focussed on the opportunities to provide a bulk transfer to Southern Water.

As written we think there are a number of shortcomings in the Draft Determination (DD) that means it does not realise all the potential opportunity from the West Country.

We propose three changes for Ofwat's consideration in the final determination (FD) to maximise the benefits and the supporting rationale:

- 1) **Proposed solutions.** We propose to develop additional strategic source capacity, transfers and solutions of 95 MI/d compared to 75 MI/d in the DD comprising:
 - Additional capacity – Southern Water transfer (25 MI/d vs 25 MI/d in DD)
 - Release of potential forecast surplus (South West Water and Wessex Water) through network reinforcement, new service reservoirs and pumping stations and treatment outputs
 - Additional transfer routes to provide resilience
 - We recommend that this is considered separately to the existing proposed transfer of 20 MI/d to Southern Water as this is a new potential solution set (see below)
 - Additional sources (70 MI/d vs. 50 MI/d in DD)
 - Effluent reuse (Wessex Water)
 - Promotion of the second reservoir at Cheddar and other opportunities (Bristol Water)
 - Pumped storage scheme (South West Water).
- 2) **Costing to meet common reporting standard.** We propose revised costings for the strategic schemes reflecting funding across all companies in the West Country and correction of an error in the calculation of the DD funding and to meet the new common reporting standard.
- 3) **Standard Gateways, reconciliation approach and collaboration.** We propose the standard gateways will be adopted rather than the accelerated timetable proposed for some of the Southern Water schemes, and we support the suggestion that the gate timings are aligned with the regional planning timetable. We also include a recommendation on the reconciliation mechanism.

2. Introduction

This proposal has been developed by the water company partners in the West Country Water Resources Group (South West Water, Bristol Water and Wessex Water) in response to the *Strategic regional water resource solutions appendix* published by Ofwat alongside the draft determination and the email received from Ofwat on 8 August 2019 inviting further proposals from companies. The three water companies (South West Water, Bristol Water and Wessex Water) and the Environment Agency have signed a Memorandum of Understanding committing the parties to work together on development of a regional plan to identify the optimum water resources solutions for the region and for water transfers.

Our aim is to contribute to securing long-term resilience at a regional and national level. The primary focus is exploring the opportunities to provide a bulk transfer to Southern Water's Hampshire zone to help meet the very significant deficits that they face in that area. In turn, meeting this objective would reduce Southern Water's need to draw on other schemes which have the potential to meet forecast deficits in London and the South East.

The joint proposal covers:

- **Potential solutions** - comments on the potential solutions that we are tasked with investigating in the draft determination appendix
- **Costings to meet common reporting standards** - we propose revised costings for the strategic schemes reflecting funding across all companies in the West Country and correction of an error in the calculation of the DD funding, as required to meet the new common reporting standard
- **Standard Gateways, reconciliation approach and collaboration** - comments and proposals for:
 - the gated process
 - the reconciliation mechanism, and
 - consistency and collaborative working.

3. Potential solutions and funding – as draft determination

Potential solutions - DD

The *Strategic regional water resource solutions appendix* includes two solutions that we are tasked with investigating as set out in Table 1 below, which also includes our comments.

Feasible options within our area are mainly derived from the list of feasible options in our Water Resources Management Plan. In addition, following discussions within the West Country Water Resources Group, we will explore the opportunities for conjunctive use of our combined systems.

Table 1: Potential solutions in the Draft Determination

Solution name	Description	Comments
West Country sources	<p>Joint solution – South West Water, Wessex Water, Southern Water.</p> <p>Development of source options, such as reuse to supply non-potable water to non-household customers, in the Wessex Water and South West Water areas to maximise available water for transfer to Southern Water.</p> <p>Solution capacity up to 50 MI/d.</p>	<p>One of our first tasks will be review all the available options and finalise the short list of options that will be subject to the feasibility studies under the gated process.</p> <p>Effluent reuse would be based on reusing treated effluent from Poole sewage treatment works.</p> <p>South West Water schemes would be based on pumped storage solutions to allow water to be displaced from West to East.</p> <p>However, the DD as written excludes the potential opportunity from solutions in the Bristol Water area that could release water across to Southern Water.</p>
West Country – Southern transfer	<p>Joint solution – South West Water, Wessex Water, Southern Water.</p> <p>A transfer from Bournemouth Water's water treatment works on the River Avon to Southern Water's treatment works within the Hampshire Southampton West zone. This will utilise supplies from both South West Water and Wessex Water. There is an existing transfer between Wessex Water and South West Water's Bournemouth that can support this solution.</p>	<p>Preliminary work has already been done on a 20 MI/d transfer pipeline from Bournemouth to Southern Water, near Testwood. We consider there may be additional volumes available up to 25 MI/d. We also consider there are potential options for a connection from the Salisbury area into Southern Water's area. As such this capacity option should be considered as an addition to the planned 20 MI/d scheme for which work is underway</p>

Solution name	Description	Comments
		<p>and as a separate scheme (or phasing) of the planned transfer.</p> <p>The operational resilience benefits to both companies of the existing bi-directional link main between Wessex Water and South West Water's Bournemouth area will need to be factored into the design of any larger transfer option.</p>

Costing to meet common reporting standard - DD

We note that some of the assumptions used to determine the values in the deep dive assessment are incorrect.

We consider that the overall allowance of £3.96m is insufficient develop the solutions to the necessary level of detail for the new common reporting approach.

Our comments are set out in Table 2 below.

Table 2: Schemes in the Draft Determination

Solution name	Capacity	Draft determination	Comments	Corrected value
Southern Water transfer (existing)	20MI/d	20MI/d	Assume costs in Southern Water plan	-
Strategic schemes:				
West Country sources	Up to 50 MI/d	<p>In the draft determination Ofwat made a simplifying assumption based on South West Water's draft WRMP Statement of response Appendix D, which is incorrect.</p> <p>It has used the cost of £23m for a 15 MI/d transfer to give a value for 50 MI/d of new sources schemes, which gives a development cost in</p>	<p>This line relates to the development of new source options. It should use either an actual cost estimate or a median rate.</p> <p>As these options have not been developed in the West Country, the median rate should be adopted as a central benchmark.</p> <p>Costs are needed for any pipeline transfer links to Southern</p>	<p>50 MI/d @£1.2m per MI/d = £50m</p> <p>6% allowance = £3.6m, compared with a DD allowance of £1.38m</p> <p>Plus cost of pipeline transfer</p>

Solution name	Capacity	Draft determination	Comments	Corrected value
		the DD of only £0.02m per MI/d. This is as a result of applying the incorrect costs and yields.	Water or other areas of need	
West Country – Southern transfer	Up to an additional 25 MI/d	<p>In the draft determination Ofwat made a simplifying assumption based on South West Water’s draft WRMP statement of response Appendix D, which is incorrect.</p> <p>It has used a total of £43m. However this is for an increase of 15 MI/d not 25 MI/d.</p>	<p>The correct breakdown of Option 3 in South West Water’s draft WRMP statement of response Appendix D is:</p> <ul style="list-style-type: none"> • Total transfer @ 45 MI/d capacity = £167m vs. £101m for 20 MI/d • Marginal cost of source expansion at Knapp Mill WTW, associated network reinforcement and transfer = £66m. (£167m-£101m) • Based on a pipeline 900 mm diameter and 40 km long. Note this is a significant pipeline distance hence why typical costs of £1.2m per MI/d are not transferrable. 	<p>Costing should be 6% of £66m = £3.96m</p> <p>Delivering an outcome of up to +25 MI/d to Southern Water</p> <p>This compares to £2.58m in the DD.</p>

The assessment above assumes that the original 20 MI/d transfer is covered in Southern Water’s plan and determination. If that is not the case the allowances would need to increase accordingly.

Standard gateway, reconciliation and collaboration - DD

The draft determination includes a gated process comprising five gates, from commencement through to development consent order, as follows:

- Gate 1 – initial feasibility and design work to enable decision making and input into regional plans at pre-consultation stage
- Gate 2 – outline design to enable decision making and input into regional plans and WRMP24 consultations
- Gate 3 – develop and submit planning application
- Gate 4 – secure planning permission, complete procurement and land purchase.
- Gate 5 – not applicable to the scale of project envisaged in the West Country.

Our solutions will not be sufficiently large to qualify as Nationally Significant Infrastructure Projects and so will not be subject to Development Consent Orders; they will require planning permission only.

The timetable for the gates is set out in the Table 4.3 of Ofwat's *Strategic regional water resource solutions appendix*, with earlier dates for Southern Water. The commencement date is assumed to be 1 April 2020.

We have reviewed in detail the gate timetable set out in Table 4.3 and we have discussed the timetable with Southern Water. We conclude that it would not be possible for us to meet the earlier dates indicated for Southern Water schemes (i.e. Gate 1 September 2020 etc.) to the required quality as set out in the new combined consistency for costing.

Unlike WRSE and WRE these schemes have not been costed before to the detailed level required for Gateway 1 and to achieve this in the April 2020 to September 2020 period is not achievable. Therefore, as currently written, the Draft Determination will cause these schemes to fail the quality test. We believe that this is counter to the ethos behind the national water resources planning and delivering high value solutions for customers and the environment.

We therefore propose the timing should revert to the standard timetable. We have discussed with Southern Water and this does not affect the strategic decisions in their plan for the AMP7 period.

The Draft Determination sets out a reconciliation approach for cost recovery by a revenue mechanism. We believe this should be on the same basis by which costs are included in the DD to ensure symmetry and ensure customers and companies have a consistent failsafe and incentive mechanism respectively.

The Draft Determination also does not include allowances for Bristol Water, however integrating operation of their system is integral to moving water from West to East e.g. they already have a transfer arrangement with Wessex Water and they are part of the Water Resources West Group and the Severn-Thames Transfer.

4. Changes for the Final Determination

Ofwat’s email on 8 August 2019 indicated that they were “willing to consider further requests in this area from all companies at final determinations”. Taking this into account and the matters set out above we propose the following changes are made for the Final Determination.

Proposed solutions - FD

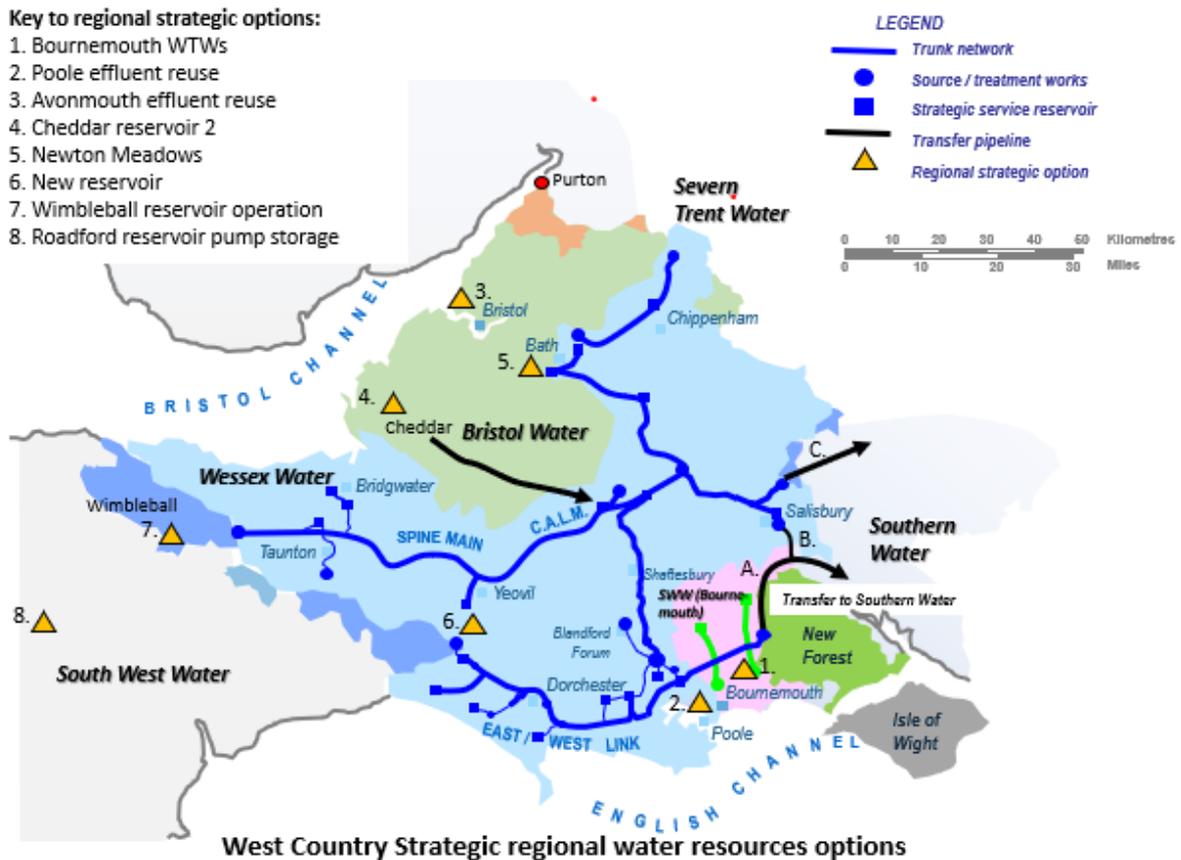
In response to the above, we propose to increase the total capacity of the solutions to 95 MI/d by the inclusion of additional schemes and Bristol Water as a partner, as described in Table 3 below.

Table 3: West country sources – Build up

Description	Company	Capacity MI/d		Comment
		DD	FD	
Southern Water transfer (existing)	South West Water	20	20	Increase based on proposed source capacity and new BW WTW.
Strategic Schemes:				
West Country – southern transfer (additional)	South West Water	10	10) Development solutions and costing reqd.))
	Wessex Water	<u>15</u>	<u>15</u>	
	Total	25	25	
West Country – additional sources	Wessex Water		15	Effluent reuse from Poole STW (new- see below)
	South West Water		25-50	Roadford pumped storage (35 MI/d median)
	Bristol Water		16	Cheddar 2 (new - see below)
	Bristol Water		<u>5</u>	Newton Meadows (new - see below)
	Sub total	50	71	
Total (strategic schemes)		75	96, say 95	

This gives a total potential volume of additional strategic supplies that could be transferred to Southern Water or meet other national framework requirements of 95 MI/d on top of the planned 20 MI/d transfer already planned

The diagram below illustrates the potential options to be investigated.



A brief outline of the additional schemes that we now propose is given the following sections:

- Wessex Effluent reuse – Poole STW
- Cheddar 2 and Newton Meadows
- Transfers to Southern Water.

Effluent reuse

The draft determination appendix refers to effluent reuse but the forecast surplus of 15 MI/d excludes effluent reuse. Therefore it is possible to add effluent reuse to the capacity to be investigated. The minimum output of Poole Sewage treatment works during dry weather is around 30 MI/d (refer to graph included in Annex 1 at the back of this document). Although theoretically it would be possible to treat all of the flow through an effluent reuse plant, for the purposes of this assessment we have assumed that half the flow would be reused, say 15 MI/d.

The effluent plant would be installed at the end of the existing process train, which would still need to meet the required capacity and effluent standards for discharge to Poole Harbour to cater for the periods when the output of the effluent reuse plant wasn't required due to reduced demand or planned outages.

There are various alternative uses for the treated effluent, which will be assessed during the feasibility stage, including:

- For indirect reuse to support river abstractions
- For indirect reuse to surface water storage upstream of treatment works
- For direct reuse for industrial purposes.

Cheddar 2 and Newton Meadows

For their 2014 Water Resources Management Plan Bristol Water developed a scheme to construct a second reservoir adjacent to the existing reservoir at Cheddar. The scheme involved a 9,000 MI bunded reservoir and a raw water pumping station. Following detail design and site selection, planning permission was granted in 2014; and is still valid. Subsequently based on the latest demand projections in their area Bristol Water decided not to proceed. The yield of the scheme is 16 MI/d. The scheme was designed to deliver water into Bristol water's existing trunk main system.

As a regional solution it would be necessary to consider how the output could be transferred eastwards to meet demands in the wider network, and by displacement a Southern Water transfer. Transferring the water out of Bristol water's area will require a long distance pipeline to Wessex Water's Grid along with associated service reservoirs and pumping stations. Therefore, while the reservoir part of the Cheddar 2 scheme is in effect "construction ready", this does not apply to any of the works associated with regional transfer of water from the reservoir and additional work will be required to evaluate the optimum way to utilise the water in the region.

Bristol Water are forecasting small surpluses of around 5 MI/d through to 2045 (depending on the phasing of feasible options). Rather than reduce the transfer to Wessex Water at Newton Meadows near Bath it would be possible to maximise the transfer, thus releasing the surplus into the Wessex Water network. It would then be necessary to reinforce the Wessex Water system such that the water could be used to displace other sources and ultimately contribute to the transfer to southern water.

Transfers

As shown on the diagram above the primary route for transfers to Southern Water are from the Poole/Bournemouth area to Testwood, routed around the north of the New Forest. The scheme (A on the diagram) would involve a 40 km log pipeline and associated pumping stations and services reservoirs.

For increased transfers volumes it would probably be preferable to provide additional transfer routes, such as connections from Salisbury to Andover, rather than increase the size of the primary transfer. This would bring operational resilience advantages and better deliverability. How these transfers would link to Wessex Water's grid and to Southern Water's network have not been evaluated in the past and the project would need to assess the options with regard to cost (capex and opex), operability and water quality. These potential additional transfer routes are shown as B and C on the diagram above.

Costings to meet common reporting standards - FD

Compared to the Draft Determination we consider there is around 95 MI/d of additional capacity that can be included in the gated assessment process on top of the planned 20 MI/d transfer to Southern Water.

Following the same approach as above, we provide estimates of the costs for the increased scope in Table 4 below.

Table 4: Solution costs for 95 MI/d total additional strategic capacity

Solution name	Capacity		Draft determination	Final Determination
	DD	FD		
Southern Water transfer	20	20	-	Costs assumed in Southern Water Plan
Additional strategic capacity:				
West Country sources	Up to 50 MI/d	Up to 70 MI/d	DD £1.38m	Corrected DD of £3.6m as Table 2 Plus: Additional 25 MI/d @ £1.2m per MI/d = £30m 6% allowance = £3.24m Plus: For the additional transfer pipelines assume the same median rates as the source options. 50 MI/d @ £1.2m per MI/d x 6% = £3.6m Total = £10.44m
West Country – Southern transfer	Up to additional 25 MI/d	Up to additional 25 MI/d	£2.58m	Corrected DD £3.96m as Table 2
Total (additional strategic schemes)	75 MI/d	95 MI/d	£3.96m	£14.4m

Based on these revised values we believe the total allowance should be £14.4m to deliver an assessment of a total additional capacity of 95 MI/d. The costs should be split by scheme between four partners (Bristol Water, South West Water, Southern Water, Wessex Water).

This is on top of the existing 20 MI/d transfer to Southern Water which we assume is funded in their plan.

Cross-checks on efficiency of costing of new sources

We have cross checked the costing to ensure the allowances proposed are efficient.

Effluent reuse: We note that typical unit costs for effluent reuse range from £2.4m to £4.3m per MI/d. We have used a standard cost of £1.2m per MI/d. For a Wessex Water plant of 15 MI/d our cost estimates are therefore c50% less than equivalent regional schemes proposed.

Cheddar: At PR14 Cheddar 2 was costed at c£100m, but for the purposes of this assessment it is considered to be “developed”. To release the water from Cheddar into the wider network would require a pipeline from Cheddar to a strategic service reservoir plus associated pumping stations and service reservoir expansion, approx. 41 km @ £1m per km = £41m i.e. a unit rate of £2.5m per MI/d. We have instead assumed an industry standard rate of £1.2m per MI/d, 48% of the estimated cost.

Roadford pumped storage – 5 potential strategic schemes in the region totally 55MI/d capacity with a total estimated cost of £114m. (See WRMP19, Appendix 6). This gives an actual unit rate of £2.1m per MI/d. We have instead assumed an industry standard rate of £1.2m per MI/d – 57% of the current forecast cost.

West country – Southern Transfer – is based on an actual engineering cost estimate for the proposed scheme. Additional transfer based on median unit rate.

We have also done a cross check against other strategic regional schemes to sense check the development allowance proposed. Other comparable schemes include:

- South Lincolnshire reservoir - Joint solution – Anglian Water, Affinity Water. New reservoir (volume 50,000 MI) constructed in South Lincolnshire with the potential for transfer to Affinity Water (see Anglian-Affinity transfer). This solution ranges from 50 to 100 MI/d. DD development allowance £38.6m vs. £14.4m for 95 MI/d in the West Country
- River Itchen effluent reuse - Southern Water. Transfer of effluent from a number of Southern Water’s wastewater treatment works and discharge to the River Itchen, upstream of the tidal limit, to augment flows and enable increased abstraction from the river. This solution ranges from 25 to 90MI/d. DD development allowance £35.8m vs. £14.4m for 95 MI/d in the West Country

This comparison gives us confidence that the allowance requested represents high value and are considerably lower than comparative schemes in the DD.

Standard Gateway Timing - FD

We propose to follow the standard gate timings. The main reasons for not adopting the earlier timetable are as follows:

- a) Given our overall water resource position in the West Country, we have not had a driver to actively investigate supply side resource options in our region, nor have we had to undertake planning or modelling at a regional scale. To meet the requirements of Gate 1, we will have to develop the solutions, including costing and deployable outputs, and then test these options in a newly developed regional model. We require at least 12 months to carry out this work.
- b) We understand from Southern Water that their September 2020 deadline for Gate 1 mainly relates to the Fawley desalination scheme. Currently Fawley desalination contributes an output of 75 MI/d out of total deficit in the Hampshire zone of circa 190 MI/d. There are significant uncertainties about the feasibility and deliverability of the remaining schemes required to deliver the other 115 MI/d of deficit. Other regional schemes are unlikely to be a substitute for Fawley but they could affect the size of the desalination plant. Therefore Southern Water's view is that Fawley desalination would need to pass through Gate 1 regardless. However its size could be revised at a later gate. For this reason it is considered acceptable for the West Country schemes to reach Gate 1 six months later in April 2021.
- c) Robust regional and company model testing is particularly important given that we expect the Environment Agency's National Framework to require us to do more work to evaluate drought resilience in our own region, and in particular require us to plan for more extreme 1 in 500 drought events on a comparable basis. At the present time we do not have a high-level regional model in which to test the regional solutions as part of the gate 1 activities. There isn't enough time to develop the regional model and use it to test the regional solutions by September 2020.
- d) The proposed regional schemes would have to work conjunctively with our existing supply systems, as the transfers inter-regionally would most likely occur partly by displacement of demand in our own supply areas. We will need to test our ability to support stated transfer volumes under more extreme droughts and ensure we meet the additional planning requirements for our own customers, whilst maintaining appropriate resilience within the region.
- e) An accelerated gateway could lead to the selection and development of sub-optimal options or solutions that may not deliver the best possible value balancing environmental and public water supply needs.

Nevertheless we would produce a progress report in September 2020 at the same time as completion of the Southern Water Gate 1.

As currently arranged the gate timings do not tie in very well with the regional plan timetable, giving rise to potential problems about having sufficient evidence to make decisions at the gateways, overlapping consultation and insufficient time to gather environmental data. We support the proposals for alternative gateway timeline presented to RAPID and Ofwat on 12 August 2019.

We have also considered the activities and deliverables required. For the gate 1 activities we clarify that the feasibility study work would be based on desktop analysis only using available data, and that no ground investigations or environmental data collection would be undertaken during this stage.

Reconciliation mechanism - FD

Section 5.3 of *Strategic regional water resource solutions appendix* describes Ofwat's proposed end of period reconciliation mechanism in the event of discontinuance or substitution of a solution, changes to partners or delivery penalties for late delivery of poor quality outputs. We appreciate that there needs to be a mechanism to provide customer protection in the event of non-delivery or changes.

The draft determination indicates that the reconciliation mechanism will be an adjustment of company revenues rather than an RCV adjustment, which was proposed by the other companies at the IAP. Our position is the adjustment should be on the same basis as the way it is funded i.e. using a standard totex mechanism of a revenue adjustment based on PAYG ratios plus an RCV adjustment for the balance.

Collaborative working - FD

There is an emphasis on consistency in the gate activities listed on page 31 of *Strategic regional water resource solutions appendix*.

On the 22 July 2019, just after receipt of the draft determination, Wessex Water and South West Water were invited to join a working group of companies and regional groups involved in the development of strategic regional solutions (Affinity Water, Anglian Water, Severn Trent Water, Southern Water, Thames Water, United Utilities and Water Resources South East). The aims of the group are:

- To support the direction of travel set out in the draft determinations
- To work collaboratively to maximise the opportunities to develop strategic water resources
- To facilitate consistency in the methodologies used and in the deliverables
- To engage with RAPID.

We support these aims and confirm that we will be active members of this group. Bristol Water are also willing to engage through this group given their contribution, and their existing role as part of the River Severn Working Group. We have been involved in the preparation of the joint company statement on strategic regional solution development dated 30 August 2019. For the purposes of this representation, the details are not repeated here.

Annex 1 - Poole STW output

