



Regional Reconcilliation Process Version 7

Title	Method Statement: Regional Plan Reconciliation
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Version	7
History of Changes made to this version	<p>This technical report is based on the PowerPoint slides circulated to the Regional Co-ordination group in July 2019, November 2019, April 2020, November 2020.</p> <p>It also encompasses the methodologies derived through the All Company Working Group; Environment Agency , NRW and members of the Regional Co-ordination Group.</p> <p>Version 6 contains an update to chapter 7 outlining the stress testing approach.</p>
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1 Executive Summary

- 1.1 Following the publication of the National Infrastructure Commission report: Preparing for a drier future, the National Framework group was commissioned and three new regional groups were established¹. These groups complemented the existing regional groups: Water Resources East and Water Resources South East.
- 1.2 The purpose of these strategic regional groups is to assess the future water requirements of their region and to set out a plan showing how these requirements could be met. These requirements cover the environment, public water supply and non-public water supply.
- 1.3 An early indication of the extent of these requirements was set out in the Environment Agency report *Meeting our future water needs: a national framework for water resources*. Immediately following this publication each of the regions published their regional perspective of their future resource requirements. These publications were in March 2020 and February 2021. Further updates to these estimates were produced for regulators and for sharing between regions² at the end of August 2021, marking the beginning of the reconciliation process.
- 1.4 Each of these regional assessments set out their key challenges for water in the future which range from an increasing need to support population growth; a requirement to protect the environment; a growing need to become more resilient as well as the essential ability for these plans to adapt to the challenges from climate change.
- 1.5 In February 2019 Ofwat also published their draft determinations of companies' business plans. This key publication put forward a series of specific strategic resource options that needed to be investigated and designed further. The scale of these schemes was nationally significant as they provided a means of moving water across the country and between regions. These strategic resource options are referred to as SRO's. The funding for these schemes was maintained in the final determinations for the companies.
- 1.6 Each SRO scheme is being developed through a structured, gated process using a set of consistent methodologies that have been developed by the All Company Working Group (ACWG). The gated process has been clearly set out in the Ofwat publications and the process is overseen by the Regulatory Alliance for Progressing Infrastructure Development (RAPID).
- 1.7 In addition to the SRO process other potential future options for the environment, other sectors and water companies are also being investigated and developed and these could also feature in regional plans as potential solutions to meet the challenges in the future.
- 1.8 The development of the regional plans, the SRO schemes and the construction of the company Water Resource Management Plans (WRMP) is an integrated process with exchanges of information flowing back and forth between these planning processes.

¹ Water Resources North, Water Resources West and West Country Water Resources

² Whilst materials at this stage may have been shared more widely in some cases, the pre-reconciliation outputs in August 2021 were not a public document or submission as such.

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- 1.9 Just as the various planning processes are linked it is also critical to ensure that the regional plans are also linked and integrated as each plan will seek to construct a series of best value plans based on the requirements of their region as well as potentially providing support to or from a neighbouring region. Therefore, each plan will need to be reconciled with the other regions.
 - 1.10 During October to December 2020 the regulators and regions undertook a series of workshops to determine what should be aligned between the regional plans³. This process identified that the alignment of the inter-regional schemes was the key focus of the plans.
 - 1.11 The process for integrating the regional plans together is referred to as regional reconciliation process and the purpose of this report is to describe the approach used to reconcile SRO (or other relevant strategic transfer) schemes and plans with each other during the period from September to December 2021.
 - 1.12 The conclusion from the reconciliation process was to set out an agreed set of inter-regional transfers, backed by supply options, which seek to support each of the emerging regional plans in meeting their challenges.
 - 1.13 For some regions the reconciled solution was confirmed that a transfer between the two regions was optimal. For other regions the process highlighted that some transfers between the regions were not possible, based on the information currently available.
 - 1.14 The reconciliation process also showed an alternative alignment of the regional plans and demonstrated that some existing assets and non-SRO schemes are critical to a number of regions when they develop their future plans.
 - 1.15 The document sets out the approach followed, the reconciliation tables that was concluded between the regions and the results of the sensitivity runs. It is unlikely that this will be the only time that we undertake this process. It is expected that following the consultation on the emerging regional plans a further stage of reconciliation will be required.

³ RCG Alignment Project Report V0.pdf

2 Introduction

- 2.1 In January 2022 each of the five regional groups will consult on their individual emerging plans⁴ setting out the combination of policies and interventions which are best suited to meet the range of challenges and outcomes required for their region. These consultations will reflect the work that they have been able to undertake at this point in the process, but they will set out some choices with an aim to obtain feedback from stakeholders and customers.
- 2.2 Each region faces a range of different challenges over the next 25 to 60 years, and beyond. These vary in magnitude, uncertainty, and spatial distribution across their regions as improved resilience requirements; different climatic change patterns; growth projections and environmental requirements contribute to a greater need for water in the future.
- 2.3 Each regional group is developing a plan to meet their specific requirements. For some regions, these requirements could be met through local or regional solutions. However, more resilient, or cost-effective solutions might be developed by considering transfers between regions. It is important to compare these various plans to understand which combination of solutions provide the overall best solution for the regions.
- 2.4 Therefore, regardless of how a regional plan is formed it is important to understand how each of the plans will interact with each other to meet their needs and collectively meet the future requirements for England and parts of Wales (as WRW regional plans will still need to ensure consumer/environment needs are met there).
- 2.5 The initial estimates for England have been based on the company plans and an estimation of the requirements of other sectors. These requirements were set out in two key national publications by the NIC and the National Framework Group⁵ (Table 1). It is worth noting though that by the time the regional plans are published in January 2022 these requirements will have been superseded as several key forecasts and environmental requirements will have been updated.

Table 1: Future water requirements for England by 2050

Organisation	Volume of water required
National Infrastructure Commission	4,000 million litres per day (Ml/d)
Environment Agency	3,435 million litres per day (Ml/d)

⁴ National Framework Senior Steering Group: Papers 11 & 17.

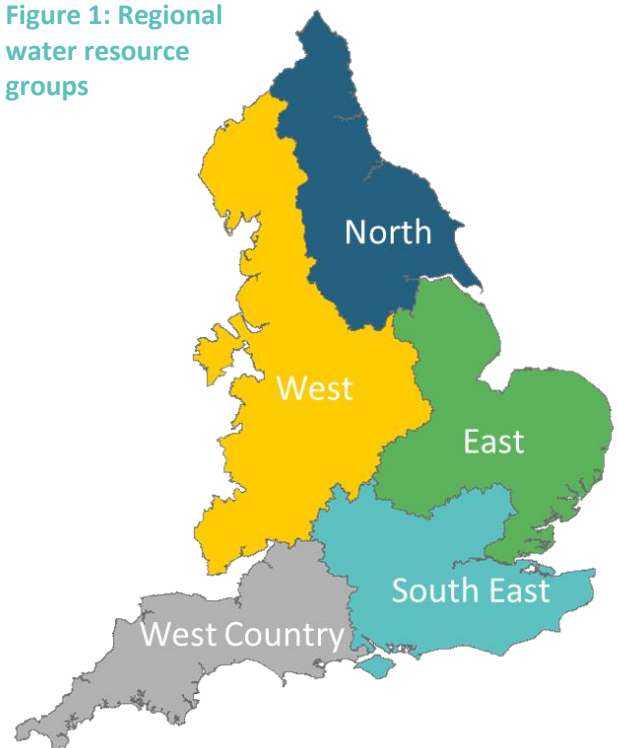
⁵ NIC: Preparing for a drier future – 25th April 2018; Environment Agency: Meeting our future water needs: a national framework for water resources.

- 2.6 This report sets out the process that was discussed at the regional co-ordination group in July 2019; November 2019 and April 2020. The approach has also been discussed at the All Company Working Group (ACWG) which is formed of the group of companies working on the Strategic Resource Options (SRO) set out in the Final PR19 Determination by OFWAT.

3 Regional planning

- 3.1 There are five regional groups established which cover England and a small area in Wales. These regions are shown in figure 1. The five regions are: Water Resources North (WRN); Water Resources West (WRW); Water Resources East (WRE); West Country Water Resources Group (WCWRG) and Water Resources South East (WRSE).
- 3.2 The latest guidance⁶ from the EA, NRW and Ofwat has set out that if you are a water company in Wales and have a resource zone within England, you should include it within the appropriate regional plan.
- 3.3 Where you have a resource zone bordering England and Wales, which is important for cross-border shared supplies, you may also include these in the relevant regional plan. You should discuss which resource zones should be used to inform a regional plan with the regional group, regulators, and the Welsh Government.
- 3.4 Your Water Resources Management Plan (WRMP) should reflect the regional plan in respect to these resource zones. In addition, you should refer to the Welsh Government guiding principles in respect to these resource zones. There is no current requirement from Welsh Government for regional plans to be produced in Wales.
- 3.5 Each region has a different set of challenges to overcome in the future. These were set out in their initial resource position statements published in March 2020. Most regions will experience deficit conditions at some point in the future, however, there are enough options both within a region and across regions to meet these future challenges.
- 3.6 In deriving a regional plan, it is important to determine which combination and schedule of options provide the best value solution for the region.

Figure 1: Regional water resource groups



⁶ EA Water Resource Planning Guidance, February 2021

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- 3.7 Best value can be derived in a variety of ways, including the approach which is set out in the UKWIR methodology⁷ and the WRPG best value text⁴. Whichever approach is used it is for the region to decide and set out, in a clear and transparent way, what is meant by best value for their plan and which metrics it will use in undertaking this assessment. These metrics are critical for the reconciliation process and were agreed and defined by each of the regional groups before the reconciliation process began at the end of August 2021. This ensured that the plans that were considered during the reconciliation process were not subject to further changes during the reconciliation process. An Excel workbook⁸ contains a template for these criteria for each region.
- 3.8 Each region will present their best value plans to their boards for sign off. The sign off process will vary with each region and the number of plans they will be presented with will also vary. For example, WRSE have several plans that are signed off, these being: the draft plan for reconciliation; the draft plan for consultation; the revised draft plan for incorporation in the company own WRMPs and the final regional plan. Each region will set out their own approach for signing off their regional plan.
- 3.9 When a scheme crosses regional boundaries, it is critical that it is represented in the donor and recipient regions' plans in a clear and coherent way such that the schemes are reconciled between the plans. The reconciliation of plans is not a new problem for the water industry and has in the past and can be, in the future, resolved through the generation of draft plans and iterative synchronisation of schemes which feature in both sets of plans. The process will usually start with one plan deriving the requirement for additional resources and neighbouring plans determining whether they can provide all or part of that resource at the timescales required.
- 3.10 Typically, scheme reconciliation problems have been confined to neighbouring companies where one company has a resource deficit, and a neighbouring company could generate additional resources which when combined with the other options produces a best value plan for both companies. For WRMP24 the reconciliation process has become more complex as there needs to be national reconciliation within and between the five regions.

4 The process of reconciling the plans

- 4.1 Each region has a different set of challenges to overcome in the future . These challenges were set out in their initial resource position statements published in March 2020. Inevitably during this planning horizon, most of the regions will encounter some form of water resource deficits in the future if they do not put in place a range of scheduled solutions. However, when considering these future options there might be a potential to develop solutions within a region that can not only meet their requirements but provide some water to a neighbouring region. By doing so, this could provide a better overall solution for customers and the environment.

⁷ Deriving a best value water resources management plan; Report Ref No: 20/WR/02/14

⁸ Microsoft Excel Workbook: Regional_Best_Value_Criteria&score.xlsx

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- 4.2 These types of opportunities need to be explored in a structured approach to determine what is the overall best set of strategic solutions for the regions. The proposed reconciliation approach sets out this process.
 - 4.3 The reconciliation process uses an iterative, cascade approach to derive an overall set of regional reconciled plans. Thereby keeping the regionally agreed approaches intact but ensuring a strategic overview of the resource solutions being selected. This cascade approach relies on comparing different sets of plans together to determine which are the better sets of solutions.
 - 4.4 To compare the benefits of an integrated regional approach with a within-region only set of solutions, the process begins with all the regions deriving their own regional optimum plans based on solutions located within their own region. This could include options for new bulk supply transfers between companies within the same region. If there is an existing bulk supply contract between two companies in different neighbouring regions these would be included in the within-region plan.
 - 4.5 To derive a set of reconciled regional plans a cascade optimisation approach was used. This approach requires one region (initiator region) to start the process off by deriving a best value plan to meet its own future requirements using set of interventions which include options both within and outside the regional geographical boundary. For example, for WRSE, Severn Thames transfer and Transfers from Anglian Water are considered alongside with other regional solutions such as leakage reduction, demand management and resource developments.
 - 4.6 Those regions which border the initiator region (primary suppliers) can then test how the transfer option impacts their own best value optimum regional plan using their defined methodologies and based on their own regional resource requirements and the requirements of the other initiator region. The final step in the cascade process requires those regions who are neither the initiator region or the primary supply regions to complete their regional plan based on their resource requirements and those from the primary suppliers (if any).
 - 4.7 These collective steps form one iterative step.
 - 4.8 Following the first iteration of the cascade process a check needs to be undertaken to ensure that the transfers between the regions can be achieved both from a timing perspective and a volumetric perspective. E.g., WRSE might require 300 MI/d from WRW by 2035. WRW might not be able to meet this requirement by 2035, but they could provide 90 MI/d by 2035, a further 64 MI/d by 2040 and an additional 150 MI/d by 2050. If the proposed solutions in the plans cannot be met, then another iteration of the plans is required noting any constraints that were established in the first phase of the iteration.
 - 4.9 The iterative process continues until an agreed set of plans can be established which meets the needs of all the regions. I.e. the regions produce their best value plan given the requirements of the lead region for this iteration. At this point no more iterations are undertaken and the first round of iterations are completed. A note of the cost and the best value plan scores for each of the regions. Likewise, the transfers between the regions (existing and future) are recorded in the inter-regional transfer template spreadsheet.
 - 4.10 The next round of the regional cascade optimisation process is then undertaken with another region acting as the initiator region and a new set of primary and secondary suppliers. At the end of this round another set of scores and costs are recorded in the relevant spreadsheets.
 - 4.11 Following an agreed set of rounds a review is undertaken to determine which schedule, size and combination of inter-regional schemes provide the overall best set of regional plans. These plans are then

stress tested to see what would happen if a scheme were: delayed and cannot achieve its benefit date; cannot supply the volume of water and cost more than anticipated.

- 4.12 Based on this combined information the potential best set of regional plans was discussed and agreed on through consultation with the regional boards during November/December 2021 to reach an agreed position to allow the regions to inform their wider consultation in January 2022.

5 The reconciliation process timeline

- 5.1 The overall reconciliation process is a simple approach to compare intra and inter-regional schemes on a like for like basis to derive a regional plan. Scheme reconciliation is based on deriving and comparing regional plans with each other through a series of reconciliation planning rounds to establish a synchronised set of inter-regional solutions across all the plans.
- 5.2 During this process the regulators participated to allow them to comment on each stage of the iteration process. Whilst it is recognised that their participation cannot compromise future regulatory positions, their participation was important to flag up any potential issues which they believe would not meet government policies or legal constraints.
- 5.3 To ensure that the correct information is available for the synchronisation of the various steps for the process a timeline was established. This is set out in the diagram below:

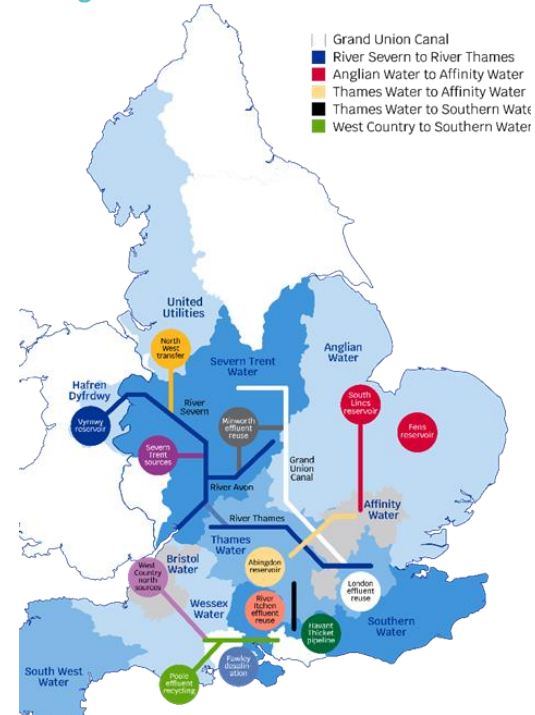
High-level timeline													
Activity	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	
Pre-reconciliation work													
Within regions plans completed													
Regional reconciliation (see alternative sheets)													
Stress testing and reliability assessment													
Consultation (formal and in-formal)													

- 5.4 The first key milestone date was the derivation of the baseline regional plan which sets out a regional best value plan based on the challenges the region faces and using potential within region solutions and contracted transfers between companies who are in different regions. This baseline plan is key to for comparative purposes later to help quantify the benefits arising from the inter-regional transfers.
- 5.5 Two rounds of reconciliation were undertaken, the two regions who initiated this process were: WRSE and WRE. The result of this process was an agreed set of transfers between the regions, which are captured in the regional transfer spreadsheet.
- 5.6 Following the reconciliation process the regions will undertake a consultation on their emerging regional plan in January 2022. If a material change to their regional plan occurs because of the consultation process on the emerging plans then an additional reconciliation process, before the autumn 2022 versions of regional plans (where relevant) and WRMPs are published, to ensure overall alignment of the plans. The extent of any further reconciliation depends on whether a strategic scheme(s) design had to change. If the material changes are associated with local schemes and the proposed changes to these schemes do not affect the identified inter-regional schemes, then the plans would not need to be reconciled.

6 Consistency of scheme costs and benefits

- 6.1 The purpose of the reconciliation process is to ensure that any interregional schemes that are selected are clearly visible in both regional plans and are developed in a timely manner. This either means that a scheme is developed in a co-ordinated manner between the two regions, or the scheme is developed in a phased way in a region to meet its own immediate needs and those need of a neighbouring region in the future.
- 6.2 Whilst each region has many different options available to it to meet its own requirements, a set of strategic resource options are being developed across several regions to generate and potential transfer resources across the country. These there are shown in figure 2.
- 6.3 Each of the SRO schemes have submitted their initial, gate 1, findings to RAPID for their appraisal. To drive consistency across key parts of these schemes the group of companies who are developing the options have formed a working group. The All Company Working Group (ACWG) represents those companies who are investigating and developing each of the SRO schemes. Four methodologies have been developed through this working group to provide consistency on: costing schemes; environmentally appraised; checked for water quality implications and their deployable outputs.
- 6.4 These ACWG methods are in line with Water Resource Management Plan guidance and are designed to provide additional technical guidance how to undertake some of these detailed assessments. These methodologies are being applied across the various SRO schemes and allow comparisons between the SRO schemes to be undertaken in a consistent way, which is key for the reconciliation process. These methods are used in conjunction with the WRPG, which was published in February 2021, this guidance includes what is expected for all options appraisals.
- 6.5 All the methodologies have been through a sign off process through the All Company Working Group (ACWG). These methodologies have also been commented on by RAPID and updates to the methodologies have been made where appropriate.
- 6.6 Ultimately, the demonstration of ‘best value’ will be done using a combination of the different cost / benefit criteria being used by each of the regions. These criteria differ between regions to reflect the concerns and priorities of their specific regional stakeholders. However, the net change in the combined regional metrics will be used to demonstrate whether the SROs or other transfer options provide a better value outcome than just relying on within-region solutions.

Figure 2: SRO schemes



7 The reconciled plans

- 7.1 As discussed earlier the regional reconciliation process undertook two rounds of assessment. The first round used WRSE as the primary draw for water from the other regions and the second round was triggered by WRE's requirements for water.
- 7.2 The WRSE Reconciliation of the regional plans considered drawing water from WRW, a western route for water into the region. WRE reconciliation considered drawing water in from WRSE, due to a lack of resources in the region, which is an eastern route.
- 7.3 The two reconciliation rounds consisted of: round 1 outlined WRSE's requirements and those from the other regions and round 2 outlined WRE's requirements and those of the other regions. The choice of the better strategy is based on the best value metrics and costs.
- 7.4 Before the beginning of the two rounds of the reconciliation process each of the regions provided and updated position on the regional surpluses which are published in the consultation documents. Typically these updated resource positions demonstrated that all of the regions will go into deficit unless a range of interventions were developed.
- 7.5 These interventions always included further measures to reduce consumption and leakage (government policy demand management and leakage reductions were included in the pre-reconciliation baselines). Following these interventions most of the regions required further interventions still to be developed. These additional interventions were not just to help the regional deficits but also a potential option to help move water from one region to the next.
- 7.6 Two different aligned plans have emerged through the reconciliation process. The first-round plan included developing a new set of transfers from WRW whilst maintaining the current supply, to Affinity, from Grafham Water reservoir to its resource zone. In the second round WRE, who are not able or required to export further water from their region, looked to see what would happen if Affinity reduced their existing abstraction from Grafham Water.
- 7.7 The reconciliation rounds also highlighted several other transfers which are or could be impacted by the updated resource positions within each of the regions.
- 7.8 The outcome of the reconciliation process is set out in the reconciliation table below. Each round of the reconciliation process considered each of these routes. The two rounds of reconciliation the regions have agreed which configuration of regional alignment provides a preferred emerging alignment of the reconciliation process are shown in the table below. This showed that the western route of the reconciliation was the overall preferred reconciliation. Therefore, at this point the regional reconciliation process has concluded that it is better overall for the existing export to the WRSE region to continue, this will be reviewed in the next regional reconciliation process.

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- 7.9 Whilst the BVP metrics from the regions were close, the cost differential played the biggest deciding factor. The final alignment of the regional plans, which will be used for the consultation on the emerging plans, was based on the alignment of the plans from round 1 which WRSE initiated.
- 7.10 The final alignment table is shown below in Table 2

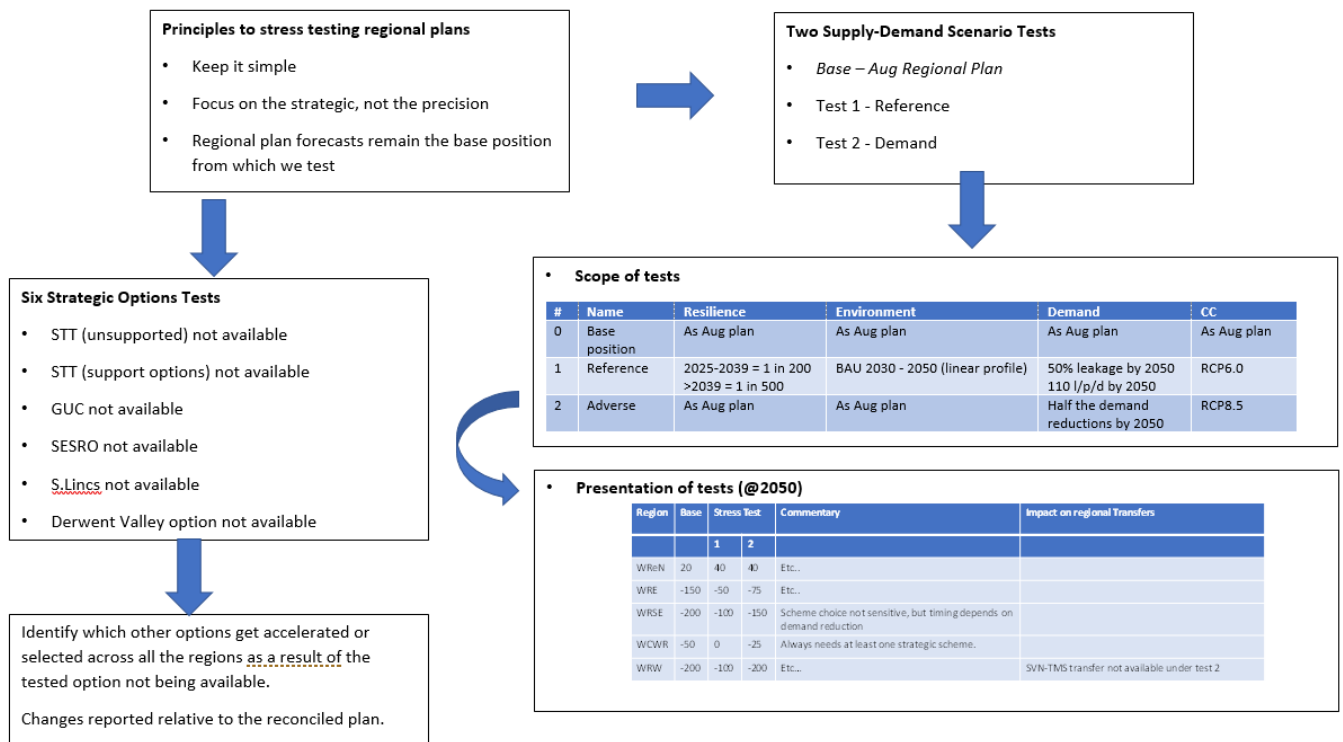
Resource zone and water company area of proposed scheme (source of abstraction)	Potential resource zones or regions that could benefit or receive water from scheme	Option Name	In-region or inter-regional option?	Type of option	Proposed scheme development history	Reconciliation stress test assessment	Reconciliation outcome and current status of scheme selection	Earliest year of MI/d benefit available	Indicative year of option selection	Maximum capacity or yield of option in MI/d
Severn Trent Strategic Grid	Thames Water (SWOX, London), Affinity Water and potentially others in WRSE and WCWR	Severn Trent Sources (Netheridge and Mythe)	Inter-regional option from WRW to WRSE (primarily) and WCRW (as adaptation)	Effluent re-use (Netheridge) and partial source re-deployment (Mythe)	Strategic Resource Option under development through the RAPID gated process	Following the update of scheme information in November the Netheridge scheme still gets selected but the Mythe does not. The Netheridge scheme are always selected in the more challenging situations in the south east of England.	Included in the reconciled plan to meet the needs of WRSE, and potential adaptation into WCWR noted. Reconciliation assessment accounts for consequential cost to Severn Trent Water being reflected in prices to WRSE companies.	2030	2040 (Netheridge)	35 MI/d (Netheridge) and 15 MI/d (Mythe)
Severn Trent Strategic Grid	Thames Water (SWOX, London), Affinity Water and potentially others in WRSE and WCWR	Minworth	Inter-regional option from WRW to WRSE (primarily) and WCRW (as adaptation)	Effluent re-use	Strategic Resource Option under development through the RAPID gated process	Minworth gets selected for both STT and the GUC transfer. These schemes are always selected in the more challenging situations in the south east of England. In the middle to lower branches these schemes aren't selected. If Minworth could only support one of the two transfer routes then the transfer route to GUC would be the referred route.	Included in the reconciled plan to meet the needs of WRSE, and potential adaptation into WCWR noted. Reconciliation assessment accounts for consequential cost to Severn Trent Water being reflected in prices to WRSE companies.	2035	2044 (via STT) and 2049 (50 MI/d via GUC) and 2060 (further 50 MI/d via GUC)	115 MI/d (via STT) and 100 MI/d (via GUC)
United Utilities Strategic Zone	Severn Trent, Thames Water (SWOX, London), Affinity Water and potentially others in WRSE (Southern), WCWR (Bristol and Wessex) and WRW (South Staffs)	North West Transfer (Vyrnwy Aqueduct and United Utilities Sources)	Both in-region option and Inter-regional option from WRW to WRSE (primarily) and WCRW (as adaptation)	Partial source re-deployment (Vyrnwy) enabled by network enhancement and new sources	Strategic Resource Option under development through the RAPID gated process	The Vyrnwy options usually gets selected in all of the scenarios that we have tested. Typically these schemes are always selected in the more challenging situations in the south east of England. It is only in the middle to lower branches in which the schemes are not selected.	Included in the reconciled plan to meet the needs of WRW, WRSE, and potential adaptation into WCWR noted. Reconciliation assessment accounts for consequential cost to United Utilities being reflected in prices to WRSE companies.	2030	2040 (75 MI/d to Severn Trent) and 2041 (50 MI/d to WRSE) and 2051 (further 25 MI/d to WRSE) and 2055 (further 20 MI/d to WRSE) and 2056 (further 10 MI/d to WRSE) and 2065 (further 25 MI/d to WRSE, via Shrewsbury) (Note dates and volumes refer to water made available by the scheme in the River Severn Uplands.)	180 MI/d via Vyrnwy Reservoir and 25 MI/d via Shrewsbury = 205 MI/d total
Severn Trent Strategic Grid and United Utilities Strategic Zone	Thames Water (SWOX, London), Affinity Water and potentially others in WRSE	Severn Thames Transfer (STT)	Inter-regional option from WRW to WRSE	New raw water transfer using rivers and pipeline or canal	Strategic Resource Option under development through the RAPID gated process	The Severn Thames Transfer is selected as one of the many solutions in the south east of England. This enabling scheme is usually configured with support options. This scheme is always selected in the more challenging situations in the south east of England.	500 MI/d transfer included in the reconciled plan to meet the needs of WRSE. Linked to supporting options: Severn Trent Sources, Minworth and North West Transfer (Vyrnwy Aqueduct and UU Sources) and benefits from unsupported abstraction from the River Severn.	2033	2040	500 MI/d
Severn Trent Strategic Grid	Affinity Water	Grand Union Canal (GUC)	Inter-regional option from WRW to WRSE	New raw water transfer using canal	Strategic Resource Option under development through the RAPID gated process	The Minworth / Grand Union canal option is selected across a number of the more challenging situations in the regional plan. These schemes were also selected in the stress tests.	100 MI/d transfer included in the reconciled plan to meet the needs of WRSE. Linked to Minworth supporting option.	2034	2049 (50 MI/d) and 2060 (further 50 MI/d)	100 MI/d
Anglian Water East Lincolnshire	Anglian Water Ruthamford North and Ruthamford South; Affinity Water	South Lincolnshire Reservoir	Inter-regional option from WRE to WRSE	New reservoir	Strategic Resource Option under development through the RAPID gated process	Not available in stress test due to conclusions of reconciliation	Selected as an in-region option only; in development as Gate 2 solution	2035-36	2035-36	150 MI/d
Anglian Water Fenland	Anglian Water WRZs in Cambridgeshire and Norfolk; Cambridge Water	Fens Reservoir	In-region option	New reservoir	Strategic Resource Option under development through the RAPID gated process	In scenarios with larger deficits in WRE the option is selected at a larger size.	In development as Gate 2 solution	2035-36	2035-36	99 MI/d
Anglian Water Ruthamford South	Anglian Water Ruthamford South; Affinity Water	Grafham Water	Inter-regional option from WRE to/from WRSE	Transfer	n/a	Not available in stress test due to conclusions of reconciliation	Options to either increase or reduce transfers from WRE to WRSE were investigated. The reconciled plan includes continuation of the existing transfer volumes. The impact of a 40 MI/d reduction in the transfer had approximately double the cost impact on WRSE compared to WRE.	2025-6	n/a	40 MI/d
Severn Trent Strategic Grid	Yorkshire Water Grid	Cease existing Derwent Valley Transfer	Inter-regional option to stop existing transfer from WRW to WREN regional group	Stop existing transfer	Operational since early 1900s	The transfer is included in the reconciled plan. Stress testing considered loss of this existing transfer which could cause in 2050 a deficit in Yorkshire Water Grid of around 40 MI/d under average baseline conditions (with the deficit up to 58 MI/d under the adverse scenario). Transfer loss impacts on the supply integrity and cause deficit in a specific part of Yorkshire Water Grid, requiring significant in-company investment for Yorkshire Water / WREN. Based on initial work completed at this stage, Yorkshire Water has estimated, at a high level, that the loss of the Derwent could result in costs of the order of £200m to develop and construction options to offset the lost water in YW's operating area.	Severn Trent could benefit from reducing this existing transfer from 2035 onwards, however this would cause significant new options to be developed in Yorkshire Water's area. Recognising this impact the option to cease the trade is not included in the reconciled plan which instead includes continuation of this transfer, enabled by the Derwent Valley Storage Increase option.	N/A existing	N/A existing (contractually existing transfer ends 2084, but with potential for break from 2035)	40 MLX/d annual average, but 68MI/d actual max
Severn Trent Strategic Grid	Severn Trent Strategic Grid and Yorkshire Water Grid (Maintains existing transfer benefit if retained)	Derwent Valley Storage Increase	In-region option, which also allows existing inter-regional Derwent Valley Transfer to continue	Reservoir enlargement	Strategic Resource Option under development through the RAPID gated process.	If this option were not available this would impact the ability to continue with the Derwent Valley Transfer above.	Included in the reconciled plan to allow Derwent Valley Transfer to continue and therefore avoid the need to develop options in Yorkshire Water's area as well as meet needs in Severn Trent. Avoids deterioration of several Best Value Plan metrics in WREN area, including significant capital, operational and opportunity cost associated with alternative solutions for Yorkshire Water.	2040	2040	80 MI/d

Resource zone and water company area of proposed scheme (source of abstraction)	Potential resource zones or regions that could benefit or receive water from scheme	Option Name	In-region or inter-regional option?	Type of option	Proposed scheme development history	Reconciliation stress test assessment	Reconciliation outcome and current status of scheme selection	Earliest year of MI/d benefit available	Indicative year of option selection	Maximum capacity or yield of option in MI/d
Severn Trent Strategic Grid and United Utilities Strategic Zone	Bristol Water and Wessex Water	River Severn to West Country Transfer	In-region option from WRW to WCWR	Enhance existing canal transfer to Bristol.	New scheme identified through regional planning. United Utilities to Bristol was identified at WRMP19. Linked to Severn Thames Transfer Strategic Resource Option under development through the RAPID gated process.	Robust option. Water could be used when not needed by other regions. Increases local resilience in Bristol and Bath towns	Not selected in reconciled plan, but benefits recognised as an adaptation pathway from 2040 onwards. Also note potential added resilience benefits if the connection is available, due to lower correlation of drought events across regions compared to within regions.	2030	N/A	35 MI/d
Bristol Water	Bristol Water and Wessex Water	Cheddar 2	In-region option for WCWR	New reservoir	Strategic Resource Option under development through the RAPID gated process, has been a feasible option in previous WRMP submissions.	Robust to a reasonable range of stresses and is selected in moderate and/or more challenging adaptive pathways	Lower value option that is likely to only be needed in the more extreme adaptive pathways of the regional plan and/or WRMP24	2030	2030-2040	16 MI/d (treated water), 65 MI/d (raw water)
Bristol Water	Bristol Water supply area, wider WCWR region and configuration options to export to WRSE in the future	Mendip quarries raw water reservoir	In-region option for WCWR, with option for inter-regional connection with WRSE in the future	New reservoir	Strategic Resource Option under development, New feasible option for WRMP24	Robust to a reasonable range of stresses and is selected in the preferred adaptive pathway	Feasible, cost-beneficial and likely to be preferred option for WRMP24	2049-50	2049-50	90 MI/d
Bournemouth Water	Bournemouth Water, Wessex Water	Poole Effluent Re-use	In-region	Effluent Re-use	Strategic Resource Option under development through the RAPID gated process.	Robust option. Water would be used in all scenarios.	Feasible and cost-beneficial. Has the potential for significant improvement in overall catchment operation. Water would be used to offset sustainability reductions on the Hampshire Avon. Also has the added environmental benefit of reducing nutrient load into Poole Harbour. Opportunity to offset an existing large industrial potable supply but analysis needed to understand the feasibility.	2030	2035	30 MI/d
Thames Water	Thames Water - Affinity Water (Potentially others that extract from the Thames)	SESRO (Abingdon)	In region option for WRSE	New Reservoir	Strategic Resource Option under development through the RAPID gated process	This option is consistently selected across all WRSE situations. This scheme is also selected in stress test model runs.	Included in the reconciled plan to meet the needs of WRSE.	2037	2040	293 MI/d
Thames Water	Thames water London (WLJ, KGV)	London Reuse - Mogden	In region option for WRSE	Effluent Re-use	Strategic Resource Option under development through the RAPID gated process.	London-Reuse Mogden option is selected across a number of the more challenging situations in the regional plan. These schemes were also selected in the stress tests.	Included in the reconciled plan to meet the needs of WRSE.	2031	2065	100 MI/d
Thames Water	Thames water London (WLJ, KGV)	Direct river abstraction - Teddington	In region option for WRSE	DRA	Strategic Resource Option under development through the RAPID gated process.	Teddington DRA option is selected in the most challenging situation in the regional plan. These schemes were also selected in the stress tests.	Included in the reconciled plan to meet the needs of WRSE.	2034	2045	50 MI/d
Thames Water	Thames water London (WLJ, KGV)	London Reuse - Beckton	In region option for WRSE	Effluent Re-use	Strategic Resource Option under development through the RAPID gated process.	The core London-Reuse Beckton is selected across all situations. The Enhanced Beckton 50MI/d options are also used in all options. The Enhanced Beckton 100MI/d options is only selected in the most challenging situation. These schemes were also selected in the stress tests.	Included in the reconciled plan to meet the needs of WRSE.	2031 Beckton 2034 Beckton Enhanced 100MI/d 2034 Beckton Enhanced 50MI/d	2031 Beckton 2046 Beckton Enhanced 50MI/d 2051 Beckton Enhanced 100MI/d	Beckton 95MI/d Beckton Enhanced + 50MI/d Beckton Enhanced + 100MI/d
Portsmouth Water	Southern Water	SWS Havant Thicket Raw Water Transfer	In region option for WRSE	Raw water transfer	Strategic Resource Option under development through the RAPID gated process.	Not included in stress testing as the reservoir now has planning permission so is more likely to be constructed.	Not included in reconciled plan	2027	n/a	Multiple options ranging from 90-190MI/d
Southern water	Portsmouth Water	SWS Water Recycling	In region option for WRSE	Reclaimed water, water re-use, effluent re-use	Strategic Resource Option under development through the RAPID gated process.	This option is consistently selected across all WRSE situations. This scheme is also selected in stress test model runs.	Included in the reconciled plan to meet the needs of WRSE.	2027	2031	90MI/d
Southern water	Southern Water	SWS Water Desalination	In region option for WRSE	Desalination	Strategic Resource Option under development through the RAPID gated process.	Not included in stress testing following the announcement that the Fawley desalination plant is no longer a feasible option following the gate 1 review.	Not included in reconciled plan	2026	n/a	Multiple options ranging from 40-200MI/d
Thames water	Affinity Water	T2AT	In region option for WRSE	Raw water transfer	Strategic Resource Option under development through the RAPID gated process.	Not included in stress testing exercise for the regional reconciliation process but will be completed for the within region stress testing	Not included in reconciled plan	2034	n/a	Multiple options ranging from 50-100MI/d
Thames water	Southern Water	T2ST	In region option for WRSE	Raw water transfer	Strategic Resource Option under development through the RAPID gated process.	Not included in stress testing exercise for the regional reconciliation process but will be completed for the within region stress testing	Not included in reconciled plan	2030	n/a	Multiple options ranging from 24-200MI/d

Table 2 Reconciliation alignment table

8 Stress testing

- 8.1 The purpose of stress testing is to show what happens and how well prepared a plan is when certain stressors are introduced. Stress testing the Regional Plans is recommended for two reasons:
- To give confidence – how far do assumptions in the forecasts each region has produced need to change to get a different answer?
 - To support the consultation – what questions we might want to ask and show links between regions and schemes
- 8.2 The approach undertaken is set out below. Two types were undertaken during the stress test process: the first was to exclude certain schemes, and the second was to stress test the supply demand balance in each region through the reduced benefits from demand management and leakage reduction schemes.



8.3 RCG has undertaken two stress tests relating to the supply-demand balance:

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- A reference scenario - that has common assumptions on resilience, climate change, environmental needs, demand and environment
 - An adverse scenario - that shows the impact of reduced demand savings and worse climate change
- 8.4 The stress tests highlight whether different scheme choices are stable, which they were within the range that they were tested.
- 8.5 A further stress test has been conducted to explore the criticality and sensitivity of selecting options. This has been done by forcing an assumption that particular options are not available for selection. Therefore, we have explored the impact on the region that benefits from the option and any knock-on consequences to the other regions through transfers. Changes are reported relative to the reconciled plan. For example, we identify which other options get accelerated or selected across all the regions due to the tested option not being available.
- 8.6 A summary of the scenarios assessed and the implications for each region can be found in Table 2 under the headings “Reconciliation stress test assessment” and “Reconciliation outcome and current status of scheme selection”

9 Summary

- 9.1 The cascade reconciliation methodology sets out an approach to reconcile the regional plans. The approach utilises each of the regions’ own planning processes in a co-ordinated and phased approach to ensure we have a coherent set of core plans.
- 9.2 The timeline for completing this reconciliation process was three months. Two rounds of reconciliation were required.
- 9.3 To complete the cascade reconciliation process each region developed a regional baseline plan based on its own requirements over the planning horizon. This baseline regional plan was used for comparative purposes with other subsequent plans.
- 9.4 To determine the overall best combination of regional plans each region also developed an agreed set of best value metrics that it used for evaluating its plan. These metrics were used to understand the overall best set of reconciled plans.
- 9.5 Key to this process was ensuring that each of the SRO schemes have costs and benefits associated with them. The ACWG methodologies have set out a series of technical approaches to ensure consistency of some key metrics for comparative purposes.
- 9.6 The final set of regional reconciled plans have been signed off / approved for consultation purposes by each of the regional boards A further round of reconciliation may be required in April 2022.

