

Future Water Resource Requirements for South East England - an update

February 2021

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Introduction

Water Resources South East (WRSE) is the regional group that covers the South East of England. We are an alliance of the six water companies that operate in the region – Affinity Water, Portsmouth Water, SES Water, Southern Water, South East Water and Thames Water – working with our associate members, the water industry regulators, and a range of stakeholders.

We are developing a multi-sector regional resilience plan for South East England. In March 2020 we published our projected future water resource requirements¹ – the additional water needed for the region – looking ahead to 2100 to address the planning challenges that we face. These include:

- Increased demand for water due to population growth
- Climate change
- Increased resilience to drought
- Protecting and improving the environment.

Our March 2020 document was largely based on data used by the six member companies in their 2019 Water Resources Management Plans (WRMP19) and analysis carried out by the Environment Agency as part of its National Framework for Water Resources². It was subject to public consultation and we produced a summary³ of the responses we received.

Since then, we have carried out further work on the important building blocks for our regional plan and have updated the information, methodologies, and systems we will use. This has included:

- Producing and consulting on 16 Method Statements that set out how we will develop our regional plan, including a new water quality framework and outage methodology for the region
- Developing a Resilience Framework through engagement with stakeholders which we will use to demonstrate how the resilience of the region is improved as a result of the regional plan

¹ [Microsoft Word - WRSE_IRP_Final_all_amends_published](#)

² Meeting our future water needs: a national framework for water resources; Environment Agency, March 2020

³ [Microsoft Word - WRSE_ResponseFWRRFinal_May20](#)

- Developing a set of spatially coherent climatic data for the region and using it to enhance our understanding of our surface and groundwater sources, and how much water will be available from them during different drought events
- Producing a range of population and property forecasts for the region to inform our household and non-household demand forecasts
- Developing a new Strategic Environmental Assessment (SEA) that is in line with statutory requirements
- Building a simulation model for the region so we can show how different water resource programmes will perform
- Developing a new central platform that links a number of databases which contain all the data and information we will use in the modelling process to derive our alternative water resource programmes
- Engaging with the Environment Agency and other stakeholders to better understand the environmental issues within our catchments and ongoing work to identify our long-term environmental destination
- Identifying new options to be considered within the plan including catchment and third-party options
- Developing a new regional investment model, in line with regulator and sector guidance, to derive potential water resource programmes
- Consulting on the criteria and metrics we will use to develop a 'Best Value' plan.

In spring 2021 we will start to develop our regional plan. It will be an adaptive plan that enables us to accommodate a range of different futures and uncertainties. Over the course of the year, we will continue to engage with customers and stakeholders across the region to understand their priorities and preferences and use this insight to help us identify the preferred water resource programme that will form our regional plan.

At the end of August 2021, we will present our preferred plan for reconciliation with the other four regional groups that exist to ensure there is alignment across the country. In January 2022, we will carry out a public consultation on our draft multi-sector regional resilience plan. We will then update our plan and publish a final version in August 2022, which the six members water companies will use to derive their individual Water Resource Management Plans (WRMP24s).

About this document

This document provides a summary of the planning challenge we face in the region and identifies where we expect to see the forecasts we provided in our March 2020 document to change, based on work we have completed so far. It covers both public water supply (water provided by water companies to

household and non-household customers) and non-public water supplies (the water used by other sectors who have their own sources of water).

We also highlight how we have responded to feedback received from stakeholders through our previous consultation.

We will publish our fully updated forecasts that contribute to the planning challenge, which will be addressed through our regional plan, in spring 2021; this will be in line with requirements for WRMP24. Our updated forecasts will take into account growth and climate change, and the expected amount of additional water needed to protect and enhance the environment and achieve increased resilience to drought. We will also set out the range of future planning scenarios that will be addressed through our adaptive regional plan.

The water resources position today

Currently, the water companies in the South East region abstract, treat and distribute more than five billion litres of water each day. This is over a third of the 14 billion litres per day that is provided, on average, by the water companies across England.

Work carried out by the Environment Agency and published in the National Framework for Water Resources in March 2020, showed that in the South East, around 153 million litres per day is used by other sectors which have their own water supplies that they take directly from rivers and underground sources for consumptive purposes. Other major users of water in the region include the power sector, primarily for generation of electricity at the Didcot power station near Oxford; the farming sector which is dominated by horticulture, in particular, soft fruit and salad production in Kent and Sussex; and the paper production industry at a major plant in Kent.

We established a multi-sector group that comprises representatives from the sectors that were shown to have the highest non-public water supply demand in the region to help us engage with them and accurately represent their future needs in the regional plan.

We have reassessed the amount of water being used by other sectors by including a number of existing water abstractions which are currently not licensed by the Environment Agency, a breakdown of which was not available last year. The Environment Agency is going through a process of reviewing these abstractions, known as 'new authorisations' and it is assumed that these licences will be authorised. Therefore, we have included them so we can fully understand the way in which water is used in the region.

As a result, this shows that around 35 million litres of water per day is currently being used by other sectors, in addition to the 2020 estimate of 153 million litres per day.

The South East's future water needs

Our March 2020 document showed the amount of surplus water available in the region will drop to 315 million litres per day by 2025, which is the start of the planning period for our regional plan; this continues to be our expectation.

In that same document we estimated that by 2050 the deficit in public water supplies could reach 1 billion litres per day and, by 2100, this will have risen to 1.6 billion litres per day.

The future needs of the other sectors were less clear as they don't produce long-term water resource management plans and must respond to market pressures. However, total demand from other sectors in the South East region was estimated to reach 175 million litres per day by 2050 and 211 million litres per day by 2100. This meant an extra 58 million litres of water would be needed by 2100 to meet the demand from other sectors.

Together, the total additional water needed by all water users in the South East region was projected to be just over 1 billion litres per day by 2050 and almost 1.7 billion litres per day at 2100.

Over the last year we have carried out work to better understand the different components of this forecast and have further developed our understanding of the future scenarios that could occur and which we should consider.

It is our expectation that the amount of additional water needed in the South East will be more than our March 2020 projection. This is primarily due a greater reduction in abstraction than previously estimated to deliver long-term environmental protection and improvement and a wider range of demand forecasts being considered. The non-public water supply requirements will also be higher, primarily due to the inclusion of abstractions not previously considered.

In the following section we break down the planning challenge being faced in the region.

Public Water Supplies

The following table was presented in our March 2020 document to summarise the future water resource position. It includes:

- Public water supply required for customers, referred to as Distribution Input
- Baseline amount of water available after the effects of population growth and climate change are taken into account
- The amount of water associated with reducing abstractions within WRMP19s, which included commitments to deliver the Water Industry National Environment Programme (WINEP) plus additional reductions identified for Southern Water and Affinity Water for environmental protection

- The reduction in water available from sources during a 1 in 500-year drought (this reflects the move from 1 in 200-year drought resilience to 1 in 500-year drought resilience).

The net water resources position is the combination of all these elements and in essence is the amount of additional water we will require in the future.

Table 1: Future public water supply projections 2025 to 2100 (March 2020)

Category	Time period	2025	2030	2040	2050	2070	2100
Public Water Supply - Distribution Input	Annual	4637.4	4686.6	4838.5	5015.2	5262.8	5537.1
Baseline amount of water available	Annual	315	-86.6	-321.0	-519.1	-806.7	-1143.2
Environmental protection	Annual			-273.7	-273.7	-273.7	-273.7
Drought resilience	Annual			-210.0	-210.0	-210.0	-210.0
Net resources available	Annual	315	-86.6	-804.7	-1002.8	-1290.4	-1626.9
Public Water Supply - Distribution Input	Summer	5246.5	5308.9	5498.2	5714.6	6038.4	6413.4
Baseline amount of water available	Summer	515	50.2	-221.5	-458.0	-818.0	-1247.5
Environmental protection	Summer			-273.7	-273.7	-273.7	-273.7
Drought resilience	Summer			-210.0	-210.0	-210.0	-210.0
Net resources available	Summer	515	50.2	-705.2	-941.7	-1301.7	-1731.2

We expect that the amount of additional water needed by water companies to supply homes and businesses is going to increase from our March 2020 forecast; however, there will be a number of scenarios that will be included within our adaptive plan to allow us to manage future uncertainties around such forecasts.

The reason that additional water is needed in the future is because of four main pressures:

- Increased demand due to population growth
- Climate change
- Increased resilience to drought
- Protecting and improving the environment.

Increased demand due to population growth

Our March 2020 projection was based on an increase in the region's population of nine million people by 2100, to a population of 29 million in total. However, the scale and rate of growth was uncertain. Concern was raised by some stakeholders through our previous consultation that future demand for water may have been overestimated.

We commissioned Edge Analytics to produce a detailed growth forecast that considered both population and property growth. This was informed by the projections from local planning authorities across the region and Office of National Statistics (ONS) data. We held a webinar in 2020 that explained how the forecast was developed⁴.

We expect that the amount of water needed to supply the growing population is likely to be higher than we previously projected and the Water Resources Planning Guideline⁵ (WRPG) requires us to use local plan data as the basis of our growth forecast – this is at the higher end of the range of growth scenarios we have produced to date. The projections range from an additional 2% to 26% population growth in 2050. However, all scenarios will be considered within our plan to ensure we can adapt depending on the level of growth that actually occurs.

Climate change

Since we produced our March 2020 document, there have been new climate change datasets produced (UKCP18) which change the way in which climate change projections are applied to water resource planning. Stakeholders highlighted the need to consider a range of climate scenarios, including a high emission scenario, in their feedback. We have considered 28 different climate change scenarios in total which are in line with the draft WRPG.

We do not expect this to cause a material change to our projections that calculate the magnitude of climate change impacts on our water resources, but we do anticipate that the frequency of extreme climatic events such as droughts will increase.

Increased resilience to drought

Our March 2020 document was based on planning for a severe drought once in every 500-years and, as a result, boosting the level of resilience of our water supplies. While some stakeholders considered this was unnecessary, there was broader consensus to support this move and since then it has been included as a requirement in the Government's National Infrastructure Strategy⁶.

Since our March 2020 document we have carried out detailed work to understand the impact more severe droughts will have on our water resources. We are considering a range of different rainfall

⁴ [Method Statements | Water Resources South East \(engagementhq.com\)](#)

⁵ Water Resources Planning Guideline; EA, NRW, Ofwat, February 2021.

⁶ National Infrastructure Strategy, November 2020.

scenarios which include droughts of different durations and intensities so that we understand how much water would be available from our sources under different drought conditions.

It is our expectation that the amount of water we need in the future to provide this increased level of resilience is likely to be greater than our original projection because we are considering a wider range of more severe droughts.

The way in which Drought Orders and Drought Permits are used within the plan to help achieve a higher level of resilience to drought has been subject to considerable feedback. Some stakeholders are keen to see them used to avoid increased investment in new resources while others want their use to be avoided altogether to help protect the environment.

Our position is to rely as little as possible on Drought Orders and Drought Permits, particularly in sensitive areas. We are currently working with the Environment Agency to review all that are currently available to water companies so that we understand the environmental risk of each. We will only include Drought Orders and Drought Permits in the plan which are agreed with the Environment Agency.

As part of our assessment of alternative water resource programmes we will test scenarios where these Drought Orders and Drought Permits are used and where they are not to compare the cost impacts. This will be shared with stakeholders and customers for their feedback.

Environmental improvement

Our ambition is to reach an environmental destination where water companies and other abstractors use sustainable sources of water so people and nature can thrive. This means that water companies will need to reduce the amount of water they currently abstract from vulnerable catchments – known as sustainability reductions – and replace these supplies with alternative sources for the future.

Over the last year, we have been engaging with customers and a range of stakeholders to understand priorities when it comes to the environment and have completed a data-gathering exercise to identify key challenges in each of the catchments in the South East. We have formed an Environmental Advisory Group that brings together experts from a range of environmental organisations to scrutinise our approach and help us identify an appropriate long-term destination based on the evidence available.

In its National Framework for Water Resources, the Environment Agency put forward a range of potential future abstractions reductions that included two main scenarios:

- Business as Usual (BAU) – a continuation of the existing policy and regulatory approach to abstraction reductions; and
- Enhanced – which provides greater protection for Special Protected Areas (SPA) and Sites of Special Scientific Interest (SSSI) rivers and wetlands, principal salmon and chalk rivers and reflects climate change.

In our March 2020 document, we used our baseline forecast, which was taken from the companies' WRMP19s and based on the delivery of their WINEP commitments. This would require reducing abstractions by some 274 million litres of water per day. In some stakeholders' view this underestimated the level of abstraction reduction that was needed and there was concern raised about the difference between our forecast and that of the Environment Agency in the National Framework for Water Resources.

We did, however, reference the potential range of abstraction reduction that may be needed, based on analysis included in the National Framework. This included abstraction reductions of 460 million litres per day under the Environment Agency's BAU scenario and 998 million litres per day, under its Enhanced scenario.

In December 2020, the Environment Agency produced updated forecasts for abstraction reduction. This has resulted in its indicative projections for future abstraction reductions changing to 900 million litres per day under its BAU scenario and 1,240 million litres per day under its Enhanced scenario by 2050. A range of other scenarios are also being considered.

We need to undertake further work to understand the impact of the updated Environment Agency forecasts at a catchment level and what that means for the individual water companies. We will do this through analysis of the technical data by WRSE and expert representatives of the environmental organisations who sit on our Environmental Advisory Group.

Once we fully understand the impact that the different scenarios will have on abstraction across the region, we will use the WRSE investment model to identify the solutions that could make up the overall shortfall in water supplies that will occur, by when and at what cost to customers. This will help us to determine the amount and phasing of any investment over the lifetime of the plan, identify our final environmental destination and when we will reach it.

It is important to note that our adaptive plan will allow us to adapt and respond to different scenarios in the future once we have greater certainty. However, for our regional plan the amount of water lost through abstraction reductions will increase significantly compared to previous water company plans and marks a step-change in the level of environmental improvement that water companies are expected to deliver.

Non-public water supplies

The forecast in our March 2020 document was based on the analysis carried out for the National Framework on future non-public water supply demand. This projected that in 2025, the start of the planning period, the amount of water being used by other sectors would be around 157 million litres per day. As previously explained, we have included abstractions not currently authorised by the Environment Agency in our updated non-public water supply demand forecast, which increases this forecast by around 35 million litres per day.

We have also considered regional population and property growth in our non-public water supply demand forecast. In addition to the increase due to the new authorisations, we project further increases – primarily associated with increased agricultural and energy demand – up to 2050.

Beyond 2050 there is little data available to help predict future demand. Therefore, we will hold our non-public water supply forecast at 2050 levels for the remainder of the planning period.

Meeting our future needs

There are a range of potential solutions available to meet our future water needs. Over the last year we have been reviewing the options available and have identified a number of new ones. In total around 1,200 options will be considered in the development of the regional plan.

The options can be split into four main groups:

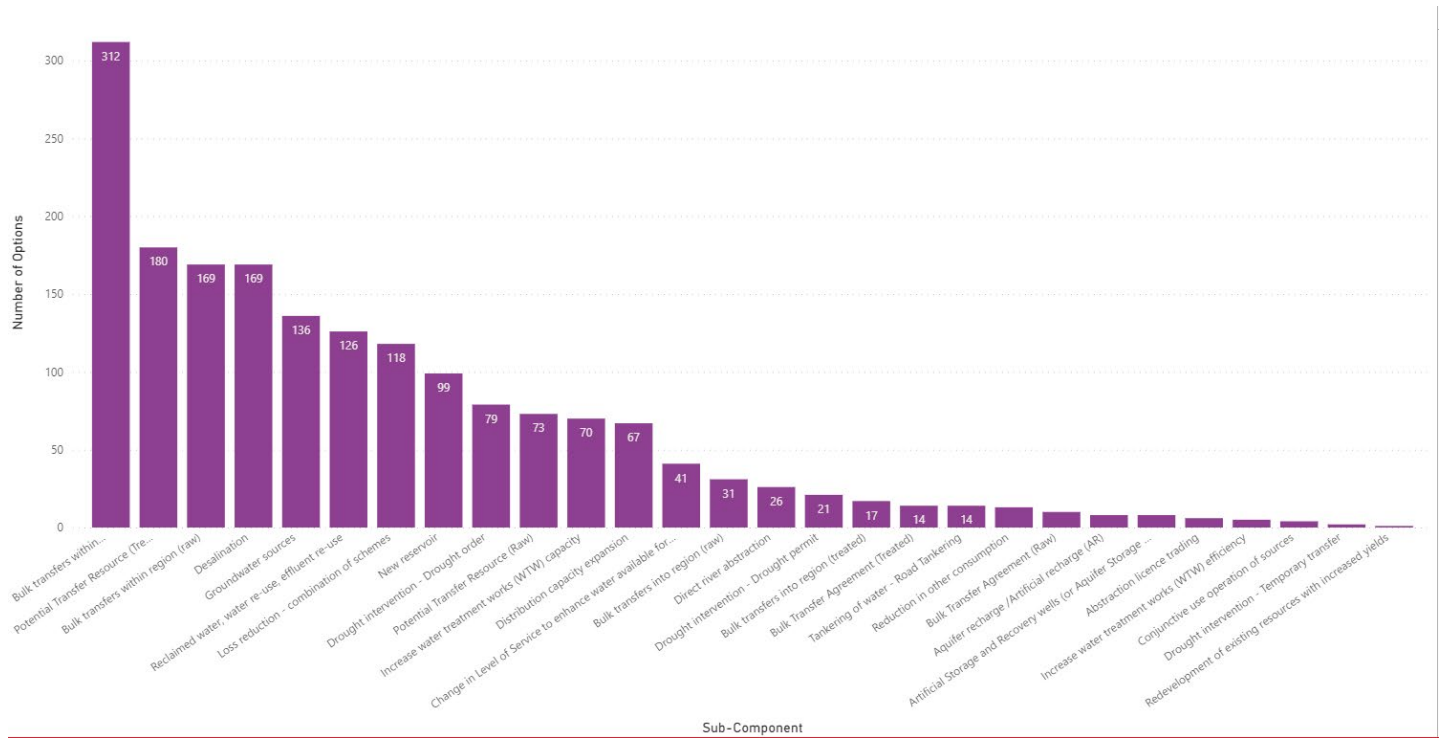
- New water sources or infrastructure – reservoirs, desalination plants, water recycling, aquifer storage recovery plants. These include the Strategic Resource Options (SROs)
- Demand reduction – leakage and water efficiency schemes
- Transfers – moving water within and between regions
- Catchment schemes – interventions, including nature-based solutions, that improve the quality, quantity, and resilience of water sources.

The regional plan will identify a number of water resource programmes that will include different sets of options which together provide the additional water needed for the future. We will assess these programmes against a number of criteria and identify our preferred ‘Best Value’ plan for the region.

The feedback received from stakeholders to our March 2020 consultation highlighted the importance of progressing demand management options, including leakage and water efficiency as part of the plan. Water companies have committed to achieving a 50% reduction in leakage by 2050 and this will be a planning constraint in the regional plan. We will develop programmes that deliver more ambitious leakage and consumption reduction and consider them as part of our process to identify the Best Value plan. Should Defra include a target associated with water use within the Environment Bill this will also become a planning constraint within the regional plan.

Figure 1 shows the different types of options and the number of each option type that we will consider in the regional plan (this is subject to change).

Figure 1: Graph showing the number of options by option type

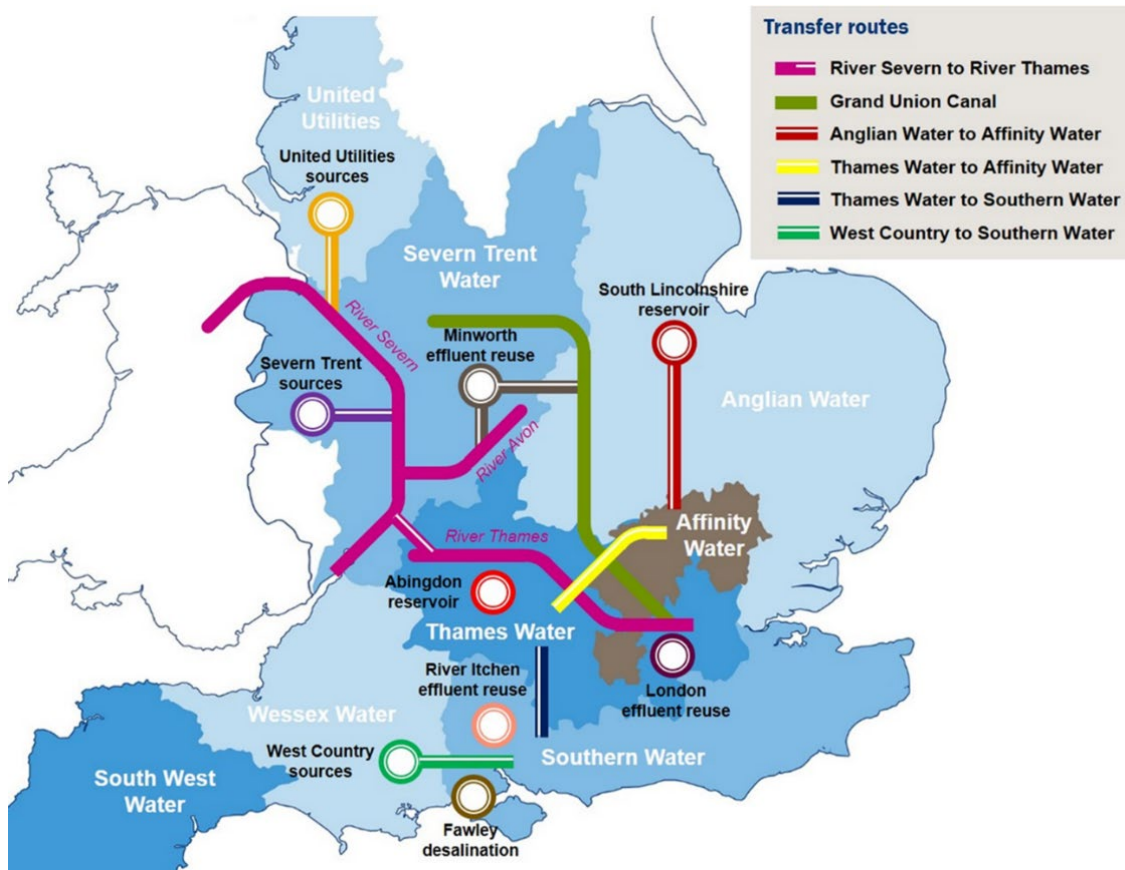


Strategic resource options (SROs)

There are a number of options which were included in the water companies’ WRMP19, which are currently being investigated in more detail to better understand the amount of water they can provide, the earliest date the water will be available, the area(s) that would benefit and to identify and address any issues that could stop or delay them from being built. This work is being led by the relevant water companies and overseen by RAPID – the Regulators’ Alliance for Progressing Infrastructure Development – which is made up of a team of experts from the Environment Agency, Ofwat and the Drinking Water Inspectorate. This is being co-ordinated with the work of the regional groups.

The aim is to ensure that any strategic resource options that the regional plan identifies are needed in the early years of the plan are “shovel ready” by 2025.

Figure 2: Strategic Resource Options⁷



The SROs being investigated by the WRSE companies and their expected deployable output (the water they can provide), are set out in Table 2. Please note these are still under consideration and subject to further scrutiny and challenge.

⁷ Source: PR19 final determinations: Strategic regional water resource solutions; Ofwat, December 2019.

Table 2: Strategic Resource Options

Strategic resource option (SRO)	Description	Expected deployable output
Minworth SRO	Severn Trent Water and Affinity Water development to consider options to augment flows in the River Avon to support the River Severn to River Thames transfer (STT) or into the canal network to support the Gran Union Canal (GUC) transfer	215MI/day (115 MI/day STT and 100 MI/day GUC)
South Lincolnshire Reservoir	Anglian Water and Affinity Water new reservoir constructed in South Lincolnshire with the potential for transfer to Affinity Water	100 MI/day
South East Strategic Reservoir Option	Thames Water and Affinity Water new bunded reservoir near Abingdon in Oxfordshire. Development to consider at least two sizes and interactions with other solutions, such as the River Severn to River Thames transfer	294 MI/day
London water recycling	Thames Water development to consider Beckton, Mogden and Teddington effluent reuse options	250 MI/day
Fawley desalination	Southern Water desalination plant on south coast with at least three different sized options being considered	75 MI/day
River Itchen water recycling	Southern Water transfer of treated wastewater upstream of the tidal limit to augment flows and enable abstraction. Different volumes and locations for augmentation are being considered	Up to 90 MI/day
West Country south sources	Development of source options in the South West Water and Wessex Water areas such as effluent reuse and additional pumped storage, to transfer to Southern Water	65 MI/day
West Country north sources	Development of a second Cheddar reservoir and pipeline to Wessex Water, and reinforcing the Wessex Water network to maximise a transfer from Bristol Water at Newton Meadows, and link to Southern Water	21 MI/day

River Severn to River Thames transfer	Thames Water, Severn Trent Water and United Utilities development to consider the transfer of water from the lower reaches of the River Severn to River Thames via a pipeline or restored canal route	Up to 350 MI/day (based on current available data)
Grand Union Canal transfer	Severn Trent Water and Affinity Water transfer from the midlands to the south-east using the canal network. This work is a partnership between the companies and the Canal & River Trust	100 MI/day
Thames Water to Southern Water transfer	Transfer from Thames Water to Southern Water. This can use existing sources or others developed as part of this programme and consider at least two route options	120 MI/day
Anglian Water to Affinity Water transfer	A transfer of water from Grafham reservoir to Affinity Water supported by the development of the South Lincolnshire reservoir	100 MI/day
Thames Water to Affinity Water transfer	A transfer of water from Thames Water to Affinity Water (considering at least two options)	100 MI/day
West Country to Southern Water transfer	A transfer of water from Wessex Water to Southern Water (considering at least two options)	45 MI/day
Transfer from Havant Thicket Reservoir	A raw water transfer from Havant Thicket reservoir to Southern Water's Hampshire region	61 MI/day

New options

Through engagement with the supply chain, other water users and local environmental groups we have identified a number of new options which will be considered as we develop the regional plan.

In order to increase connectivity across the South East we have identified 76 potential new transfers between the six WRSE companies. These schemes could enable us to access surplus water in the region and move water around more easily. The new transfer options will be appraised as part of the development of the regional plan.

The importance of using catchment-based solutions within our regional plan has been highlighted by a number of stakeholders. We carried out a series of workshops with local catchment groups, regulators, and land and water users to identify potential schemes that could be considered to improve the sources of water we all rely upon across the region. This will mean that the environment is more resilient to

drought and other events and we can continue to abstract water without damaging it. More than 300 opportunities were submitted through our online 'storymap' tool, some of which we will include as options within the regional plan and some which we will consider developing further for inclusion in future plans.

Some of these options could also contribute to reducing flood risk and will be shared with Thames Water and Southern Water which are both developing Drainage and Wastewater Management Plans (DWMP) as there is potential for multiple benefits to be delivered.

We have also received eight offers of water from other abstractors as a result of our engagement activity which will be considered as part of the regional plan and through the water companies' individual Bid Assessment Frameworks.

Next steps – engaging with you

In spring 2021 we will produce the forecast that sets out the planning challenge with the updated projections associated with our future water resource requirements. This will be in line with requirements for WRMP24 and will be used to derive the regional plan.

In tandem with that we will continue to engage with customers and stakeholders. We have set out our engagement journey in Figure 3 (below), which highlights the key engagement points with customers and stakeholders. This will be supported by a number of interactive webinars and workshops on key topics of interest.

We will continue to provide updates on our website wrse.org.uk and via our online engagement platform [Water Resources South East | Homepage \(engagementhq.com\)](http://WaterResourcesSouthEast.com)

You can contact us at contact@wrse.org.uk

Figure 3: The WRSE regional plan engagement journey

