south east water

Planning for the future

DRAFT WATER RESOURCES MANAGEMENT PLAN (2025 TO 2075) TECHNICAL OVERVIEW

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Executive summary

Our draft water resources management plan (dWRMP24) sets out how we propose to provide our customers with safe, reliable water supplies now and in the future and, at the same time, protect and enhance our precious environment.

Within this document we present the draft regional best value plan which has informed our Preferred Plan. The draft regional best value plan has been developed through our work with Water Resources South East (WRSE) and details how we will efficiently deliver a resilient and sustainable supply of clean drinking water, while managing the challenges of operating in an area of serious water stress.

We have then built on the draft regional best value plan and our Preferred Plan and created an alternative plan which offers a range of benefits including additional resilience during the next 50 years as well as added social and environmental value. It does this by delivering a number of planned schemes earlier, in case reductions in demand do not fall as projected.

Our plan follows the latest national framework, regulatory requirements, government guidance and policy for water resources planning. It goes beyond the minimum 25-year period, looking forward to 2075 to enable us to fully investigate, scrutinise and plan future water resource needs.

Aerial view Arlington Reservoir water tower

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Executive summary continued

Our plan is ambitious and wide-ranging and has been guided by extensive research, detailed data, customer involvement, and engagement with stakeholders and other interested parties. Our 25-year Environment Plan and a new 'regional first' approach to planning and engagement, through WRSE, have both helped to inform and shape our plan. Its development has been carried out with ongoing stakeholder challenge provided by our Customer Challenge Group (CCG) and Environmental Scrutiny Group (ESG).

We have collaborated in more ways than ever before, with more stakeholders, customers and communities, to create a draft plan that meets future needs and priorities. This has included working with other water companies to develop inter-regional options. We will continue to develop it through close and continuous engagement, regional collaboration and our consultation process.

We have adopted an adaptive planning approach which ensures our plan is agile enough to adapt to future changes, such as population growth. Our plan fully reflects the regional planning outputs and is a long-term best value plan that considers environmental factors, natural capital, resilience and customer acceptability, as well as cost, and enables us to address the predicted future shortfall in water available.

By 2050, it's estimated that the population of our supply area will increase to 2.81 million. An increasing population, climate change and a reduction in the amount of water we can extract from the environment leads us to a potential shortfall of 206 million litres a day by 2075 in our supply area.

Our dWRMP24 sets out a range of demand management measures and new water supply options to address that predicted deficit.

To address this shortfall, we will continue building on our track record of using innovation and new technology to drive down leakage across our region to achieve a 23 per cent reduction by 2030. We remain committed to halving leakage levels by 2050. Our plan also supports customers to reduce demand for water through smart metering innovations and water efficiency programmes as well as interventions needed by government and others so that we can get close to the per capita consumption (PCC) target of 110 litres per head per day by 2050.

To increase the amount of water available for use, the plan also includes critical investment options across our network which will allow us to move and store more water, reducing the risk of localised impacts on supply we have seen during the 2022 drought. These include new reservoirs, water transfers, water recycling plants and desalination schemes.

Our plan will be resilient to a one in 500-year drought event by 2040 and it takes account of the uncertainty around the impact of necessary abstraction reductions to ensure the water we use is sustainable. Our plan highlights the range of environmental pressures affecting raw water quality and quantity across our supply area. It also demonstrates how we are working with regulators, key stakeholders, landowners and farmers to adopt an integrated catchment management approach to deliver multiple environmental benefits and increase the resilience of our water sources.

The table below sets out indicative increases in customer bills (before inflation) as a result of the schemes and interventions identified by the regional plan and our own company dWRMP24.

Investment in water resources is largely funded through customers' water bills. Delivery of the schemes in our WRMP will require an increase in bills.

Bill Impact scenario	2025 to 2030	2030 to 2035	2035 to 2040	2040 to 2045	2045 to 2050
WRSE Regional Schemes	£12	£38	£70	£99	£106
SEW Additional Schemes	£17	£15	£12	£8	£8
Total	**£29**	**£53**	**£82**	**£107**	**£114**

We will be completing a lessons learned exercise following the 2022 drought once our Temporary Use Ban restrictions are lifted and any recommendations that influence our longer term plans will be incorporated at that time.

Our final plan will take account of your feedback and also any further learnings from the ongoing 2022 drought.

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Introduction

A resilient water supply is more important than ever due to the challenges of population growth, climate change and the need to protect our natural environment.

South East Water is committed to maintaining water supplies by providing an affordable, resilient and sustainable supply of drinking water for years to come.

Every five years we create a Water Resources Management Plan (WRMP). This looks at how we can continue to supply enough drinking water in the future.

It also sets out how we will protect and enhance the environment.

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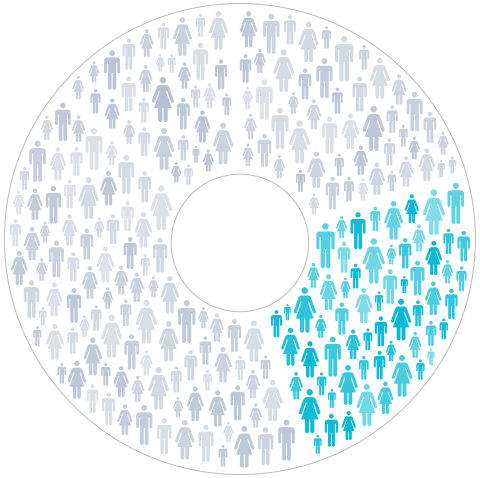
Plan highlights

Water is our most precious resource and it's our responsibility to make sure there's enough for everyone and for our environment.

Our dWRMP24 sets out what investment is needed between 2025 and 2075 to secure drinking water supplies into the future. The plan strikes a delicate balance. We need to ensure there is enough water to meet the needs of a growing population and a changing climate while complying with new environmental laws. At the same time, we are committed to protecting and enhancing our natural environment and adding wider value to society through our plan.

Key fact

Our supply area is expected to see a 25 per cent increase in population by 2049/50 to 2.81 million



What's the plan?

We plan to tackle current pressures and future challenges by:

- Looking 50 years ahead so we can make decisions now which will keep taps flowing for years to come
- taking a regional-first approach to water resource planning and building on the south east region's plan to create our ambitious company plan
- using an adaptive planning approach which allows us to be more agile, adapting our plans, if needed, to accommodate future changes
- investing £2.2 billion over the next 50 years to build large-scale infrastructure projects such as reservoirs, water recycling plants and desalination schemes
- investing £2.1 billion by 2050 to drive down leaks and reduce water use
- developing additional water supply options, building resilience and increasing available supplies through, for example, regional and inter-zonal water transfer schemes and improvements to our water network
- reducing the amount of water we abstract from the environment by 158 million litres a day by 2050 to support thriving habitats
- using technological advancements to aid our detection of small, hidden leaks as we aim to reduce leakage by 50 per cent (from 2017/18 levels) by 2050. Since 2000/01, we have reduced leakage by 22 per cent, outperforming the target set by our regulator, Ofwat
- supporting our customers to reduce their water consumption through water audits, the installation of water efficiency devices, community partnerships and the introduction of water labelling of white goods. Changing long-term behaviour is projected to reduce water use from 146.3 litres per household per day (2019/20), to 112 l/h/d in 2049/50
- improving the connectivity of our existing network to eliminate potential hotspots where deficits will occur at a sub-zone (more local) level
- working in collaboration with customers and stakeholders to help us build an even better plan.

Find out more

▷ southeastwater.co.uk/futurewater

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Our Preferred Plan

Our Preferred Plan sets out to achieve the following:

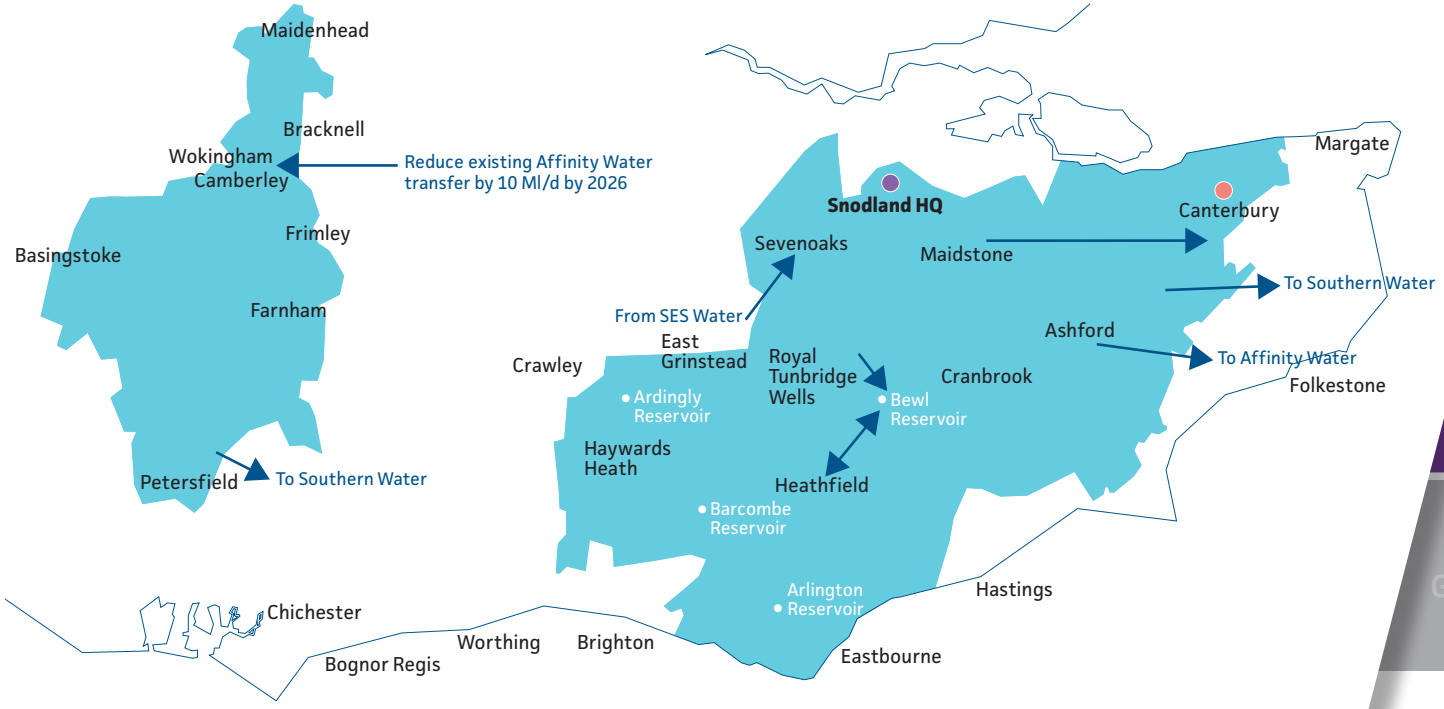
2025 to 2040

- Leak reduction and water efficiency activities – saving an additional 14 million litres of water a day
- new pipelines to increase the amount of water moving between water companies and within our supply area
- a new reservoir at Broad Oak (Kent) in 2036 – to provide an additional 22 million litres of water a day
- a new groundwater source, via a licence trade near Maidstone (Kent)
- sub-zonal schemes to improve our network connectivity.

Reducing leakage
by 36% by 2040*

Reducing customer demand
to 124 litres a day by 2040

*% Reduction (from 2017/18 levels)



Key

- New reservoir at Broad Oak, Canterbury
- Water transfers
- Licence trade and site improvements

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Plan highlights continued

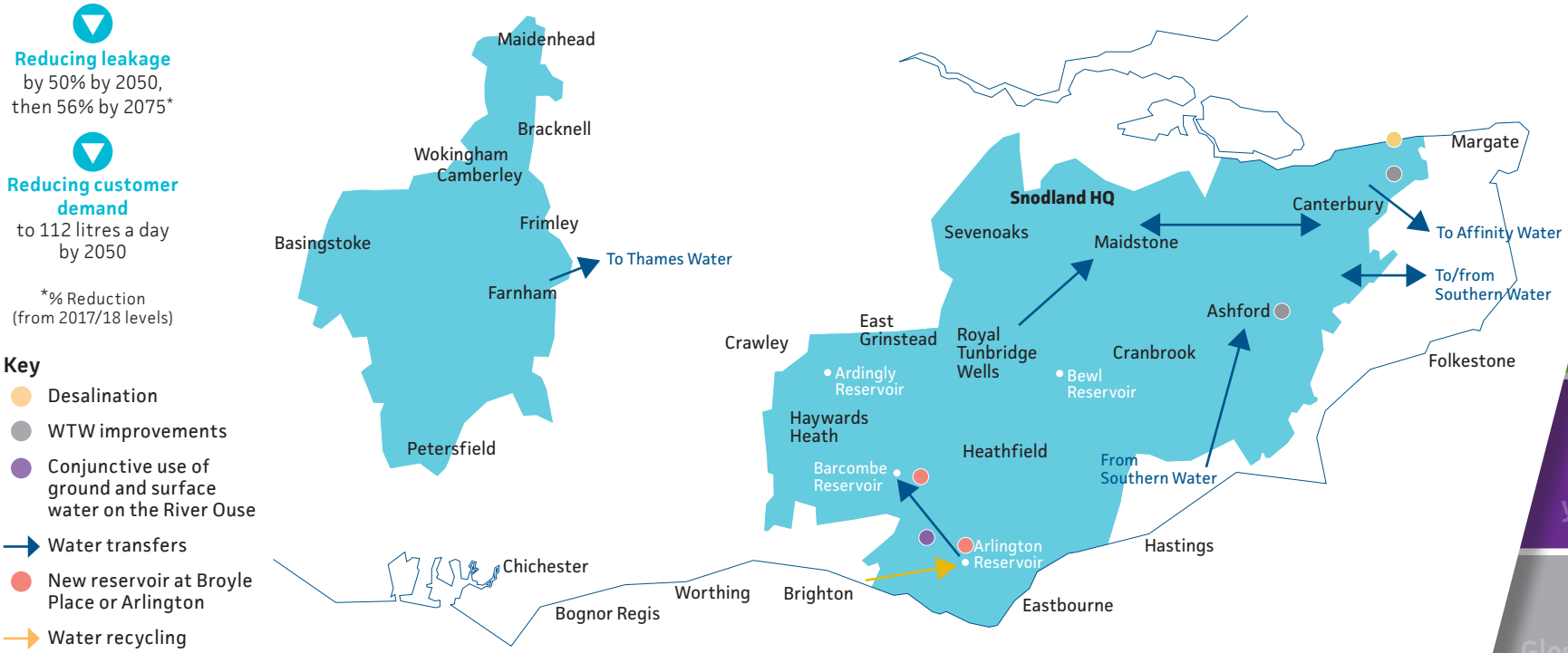
2041 to 2075 (long-term options)

- Additional pipelines to increase the amount of water that moves between water companies and also within our supply area
- Peacehaven water recycling to provide 30 million litres of water a day by 2041
- desalination at Reculver, Kent to provide 30 million litres of water a day by 2046
- a scheme to operate our surface water and groundwater sources more conjunctively on the River Ouse by 2053
- water treatment works improvements near Ashford by 2061
- new reservoir at Broyle Place, East Sussex to provide 18 million litres of water a day by 2075.

Reducing leakage
by 50% by 2050, then 56% by 2075*

Reducing customer demand
to 112 litres a day by 2050

*% Reduction (from 2017/18 levels)



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Plan highlights continued

Our alternative plan

Our preferred best value plan demonstrates a high level of ambition to reduce both customer water use and leakage to meet the current government targets. To achieve these targets requires technological advancements and customer behaviour change.

While we will do our best to achieve these targets we have developed an alternative plan as there are a number of schemes we could introduce and/or bring forward in our plans during the next 15 years, to reduce the risk of not achieving these by the desired date.

These schemes will increase resilience and, at the same time, improve environmental and wider societal health and wellbeing which are key priorities in our alternative plan.

For instance, we could use our extensive knowledge and experience of creating new habitats and recreational opportunities to bring similar benefits to other local communities.

The approaches we can take include:

- **Bringing forward plans for a new reservoir at Broad Oak (Kent) to 2033**

Our Preferred Plan, which has the regional plan at its core, has Broad Oak reservoir being operational in 2036. We want your views on accelerating the plans to build it by 2033. This follows feedback we received during WRMP19

- **Second Arlington Reservoir (East Sussex) to be built by 2041**

Our Preferred Plan currently selects Peacehaven water recycling as a key scheme to provide additional water in Sussex. However, we consider the environmental and social benefits the new Arlington Reservoir could provide are significant and therefore should be investigated further

- **There are a number of supply side schemes that we could introduce and/or bring forward in our plans**

Undertake all planning and development work, in the next five years, needed to deliver these schemes.

Find out more

▷ **Have your say**

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WRSE Draft regional plan

What this is:
It is a regional, strategic plan, that considers the future water needs of the whole of South East England.

It has set the strategic planning framework and decision making process that has been applied across the WRSE water companies' WRMPs.

It has considered all the options that are available to the region.

It identifies the regional solution to provide the water we will need between 2025 and 2075.

What this is not:
It is not a consultation on an individual water company's draft WRMP.

It does not include details of the individual schemes and how they will be delivered.

How to respond:
If you would like to respond to the regional consultation,
visit: wrse.uk.engagementhq.com

Draft Water Resources Management Plan (dWRMP)

What this is:
This is a plan prepared by each water company that sets out how it will meet its legal duties to provide secure water supplies to customers in its supply area.

It has adopted the regional planning framework and reflects the draft regional plan.

It will present the options that the company intends to progress in the future for consultation.

Each water company is required by law to hold a consultation on its draft WRMP and produce a statement of response.

What this is not:
It is not a consultation on the technical detail of individual schemes and how they will be delivered. Individual schemes will be progressed through the appropriate planning process.

How to respond:
If you would like to respond to our company dWRMP24, visit: southeastwater.co.uk/futurewater

Once you've read this document and the supporting documentation, we're keen to hear your thoughts.

Between 14 November 2022 and 20 February 2023 we want to gather your views on both the Preferred Plan and alternative plan outlined in this document.

Your views will help finalise our plan.

Find out more

▷ Have your say

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Plan highlights continued

We're keen to receive your answers to the questions below, as well as any further comments you have.

Q Alongside embedding the ambitious regional best value plan within our draft water resources management plan, we have also proposed an alternative plan for our supply area. This alternative plan brings forward two new supply schemes which would deliver additional resilience and water supplies during the next 50 years, as well as local benefits to customers, communities and the environment. Do you support our alternative plan?

Q Is there additional local information we should consider when creating our final water resources management plan?

Q Are there any additional cost-effective benefits we should consider and include in the plan?

Q Would you or your organisation be interested in collaborating with us to reduce water use?

You can answer these questions, as well as leave dedicated feedback on our consultation hub.

Further information on how you can make your views known can be found in the Have Your Say section of this document.

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Population water resource planning

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River Ouse, East Sussex

Planning nationally, regionally and locally

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Planning nationally, regionally and locally

Through our draft Water Resources Management Plan (dWRMP24) we look ahead and assess the balance between the amount of water available with the anticipated demand of customers, especially in very dry years when water levels fall while demand rises.

To be effective, we undertake water resource planning at regional and national level as well as at a company level.

The national picture

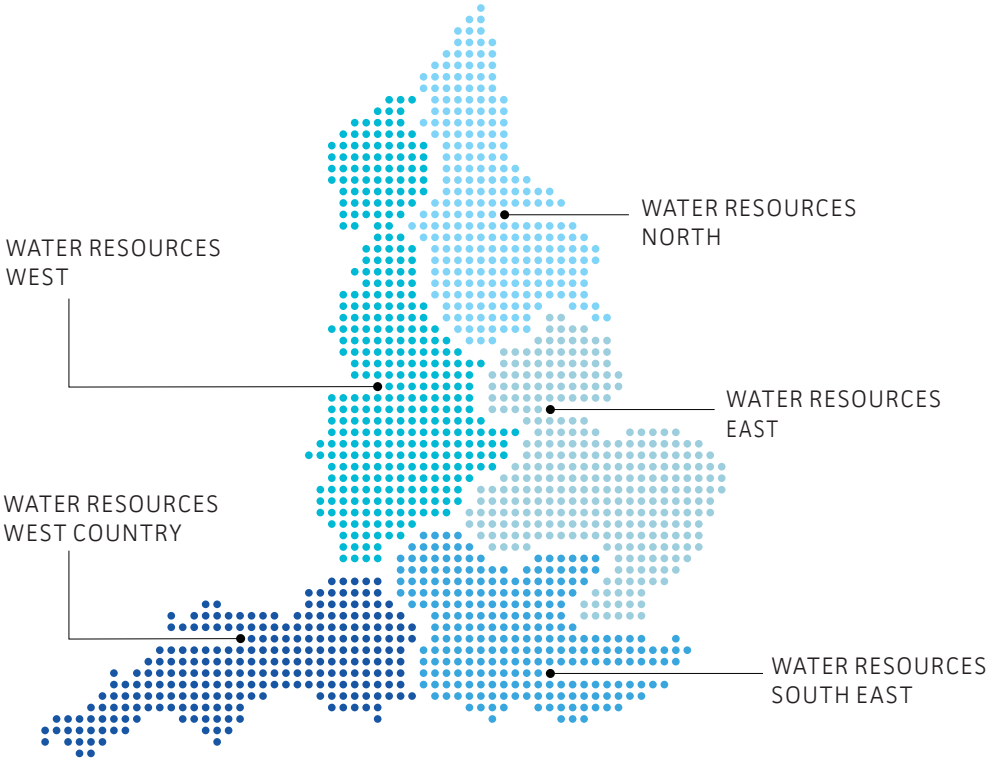
Water regions across England are developing their own regional plans, giving us a complete picture of the nation's water resources for the first time.

However, regions no longer work in isolation. Using the Environment Agency's National Framework for Water Resources as the basis for future water resource planning, regions now work together, across boundaries.

This ensures that the regional plans, when combined, can meet the national need in a dynamic yet flexible way. This more 'joined up' approach marks a step-change in water resource planning.

By working collaboratively to strengthen regional planning in this way, we can ensure we produce better plans and provide a more co-ordinated response to events like droughts and flooding.

The five regional groups are:



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Planning nationally, regionally and locally continued

Regional collaboration

The south east faces great pressure on public water supplies as a designated area of serious water stress.

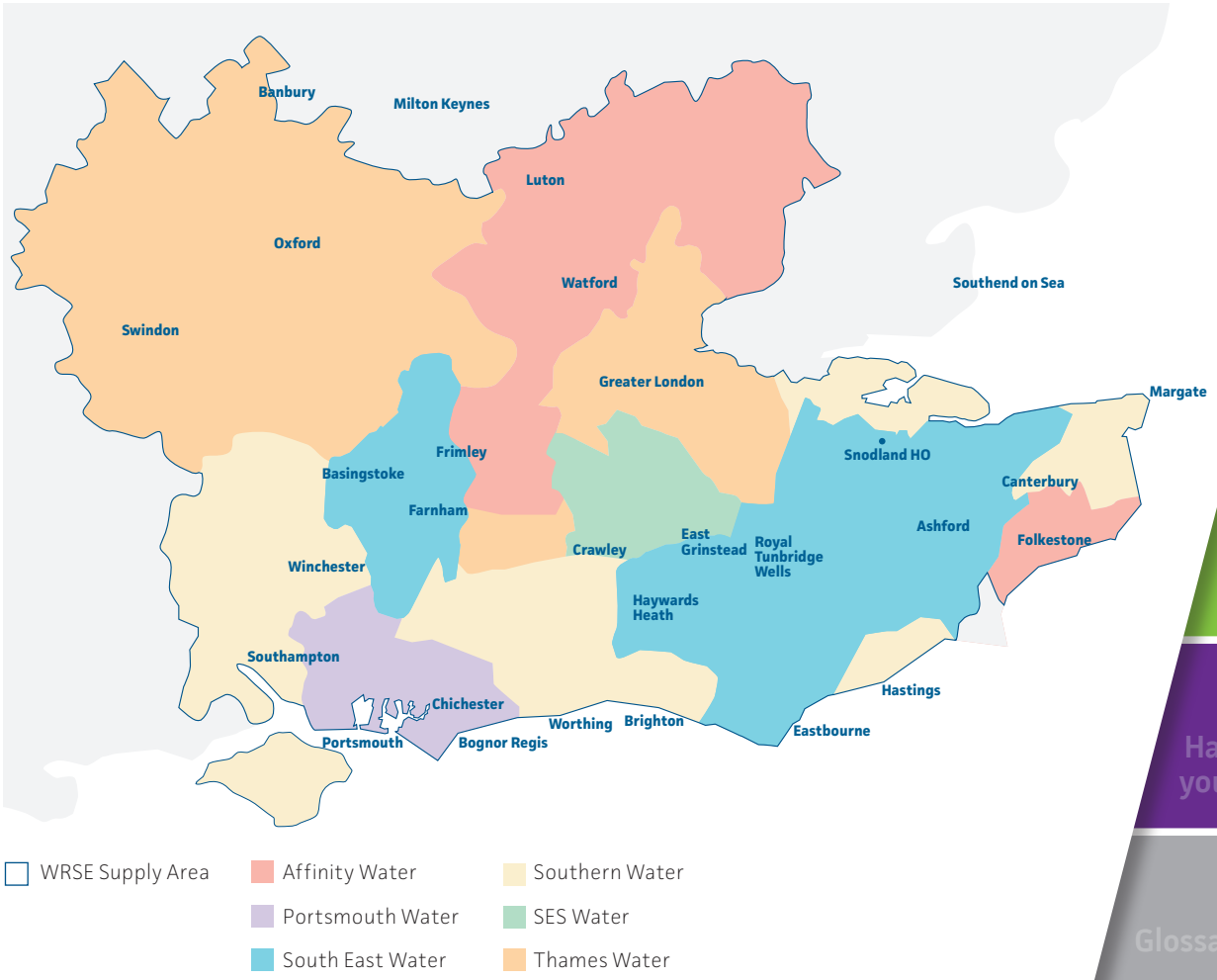
We have been working with five neighbouring water companies to develop a regional plan for the south east as part of the Water Resources South East (WRSE) alliance.

WRSE is a strategic regional group which exists to assess the future water requirements of our region and to make sure there is a comprehensive plan in place, showing how these requirements could be met.

The regional plan, which forms the backbone of our company plan, looks beyond company boundaries and responsibilities. It sets out the key challenges for water in our region in the future, namely:

- Population growth
- protection of the environment
- dry weather/drought resilience
- climate change.

WRSE area and water companies



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Planning nationally, regionally and locally continued

The regional plan explains the actions that water companies in the south east need to take to meet the demands of all water users and to keep supplies flowing over the next 50 years.

It covers investment in new infrastructure, leakage reduction measures and water efficiency programmes. The regional plan also considers catchment management solutions.

The regional plan will be integrated with other regional plans through a process called regional reconciliation.

This regional perspective also informs and feeds into our other work, including our Drought Plan, our overarching company business plan for 2024 (PR24) and future investment decision-making.

Read more online

- ▷ **Water Resources South East regional best value plan**
- ▷ **Water Resources South East regional best value plan non-technical summary**

Best value plan

There is considerable uncertainty to planning many years in advance, as this requires planning for different scenarios using various supply and demand projections. However, the regional planning process has been specifically designed to help water companies adopt a forward-looking approach to uncertain requirements through adaptive planning. This allows companies to plan for schemes that may be required from 2025 and beyond.

Through this approach, it is possible to track the progress of factors such as water demand, population growth and climate change across the region. Adaptive planning also enables us to analyse and respond to changing projections for water abstraction. The aim is to take (abstract) less water from our most sensitive rivers and aquifers in the future as part of our commitment to protect and enhance the environment.

At a regional level it is possible to model and stress-test many different options and solutions to give confidence in the approach and to support the consultation process. This will help to ensure a resilient and adaptive best value plan is selected which provides the best value solution for the region and a better overall solution for customers, the environment and society.

Our best value plan therefore takes into account additional factors, beyond cost, such as environmental protection and improvement through, for example, enhancements in biodiversity and natural capital, as well as social benefits, including recreation and wellbeing.

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Planning nationally, regionally and locally continued

At a local level

The development of the regional plan and our own individual WRMP is a fully integrated process. The collaborative work to prepare the regional plan has been a key building block for our WRMP. The resulting regional plan is essentially the backbone of our dWRMP24. We have taken the regional plan one step further by expanding upon it, developing those key schemes and incorporating more localised options.

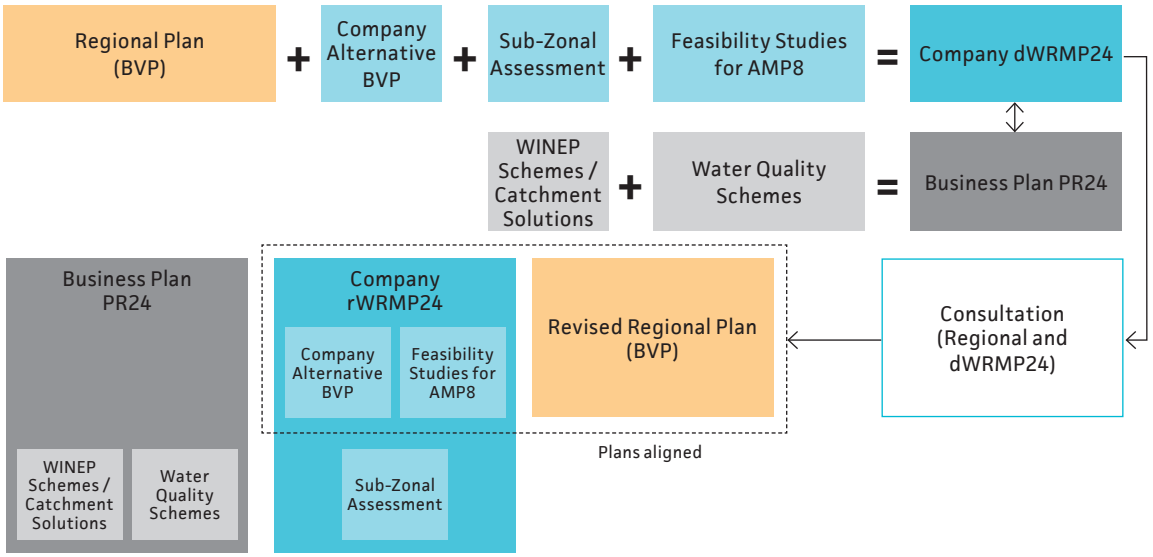
Consultation with customers, communities and stakeholders throughout the water resource planning process is central to the development of sustainable, resilient, and affordable regional and local plans that are fit for the future and that support our precious environment.

The various forecasts, consultation results, stakeholder engagement and customer research findings help to shape our approach. This extends to consulting on a Strategic Environmental Assessment report which highlights the key environmental sustainability issues that will be addressed in our plan.

We have harnessed our own company expertise and experience, alongside far-reaching research, engagement and consultation, to develop our draft WRMP. We will continue to develop our plan through further engagement and consultation. Final regional and local plans will only be published once the formal statutory consultation and approval processes have been completed.

We will be working with WRSE to share responses made to both the regional consultation and our own consultation ensuring all views received are used to shape the final plans.

Our company dWRMP24 – what it includes and how it aligns



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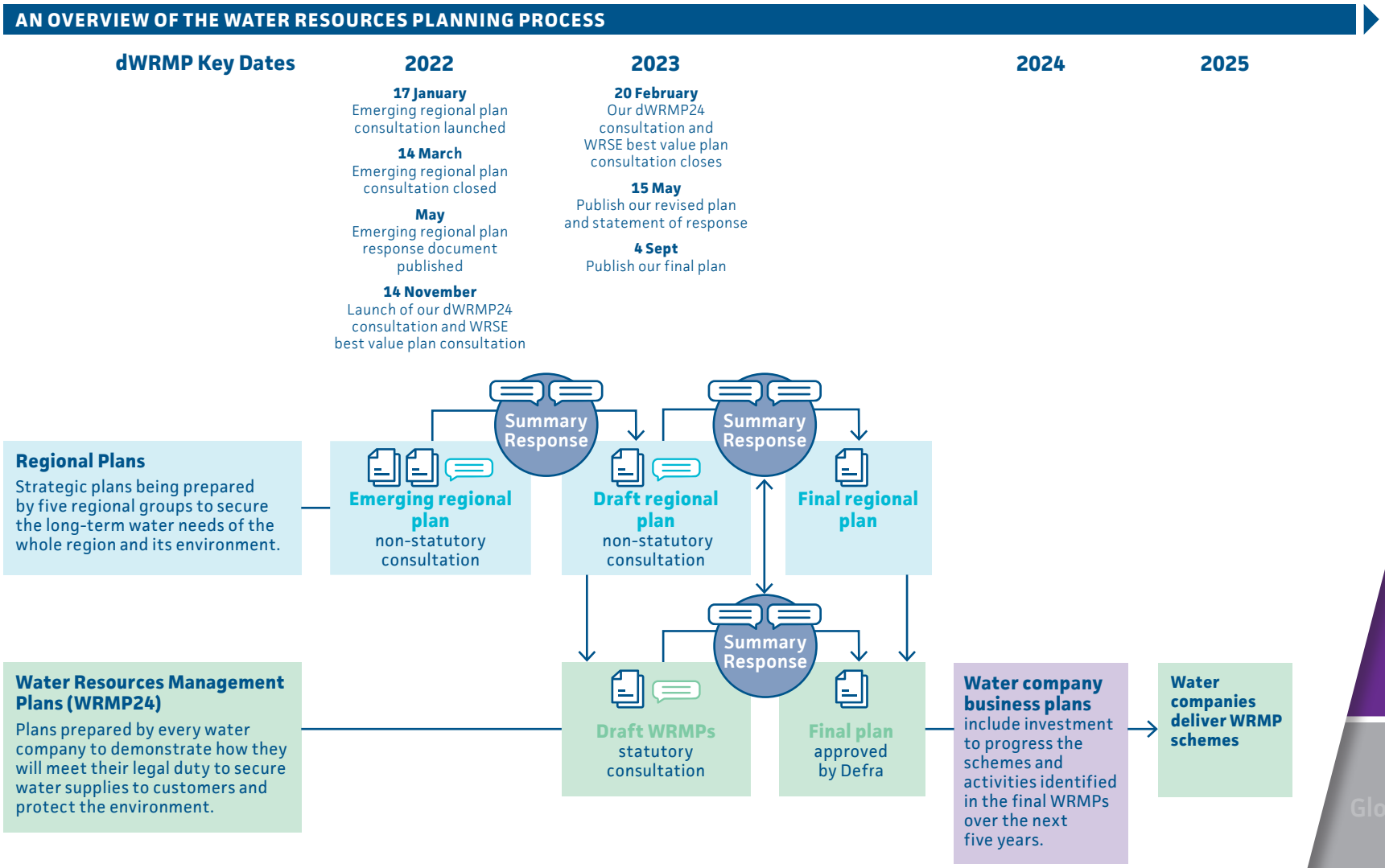
Planning nationally, regionally and locally continued

AN OVERVIEW OF THE WATER RESOURCES PLANNING PROCESS



Water resources in our region

Arlington Reservoir, East Sussex

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Water resources in our region

We supply high-quality drinking water to around 2.3 million customers across Kent, Sussex, Surrey, Hampshire, and Berkshire.

Pressure on our region's water resources is already significant. We operate within an area of serious 'water stress' as designated by the Environment Agency. This is due to the warm, dry climate and growing population. Climate change is adding to the pressure on resources in our area.

Our supply area is divided into two parts geographically, with one located to the west, and the other, to the east. We have three operational areas: West, Sussex and Kent. These operational areas are then each sub-divided into water resource zones (WRZ). We use these zones to plan water resources, manage supply and demand, and identify investment priorities.

One of the first steps we take to develop our water resources management plan is to consider the supply demand balance. This is the availability of water that we produce versus the water required to meet customer demand. We assess the vulnerability of our supply demand balance to challenges and risks, such as population growth, supply availability and investment needs. We also assess the likely impact of any vulnerabilities. This information helps to inform our future approach to water resources decision-making so that we respond in the right way at the right time.

We assess this vulnerability through a problem characterisation assessment, using UK Water Industry Research (UKWIR) guidelines and best practice planning frameworks.

Problem characterisation

Problem characterisation is a sophisticated planning tool which provides a framework for assessing the size and complexity of the problems and vulnerabilities in the supply demand balance, as well as the uncertainties we might face in the future.

We used the problem characterisation assessment from our last water resources management plan (WRMP19) as our starting point for WRMP24. The previous WRMP19 assessment determined that we had a moderate level of concern regarding the risks and vulnerabilities faced in addressing future water resource needs.

Our updated assessment for WRMP24 looked at the scale and complexity of the problems to produce an overall combined company risk score. As we continue to operate in an area facing increasing forecasts of high population growth, climate change uncertainty, and significantly restricted supply availability, our latest assessment results indicate that there is now an overall high risk to water supplies over the planning period.

Our company-level results have been fed into WRSE to help inform the decision-making approach for the regional planning process. Results from WRSE's regional-level problem characterisation assessment indicated that our south east region faces an overall high risk to supplies over the planning period.

WRSE has therefore adopted advanced decision-making methods, including best value planning to resolve the challenges facing the south east region. This is over and above the use of the industry-standard approaches.

Find out more

▷ Problem characterisation

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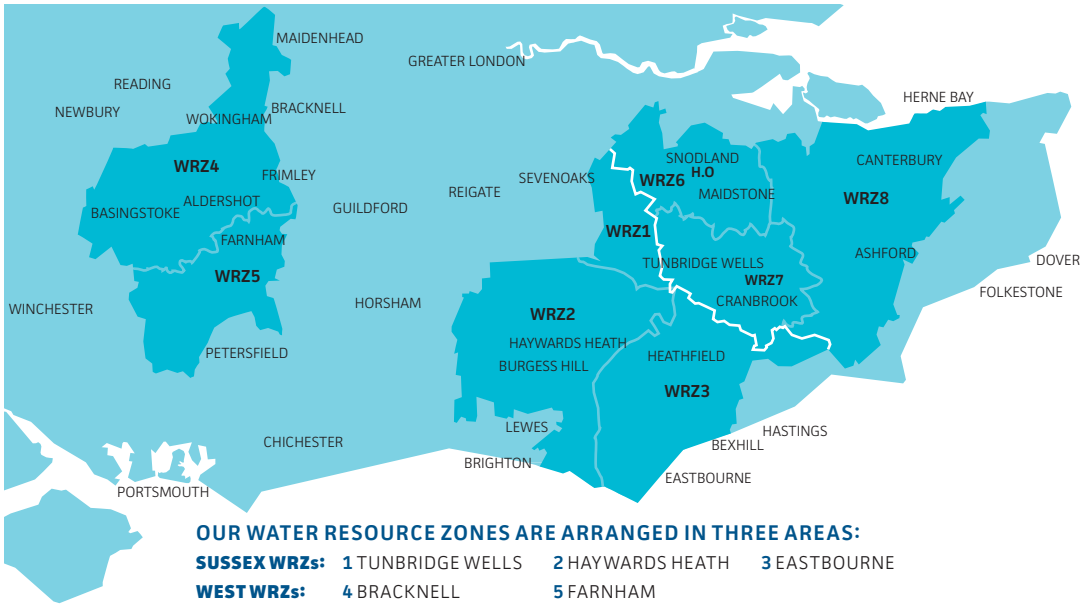
Water resources in our region continued

Water Resource Zone integrity

We divide our operational supply area into eight individual water resource zones (WRZ) for water resources planning and investment purposes.

These are geographical areas that we use to develop forecasts of supply and demand and the supply demand balance. Supply infrastructure and demand centres (areas with a population of more than 25,000) in each zone are closely linked.

As part of the water resources management planning process, we must demonstrate that our WRZs meet the Environment Agency definition for WRZs (see below) and that they are fit for purpose. We do this through a formal assessment process known as Water Resource Zone integrity.



OUR WATER RESOURCE ZONES ARE ARRANGED IN THREE AREAS:

SUSSEX WRZs:	**1** TUNBRIDGE WELLS	**2** HAYWARDS HEATH	**3** EASTBOURNE
WEST WRZs:	**4** BRACKNELL	**5** FARNHAM	
KENT WRZs:	**6** MAIDSTONE	**7** CRANBROOK	**8** ASHFORD

> **“Water Resource Zones are the largest practical spatial area within which, managing supply and demand for water is largely self-contained (apart from defined bulk transfers of water); where the resource units, supply infrastructure and demand centres are linked so that customers within the zone experience the same risk of supply failure.”**

Environment Agency definition

The WRZ integrity process includes a review of the existing structure and operation of our network. It looks at major demand centres, supply sites (such as water treatment works), how the WRZs are connected, and any bulk supply arrangements in place.

The latest assessment has concluded that there have been no significant changes to our supply network since the last integrity assessment for WRMP19. The current WRZ set-up and structure continue to comply with the Environment Agency’s guidelines for resource zone integrity. Therefore, we have not needed to make any changes to the water resource zones for WRMP24.

Find out more

▷ Water resource zone integrity

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Water resources in our region continued

Progress since our last plan

With each new WRMP, we aim to improve on our last one through demand reduction and water supply schemes.

We have performance commitments to reduce our leakage levels and to help household customers to reduce their use of water, known as per capita consumption (PCC).

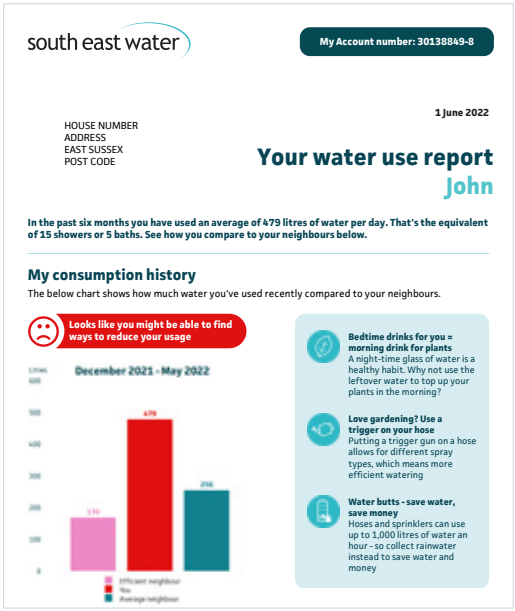
The coronavirus pandemic altered our approach, as measures introduced to combat Covid-19, including more working from home and enhanced hygiene measures, impacted our ability to reduce household demand for water. Rather than rolling out a planned water efficiency strategy, we focussed on activities to prepare for the lifting of restrictions.

These included ordering more water efficiency devices, enhancing business systems and processes, extending communications, and conducting more research into customer priorities.

When Covid-19 restrictions were lifted, we progressed four key areas:

- Behavioural change initiatives
- free water-saving devices for customers
- partnership and community campaigns
- communications campaigns.

Our Household Neighbour Comparison report is one way we are encouraging customers to save water.


south east water

My Account number: 30138849-8

1 June 2022

HOUSE NUMBER
ADDRESS
EAST SUSSEX
POST CODE

Your water use report
John

In the past six months you have used an average of 479 litres of water per day. That's the equivalent of 15 showers or 5 baths. See how you compare to your neighbours below.

My consumption history

The below chart shows how much water you've used recently compared to your neighbours.

Looks like you might be able to find ways to reduce your usage

December 2021 - May 2022

Bedtime drinks for you = morning drink for plants
A night-time glass of water is a healthy habit. Why not use the leftover water to top up your plants in the morning?

Love gardening? Use a trigger on your hose
Putting a trigger gun on a hose allows for different spray types, which means more efficient watering

Water butts - save water, save money
Hoses and sprinklers can use up to 1,000 litres of water an hour - so collect rainwater instead to save water and money

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Water resources in our region continued

Butler Water Treatment Works, Kent

We have also made significant progress on leakage management, meeting our target for 20 consecutive years.

Our total reported leakage for:

2020/21

92.7 Ml/d

Lower than our target of **95.2 Ml/d**

2021/22

88.7 Ml/d

Lower than our target of **94.4 Ml/d**

During the Covid-19 pandemic, we still focussed on finding and fixing leaks on our network and replacing our oldest pipework. This remains a high priority and we are using the latest satellite technology to help us find even the smallest leaks.

We are on target to achieve a 15 per cent reduction in our leakage levels and a 7.6 per cent reduction in PCC by 2025.

Since our last WRMP, we are well on our way to delivering three major new supply schemes:

- Butler Water Treatment Works (WTW) on the former Aylesford Newsprint site (Kent). A new abstraction licence will boost drinking water supplies by 8.12 Ml/d in 2022. The full capacity of the new WTW will be 18.2 Ml/d, with completion scheduled for March 2025
- Woodgarston Catchment Management (Hampshire) – where we are working with landowners to reduce nitrates on more than 1,387 hectares of farmland, reducing water treatment costs
- Bewl to Darwell (Kent and East Sussex) replacement bulk supply scheme has started.

In addition, two long-lead strategic schemes are also moving forward:

- Broad Oak Reservoir – design work continues ahead of plans to develop and submit a planning application for this new reservoir near Canterbury, Kent. The reservoir will yield an additional 22 Ml/d and is necessary to meet the growing demand as well as allowing us to reduce our abstractions on environmentally sensitive groundwater sources in the area
- Arlington Reservoir – we have carried out further development work on this scheme to develop a new reservoir next to our existing reservoir in East Sussex to yield an extra 18 Ml/d.

Find out more

▷ Progress since WRMP19

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Wild flower meadow, South Downs

Supporting our local environment

Pure know h$_2$ow

Supporting our local environment

Protecting and improving the environment is central to how we manage our water. This section sets out the environmental context and the policies which have helped to inform and shape our dWRMP24.

"In April 2022, we produced a draft 25-year Environment Plan that sets the environmental principles that we will work to as a business. It sets out the actions we commit to taking to protect and enhance our environment in the short and long-term. We have used this when developing our dWRMP24 to ensure that we create a plan which provides long-term environmental resilience and helps to address wider water quality and water availability issues that also contribute to environmental resilience."

Our environmental commitment, as set out in our draft 25-year Environment Plan

Development of the dWRMP24

Through the regional planning approach, we have shared our future supply and demand scenarios and our water resource options, and refined our plans through WRSE, to develop a resilient and adaptive dWRMP24.

Our Strategic Environmental Assessment (SEA) has been developed alongside our dWRMP24 to ensure environmental assessments are fully integrated into every stage of our plan development. Our dWRMP24 is closely linked to our other strategies, including our drought, business and environment plans, and we have engaged with our Environment Strategy Group (ESG) throughout the development of our plan.

Environmental constraints and challenges

Pressure on our region's water resources is already significant. We operate in an area of water-stress and climate change is adding to this pressure. To supply our 2.3 million customers with high-quality drinking water, we draw water from 250 boreholes, six rivers and six reservoirs. This water is treated at one of our 87 water treatment works before being pumped to homes and businesses through more than 9,000 miles of underground pipes.

We rely upon our streams, rivers and underground aquifers to supply both current and future customers with safe and reliable supplies of drinking water. Other industries and businesses rely on water too which can affect the availability and quality of the raw water we need for drinking water supplies. Climate change and changing rainfall patterns mean there may be less water available – to turn into clean drinking water – in some of our rivers and underground sources in the future.

The choices we make to address these issues affect the environment and, as a result, we have to make sure we make the right long-term environmental decisions to protect and, where possible, improve our environment – and our water supply.

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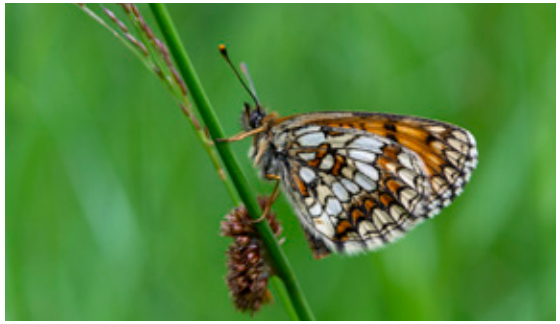
Supporting our local environment continued

Environmental resilience



We need to protect and support the environment so that it:

- Can adapt to, absorb and recover quickly from events such as floods, drought and pollution
- is capable of adapting to the impacts of long-term climate change.

Regional and local factors both have an impact on our water sources.

Regional factors include the water-stressed area, our high reliance on groundwater (73 per cent of water supplies), our special landscapes and a growing population with significant housing needs.

Local factors impact on environmental resilience too; factors such as the vulnerability of water sources to pollution and land management practices, and land use and the cumulative impact of our and other third parties abstractions.

All these factors can damage ecosystems resulting, over time, in an environment which is no longer resilient enough to cope with flooding, droughts and pollution. This would mean the loss of water sources and the need to develop new, more costly sources with varying environmental impacts, and investment in more water treatment to counteract declining raw water quality.

Our supply area is rich in biological diversity, cultural heritage and protected landscapes, with:

- **A world heritage site**
- **196 Sites of Special Scientific Interest**
- **17 special areas of conservation**
- **two marine special areas of conservation**
- **nine special protection areas**
- **11 national nature reserves**
- **593 scheduled monuments**
- **111 registered parks and gardens**
- **one UNESCO World Biosphere Region.**

The south east is also the most wooded area in England, with 38 per cent of the country's rarest ancient woodlands.

Rare and protected species flourish because of this habitat and our warmer climate.

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Our approach

We are at a critical point for the environment, reflected in the recent policy changes and declaration of a climate and environment emergency. Tighter protection is being adopted to prevent deterioration and enable rivers, wetlands and aquifers to meet environmental objectives in future.

We need to fully understand the impacts of decisions on the environment as a whole to enable us to make the right decisions. We are committed to continuing to work with key environmental stakeholders, and to doing our fair share to improve the quantity and quality of raw water, the impact of carbon, biodiversity and the efficient use of wider resources in our operating area. Our 25-year Environment Plan contains more information about our analysis of some of these challenges.

The environmental aspects of our dWRMP24 are guided by the latest national and industry policies and guidance, including the Water Industry Strategic Environmental Requirements (WISER) and the Water Industry National Environment Programme (WINEP). Other key policies include Defra's 25-year Environment Plan and the Drinking Water Inspectorate (DWI) guidance on long-term planning for the quality of drinking water supplies. Together, these have set the direction of travel for our dWRMP24.

WISER provides a strategic steer to water companies and sets out the issues and opportunities water companies should consider in meeting their environmental obligations.

The WINEP methodology provides guidance on the actions that are needed to meet environmental legislative requirements (as set out in WISER), including the statutory programme for restoring sustainable abstractions and improving raw water quality and biodiversity.


Coggins Mill

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Supporting our local environment continued

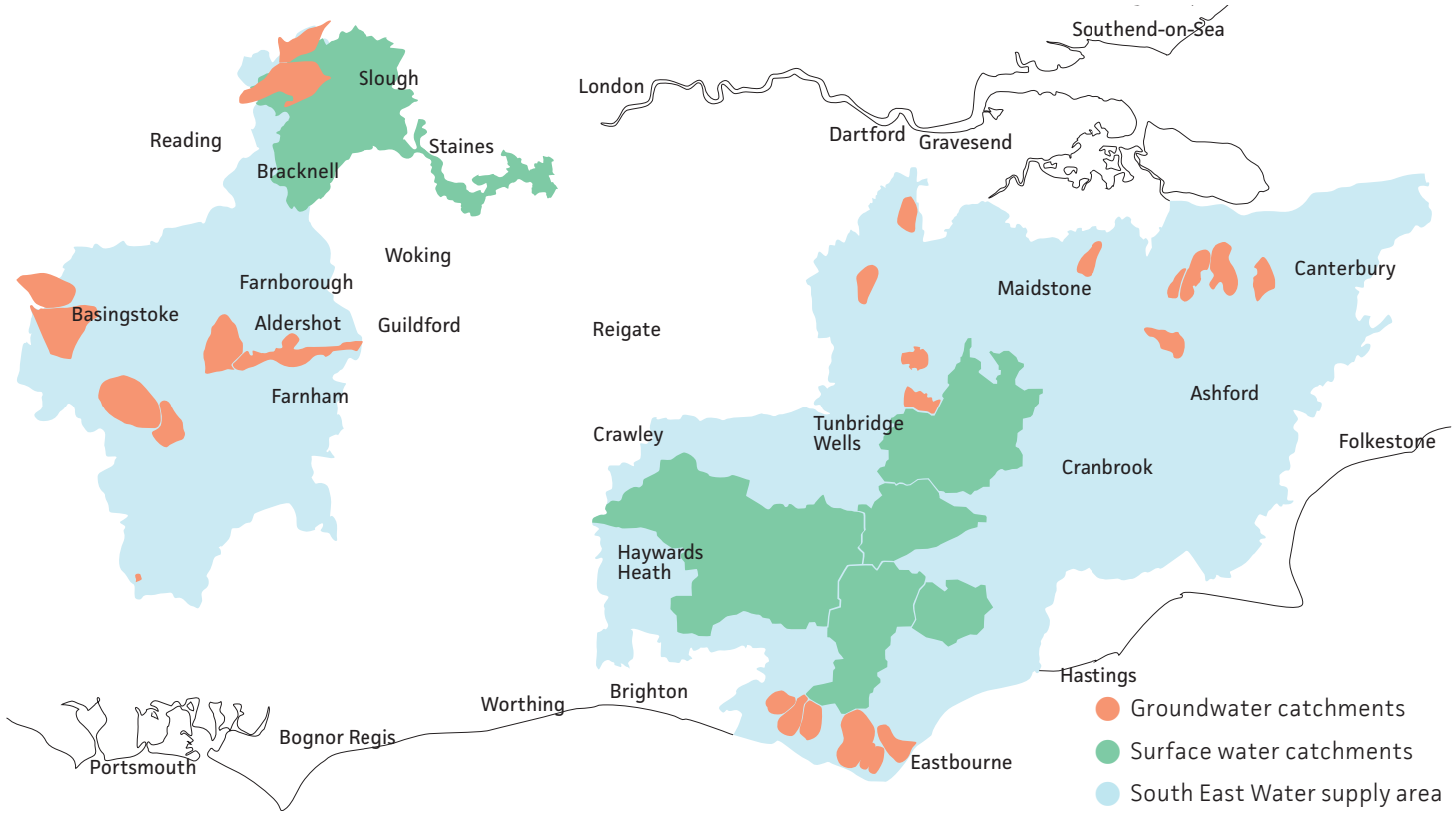
Environmental pressures and catchment management

We are seeing a range of environmental pressures affecting raw water quality and quantity across our supply area. There are existing and emerging environmental issues with a variety of complexities and interlinkages.

Working with our regulators and key stakeholders, we are adopting an integrated catchment management approach to deliver multiple environmental benefits rather than tackling environmental issues in isolation.

We have identified the environmental pressures to capture whether they differ between catchments. This sets a useful baseline for each of our operational areas, and we have used this to inform our developing WINEP24 programme.

Our groundwater and surface water catchments



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Supporting our local environment continued

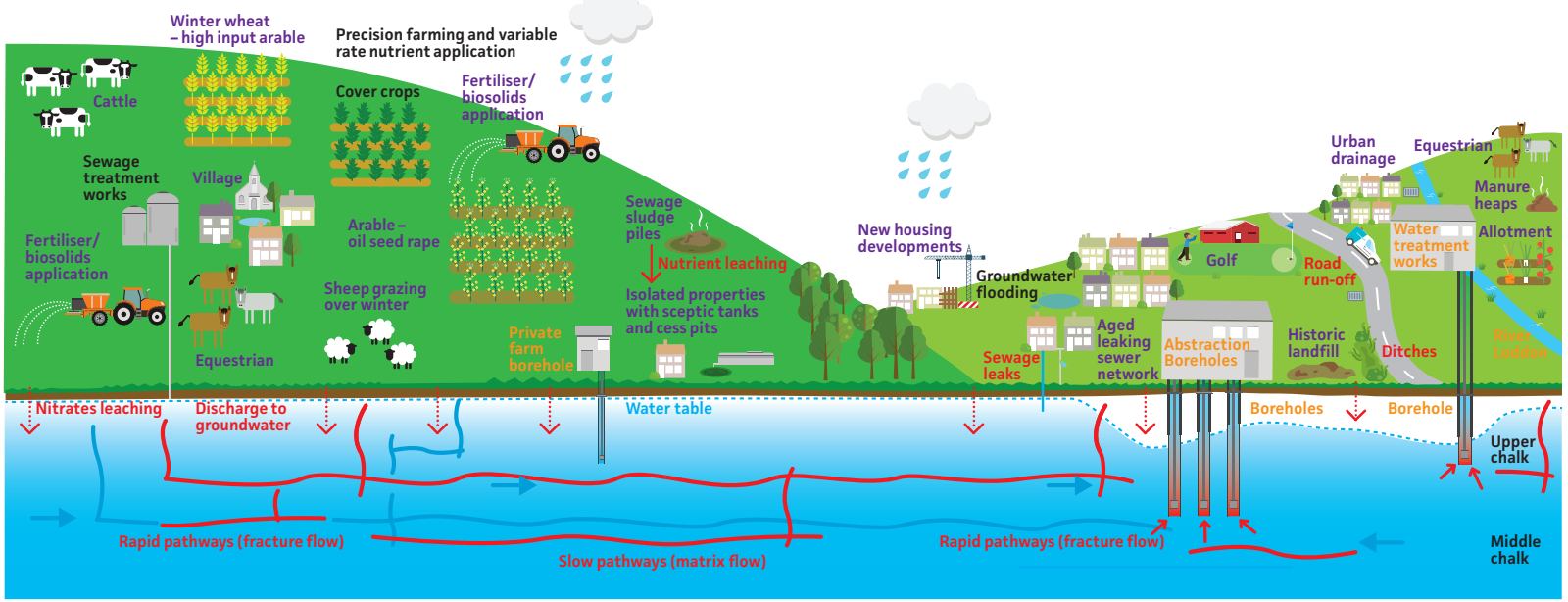
Catchment challenges in our West region

We have identified a range of pressures including pesticides, nitrates, chemicals (chlorinated solvents, chromium) and bacteria within our West operational area (parts of Hampshire, Berkshire and Surrey). The diagram below shows how nitrates reach the groundwater in the chalk aquifer and how the groundwater flows to abstraction points/water treatment works.

Under our developing WINEP24 programme, we are proposing groundwater catchment management and targeted management around sources in a number of Drinking Water Protected Areas (DWPA) to prevent deterioration in water quality, particularly from nitrates. We have done this successfully within the Woodgarston groundwater catchment in Hampshire, using cover crops to reduce nitrate leaching. We are also considering opportunities for further surface water catchment management in the Lower Thames where there is a DWPA driver for pesticides.

Our Source-Pathway-Receptor model characterises the nitrate sources, how the nitrates reach the groundwater in the chalk aquifer and how the groundwater flows to West Ham and West Ham Park Abstractions.

- ***Source*** – *livestock, manure heaps, waste water discharges and fertilisers applied to the land*
- ***Pathway*** – *nitrates leach into the subsurface and then into the aquifer*
- ***Receptor*** – *contaminated groundwater abstracted at the water treatment works, and groundwater issuing as springs*



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Supporting our local environment continued

Catchment challenges in our Sussex region

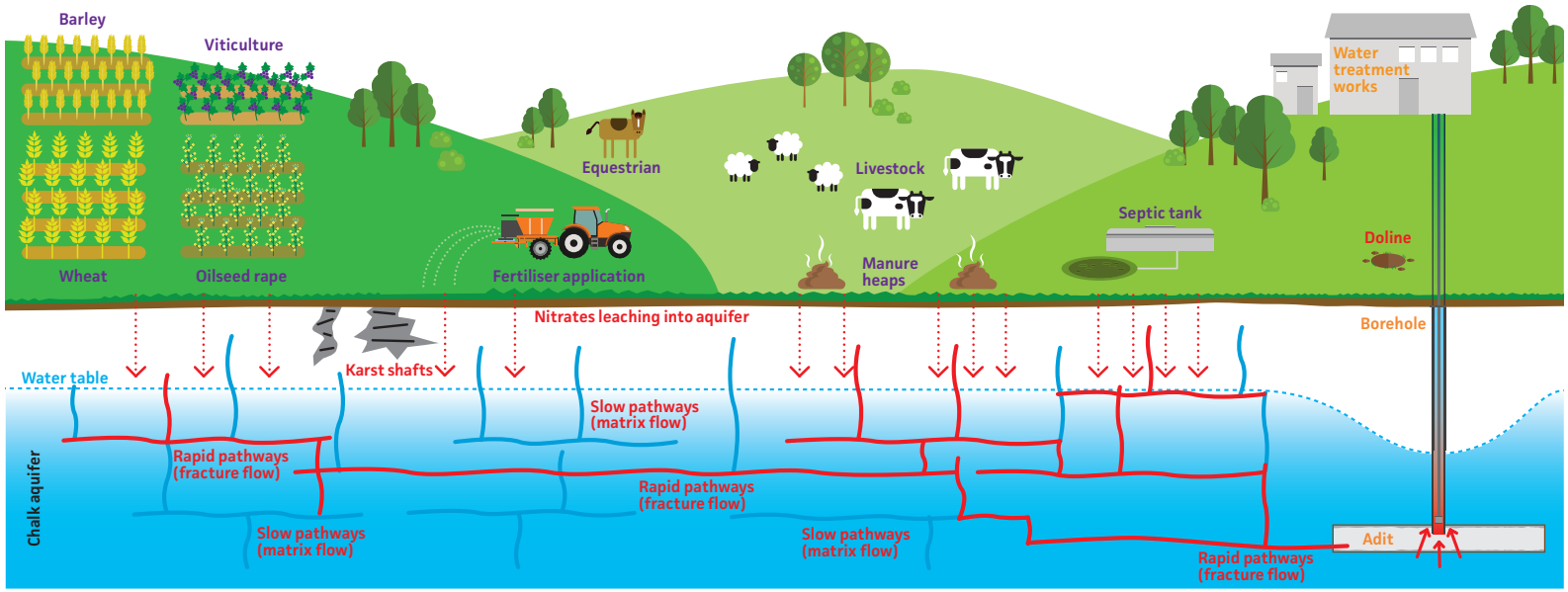
We have identified a range of pressures including turbidity, algae, pesticides, chlorides (saline intrusion) and nitrates in our surface and groundwater catchments within our Sussex operational area. Under our developing WINEP24 programme, we are undertaking catchment management in the Seaford chalk groundwater body to prevent deterioration in water quality from nitrates.

We operate a number of sources and are working to ensure no deterioration in the DWPAs and across the chalk aquifer block. The following diagram shows the nitrate sources in the Seaford chalk groundwater body and how the groundwater flows to the abstraction/water treatment works. A similar situation exists with chlorides reaching the groundwater in the neighbouring Eastbourne chalk groundwater body.

We are also undertaking catchment schemes to address algae at Arlington Reservoir and eutrophic conditions in the River Cuckmere and in the Shell Brook water body upstream of Ardingly Reservoir. Eutrophic conditions occur when a river becomes over-rich in nutrients (often caused by nitrate fertilisers) and, as a result, it becomes overgrown in algae. The aquatic plants die and decompose, robbing the water of oxygen and the river ultimately becomes lifeless. We are working up a pilot scheme for the River Cuckmere and Wallers Haven – linking to the Environmental Land Management (ELM) scheme – supported by Cuckmere & Pevensey Levels Catchment Partnership, and we are considering further cross-sector partnership pilots.

Our Source-Pathway-Receptor model characterises the nitrate sources and how the groundwater flows to the water treatment works.

- ***Source*** – *fertiliser application, unused nitrate in arable crops, livestock, manure heaps, slurry lagoons and leaking domestic sewerage systems*
- ***Pathway*** – *leaching through the unsaturated zone, dolines and shafts*
- ***Receptor*** – *adit, borehole and water treatment works*



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Supporting our local environment continued

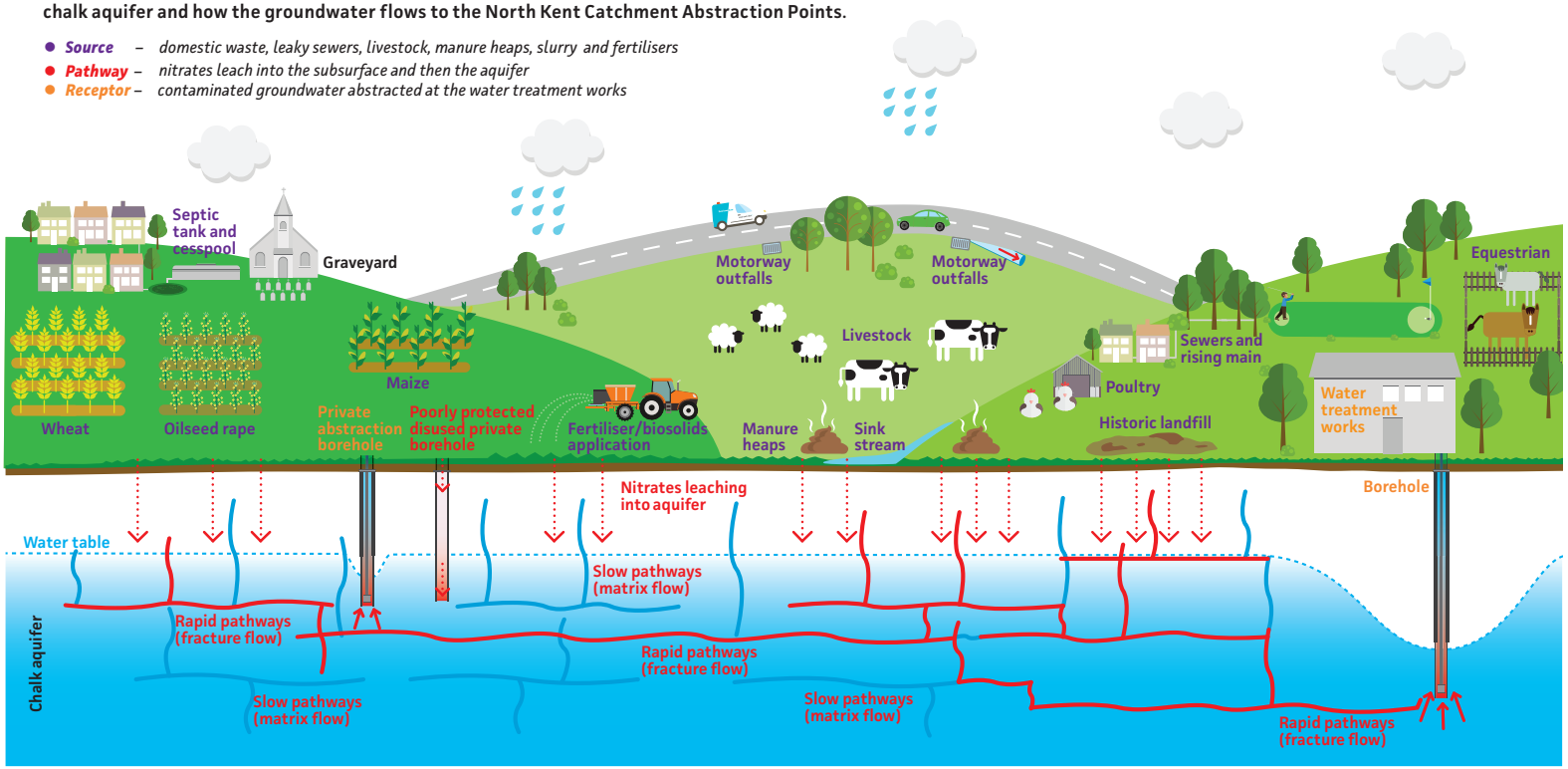
Catchment challenges in our Kent region

Our surface and groundwater catchments in our Kent region face pressures from risk of fungicides, pesticides and nitrates. The diagram below illustrates how nitrates reach the groundwater in the North Kent chalk aquifer and how the groundwater flows to abstraction points and water treatment works. The same issue exists in the Upper Great Stour greensand groundwater body.

Under our developing WINEP24 programme, we are proposing groundwater catchment management and targeted catchment delivery around sources in a number of DWPAs to prevent deterioration in water quality. We are also undertaking surface water catchment management at Bewl Water/River Medway where pesticides are a key risk to water quality in the drinking water and algae is potentially an emerging risk.

Our Source-Pathway-Receptor model characterises the nitrate sources, how the nitrates reach the groundwater in the chalk aquifer and how the groundwater flows to the North Kent Catchment Abstraction Points.

- ***Source*** – *domestic waste, leaky sewers, livestock, manure heaps, slurry and fertilisers*
- ***Pathway*** – *nitrates leach into the subsurface and then the aquifer*
- ***Receptor*** – *contaminated groundwater abstracted at the water treatment works*



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Supporting our local environment continued

Sustainable abstraction

We have considered current and future challenges, including future environmental objectives, to ensure sustainable abstraction and to make sure we meet our goal of protecting and improving the environment.

Risk of deterioration

In developing our dWRMP24, we have ensured our plan supports the achievement of environmental objectives for water resources in the River Basin Management Plans by preventing deterioration and supporting the achievement of protected area and water body status objectives.

We have considered other environmental obligations, including those towards Sites of Special Scientific Interest (SSSI), covered by the Wildlife and Countryside Act 1981, and the potential need to change abstractions to protect or improve other important local sites. This work has been done through our Strategic Environmental Assessment (SEA).

Licence capping

Guidance has been provided by the Environment Agency (EA) setting out how it will change abstraction licences to prevent deterioration as part of the EA abstraction plan for 2027. This could involve caps on time limited licences and future caps on permanent licences. We have taken account of this guidance in developing our dWRMP24. As part of our supply assessment, anticipated licence capping has been included.

Water quality deterioration impacts

Through our catchment approach to protecting drinking water supplies, we are actively considering catchment options to reduce the treatment process while remaining compliant with drinking water regulations, and considering measures to protect supply against long-term pollution risks.

Long-term environmental destination

The WRSE regional plan has developed a proposed long-term environmental destination – actions to build environmental resilience to future challenges (eg, drought, flooding, raw water quality decline) – which we have used as the base for our dWRMP24 long-term environmental destination.

In addition to the WRSE National Framework Enhanced Scenario which is used in our adaptive plan, we have developed two further scenarios to complement this and inform our decision making. These scenarios are based on the local knowledge of our catchments. The investigations and actions we intend to take are captured in our WINEP24.

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Delivery of environmental outcomes

Delivery of our environmental outcomes is linked to WINEP. Following the changes to the WINEP methodology and according to the guidance and timetable for our next business plan, known as PR24, we have been developing our WINEP24 programme.

WINEP24 will be a 10 year plan and is being developed collaboratively with our stakeholders and regulators using an evidence-based approach. In developing our dWRMP24, we have been working off an initial view of the WINEP24. WRMP24 and WINEP24 link closely and any updates will be made in our final WRMP24 to ensure both align.

We have already committed to delivering the following between 2020 and 2025:

Environmental resilience area	What we will deliver
Protecting wildlife and increasing biodiversity	One Water Framework Directive (WFD) river investigation A programme to protect wildlife and enhance biodiversity on 1,460 hectares of company land
Invasive Non-Native Species (INNS)	One new pipeline (to prevent INNS transfer) Five local projects where INNS is an emerging risk
Surface water catchment management	Eight projects across six catchments to improve water quality
Groundwater catchment management	28 projects across ten WFD groundwater bodies
Ensuring our catchments are sustainable	22 projects across 18 WFD surface and groundwater bodies
	Three Abstraction Incentive Mechanism (AIM) sites
Helping others to ensure their abstraction is sustainable	Working with other abstractors in the River Cuckmere and Little Stour
Carbon	Carbon reduction programme
Natural capital valuation and accounting principles	Natural capital commitments (responsible business)

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Supporting our local environment continued

Protecting wildlife and increasing biodiversity

Our supply area is unusually rich in biological diversity. We have robust policies, procedures and programmes of work in place to ensure we protect and, where possible, enhance the biological diversity of both our own landholdings, and the area within which we operate.

We work to design out environmental impacts to ensure biodiversity is protected and, where possible, enhanced. We do this through careful desktop review of projects and, where possible, by designing schemes which avoid key environmental sensitivities.

We are currently undertaking pilot trial project work to improve fish habitat on the highly modified reach of the River Cuckmere, upstream of the weir at Arlington Reservoir, and have plans for further improvements.

Our customer research continues to show that biodiversity net gain is an area which is important to customers. For this reason we have chosen to invest time and resources in to furthering this area.

We are delivering an enhanced biodiversity programme which will protect the current wildlife value of our sites and produce a net gain in biodiversity and wildlife through active conservation work on the land we own. In 2020 we managed 1,172 hectares of our estate for the benefit of wildlife and to enhance biodiversity. We are on track to increase this to 1,671 hectares of our estate by 2025. This will result in 77 per cent of our landholdings being managed to protect wildlife and enhance biodiversity. As part of our developing WINEP24 programme, we are aiming for 90 per cent of company landholdings being managed to protect wildlife and increase biodiversity. We are working on a biodiversity net gain strategy and planning work within catchments to deliver biodiversity net gains, carbon sequestration and water quality benefits.

Managing the risk of Invasive Non-Native Species (INNS)

Invasive non-native species of flora and fauna are a threat to biodiversity in our region due to our proximity to mainland Europe and, as a result of shipping from Europe into Kent and the Lower Thames, which can facilitate INNS movement.

INNS can have a serious impact on biodiversity and the WFD status of water bodies by affecting native invertebrate numbers or fish stocks. Our treatment processes can also be adversely influenced by the presence of INNS in the raw water we abstract.

Our current WINEP programme includes measures to identify priority pathways, the risks posed by the spread of INNS and how pathways of spread can be mitigated to meet conservation objectives and to prevent deterioration in raw water quality. We have put a number of procedures in place to improve biosecurity on our sites and have produced biosecurity plans for our open water reservoirs. We will be one of the first companies to cease all raw water transfers between catchments to stop the spread of INNS. We are focussing on an awareness programme for staff, stakeholders and contractors and building engagement at catchment level. We are working with partners in the Ouse catchment to develop a catchment-wide invasive species strategy and are also part of an industry-wide initiative to develop an app for the recording of INNS in the field which will be rolled out to our staff and stakeholders.

We have successfully undertaken pilot project investigations looking at ways to control two INNS – Himalayan balsam and New Zealand pigmyweed – at Arlington Reservoir and are already considering a number of further projects.

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Supporting our local environment continued

Building greater resilience into our surface water catchments

Raw water quality is at risk of decline in several of our surface water catchments due to increasing levels of pesticides (including metaldehyde), turbidity (caused by soil erosion and sediment run off) and excessive levels of nutrients.

We have been implementing catchment management measures to prevent this decline for many years. The measures introduced include:

- Promoting best practice to land managers
- promoting an education programme centred around best practice use of pesticides
- encouraging integrated pest management through partner organisations
- promoting of less harmful alternative chemicals for pest control
- incentivising land manager behaviour through advice, training and payments for ecosystem services.

Water quality deterioration from pollution may ultimately require more enhanced treatment processes so we can continue to meet strict drinking water standards, but this treatment is an 'end of pipe' solution and often costly to build and operate and generates significant quantities of waste and greenhouse gases.

Our preferred approach to improving raw water quality is a long-term catchment management programme, delivered via our WINEP programme. We will do this by:

- Continuing to monitor water quality levels across our catchments
- prioritising our resources into high-risk areas
- supporting farmers and promoting land management practices that reduce soil erosion and pesticide losses to the environment
- working with key stakeholders in the catchment to form partnerships and drive forward our catchment management programme.

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Building greater resilience into our groundwater catchments

Catchment management aims to tackle pollution at the source of the problem and to build long-term environmental resilience within our groundwater catchments, helping to deliver a cleaner, healthier environment along with wider biodiversity and economic benefits.

We work closely with the EA to assess the pressures affecting groundwater sources and take a catchment management investigative approach to explore the sources of pollution in each of our affected groundwater sources through WINEP.

All our groundwater catchments are different through their geology, varying land uses and different contaminants.

We have developed conceptual models to identify the sources of pollutants, how the pollutants reach the groundwater and flow through the aquifer and how this affects our abstraction.

We have completed 22 groundwater investigations to meet the delivery date of March 2022 and are working on six catchment measures, required by December 2024, to prevent deterioration in drinking water protected areas. We are further developing our catchment programme for delivery through WINEP24 and focussing on actions that will allow us to address the identified risks and protect water quality from deterioration. We will continue to work with our regulators and form further partnerships with key stakeholders to deliver the groundwater catchment schemes.

Sustainable abstraction

WINEP provides the UK's statutory Restoring Sustainable Abstraction (RSA) process, which is administered by the Environment Agency to determine whether an abstraction is environmentally sustainable or not. If the abstraction is found to be the cause of environmental failure, then measures must be implemented to restore sustainable abstraction and improve the ecology in the area. We are working on a programme of investigation and option appraisal studies and are considering future sustainability schemes through our developing WINEP24 programme.

We are committed to going beyond the statutory commitments and are looking at other mechanisms to build environmental resilience into the catchments we abstract from.

We believe that reducing overall abstraction for water in the most vulnerable catchments will help improve environmental resilience to climate change events. We are taking an innovative and proactive step to work with other abstractors in two of our surface water catchments to reduce the overall volume of water abstracted. We will offer water audits and incentivise abstractors to consider options that reduce their reliance on abstracted water, for example, rainwater harvesting facilities. This will introduce a stronger catchment-based focus on wider water sustainability.

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Carbon reduction

We have undertaken a programme of improvements aimed at ensuring better data capture, reporting and understanding of our energy utilisation and emissions. We have committed to completing our Energy Savings Opportunity Scheme (ESOS) phase 2 assessments and submissions within 2020 to 2025. We will also continue to use the UKWIR carbon accounting workbook (CAW) which will provide a consistent and robust position of our operational carbon accounting, ensuring transparency.

We have set ourselves a target for baseline and consistent accounting for carbon emissions from embedded carbon by 2023. Our investment solutions for dWRMP24 already consider embedded carbon impacts, helping us to select appropriate and resilient solutions for the future which are not only cost-effective, but carbon-effective too. We have also started a series of delivery initiatives that will reduce our carbon footprint, and thereby our environmental impact.

We remain committed to reducing our operational and embedded carbon and our target is for net zero operational carbon emissions by 2030. This period is also key to evolving our understanding and management of embedded carbon.

Natural capital

WISER guidance requires us to adopt a natural capital approach to inform our planning and long-term investment decisions. We have committed to natural capital and social capital evaluations driving all business investment decisions by 2030. As part of our 25-year Environment Plan, we have set ourselves additional goals including:

- A natural capital evaluation of landholdings – an inventory of the land that we own and manage to understand the natural capital assets we impact and to better track their extent and condition
- two pilot natural capital evaluations related to water resource management/options for rivers Ouse and Great Stour
- development of a natural capital assessment tool to enable wider decision-making for Business Plan 2024
- establishing 'capitals' evaluation tools and associated long-term roadmap.

Find out more

▷ Supporting our local environment


River Stour

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Ensuring our supplies are resilient

Operating 24/7 to supply 543 million litres of water per day

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Ensuring our supplies are resilient

There are a number of definitions of resilience, but we consider resilience is the ability to cope with, and recover from, disruption and variability in order to maintain services for people and protect the natural environment, now and in the future.

This definition is broader than only considering the impacts of drought; for instance, it also covers the potential impacts that can occur from flooding, cyber-security breaches and terrorism events.

We have considered these more fully, including levels of resilience to non-drought events, in our business plan, but drought resilience is clearly an important metric for consideration of resilience in the context of our WRMP24.

For water resource planning, the level of resilience is primarily governed by the reliability of our source outputs under different drought conditions; and the ability we have in our network to adapt and manage how we use our supplies to meet demand under a range of droughts with differing durations and severity.

In line with the latest WRMP guidelines we have considered:

- An assessment of more extreme but nevertheless plausible droughts than seen in the historical record
- set out what is required to achieve a reference level of resilience to drought events of one in 500-years.

The ability to move water from areas of surplus to those in deficit helps cope with drought, but is also helpful during non-drought periods; for example, during source outage events when shortfalls of supply need to be made up from other sources.

To define the resilience of our plan, we used three tests:

- Reliability
- adaptability
- evolvability.

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Ensuring our supplies are resilient continued

Systems-based evaluation

What is the system?	What does it typically include?	What does greater resilience for this system look like?
Public water supply	All the operational infrastructure associated with the abstraction, treatment, and distribution of water supplies to the region's households.	Maintaining the balance between supply and demand so that there is enough water to cope with short-term shocks e.g. drought or long-term challenges e.g climate change.
Multi-sector water supply	The abstraction of water and associated operational infrastructure for other sectors/businesses in the region that also rely on water for their commercial needs e.g. agriculture, paper mills, power, canals, quarries, golf course.	The ability for these sectors/businesses to predict their future water needs so we can continue to support their economic activities – and which often have added social benefits too.
Environment	Catchments, including water bodies and soils, along with the wildlife and ecology they support	Catchments and water bodies that can maintain water quality and water quantity to protect wildlife and ecology during and after short-term shocks (drought) and long-term challenges (climate change).

Together with WRSE we developed the three main systems - environment, multi-sector water supply and public water supply. This enabled us to see how these systems interact with each other and also how they benefit the fourth wider social and economic system of the south east.

In essence, if we improve the overall resilience of these three systems, and can measure that improvement, then the wider south east region benefits too.

We can then make sure our plan delivers what each system needs in the face of short-term shock events and long-term stresses.

After looking at the various models, we applied 19 metrics that helped us measure the resilience of the plan in terms of its reliability, adaptability and evolvability against those models.

Find out more

▷ Water Resources South East

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Ensuring our supplies are resilient continued

Sub-zonal Supply Demand Balance Assessment

Our eight water resource zones (WRZ) are divided into 72 sub-zones for water resources planning and investment purposes. As part of the WRMP process, we review whether future changes to our planned supply or demand would cause any issues to these sub-zones. If this is the case, we need to identify any schemes in our dWRMP that will resolve those issues. This process helps to ensure our supplies remain resilient.

Since the Covid-19 pandemic we have also seen demand fluctuate between the zones due to new working arrangements, including increased home working.

We have assessed the supply demand balance in each of the 72 sub-zones, using our dWRMP24 average day peak week demand scenario for the corresponding WRZ. This forecast looks at:

- Existing and future population and housing growth
- changes to the supply forecast due to deployable (DO) reassessments
- climate change impacts
- reductions to source outputs due to WINEP sustainability reductions.

The forecast also includes any benefits of new water, as outlined in our dWRMP24. New water could come from leakage reductions, demand management and new water resources.

We know that there is a positive supply demand balance at WRZ-level in 2035. However, the distribution of supply and demand varies widely across our sub-zones. We need to make the most of the existing interconnectivity in the treated water distribution network between sub-zones to achieve the positive supply demand balance that is seen at WRZ-level.

This would allow the sub-zones to be more joined up so that customers in a zone face the same risk of supply failure and the same level of service for demand restrictions, in line with the planning guideline.

Our assessment and modelling shows that the situation improves when we incorporate all existing interconnectivity between the sub-zones. This results in existing capacity in the treated water distribution network being used to move water between all the sub-zones, delivering a positive supply demand position more widely across the WRZ.

Pressure on these hotspots increases further during extreme weather events such as Storm Eunice in February 2022 and the hot weather we experienced in 2020 and in July 2022.

To resolve these deficits 23 sub-zone schemes will be required between 2025 and 2030 to maintain the integrity of the current WRZs. It is essential these schemes are delivered by 2030 to maintain the current integrity of the water resource zones.

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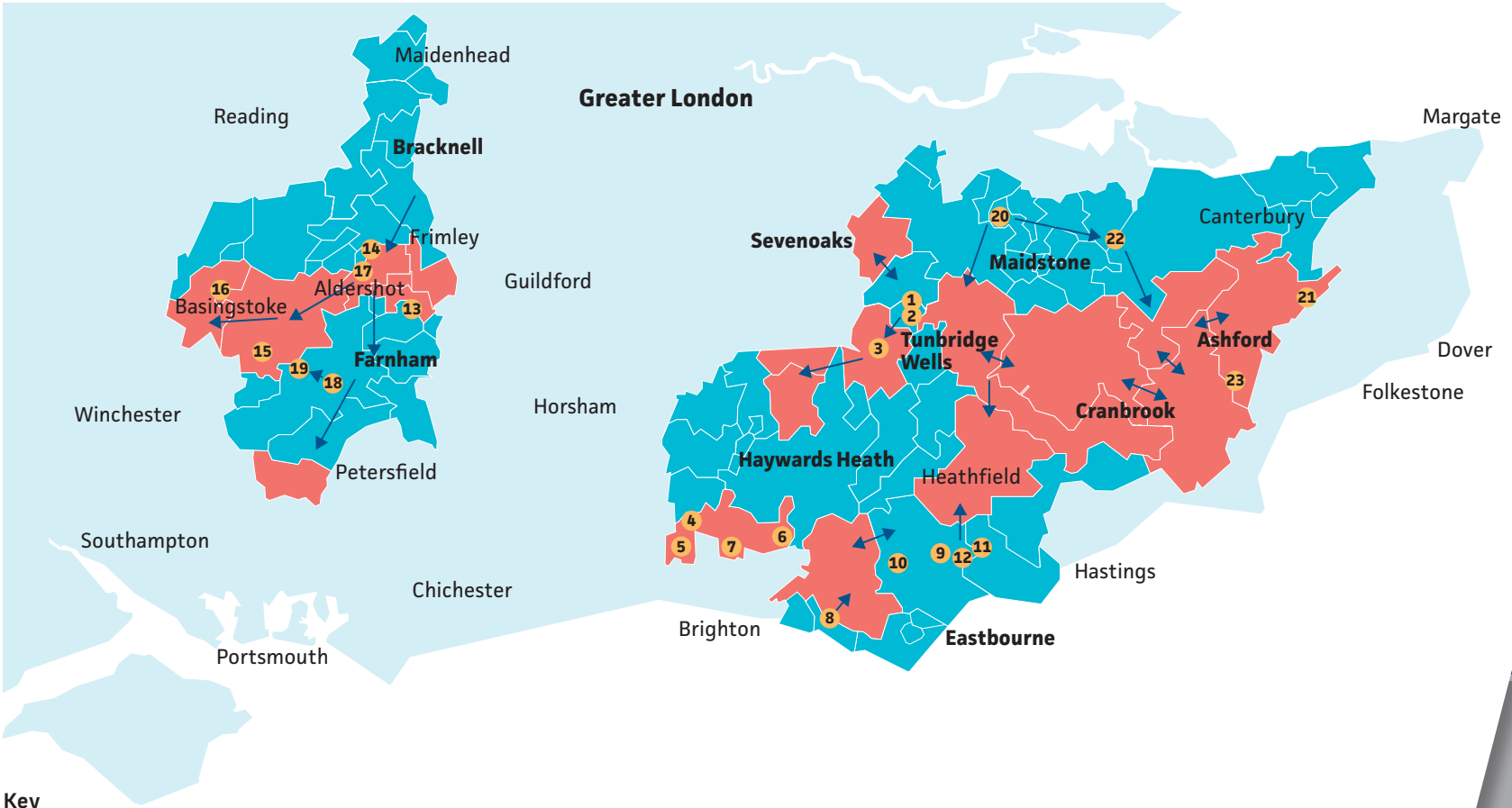
Ensuring our supplies are resilient continued

Through our mass balance assessment, which examines storage and treatment capacity in each zone to assess deficit, we have found a strong correlation between the results of the assessment and our real life experience during the hot weather of 2020 and 2022. If the schemes were in place then, they would have significantly reduced customer impact.

All 23 sub-zone schemes have been included in Our Preferred Plan. The map below shows the location of these 23 schemes.



Key

- Hotspot areas where there is insufficient network capacity to meet the supply demand balance meaning deficits occur
- Areas with sufficient amounts of water to deliver a largely positive supply demand position
- Scheme number and location
- How schemes support sub zone transfer of water

Ensuring our supplies are resilient continued

Levels of service

Levels of service are a contract between a water company and its customers; it sets out the standard of service that customers can expect to receive in terms of the reliability of their supply.

This service is expressed in terms of the frequency of restrictions (temporary use bans imposed by us, such as hosepipe bans) which customers are willing to accept. It also determines which levels of demand we need to plan to meet.

Our current quoted level of service for temporary use ban restrictions is one year in 10. The adoption of more frequent levels of service restrictions (for example, one year in five) would result in lower demand forecasts for water, because the demand would be more frequently restricted and consequently there would be less need for new water supplies. Conversely, less frequent restrictions (for example, one year in 20) would result in a higher demand forecast and a greater need for new water supplies.

During the preparation of this WRMP24 we will be consulting with customers on the levels of service they wish us to plan for. We have previously tested customers' acceptance of planned levels of service compared with alternatives, such as more frequent (one in five year restrictions and lower cost to customers) and less frequent (one in 20 year restrictions, but higher cost to customers). Our research in WRMP19 confirmed that customers support our existing levels of service. Therefore our WRMP24 continues to be based upon:

Our current Levels of Service

Description	Frequency	Probability of occurrence
Temporary use bans	No more than once in 10 years on average	10 per cent annual probability of happening
Non-essential water use restrictions (drought orders)	No more than once in 40 years on average	2.5 per cent annual probability of happening
Application for permission (via drought permits/orders) to vary abstraction licence conditions and quantities	No more than once in 50 years on average	2.0 per cent annual probability of happening
Emergency drought order (Abstraction restrictions further relaxed, rota cuts, standpipes and tankering)	No defined level of service although would be implemented during the emergency planning phase; we will do everything in our power to avoid their use	

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Ensuring our supplies are resilient continued

Arlington Reservoir, East Sussex, September 2022

In practice, we have operated in line with our levels of service - it was necessary to impose temporary restrictions on customers during 2022, and previous to that in April 2012.

To support our assessment of resilience required to meet our levels of service we have reviewed the worst droughts on record (one in 100-year probability of occurring) as well as more severe drought events not previously experienced.

They include a one in 200-year drought (reference scenario specifically requested by Defra) and a very extreme one in 500-year drought event. We have used these drought scenarios to develop and stress-test future solutions included in Our Preferred Plan.

In WRMP24 we propose to enhance our levels of resilience, from our current one in 200-year to a one in 500-year drought event by 2039, so that we can more reliably operate to our planned level of service in all water resources zones.

We have complied with the WRMP Directions 3(b) and 3(c) which relate to the description of the annual average risk as a percentage throughout the planning period and the assumptions behind determining these figure in Table 6 of the planning tables.

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Pluckley new water mains reinstatement

Planning for the future

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Stakeholder event, Bewl Water

Engaging and collaborating with our customers and stakeholders

Engaging and collaborating with our customers and stakeholders

Our customers and stakeholders have played, and continue to play, a critical role in helping to inform and shape the development of each stage of our plan.

This section sets out how we have collaborated in more ways than ever before, with more stakeholders and customers, to ensure we create a draft plan that meets future needs and priorities.

We will continue to engage with customers and stakeholders throughout the process until we publish our final WRMP in 2023. In the meantime, we would like to thank everyone who has contributed their time to this process.

We wish to extend our special thanks to members of the Environment Scrutiny Group (ESG), Customer Challenge Group (CCG) and Water Resources South East's (WRSE) various advisory groups for their valued input into our process.

Our approach

Since our last plan (WRMP19), there has been a new 'regional first' approach to water resource management planning. This has led to a highly collaborative regional approach to customer and stakeholder engagement. Activities carried out regionally between January 2020 and March 2022, by the WRSE alliance of six water companies, formed a key part of our dWRMP24 pre-consultation.

At a company level, taking learnings from our previous WRMP and business planning processes, as well as national engagement guidance, our engagement strategy has evolved into an approach that has been embedded into the organisation on an ongoing basis, with a customer and community first approach to learning.

Our evolved approach is based on a cycle of insight from customers, stakeholders and communities that helps us understand how to achieve our company purpose via our short and longer term planning.

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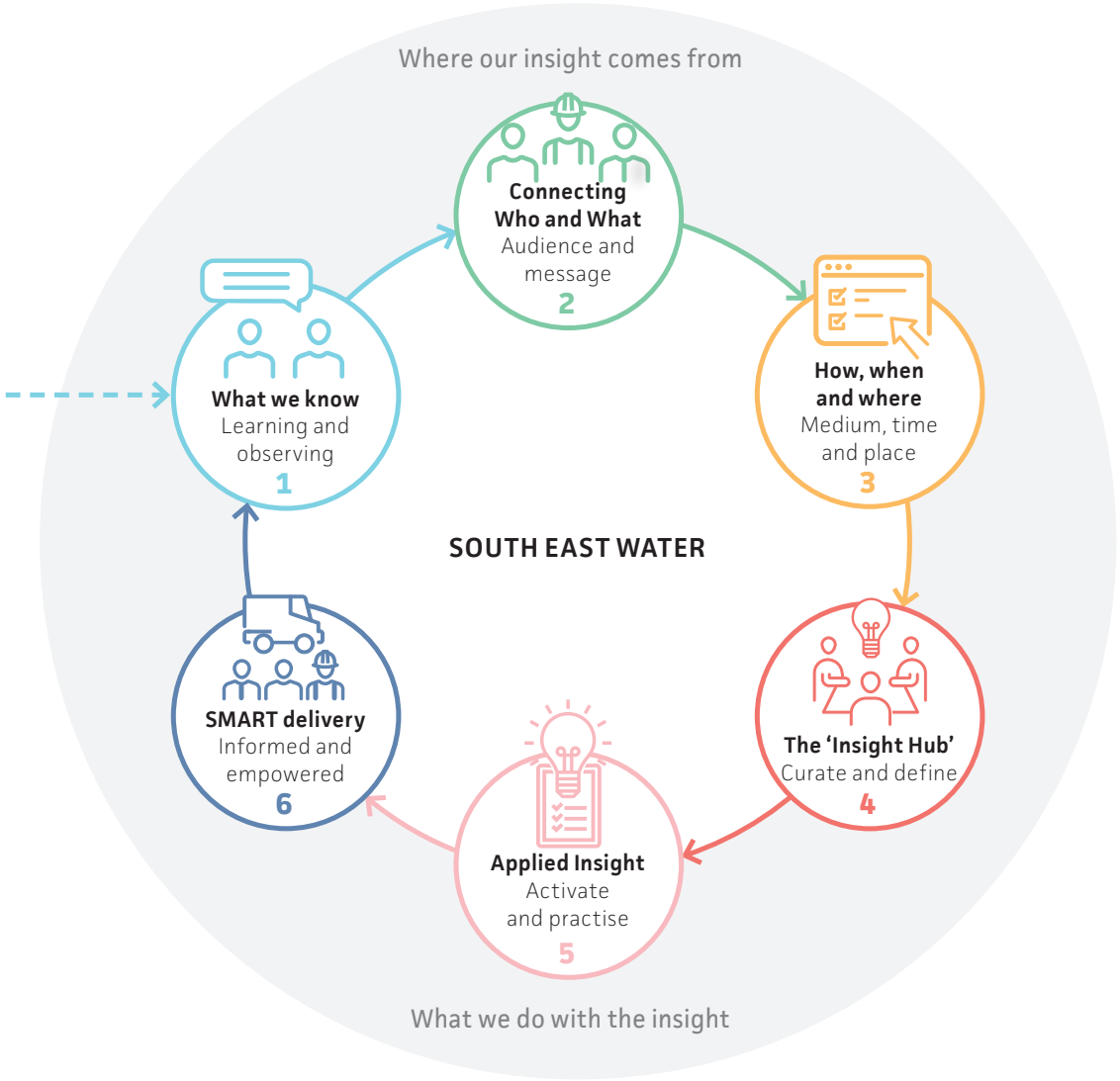
Engaging and collaborating with our customers and stakeholders continued

Our engagement strategy



While WRSE has engaged at a regional level regarding dWRMP24, we have continued to engage with our customers and stakeholders at a local level.

In preparation for dWRMP24, we commissioned an independent review of our customer and stakeholder engagement process with benchmarking against the wider industry and best practice. This concluded that we delivered many best practice activities but also recommended some future actions to improve engagement. The results of the independent review have helped to shape our dWRMP24 customer and stakeholder engagement programme.

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Engaging and collaborating with our customers and stakeholders continued

Customer engagement

The collaborative engagement developed and delivered by WRSE has provided the foundation for customer views on regional water resources.

The research was focused on understanding customer priorities and preferences across three key phases:

- Phase 1 – Review of all companies previous research (desktop review)
- Phase 2 – Qualitative research through customer focus groups
- Phase 3 – Quantitative research with 2,500 customers across the south east region

WRSE's customer research found that customers:

- Want resilient plans for future that avoid damage to the environment and the need for severe water use restrictions
- believe companies should reduce future uncertainty by building capacity into the water system with reservoirs being the favoured option due to added environmental and social benefits
- feel demand reduction options are important but are not the only solution
- are in favour of smart metering
- expect water companies to lead by example and reduce their leakage but recognise leak reduction can only go so far.

To further support this engagement programme, we used additional research held within our company Insight Hub to provide greater insight to support the development of the dWRMP24.

We have used insight from our monthly customer satisfaction surveys and recent feedback following the implementation of the Temporary Use Ban (hosepipe ban) in August 2022.

This insight has shown that leakage continues to be a key driver of satisfaction and an area of priority for customers and that they are unaware of our performance in this area.

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Engaging and collaborating with our customers and stakeholders continued

Water Horizons Forum

Our Water Horizons Forum (WHF) is made up of a number of individuals and businesses who reflect our diverse customer base and consists of people of different ages, genders, at different life stages, from different geographic locations as well as ethnic and socio-economic backgrounds.

We undertook engagement with the WHF to understand expectations on long-term plans and priorities.

When asked about the core role of a water company, they highlighted that it was to manage demand, infrastructure maintenance, minimising waste/reducing leakage and speedy response to burst pipes.

When asked about themes customers would like to see in our long-term strategies, they identified:

- Building of sustainable infrastructure from responsible materials
- management of supply/demand – plan for population growth and climate change
- careful with water e.g. prevent leakage and prolonged wastage
- restoration of natural habitats after operational work
- care for rivers and wildlife
- reduce, reuse, recycle, renewables in all operations including Hydro
- engage and work with local groups/ partnerships e.g. farmers, communities, town planners and lobby government
- liaison with house builders and advise on reuse/recycling methods
- increase visibility and presence locally
- improve customer dialogue to ensure better education.

Additional research

Further customer research undertaken between 2020 and 2022 identified that:

- Since Covid-19 customers have a stronger appreciation of local issues and their local environment
- water use has changed since customers are working from home more, with some (not all) noticing an increase in their own use
- customers do not know how much water they are using.

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Engaging and collaborating with our customers and stakeholders continued

Stakeholder engagement

Our stakeholders have informed both the regional resilience plan and our company's draft plan. Our aim is to engage a wide range of stakeholders through the most appropriate communication channels. Close and continuous engagement with our stakeholders is key to developing successful long-term plans that gain widespread support.

More information about the regional engagement plan, process and consultation events can be found in WRSE's stakeholder engagement report. There is more detail about our collaboration with WRSE later in this section too.

Ensuring stakeholders have lots of opportunities to contribute to the various consultations and events run by WRSE while keeping them up-to-date on progress with the regional plan and our own draft plan has been key. Our aim is to help stakeholders understand the decision-making process and to contribute at every stage in the development of the plans.

Our engagement strategy

Not surprisingly, there is considerable crossover and collaboration between the approaches to engagement for the WRSE's regional plan and our own dWRMP24.

More information about our work with WRSE can be found in the Engaging and collaborating with our customers and stakeholders technical report and later in this section.

Our Environment Scrutiny Group (ESG) developed and reviewed our engagement strategy, covering both the regional plan and our company plan, in October 2020. This review led to us making changes to our stakeholder map and engagement tactics. Due to the high levels of engagement and communication we require for the WRMP process, we have used a mix of informing, consulting, collaborating, and involving our stakeholders to ensure we engage them in the most appropriate way. Our specific engagement methods have been tailored to each stakeholder group.

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Engaging and collaborating with our customers and stakeholders continued

In developing the dWRMP24, there are three key consultation phases:

Phase 1:

Our dWRMP24 pre-consultation engagement
March 2020 to March 2022

WRSE emerging regional plan development and consultation
January 2022 to March 2022

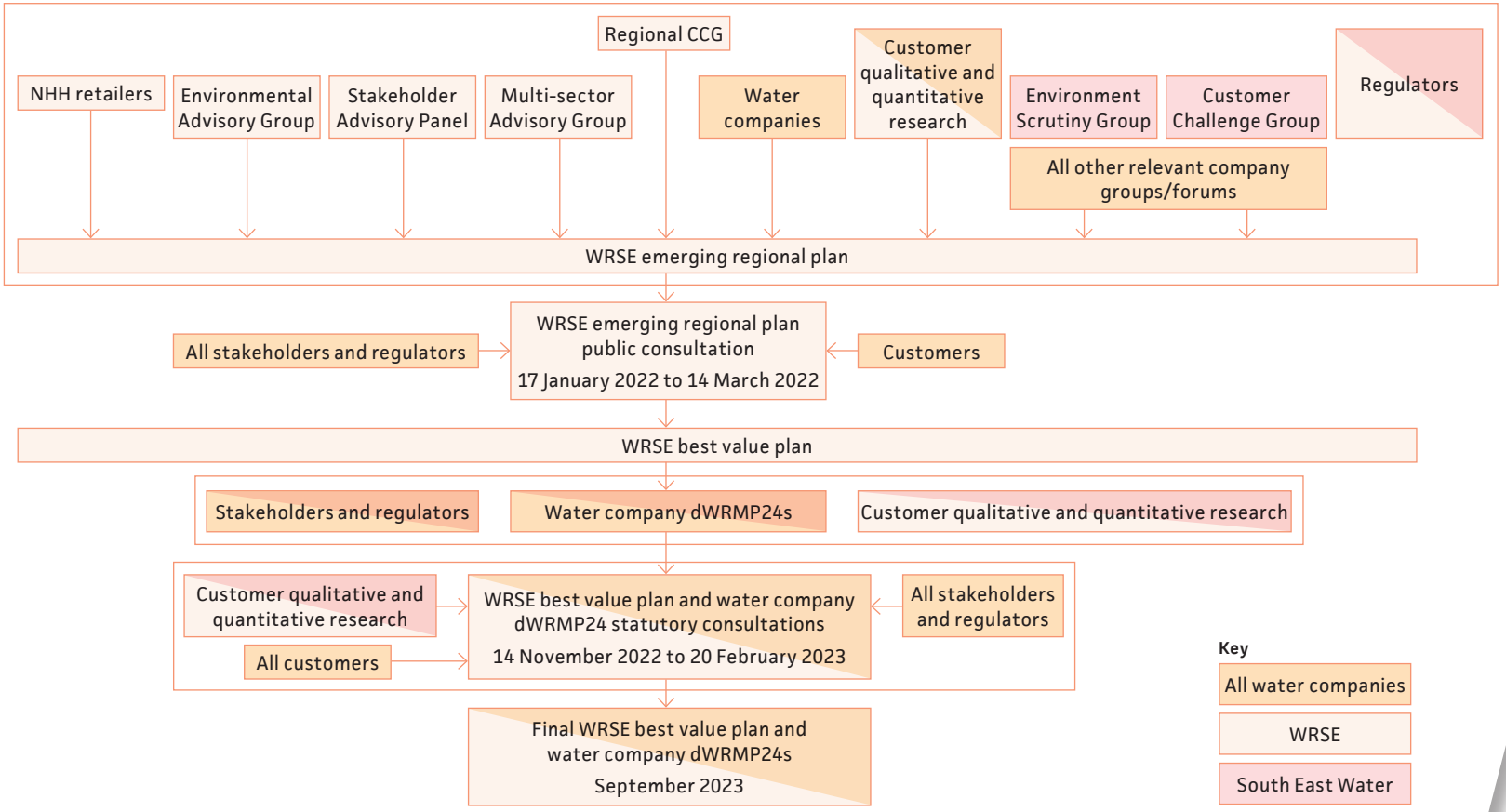
Phase 2:

Formal 12-week consultation of the dWRMP24 and regional best value plan
November 2022 to February 2023

Phase 3:

Post-consultation, prepare statement of response and revised plan
February 2023 to May 2023

dWRMP24 engagement process



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Engaging and collaborating with our customers and stakeholders continued

Pre-consultation engagement

Our Phase 1 pre-consultation activities ran from March 2020 to 14 March 2022. We set out our high-level approach to the development of our dWRMP24 and organised regular consultation activities with our statutory consultees, including the Environment Agency and the Secretary of State, Ofwat, Natural England and Consumer Council for Water (via our ESG).

Pre-consultation discussions were also held with a range of other consultees including our ESG, other water suppliers, neighbouring water companies and Customer Challenge Group. Engagement with these organisations included one-to-one briefings, website updates, stakeholder focus groups, webinars and The Source newsletter updates.

We have approached those who engaged with us during the development of the last plan (WRMP19) and reviewed the responses to that plan in detail to identify any engagement gaps. This process involved reviewing geographical areas to make sure we engage directly and specifically with areas that may be impacted by our plan. Proposals for new infrastructure, for instance, are likely to generate considerable community and stakeholder interest. All the feedback and responses we received were considered when preparing our draft WRMP24.

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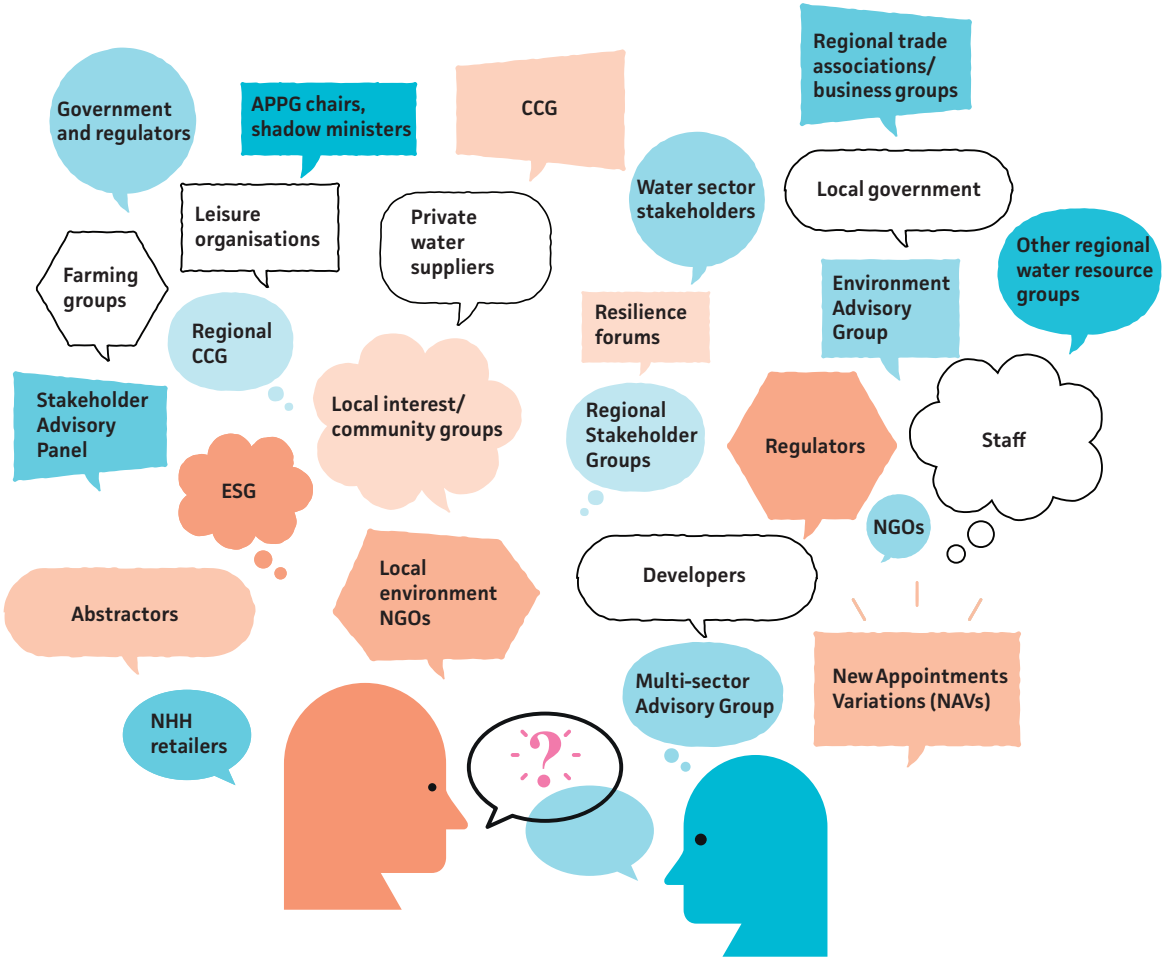
Engaging and collaborating with our customers and stakeholders continued

Our stakeholders

There are many stakeholders who have an interest in our company dWRMP and can influence its development.



Blue speech bubbles: WRSE stakeholders
Orange and white bubbles: South East Water stakeholders

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Engaging and collaborating with our customers and stakeholders continued

Role of Environment Scrutiny Group (ESG)

Our ESG meets quarterly to ensure our long-term approach to environmental, drought and water resource issues reflects the needs and priorities of stakeholders in local communities. Members, who work in parallel with the Customer Challenge Group (CCG), have been kept fully informed of progress with WRSE's emerging regional plan and its influence on our dWRMP24. WRSE directors were invited to all our ESG meetings, and ESG members participated in WRSE-led consultations, webinars, and events, as well as the emerging regional plan consultation in spring 2022.

Our colleagues

Our stakeholder events and materials are always available to our colleagues, but we also encourage them to take part directly in the consultation process. Articles have been published on our company intranet (Gurgle) and information to date has been shared through staff briefings.

We also invited staff to contribute their ideas to further reduce water demand and leakage and to increase the amount of water available for use. We did this via our internal innovation platform, Atlas. This challenge resulted in seven ideas and 15 comments being submitted and reviewed, including rainwater harvesting programmes. All feedback from colleagues is treated in the same way as feedback from other stakeholders.

Other stakeholders

We have actively encouraged organisations interested in becoming involved in water trading to contact us. Similarly, we appealed to companies that may have innovative technology that could help us to reduce leaks on networks and reduce water use in the home to contact us. As a result, we have received seven potential leads.

We have kept developers and non-household retailers up to speed on our plans through four company update events and encouraged these stakeholders to attend regional WRSE events too. We have become a member of Kent Invicta and Sussex Chambers of Commerce to ensure we keep in close contact with local business communities, using briefing packs, blogs and articles in chamber magazines to start a two-way dialogue.

Meetings have been held with MPs, councillors and environmental organisations and we have placed articles in the farming press and within our newsletters to encourage landowners to get involved.

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Engaging and collaborating with our customers and stakeholders continued

Collaboration with WRSE

Our water resources in the south east face considerable pressure from population growth, climate change and new laws to protect the environment. This regional challenge requires a regional-level response to secure future water supplies. For WRMP24, regional WRMPs have been developed before individual water company plans with an ongoing dialogue throughout the process to ensure synergy.

WRSE created stakeholder advisory groups to provide regular input into the plan. More information about WRSE, its stakeholder groups and how engagement helped to shape the regional plan can be found at **wrse.uk.engagementhq.com**

Through our membership of WRSE and representation on various advisory groups, we have played an integral role in helping to shape the development of the emerging regional plan for the south east and to promote the WRSE consultation process. Our partnership with WRSE has extended to sharing WRSE social media messages and linking a page on our website to WRSE's plan website. All this work feeds into our own draft plan.

We emailed more than 670 of our own stakeholders to notify them about WRSE's emerging regional plan consultation, which feeds into our company plan. We also supported WRSE by undertaking interviews and issuing press releases about the regional consultation period. Our company experts supported six WRSE stakeholder events, by taking part in presentations and panel discussions. In total, more than 1,150 consultation responses were received by WRSE from across the region, with 46 of these having an interest specifically in our supply area. Full details of the WRSE consultation results can be found at **wrse.uk.engagementhq.com**

Find out more

▷ Engaging and collaborating with our customers and stakeholders

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Bray Keleher Water Treatment Works

Our future water supply

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Our future water supply

Our water resource plan sets out how we intend to achieve an efficient, sustainable and secure supply of water for our customers, whilst protecting and enhancing the environment.

In our dWRMP24 we assess the amount of water available to supply customers each year between 2025 to 2075. This is known as our baseline supply forecast.

Our baseline supply forecast

Our baseline supply forecast for 2025 to 2075 feeds into our assessment of the supply demand balance. The baseline supply demand balance compares the forecast amount of water available to supply customers with forecast demand, to determine whether any interventions are needed (in the form of new options) to maintain water supplies in future.

We begin by calculating the amount of water available for use (WAFU).

The following elements make up our WAFU, with each described in more detail below:

- Deployable output from our own water sources
- existing transfers and bulk supplies
- outage (an allowance for short-term losses of supply)
- process losses (water lost through operations and the abstraction treatment process).

Planning scenarios

In accordance with planning guidelines, our base year deployable output and baseline supply forecast have been assessed under two 'dry year' planning scenarios:

- Annual average conditions over a dry year (dry year annual average – DYAA)
- peak week or critical period conditions in a dry year (dry year critical period – DYCP).

We have chosen a 50-year planning horizon for forecasting supply and demand, rather than the statutory minimum 25-year period. This reflects the 'high risk' to supplies outlined in the problem characterisation report.

This longer timeframe also aligns with the WRSE's regional approach and allows us to be more strategic in considering options to address potential supply demand deficits caused by climate change or population growth.

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Our future water supply continued

Deployable output

River Way, Hampshire

Deployable output (DO) is the starting point for calculating our WAFU and is therefore a key process for developing the supply forecast for dWRMP24. Deployable output is the volume of water we expect to reliably pump from our groundwater or surface water sources (boreholes, river intakes and reservoirs) on a daily basis.

We measure DO in megalitres per day (Ml/d). We have calculated the DO for each of our WRZs in line with the latest guidance.

Our DO calculations take into consideration constraints in our supply system such as the amount of water physically available, abstraction licence conditions including abstraction reductions, water quality, the size of water pipes and the capacity of treatment. The DO changes depending on the severity of drought events we plan for.

A more severe drought planning scenario means a lower DO. For dWRMP24, we plan to make our supply resilient to a one in 500-year drought event.

We have undertaken our DO assessment for dWRMP24 using groundwater and surface water modelling, conjunctive use modelling and stochastic weather datasets to determine our one in 500-year return period deployable output. We have also used historical drought records in our planning.

All this means we stress-test our systems with drought data more extreme than any drought we have ever experienced. Our supply forecast is based on the WRSE regional work for consistency and to inform our dWRMP.

Our baseline supply forecast including existing bulk supplies, compared against WRMP19, for each WRZ is summarised below.

Dry Year Annual Average

WRZ	WRMP19	WRMP24
WRZ1 Tunbridge Wells	43.24	42.38
WRZ2 Haywards Heath	68.00	69.99
WRZ3 Eastbourne	75.00	71.79
WRZ4 Bracknell	215.91	210.79
WRZ5 Farnham	53.91	53.97
WRZ6 Maidstone	70.59	92.62
WRZ7 Cranbrook	19.66	21.61
WRZ8 Ashford	93.92	93.92
Total	**640.23**	**657.07**

The differences between our assessments undertaken for WRMP19 and WRMP24 are summarised below:

- **The WRMP19 DO figures are based on different stochastics datasets than WRMP24 figures**
- **WRZ6 has a new source; Butler WTW (Aylesford Newsprint)**
- **WRZ4 has WINEP reductions at our Greywell and Itchel sources.**

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Our future water supply continued

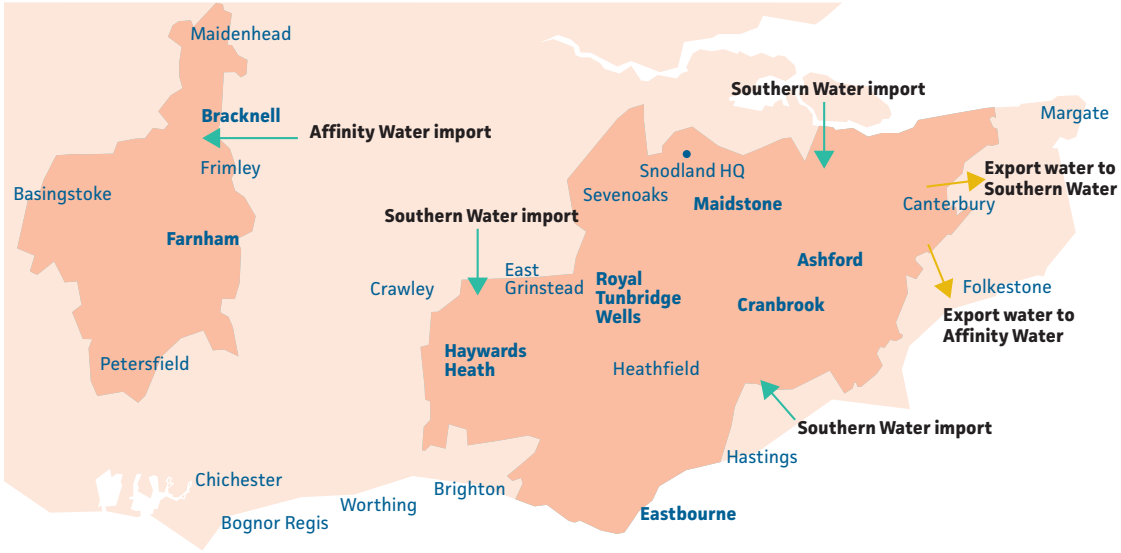
Bulk supplies

We are the highest net importer of drinking water of any water company in England and Wales. Eight per cent of our supplies come from water transferred from sources owned and operated by other companies under joint rights or bulk supply agreements.

Bulk supplies are added to deployable output as a further component of water available for use. Determining these yields is therefore a key part of developing the supply forecast for dWRMP24.

For dWRMP24 we have confirmed the availability of bulk supplies output under different drought severity events with the donor companies. We have also updated the details of our intra-company transfers of water which enable us to transfer water within our supply area, across resource zones and regions.

Our bulk supply agreements, summarised in the adjacent table, have been used in the supply demand balance analyses and investment modelling to help identify the schemes that make up Our Preferred Plan.



WRZ	Bulk Transfer (Import from/export to neighbouring company)	WRMP24					
		1 in 100-year		1 in 200-year		1 in 500-year	
		DYAA	DYCP	DYAA	DYCP	DYAA	DYCP
2	Southern Water (Weir Wood)	5.40	5.40	5.40	5.40	4.27	4.27
3	Southern Water (Darwell)	8.00	8.00	8.00	8.00	4.00	4.00
4	Affinity Water (Egham)	36.00	36.00	36.00	36.00	36.00	36.00
6	Southern Water Matts (Belmont)	6.85	7.39	6.85	7.39	5.14	5.54
	Southern Water (Pitfield)	0.10	0.50	0.10	0.50	0.10	0.50
8	Affinity Water (Kingston Export)	-2.00	-2.00	-2.00	-2.00	-2.00	-2.00
	Southern Water (Wingham Export)	-2.00	-2.00	-2.00	-2.00	-2.00	-2.00
	Total (net)	**52.35**	**53.29**	**52.35**	**53.29**	**45.51**	**46.31**

Bulk supply agreement with Southern Water (Darwell) will terminate in 2025 and be replaced with a new agreement abstracting water from Bewl Reservoir.

Key: DYAA = average deployable output; DYCP = peak deployable output

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Our future water supply continued

Outage allowance

We have completed an assessment of our planned and unplanned outage for dWRMP24. Outage is a temporary loss of deployable output through, for instance, power or system failures, or through planned works. The loss typically lasts no longer than three months but results in a short-term reduction in WAFU.

An outage allowance has been developed for each water resource zone under both dry year annual average and dry year critical period scenarios. The regional WRSE companies developed a new approach to calculate outage, ensuring alignment across the region. This included consistent processing, analysing and modelling outage event data across a shared modelling platform, which improved the quality of our outage data analysis giving us greater confidence in the data outputs for dWRMP24.

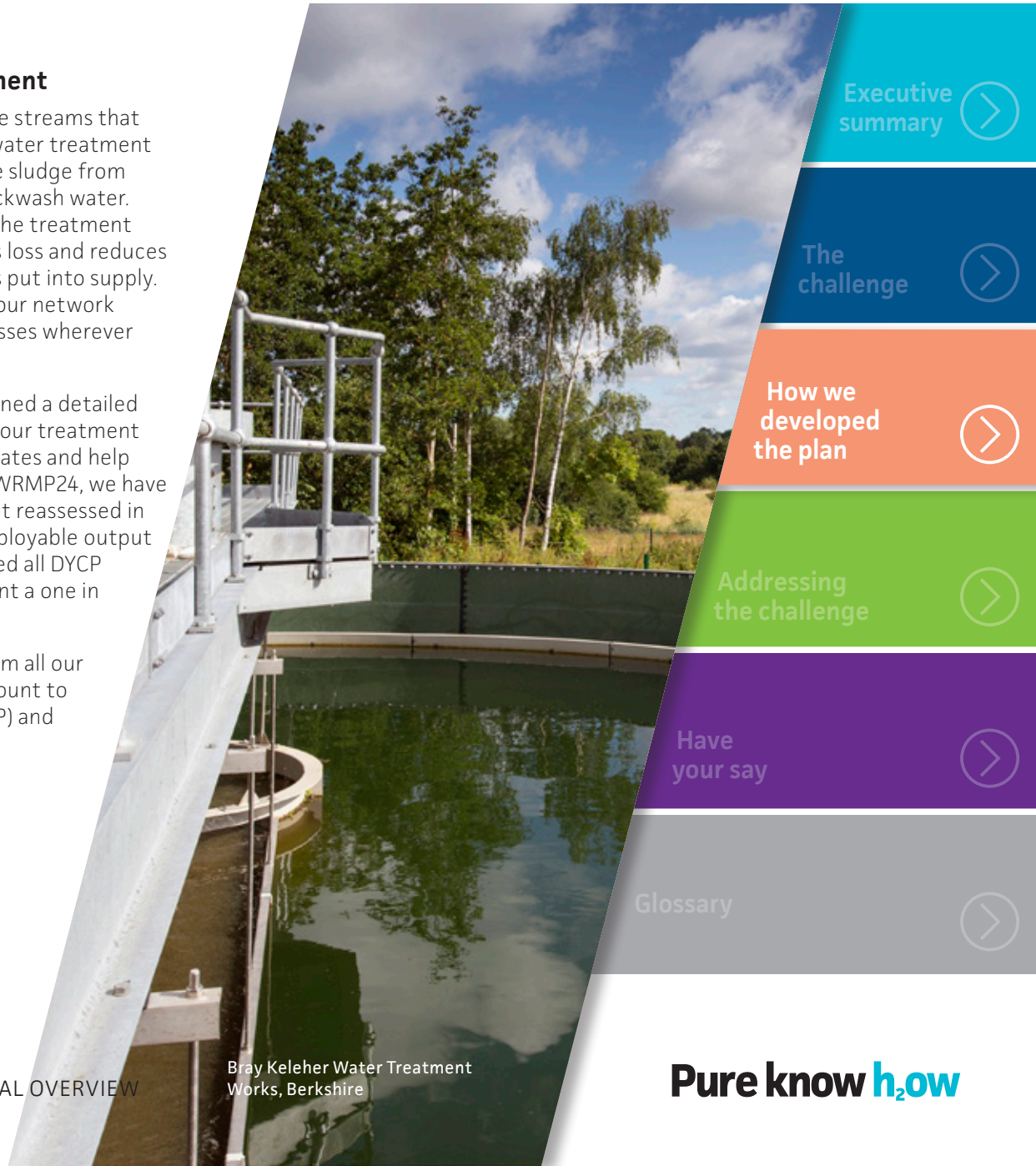
The outage allowance for dWRMP24 is 15.42 Ml/d for DYAA and 11.96 Ml/d for DYCP.

Process losses assessment

Process losses are the waste streams that are produced by the main water treatment processes. They can include sludge from clarifiers and dirty filter backwash water. Water that is lost through the treatment process counts as a process loss and reduces the amount of water that is put into supply. We do our best to operate our network efficiently and to reduce losses wherever possible.

For WRMP19 we commissioned a detailed process loss assessment at our treatment works to improve our estimates and help reduce future losses. For dWRMP24, we have used the same approach but reassessed in line with changes to our deployable output assessment and also updated all DYCP and DYAA values to represent a one in 200-year drought event.

The total process losses from all our water treatment works amount to 5.8 Ml/d at dWRMP24 (DYCP) and 4.85 Ml/d (DYAA).



Bray Keleher Water Treatment Works, Berkshire

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Our future water supply continued

Future changes to deployable output

For dWRMP24, we have calculated future changes to our deployable output as a result of proposed sustainability reductions, water quality deterioration impacts and licence capping changes, which have been accounted for as part of our adaptive planning approach. This includes risks to our groundwater and surface water sources due to declining water quality or saline intrusion, how these might be addressed and how this might impact our deployable output in future. Our plan also covers scenarios which show the impact of sustainability changes, other licence changes and different levels of environmental ambition.

In line with the latest planning guidance, our dWRMP24 reports the impact of any confirmed sustainability changes up to 2025 separately from the impact of other future changes anticipated across the planning period. Confirmed sustainability changes are included within our baseline supply forecast.

The impact of climate change is another key consideration in our supply forecast, which is assessed as part of our deployable output modelling, but included and accounted for as part of our adaptive planning approach.

Environmental destination – impact on deployable output

Understanding how much water can be abstracted from the environment in a sustainable way, now and in the future, is crucial to the development of a resilient plan. We are taking a leading role in addressing unsustainable abstraction and have committed to developing a long-term environmental destination to help us deliver sustainability and environmental resilience. This longer-term forecasting approach reflects and supports the regional ambition too.

The Water Resources National Framework sets out five different scenarios that are required by 2050 while ensuring we protect the ecological status of each water body.

The enhanced version of the National Framework scenario was chosen and used in our adaptive planning approach.

Two further scenarios complement the National Framework scenario:

- **Company Central (based on sustainable reductions only)**
- **Company Alternative (based on sustainable reductions + water quality deterioration impacts + potential licence capping changes).**

Raw water quality deterioration – impact on deployable output

Raw water quality deterioration in our surface or groundwater sources can impact on source deployable output. We have assessed the potential for raw water quality deterioration to determine the likely impact on loss of deployable output if the predicted deterioration actually occurred. Below is a summary of the reductions due to water quality deterioration alone, estimated during the assessment for DYAA and summer peak scenarios.

Water Resource Zone	Reduction due to raw water quality deterioration (Ml/d)	
	DYAA	DYCP
WRZ1 Tunbridge Wells	-0.07	-0.10
WRZ2 Haywards Heath	-7.33	-7.33
WRZ3 Eastbourne	-13.61	-16.75
WRZ4 Bracknell	-15.97	-17.32
WRZ5 Farnham	0.00	0.00
WRZ6 Maidstone	0.00	0.00
WRZ7 Cranbrook	0.00	0.00
WRZ8 Ashford	-9.42	-13.57
Total	**-46.40**	**-55.07**

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Our future water supply continued

Licence capping – impact on deployable outputs

According to the latest water resources planning guideline (WRPG), we should not retain unused water on our licences where it poses a risk of deterioration. We have therefore assessed all our sources to determine the level of reductions to be applied to our licences depending on the risk of deterioration.

This assessment has identified whether we will either cap licences at maximum peak abstraction or recent actual average abstraction depending on the environmental risk. Maximum peak abstraction is the maximum volume of water abstracted in any one year during a representative abstraction period (2009 to 2020), while recent actual average abstraction is the total volume of water abstracted during the representative recent actual period, divided by the number of years in that period.

As a result of our assessment, we identified a number of sources where changes to our existing licence conditions may be necessary. Below is a summary of the reductions due to licence capping alone, estimated during the assessment for DYAA and summer peak scenarios.

	Reduction due to Licence Capping (Ml/d)	
Water Resource Zone	**DYAA**	**DYCP**
WRZ1 Tunbridge Wells	0.00	0.00
WRZ2 Haywards Heath	-0.15	-1.00
WRZ3 Eastbourne	-0.31	-5.60
WRZ4 Bracknell	0.00	0.00
WRZ5 Farnham	-0.28	-0.48
WRZ6 Maidstone	0.00	-1.30
WRZ7 Cranbrook	0.00	0.00
WRZ8 Ashford	0.00	-2.40
Total	**-0.74**	**-10.78**

The potential impacts from raw water quality deterioration and licencing capping changes, as described above, have been included as reductions in our company alternative scenario, alongside sustainability reductions. In doing this, we have also considered the relationship between the sustainability reductions, water quality impacts and licence capping changes to ensure we do not overestimate or double count the reductions at each source.

Find out more

- Supply forecast and deployable output assessment
- Bulk supplies
- Outage allowance
- Process losses assessment
- Future changes to deployable output

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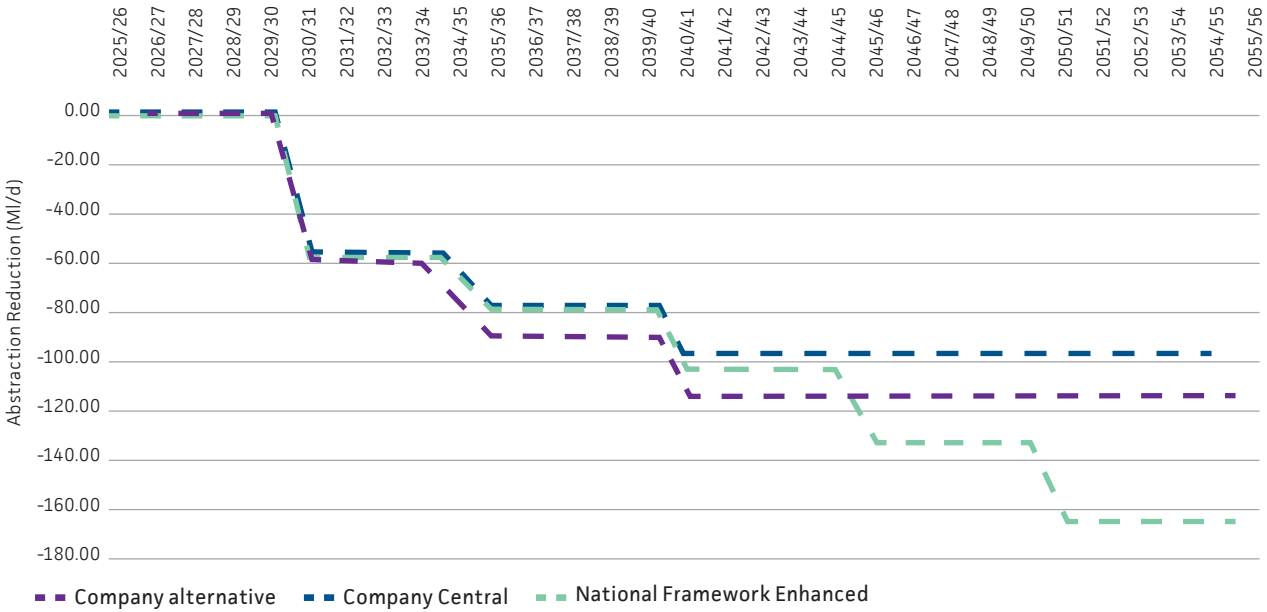
Our future water supply continued

Maintaining the environment through sustainable abstraction

We have taken three supply scenarios forward to adaptive planning to inform our decision-making and regional investment modelling. The calculated abstraction licence reductions for each WRZ under each of the three scenarios are shown below, in Ml/d:

	National Framework Enhanced		Water Company Central		Water Company Alternative	
Water Resource Zone	**DYAA**	**DYCP**	**DYAA**	**DYCP**	**DYAA**	**DYCP**
WRZ1 Tunbridge Wells	-21.76	0.00	-10.66	-10.66	-10.73	-10.76
WRZ2 Haywards Heath	-1.81	0.00	-4.07	-0.40	-6.78	-5.83
WRZ3 Eastbourne	-20.58	0.00	-9.09	-9.09	-20.70	-23.84
WRZ4 Bracknell	-15.99	0.00	-30.49	-33.20	-31.99	-34.70
WRZ5 Farnham	-4.07	0.00	-2.71	-3.86	-2.71	-3.86
WRZ6 Maidstone	-19.68	0.00	-4.40	0.00	-4.40	0.00
WRZ7 Cranbrook	-2.12	0.00	0.00	0.00	0.00	0.00
WRZ8 Ashford	-72.09	0.00	-36.79	-31.95	-37.48	-43.23
Total	**-158.11**	**0.00**	**-98.21**	**-89.16**	**-114.79**	**-122.22**

Profile of reductions under each of the three WRSE scenarios for DYAA



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Future demand for water in our region

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Water supply 24 hours a day, 365 days a year

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Future demand for water in our region

Our draft WRMP sets out how we will ensure we have sufficient water supplies to meet demand over the next 50 years.

Demand forecast

Our demand forecast involves calculating future demand by assessing and predicting several factors and scenarios. We analyse property and population growth and the impact of water efficiency programmes, as well as how much water we predict our customers (household and non-household) will use in the future.

Forecasting also assesses the amount of water that is lost through, for example, leakage, and how weather variations, or events like the Covid-19 pandemic, affect demand.

We follow Defra and the Environment Agency guidance, and industry best practice, to collect and assess data about these, and other, factors. We then model and test the data to predict the impact on future demand.

Our dWRMP includes an initial (baseline) water demand forecast for our area and our eight water resource zones. This does not take into account the ways we plan to reduce future demand, for instance through leakage reduction, and water efficiency interventions. These are set out in Our Preferred Plan.

Find out more

▷ **Baseline demand forecast**

Property and population

We develop property and population forecasts as part of our baseline demand forecast. Population growth will be a key driver for future demand.

Working alongside WRSE, we have produced growth forecasts and projections for the draft regional plan. The forecasts reflect national guidance and are based on latest local authority plans, local housing need calculations and data from the Office for National Statistics. They also cover various scenarios and incorporate additional projections to cover uncertainties around the future extent of population growth.

Household forecast + **Non-household forecast** + **Minor uses** + **Leakage** = **Demand forecast**

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Future demand for water in our region continued

By 2049/50, we expect the population of our supply area will increase from 2.26 million to 2.81 million people – a 25 per cent rise from 2019/20.

Our long term household growth forecast predicts that population will rise by a further five percent (minimum) and 26 per cent (maximum) by 2075.

Find out more

▷ Property and population forecast

Household forecast

Understanding household demand for water is key to ensuring that our water resources systems are fit for the future.

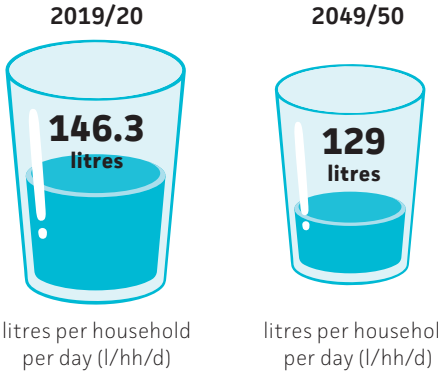
Our draft plan involves calculating household consumption rates, following national guidance and best practice methods. Forecasts have been developed and modelled for a range of different weather scenarios and use certain assumptions. For example, future technological advances should make washing appliances more water efficient.

We have used 2019/2020 data as the base year for our calculations. The Covid-19 pandemic had a major impact on how we all used water. More people worked from home which resulted in domestic water consumption rising.

We have made allowances for the ongoing impact of the Covid-19 pandemic, and the changes to the way we use water, in our forecasts. However the long-term impact on water use is uncertain.

Our customers have been split into different categories ('segmentation'), and we have collected data for metered/measured and unmetered/unmeasured households, comparing the differences in their use of water. We have also adjusted our consumption forecasts based on a normal year and a dry year scenario.

We forecast that for household consumption, baseline average per capita consumption (PCC) in a dry weather year will reduce as shown below.



Find out more

▷ Household consumption forecasting

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Future demand for water in our region continued

Micro-components

For household forecasts, we also assess other factors called micro-components. These include toilet flushing, personal washing (showering, bathing, handwashing), clothes and dish washing, and other indoor/outdoor water uses.

We use our customer appliance survey, and other external data, to help us to forecast, for example, how many people will own appliances in the future, how often they will be used and how much water they will need.

Non-household forecast

Our non-household customers include businesses, industry, farms, hospitals, prisons, educational settings, and charities. Forecasting how much water these customers will need in the future is an important part of our demand forecast.

We have produced non-household demand forecasts for all water resource zones in our region. The forecasts follow national guidelines and existing best practice and reflect the latest demographic, economic, and climate change projections.

Different categories of non-household customer have been mapped to work out demand forecast by sector. Data has been collected, analysed, modelled, and tested against a range of scenarios. However, there is significant uncertainty around these predictions. For instance, we don't yet know the full impact of Covid-19, with changes to working practices. The employment impact of Brexit is also still not fully known, while unexpected events or technological advances could affect future consumption too. Some approximations are included in the forecasts to overcome these unknowns. We will update the forecasts again before submitting our final WRMP24.

The non-household forecast demand for South East Water will be 90 Ml/d in 2025, within a range of 87 to 95 Ml/d. By 2075 this is expected to rise to 109 Ml/d – an increase of 19 Ml/d – within a range of 97 to 119 Ml/d.

Find out more

▷ Non-household demand forecast

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Future demand for water in our region continued

Leakage

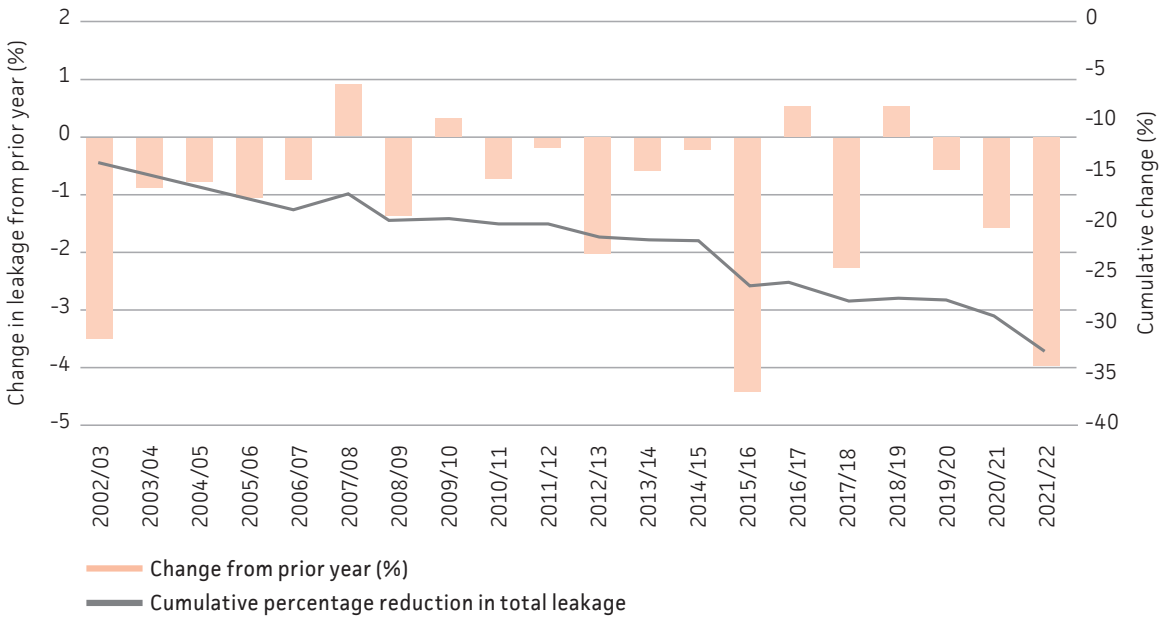
Reducing leakage – water lost from our network or customers' pipes – is vital to protect our water supply and make it resilient for the future. Managing leakage effectively helps us to maintain the right balance between supply and demand of water resources.

Since 2002/2003 we have reduced leakage by 33.5 per cent. Our proactive leakage strategy will ensure we continue to improve, guided by regulatory requirements and our customers' preferences and priorities. We aim to use smart technology to prevent leaks occurring in the first place and to help us find and repair the smallest leaks quickly.

Our starting position for this plan is the average (baseline) annual leakage level 94.2 Ml/d. The regulator has set us a target to reduce leakage by 15 per cent by 2025 and 50 per cent by 2050.

We set out how we plan to achieve this in Our Preferred Plan.

Improvement in total leakage performance over time



Find out more
▷ Leakage

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2075 – The challenge

New pipeline installation, Diplocks Way, Hailsham

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2075 – The challenge

Our aim is to ensure there is always enough water for our customers across all our water resource zones (WRZs), even when supplies are under considerable strain. We do this by maintaining an adequate balance between supply and demand throughout the planning period and addressing uncertainties in our forecasts. Our starting point is a calculation of our baseline supply demand balance.

We use the most up-to-date and relevant tools, methods and data to produce our supply and demand forecasts. Although we have a good understanding of the challenges facing us here in the south east – a designated area of water-stress – there will inevitably be some uncertainty in our forecasts due to the long-term nature of our WRMP.

We know there is a high risk to supplies and we will continue to use advanced methods to address the uncertainties in forecasting.

By having a deeper understanding of the future risks and uncertainty, we are better placed to make the right investment decisions and to maintain our levels of service.

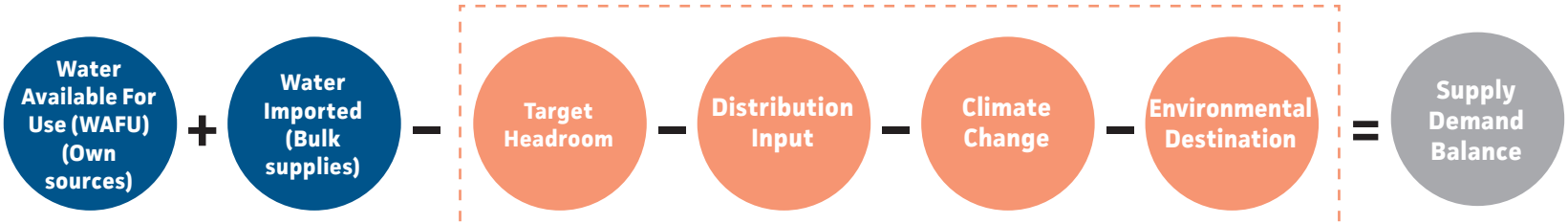
Headroom assessment

Our supply demand balance includes an allowance for uncertainty, known as target headroom. Target headroom provides a legitimate planning buffer for the uncertainty and risk included within the main building blocks of our WRMP. Our assessment of target headroom takes account of unforeseen events and uncertainty.

The components we have individually and collectively considered in our headroom calculations are based on a best practice approach and include:

- Bulk imports
- gradual pollution
- accuracy of supply side data
- climate change impact on supply uncertainty
- accuracy of sub-component data
- demand forecast uncertainty
- climate change impact on demand uncertainty.

Our baseline supply demand balance



These are the components of our supply demand balance that vary in our adaptive planning

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2075 – The challenge continued

Higher target headroom can lead to a larger supply demand balance deficit, meaning more investment is required during the planning period. Conversely, lower target headroom can mean a smaller supply demand deficit. This requires less investment but also increases the risk of supply shortfall, particularly if our assumptions about the future supply or demand forecasts are wrong. Determining the right target headroom as the buffer we should adopt in our plan is a balancing act – one that balances risk to supplies with the cost of securing supplies for existing and future customers.

We have adapted our target headroom model to look 50 years ahead and reviewed and updated our inputs into the model to align with the regional adaptive planning approach. This ensures we do not double-count uncertainties, such as population growth and climate change impacts, which may impact on target headroom.

Target headroom results

We have assessed headroom at company and WRZ-level under two conditions: Dry Year Annual Average (DYAA) and Dry Year Critical Period (DYCP). The output is a volume (in Ml/d) of target headroom every five years across the planning period, against a level of risk, which we refer to as the 'percentile'.

A 100 percentile level of target headroom represents a very risk-averse position. A very low percentile would not allow any buffer for the uncertainty and risks that exist in our supply demand forecasts when looking 50 years ahead.

Water companies generally adopt a level in the 50 to 85 percentile range. However, they always represent the overall level of risk that can reasonably be shared between the company, its customers, and the environment.

For WRMP19, we adopted the 80th percentile of target headroom outputs at the start of the planning period, reducing to the 40th percentile of target headroom inputs at the end of the planning period. Following changes to update our input data, model assumptions and WRSE alignment we have reviewed our risk profile.

That review found that the outputs from our headroom assessment for WRMP24 produced a much lower rise in the level of uncertainty over the planning period compared to WRMP19. Therefore, by using a flat percentile across the planning period, we maintain a similar level of uncertainty to WRMP19 which we consider appropriate.

For dWRMP24, we have adopted a flat 85th percentile of target headroom across the entire planning period. By the end of the next asset management plan (AMP8) period, we anticipate a headroom allowance of 7.2 per cent of total company forecast demand, rising to 8.3 per cent of total average demand by the end of 2035. Headroom will be reassessed for WRMP29 to reflect any changes.

Find out more

▷ **Headroom assessment**

Adaptive planning

As well as including target headroom in our baseline predictions for supply and demand, we have explored a wider range of risk in this dWRMP24 than in previous plans.

We have considered how different our supply demand balance (SDB) calculation could look under a range of different future scenarios as part of the WRSE regional adaptive planning approach.

WRSE designed multiple scenarios to test future uncertainty by adjusting supply demand balance components.

These have helped to inform the final decision-making for Our Preferred Plan.

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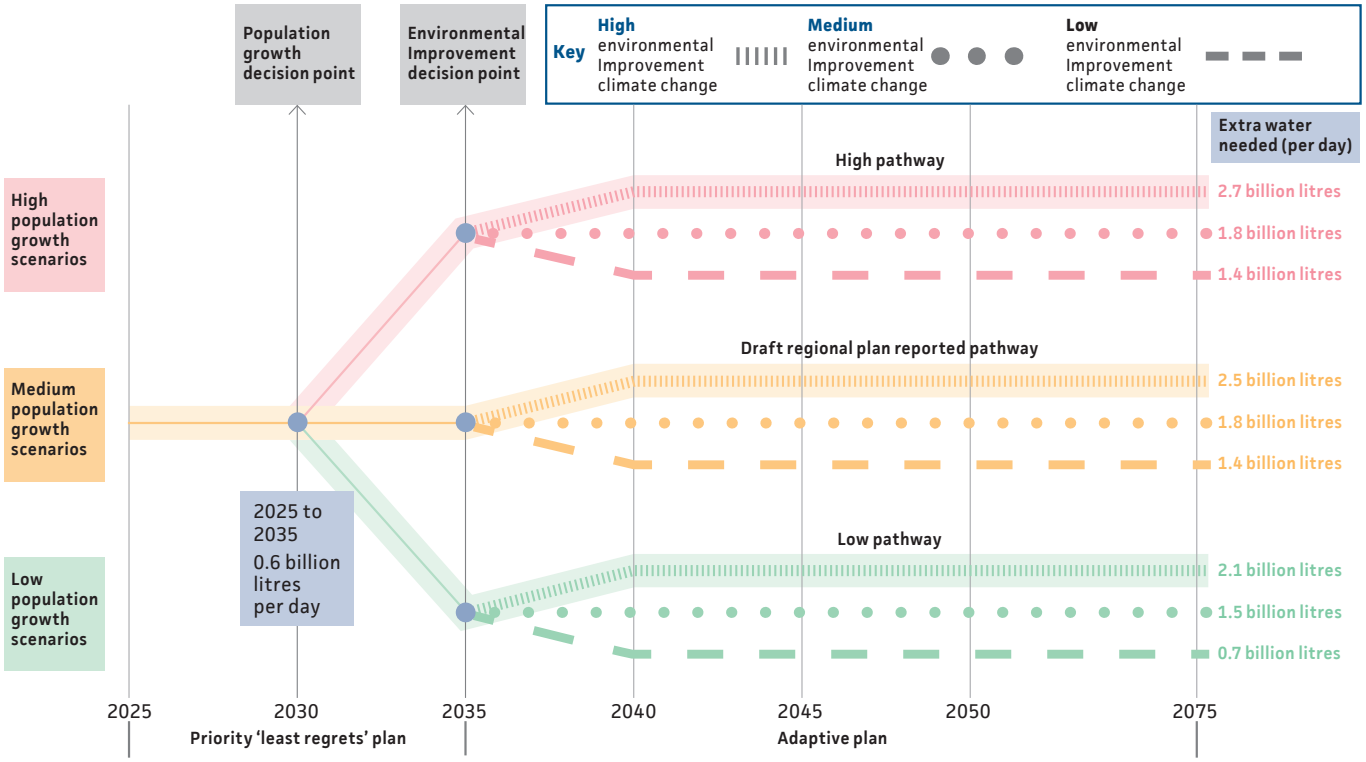
2075 – The challenge continued

The further ahead we look with our forecasts, the more uncertain the future looks. We are therefore adopting an adaptive planning approach to help us make the right investment decisions.

We have looked at a range of nine future scenarios (situations) we might face over the next 50 years, with different combinations of population growth, climate change impacts and levels of environmental ambition (abstraction reduction). From this, we can see how much extra water would be needed in each case.

As a result of all the work being done, WRSE has developed a 'root and branch' adaptive tree as the base forecast for its regional plan investment modelling. This is the plan we have adopted and includes the most likely set of future challenges and uncertainties facing our region.

The various scenarios mapped by WRSE at a regional level which includes each of the alternative pathways and how much extra water will be needed in each across the whole of the south east region by 2075.



High pathway: Maximum population growth high environmental improvement, and high climate change

Reported pathway: Housing plan population growth high environmental improvement, and high climate change

Low pathway: ONS18 population growth medium environmental improvement, and medium climate change

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2075 – The challenge continued

The root branch (2025 to 2030) is based on housing plan growth, medium climate change and current statutory environmental ambitions. We consider this root branch to represent the most appropriate and robust basis for our draft plan.

The next three branches (2031 to 2035) include the same environmental ambition and climate change projections but cover a wider range of potential housing growth scenarios.

The final set of branches (post 2035) focus on how alternative environmental ambition scenarios and climate change forecasts could continue to impact on the future availability of water.

Root situation (2025 to 2030)	First branch (2031 to 2035)	Second branch (2036 to 2075)	Situation
Population growth using housing plan trend data **Abstraction reduction to meet statutory requirements** **Medium projection of climate change impacts**	Population growth using housing plan trend data (including Oxford-Cambridge projections) Abstraction reduction to meet statutory requirements Medium projection of climate change impacts	Population growth using the highest forecast projections Abstraction reduction to achieve highest environmental protection High projection of climate change impacts	1
		Population growth using housing plan trend data (including Oxford-Cambridge projections) Abstraction reduction to exceed statutory requirements Medium projection of climate change impacts	2
		Population growth using housing plan trend data (including Oxford-Cambridge projections) Abstraction reduction to meet statutory requirements Low projection of climate change impacts	3
	Population growth using housing plan trend data Abstraction reduction to meet statutory requirements Medium projection of climate change impacts	Population growth using housing plan trend data Abstraction reduction to achieve highest environmental protection High projection of climate change impacts	4
		Population growth using housing plan trend data Abstraction reduction to exceed statutory requirements Medium projection of climate change impacts	5
		Population growth using housing plan trend data Abstraction reduction to meet statutory requirements Low projection of climate change impacts	6
	Population growth using ONS trend data Abstraction reduction to meet statutory requirements Medium projection of climate change impacts	Population growth using ONS trend data Abstraction reduction to achieve highest environmental protection High projection of climate change impacts	7
		Population growth using ONS trend data Abstraction reduction to exceed statutory requirements Medium projection of climate change impacts	8
		Population growth using the lowest forecast projections Abstraction reduction to meet statutory requirements Low projection of climate change impacts	9

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2075 – The challenge continued

What does this mean for the supply demand balance?

The scenario featuring the highest environmental ambition has the greatest impact on our supply forecasts and therefore represents our most challenging future.

We have plotted three scenarios (situations 1, 4 and 9) on the graph below to show their impact on our supply demand balance. These represent the least and most challenging scenarios and also situation 4 which is our reported pathway in Our Preferred Plan.

We have considered the following planning scenarios:

- **Normal Year Annual Average (NYAA)**
- **Dry Year Annual Average (DYAA)**
- **Dry Year Critical Period (DYCP)**
- **and for different drought conditions ie 100-year to 500-year drought.**

Our best estimates of demand forecast, target headroom, and Water Available For Use (WAFU), for any of the future scenarios, could result in a negative baseline supply demand balance within one of our WRZs, at some point within the planning horizon.

A negative balance, or deficit, means extra resources, and/or demand management measures will be required to reduce demand, to ensure enough water is available to our customers.

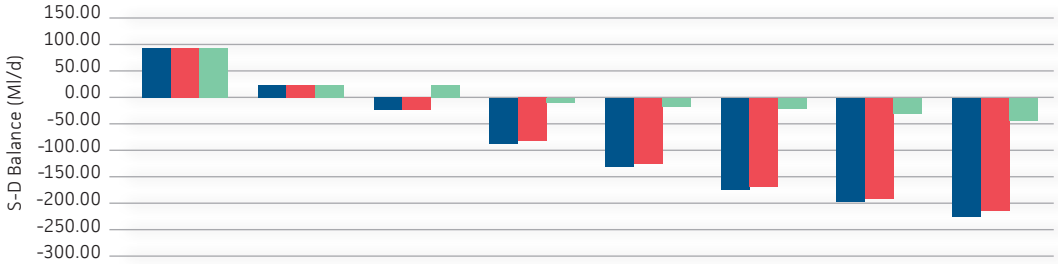
The one in 500-year drought event planning scenario, which represents the new regional drought resilience standards, provides the greatest challenge. We have set 2040 as the date for meeting the 1:500-year requirement. The 1:500-year Dry Year Annual Average (DYAA) scenario (see graph), in which the full extent of abstraction reductions impacts on our sources and the future availability of water, is the most severe and is a key driver for our future interventions. Each situation (or pathway) reflects a different future scenario made up of different combinations of population growth, climate change impacts and levels of abstraction reduction so we can see how much extra water will be needed under each one.

In 2025, at company level, our baseline supply demand balance starts with a surplus across all nine planning scenarios/situations using all our own sources of water.

This surplus increases with the inclusion of bulk supplies from neighbouring companies.

By 2035 we reach a company-level deficit for both Dry Year Annual Average and Summer Peak Period across all nine planning scenarios. This deficit comes sooner, as early as 2030, at a local level in some of our individual WRZs. Environmental ambition accounts for most of the deficits between 2030 and 2050. The impact of population growth and climate change influence the longer-term forecast to 2075.

Company-level supply demand balance: 1 in 500 Dry Year Annual Average



	2025/26	2030/31	2035/36	2040/41	2045/46	2050/51	2060/61	2075/76
Situation 1	85.72	14.91	-14.79	-85.19	-126.95	-167.78	-194.67	-225.22
Situation 4	85.72	14.91	-14.79	-82.69	-122.89	-163.49	-184.69	-206.15
Situation 9	85.72	14.91	13.93	-3.56	-9.26	-14.46	-29.34	-41.16

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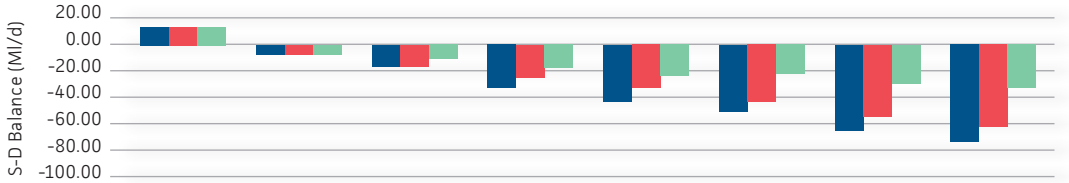
2075 – The challenge continued

Sussex Region (WRZs 1-3)

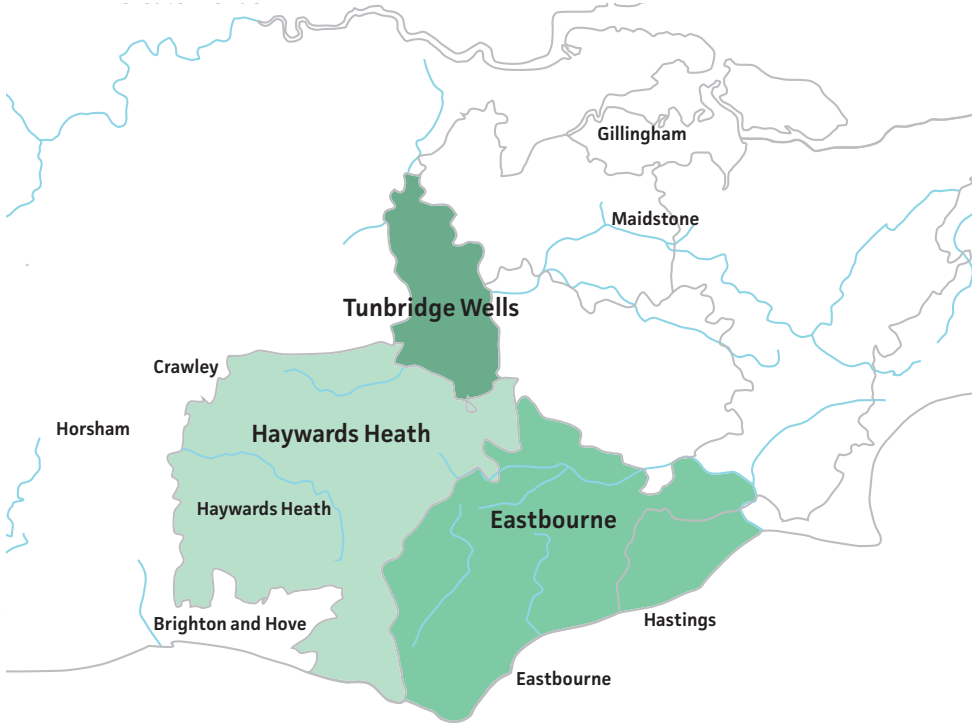
In our Sussex region our graph shows that the local supply demand balance will be in deficit by 2030.

River Ouse

Sussex region supply demand balance: 1 in 500 Dry Year Annual Average



	2025/26	2030/31	2035/36	2040/41	2045/46	2050/51	2060/61	2075/76
Situation 1	8.13	-4.58	-16.25	-31.26	-41.17	-49.57	-62.15	-74.00
Situation 4	8.13	-4.58	-16.25	-25.54	-34.83	-43.16	-53.54	-61.80
Situation 9	8.13	-4.58	-10.68	-19.42	-21.74	-22.67	-30.75	-35.45



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2075 – The challenge continued

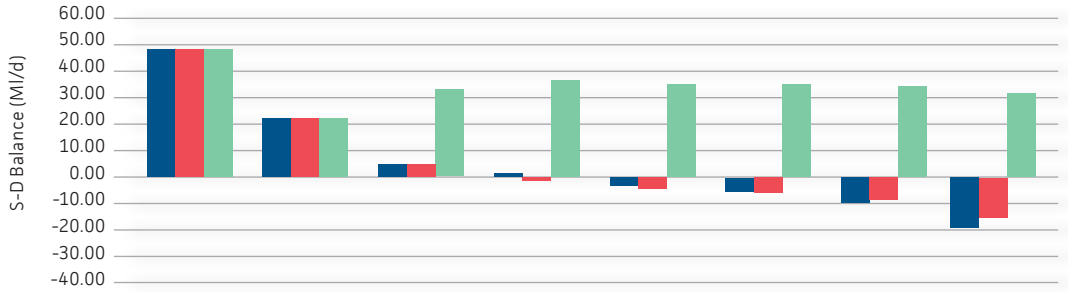
Backwater at Marsh Meadow

Western Region (WRZs 4-5)

In our Western region our graph shows that the local supply demand balance will be in deficit by 2040 in the worst situation.

The graph below shows how the different scenarios impact on the local supply demand balances in our Western region.

Western region supply demand balance: 1 in 500 Dry Year Annual Average



	2025/26	2030/31	2035/36	2040/41	2045/46	2050/51	2060/61	2075/76
Situation 1	46.61	22.62	17.43	1.47	-2.35	-4.99	-10.01	-19.15
Situation 4	46.61	22.62	17.43	-0.19	-3.35	-5.91	-8.81	-14.73
Situation 9	46.61	22.62	34.12	35.47	34.43	34.05	33.43	31.00

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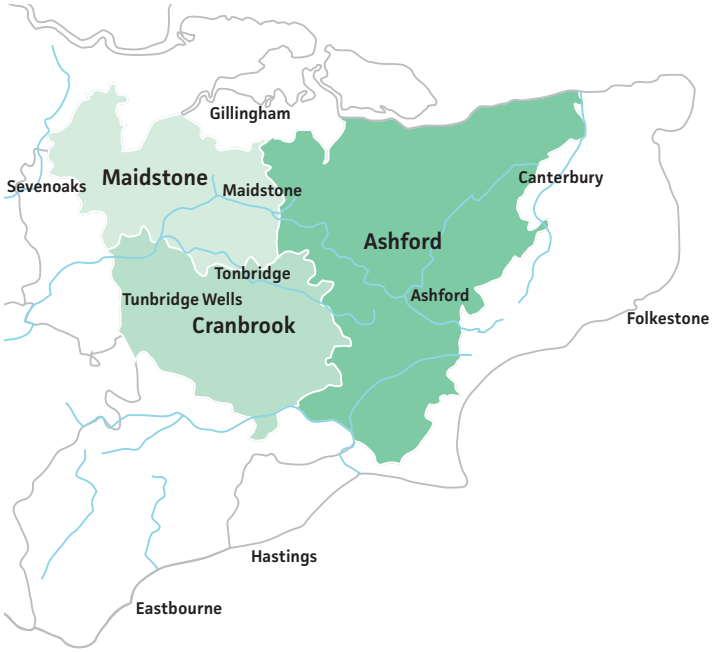
2075 – The challenge continued

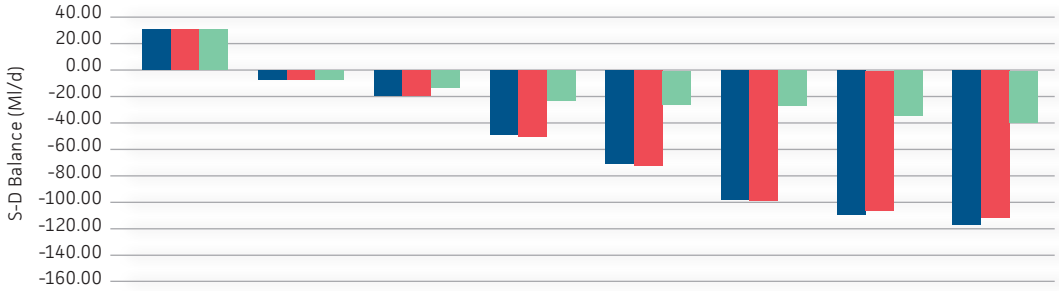
River Stour



Kent Region (WRZs 6-8)

The graph below shows how our Kent region will fall into a supply demand balance deficit by 2030.

Kent region supply demand balance: 1 in 500 Dry Year Annual Average



	2025/26	2030/31	2035/36	2040/41	2045/46	2050/51	2060/61	2075/76
Situation 1	27.40	-6.74	-19.59	-48.12	-72.36	-98.54	-108.73	-118.60
Situation 4	27.40	-6.74	-19.59	-49.33	-73.26	-99.33	-108.03	-115.40
Situation 9	27.40	-6.74	-12.82	-22.89	-25.13	-29.05	-35.85	-40.37

Find out more

▷ Supply demand balances and adaptive planning

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Identifying possible options

The River Ouse and grazing cattle

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Identifying possible options

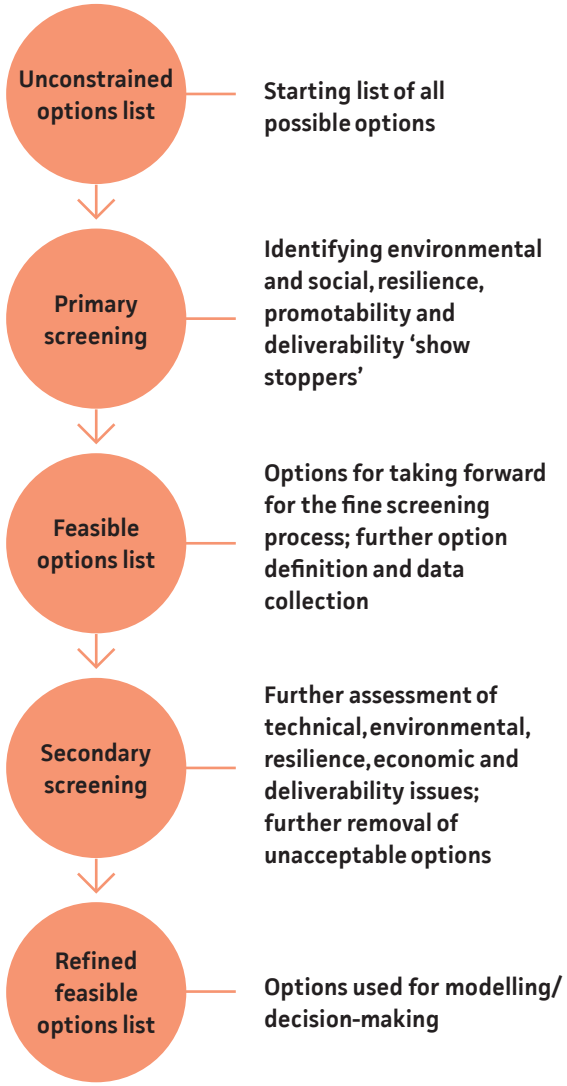
Our supply demand assessment has identified that we are forecasting a deficit of water in the future. This means we will be unable to meet the levels of service our customers expect unless we invest in new schemes to increase supply or reduce demand.

This section sets out our approach to identifying all possible options for addressing the future deficit. These need to be acceptable in terms of cost, environmental resilience and deliverability. They must be informed by customer views and customer challenge, and go through a thorough environmental assessment through the Strategic Environmental Assessment (SEA) and Habitats Regulations Assessment (HRA).

The process of identifying and evaluating possible water resource management options is an important stage in the development of our dWRMP24. When assessing what options could meet any deficit, we follow a multi-stage approach that screens every option against a pre-defined set of criteria.

Options development involves several key steps, including:

- Identifying all possible options we could use in our plan (unconstrained options list)
- primary and secondary screening assessments (feasible options list and refined feasible options list).



These steps are all carried out before we put forward our preferred options. The multi-stage approach to options appraisal and development actively involves our stakeholders and customers and integrates fully with the work being done at regional level by WRSE.

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Identifying possible options continued

Identifying options

The options appraisal and screening process started from a generic list of water resources option types.

The range of options considered has included:

- Ways of reducing and managing demand
- new supply options
- new transfers of water.

Unconstrained options list

We revisited the options considered for WRMP19 and reassessed those not taken forward, including options previously rejected to make sure our previous assessments remained valid.

We then added new options identified through the regional planning process, through consultation with our internal and external stakeholders, and from third parties.

One of our many water treatment sites

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Identifying possible options continued

New supply side options

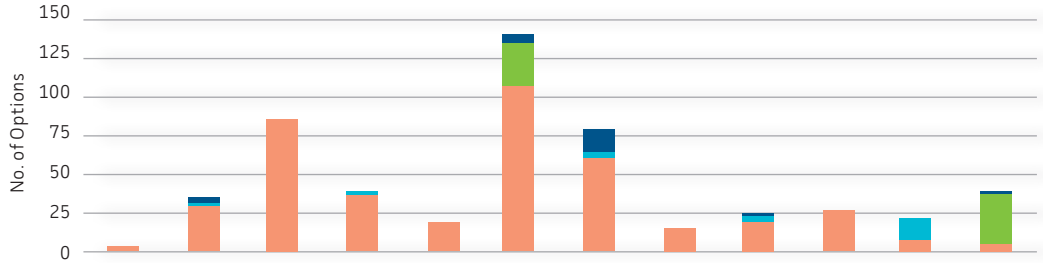
We used our internal innovation platform, Atlas, to engage with our colleagues and gather their input. As a result, some new options were identified for further investigation and appraisal.

We also needed to identify new actions that could be taken during extreme drought situations. These additional emergency drought options, ranging from more intensive communications campaigns to restricting water use between certain hours or in specific locations, were included in our unconstrained options list.

The latest guidance recommends considering new options that focus on building resilience, rather than contributing to the supply demand balance. Our regional work has ensured that the regional plan has been tested against a new resilience framework. This means we can assess options for their resilience to future shocks and stresses as well as for cost, best value and impact on the environment (including climate change). We have identified and developed several options to address resilience gaps highlighted through the WRSE's new resilience framework.

Other new options we have identified include storing treated water during winter in an underground aquifer at one of our existing sites in Kent, and using an existing groundwater source that is currently owned by a third party within our area. For dWRMP24, we have also developed the Peacehaven water recycling scheme further, in collaboration with Southern Water. This scheme was included in WRMP19 as an alternative option.

Summary of dWRMP24 Unconstrained Options List



	SUR	RES	GRO	EFF	DES	TRA	DEM	CON	WTW	LIC	DRO	CAT
Third Party Options	0	4	0	0	0	0	14	0	1	0	0	1
SEW New Options	0	2	0	2	0	5	4	0	5	0	13	0
WRSE New Options	0	0	0	0	0	29	0	0	0	0	0	28
WRMP19 Options	2	28	84	37	19	106	59	13	19	26	7	5

SUR	surface water
RES	reservoirs
GRO	groundwater
EFF	effluent reuse
DES	desalination
TRA	water transfer
DEM	demand management
CON	conjunctive use
WTW	water treatment works
LIC	licensing
DRO	drought measures
CAT	catchment management

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Identifying possible options continued

Demand management options

Our dWRMP24 is about managing demand for water as well as about finding new water supplies. The WRSE regional assessment has included both.

The options in our plan reflect the need to make water demand savings, as outlined in the National Framework for Water Resources (2020) and the government's expectations for water resources planning (2022). These commitments include reducing leakage by 50 per cent by 2050 (based on our 2017/18 levels), reducing non-household demand and achieving a national average per capita consumption (PCC) of 110 litres/per person/per day by 2050.

We continue to work with WRSE and other companies to ensure our regional approach to demand management is consistent and closely aligned. WRSE has produced new guidance and a template to help water companies develop demand reduction strategies and options using similar methods and datasets.

Using a new framework, water companies in our region now combine demand reduction options into low, medium and high strategies, with suggested targets for water consumption and for leakage reduction during the life of the WRMP.

Find out more

▷ Demand management strategy

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Identifying possible options continued

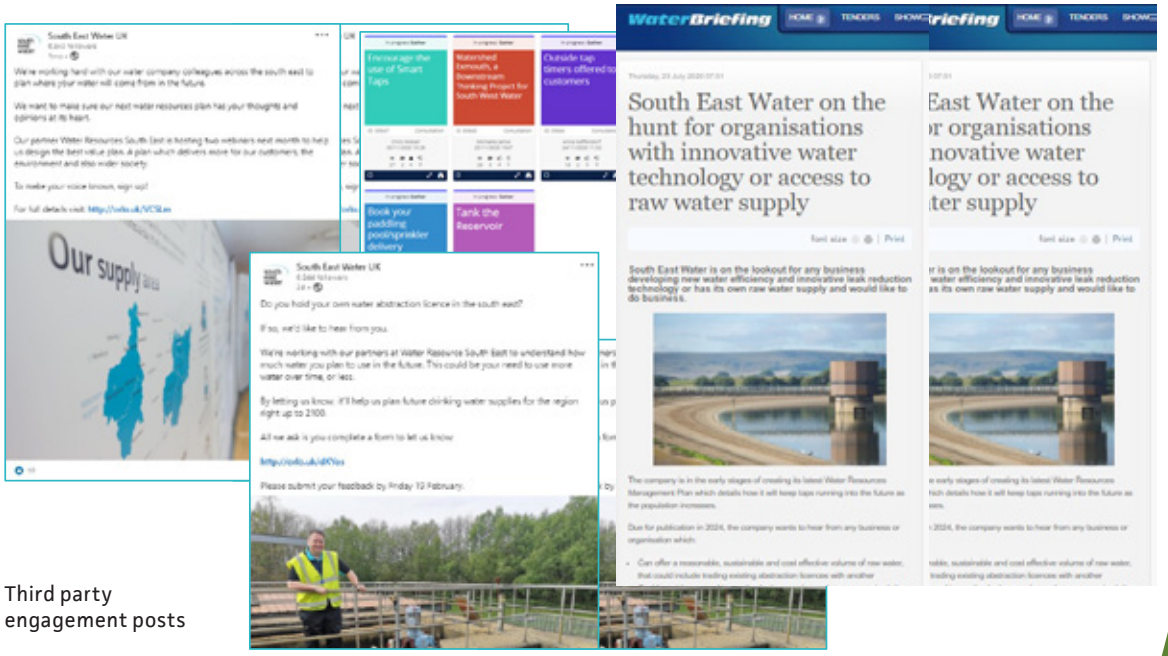
Regional options appraisal

A regional options appraisal process was carried out by WRSE and we contributed our unconstrained list of options to this process. Options considered at regional level included new water supplies and infrastructure, green infrastructure and catchment management, demand management and reduction measures, and interventions to manage drought events. We have included the catchment options developed by WRSE within our unconstrained options list.

WRSE has also conducted more work to identify and develop water transfer options to make use of the unused surpluses that will exist within the region in 2025. This work has looked at how neighbouring water resource zones could be better connected to benefit from such a move. We have included these new water transfers in our unconstrained list for further development.

Third-party options

We have considered viable third-party options and opportunities for collaboration to develop supply or demand options. Third party options could include, for example, a transfer of water between water companies, licence trading, or water efficiency schemes provided by a third party. To stimulate new third-party options, we extended our engagement approach.



Third party engagement posts

We developed a water resources bidding market area on our website to make water resource data openly available to potential bidders and to receive their third-party plans. We used a bid assessment framework, based on the system used to assess our own options, to review these.

Through our regular regional WRSE meetings, we contacted neighbouring water companies to assess the feasibility of inter-company transfers. In addition, we contacted licensed abstractors within our supply area, inviting them to consider trading part of their licence.

Our Environmental Scrutiny Group (ESG) has provided a further opportunity to engage with stakeholders (regulators, local authorities and environmental groups) about other potential third-party options. We have used local and social media channels to promote our search for new options too. As a result, we generated new third-party options that were included in our unconstrained options list.

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Identifying possible options continued

Primary screening

The 478 unconstrained options were screened to develop a manageable set of the more promising options for further consideration (the feasible options list). We applied a simple pass/fail method to remove options and we retained options that were considered marginal so they could be assessed in greater detail at the next stage. Options were screened for:

- Resilience
- promotability
- deliverability
- environmental and social acceptability.

We used the same screening criteria to WRMP19, based on the latest guidance. This ensured a consistent and efficient shortlisting process.

For the environmental and social acceptability criteria, we screened out options that were likely to have unacceptable environmental impacts that could not be mitigated or avoided.

The yield of each option was considered for both dry year annual average and dry year summer peak period for each year of the planning period, across a range of drought scenarios.

After primary screening, the feasible options set comprised 208 options for further assessment during the secondary screening stage.

One of our many water treatment sites

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Identifying possible options continued

Secondary screening

Further (secondary) screening used the same overarching four principles to reduce the feasible options list. This resulted in a shortlist of options (refined feasible options list) to assess for inclusion in our decision-making process.

Discussions with our stakeholders have helped ensure that options have been rigorously and transparently tested against a range of challenges, including to meet the requirements of SEA, HRA and the Water Framework Directive (WFD).

The feasible options list was reviewed by the Environment Agency and Natural England as part of our secondary screening process. Feedback received helped us further refine the list to ensure we only took realistic options forward. We have tested the range of options with our customers (including via willingness to pay research) to better understand customers' preferences for different option types.

As part of the screening process, we screened out options considered to have unacceptable environmental impacts that could not be overcome. In our feasible options process, we conducted environmental assessments to help conserve protected habitats and species and looked for opportunities to help nature to become more resilient to climate change.

Refined feasible options list

After secondary screening, the refined feasible options set comprised 157 options. These options were passed to WRSE for inclusion in the regional decision-making process.

Find out more

- Options appraisal methodology
- Unconstrained options report

We take pride in conserving protected habitats and species

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The River Ouse in West Sussex is the principal raw water source in the county

Strategic Environmental Assessment

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Strategic Environmental Assessment (SEA)

There are many different investment options we could choose to address the water supply demand deficit in our supply region and they vary in terms of scale, cost and reliability. We are committed to protecting and improving the environment and leaving it in a better place for future generations.

We have published a 25-year Environment Plan which sets out our company's roadmap to build environmental resilience to future challenges. We have used this roadmap, formal environmental assessments and a natural capital approach to inform our decision-making, to influence and shape our plan and to minimise impacts on the environment and, wherever possible, enhance the natural environment further.

We recognise that some of the options outlined in our draft plan to increase supply, improve network resilience, and reduce pressure on water-stressed sources could have an adverse effect on the environment or on local communities, either during construction or through our operations. Through the dWRMP24 process, we conduct a Strategic Environmental Assessment (SEA) and other environmental analysis to formally assess and mitigate the potential impact of our strategic plans and operations on the environment.

SEA process

The aim of the SEA process is to provide a high level of protection for the environment and to ensure that the environment is considered at all stages of the preparation of our dWRMP24. The SEA process involves collecting information, defining alternatives, identifying environmental effects, developing mitigation measures and revising proposals in light of the predicted environmental effects.

There are four key stages to the SEA process:

Stage one
Setting the context and objectives, establishing the baseline and deciding on the scope

Stage two
Developing, refining and appraising strategic options and assessing effects of the dWRMP24

Stage three
Preparing an SEA report for our dWRMP24

Stage four
Consulting on our SEA dWRMP24 report, assessing significant changes and producing a post-adoption statement.

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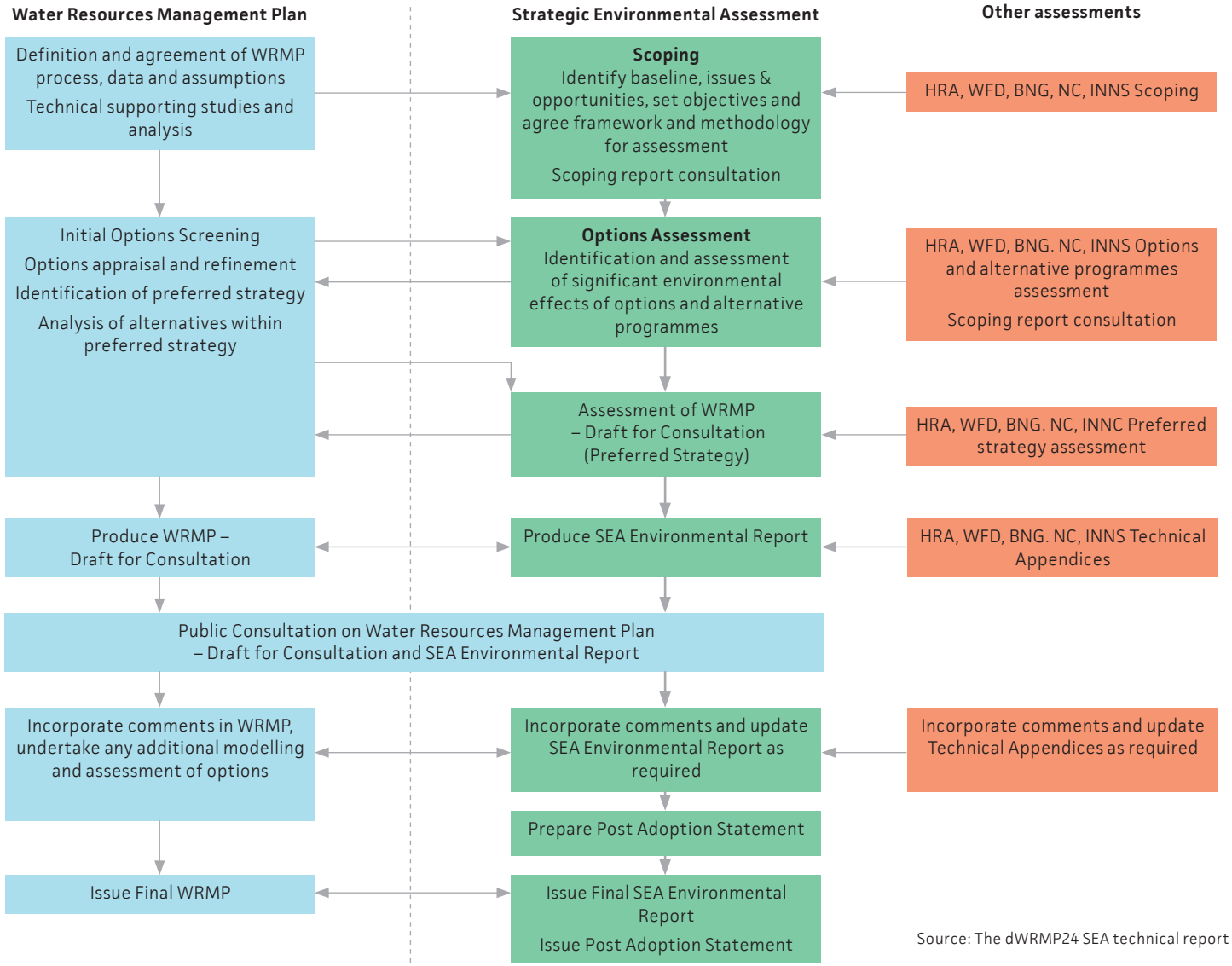
Strategic Environmental Assessment continued

Relationship between WRMP24, SEA and other environmental assessment processes



Source: The dWRMP24 SEA technical report

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Strategic Environmental Assessment continued

SEA scoping report

The first stage of the SEA process was a scoping study to identify both the focus and extent of the SEA. This provided a framework and objectives for further assessment of the key environmental, socio-economic and sustainability issues in the south east and the implications and opportunities arising out of these for our dWRMP24.

The scoping study provided baseline data and information about the current and potential future environmental conditions in our area. Our SEA objectives and criteria have been agreed through consultation, after reviewing links with other relevant processes, plans and policies and the environmental baseline information. We consulted on our scoping report in March and April 2022 with statutory environmental bodies and other key stakeholders.

We reviewed the feedback from the scoping report consultation and have incorporated changes, as necessary, in the SEA report for dWRMP24, which sets out the results of the SEA. During development, the SEA has informed the dWRMP24 decision-making process as we iteratively assessed and developed our options and Preferred Plan (dWRMP24). The aim of the SEA process is to develop a dWRMP24 that both meets legislative environmental requirements and provides environmental net gain. Further views will continue to be sought as part of our statutory consultation.

SEA objectives

The objectives of our dWRMP24 SEA are to:

- **Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain**
- **protect and enhance the functionality, quantity and quality of soils**
- **protect and enhance the quantity and quality of surface, groundwater, estuarine and coastal water bodies**
- **reduce and minimise air and noise emissions**
- **achieve South East Water's target of reducing operational carbon emissions to net zero by 2030 and contribute to the national target of net zero by 2050.**

Our company-level SEA reflects the environmental assessment process adopted for the regional resilience plan (through our WRSE collaboration). This consisted of six different assessments:

- Strategic Environmental Assessment (SEA)
- Habitats Regulations Assessment (HRA)
- Water Framework Directive (WFD) Assessment
- Biodiversity Net Gain (BNG) Assessment
- Natural Capital (NC) Assessment
- Invasive Non-Native Species (INNS) Assessments

How we contribute to an environment that flourishes

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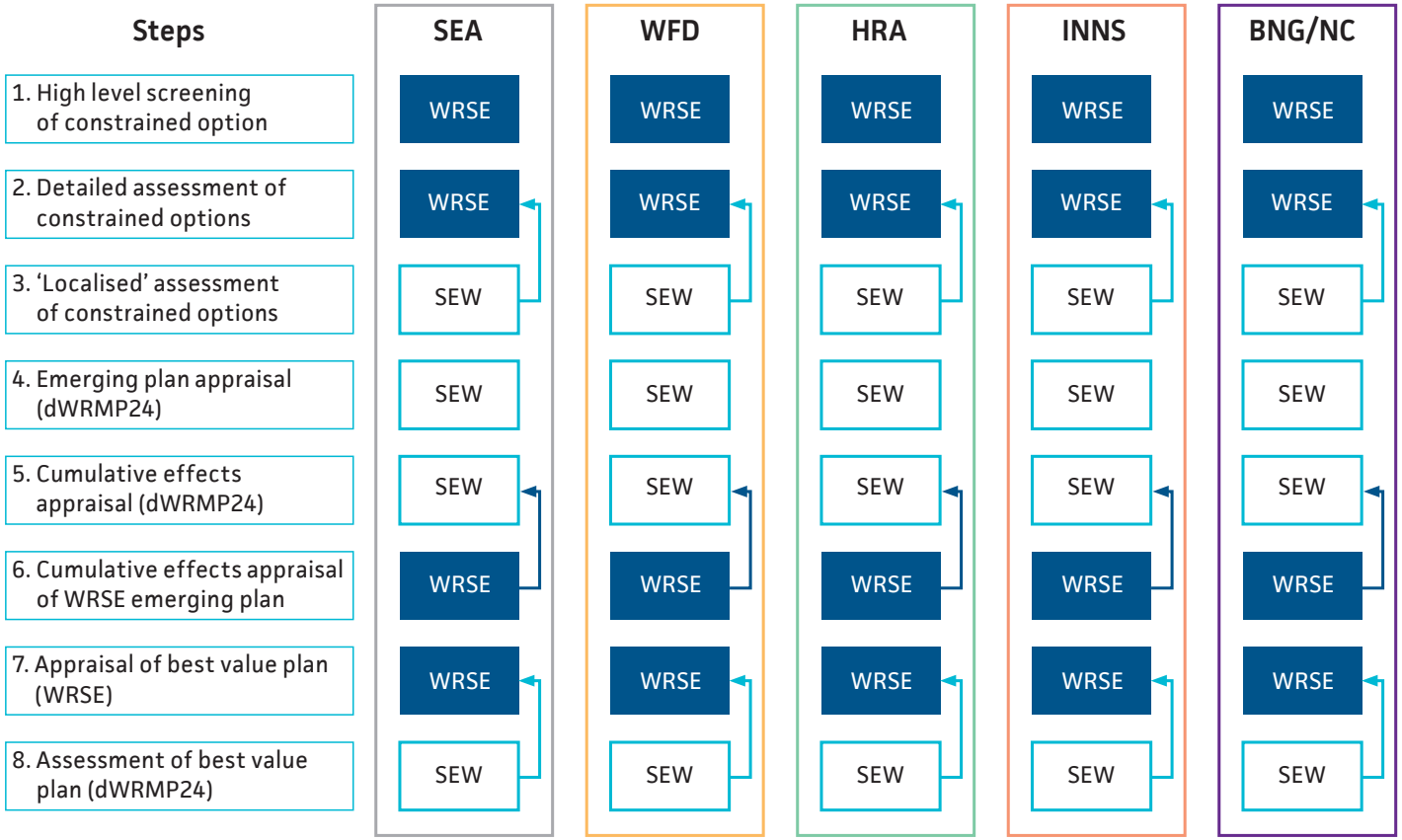
Strategic Environmental Assessment continued

During the scoping stage, we reviewed, validated and adapted the regional SEA objectives, criteria and results. This validation and adaptation process, using local plans and policies, has helped us to keep local issues, specific to our supply area, in sharp focus. As a result, we have developed a bespoke SEA framework that is compatible with the regional WRSE framework while reflecting local issues and opportunities.

WRSE, dWRMP24 and environmental assessment relationship



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Strategic Environmental Assessment continued

Environmental baseline

In order to assess the potential environmental sustainability effects of the dWRMP on our supply area, we established an environmental baseline.

We used a geographical information system (GIS)-based approach to analyse maps and databases showing environmental features and constraints across our supply area and beyond. This has looked at key SEA topics, such as biodiversity, soils, the water environment, air and climate, cultural heritage, and landscape, as well as social aspects including health and material assets.

The SEA process is designed to be flexible, adaptable and responsive to changes in the baseline.

Key environmental issues and opportunities

We identified key environmental sustainability issues from the review of the baseline information and other plans and programmes. The analysis of these issues has influenced the development of the SEA framework, especially in relation to decision-making questions. The key issues are:

- Biodiversity
- soil (protecting and enhancing the functionality, quantity and quality of soils)
- air quality
- greenhouse gas emissions
- adaptation to a changing climate and flooding
- cultural heritage
- water resources
- land use, soil and agriculture
- natural resources and waste
- population and human health.

Links with other policies, plans and programmes

Our dWRMP24 will influence and be influenced by plans, policies and programmes produced by local authorities, statutory agencies and other planning bodies. It is therefore important that our SEA closely aligns with the dWRMP24 and other relevant plans and environmental objectives at a local, regional and international level. This ensures that the objectives of the SEA are not at odds with the objectives of these other plans.

We have reviewed recent strategies, legislation and updates, such as the UK Environment Act, UK Net Zero Strategy and National Planning Policy Framework. At a more local level, we have reviewed local policies, plans and programmes and also reviewed our own corporate plans and strategies to ensure close alignment.

Our SEA process follows current and emerging guidance and best practice and we continue to consult widely with stakeholders about the potential impact of our plans on the environment.

How the SEA has influenced our plan

In developing our dWRMP24, we have identified a wide range of possible investment options that could address the water supply demand deficit in our supply region. These options differ significantly in scale, cost and reliability and include options to reduce demand for water (eg. water efficiency measures and leakage reduction) and options to increase supply (eg. storage reservoirs, reusing water, desalination of sea water, abstraction from groundwater and rivers and transfers between water companies).

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Strategic Environmental Assessment continued

A qualitative assessment of options was conducted using the SEA objectives to look at the environmental and social implications of the construction and operation of the proposed solutions. From this assessment we have been able to determine whether any impact would be beneficial or adverse. The results have been fed back into our dWRMP process and to the regional planning team for further consideration.

Beneficial impacts are likely to be long-term operational effects linked to improved network resilience, reduced pressure on water-stressed sources, and benefits associated with habitat creation, landscaping, and provision of recreational and amenity features.

Significant adverse effects are most likely during construction activities and may impact on biodiversity, water, soils, and landscape. Our SEA has identified these potential impacts and started the process of identifying ways to minimise the impact. In many cases, when construction activities end, environmental benefits will ensue as pressure on the water environment is reduced, water availability is increased, and other benefits are realised. For instance, a new reservoir would lead to water-based recreation, habitat creation and walkways. There would also be a knock-on positive impact on people's health and wellbeing.

Adverse effects connected with the operation of schemes are much less likely. Where they do exist, they are more to do with carbon emissions. We have identified appropriate mitigation measures to address significant adverse effects and to ensure we make the most of any beneficial effects.

Even some of our small solutions may cause disturbance to people or the local environment but this is likely to be minimal and short-term.

Assessment of alternatives

The SEA Regulations require us to identify, describe and evaluate the likely significant effects of implementing alternative scenarios to the plans which have been assessed as well as the likely significant effects of the plan itself. For dWRMP24, we have identified four alternative scenarios.

We have also considered secondary and indirect effects that may occur. These could stem from a cumulative effect of several proposals being implemented in the same area or at the same time. Or they could have a synergistic impact when two or more impacts collectively create a much larger effect.

Monitoring

The SEA process sets out a series of monitoring indicators to be considered during the further development of the WRMP24. Monitoring is expected to extend to significant social, environmental and economic effects. Our work on this is ongoing and will carry on in parallel with the development of our preferred options and through the detailed design and implementation phases. All work done through this process to highlight areas of potential risk and opportunity, as well as mitigation requirements, will inform the design process, including site selection and route alignment.

Find out more

- WRSE Regional Plan Strategic Environmental Assessment scoping report
- WRSE Regional Plan Strategic Environmental Assessment report

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A Kent water treatment works

Planning for the future

Addressing the challenge

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The regional approach and decision-making process

Groundwater resource, Pembury reservoir

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The regional approach and decision-making process

Our starting point for our company dWRMP24 has been the draft regional best value plan which has been developed through Water Resources South East (WRSE). This section covers the development and selection of the best value plan, covering the approach and decision-making process.

The regional approach

The draft regional best value plan builds on the emerging plan consultation and sets out how the region plans to achieve a secure, resilient and sustainable supply of water for customers and other sectors, across a range of challenging potential futures. The plan includes a mix of options that together provide the water needed for the region's people and places, alongside a range of wider benefits to society. WRSE has developed a best value plan which looks at factors beyond just cost to reflect wider societal expectations and to ensure the plan delivers additional environmental benefits.

Wallers Haven downstream of Boreham Bridge

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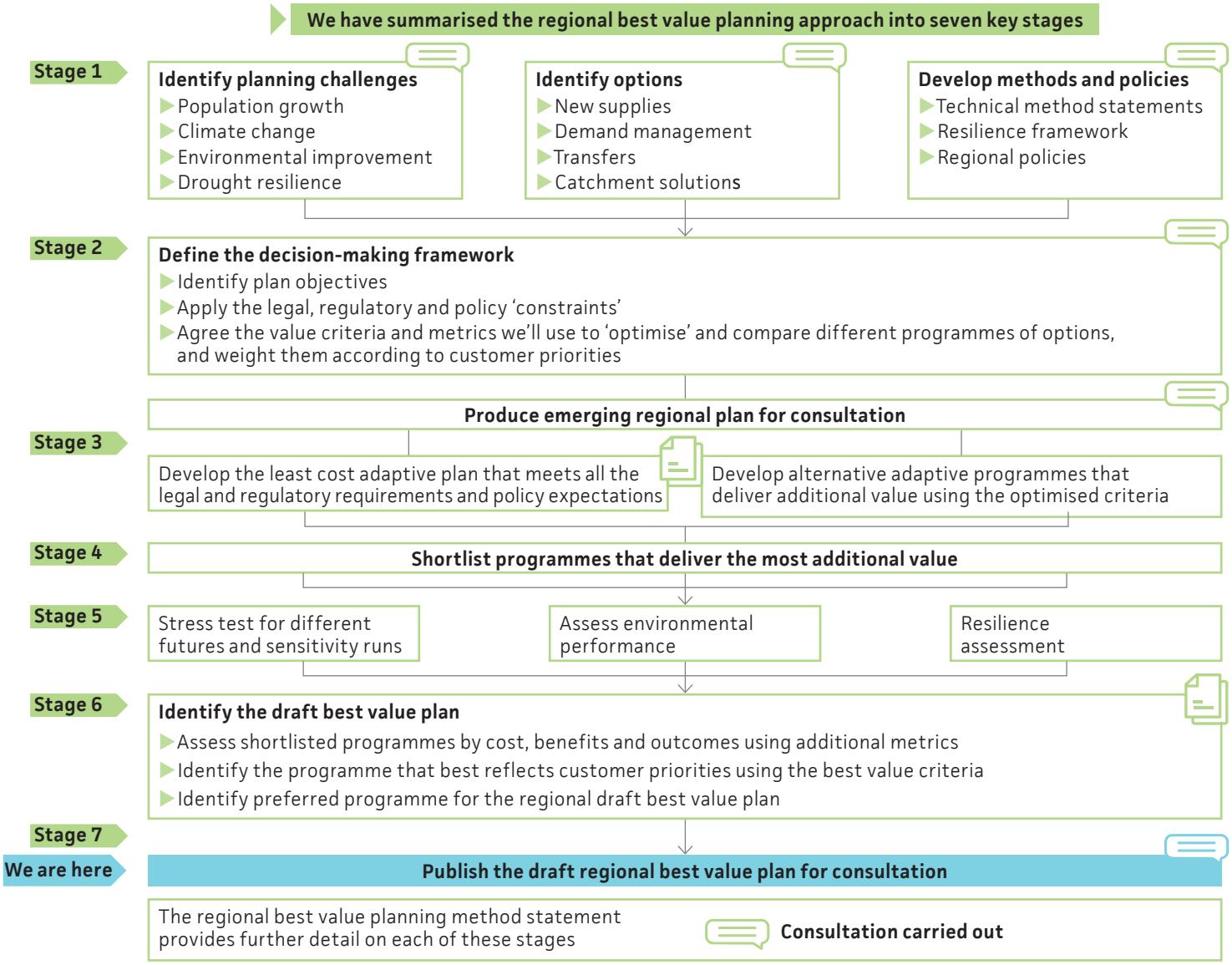
The regional approach and decision-making process continued

The process to develop and select a regional best value plan has involved a number of key steps and is summarised in the diagram below:



The plan is still in development. Feedback, consultation and customer views will continue to inform WRSE's work as it moves towards a final regional plan.

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The regional approach and decision-making process continued

Investment modelling

WRSE has undertaken hundreds of investment model runs to develop a regional best value plan and an adaptive plan. These have resulted in the following conclusions:

- **Immediate schemes are required to meet the challenges in the region. These must be developed and in place within the first six years of the plan**
- **the move to a greater level of resilience within the region will require another set of strategic solutions. These solutions, and the connectivity they add, will allow the region to better adapt to the future**
- **the final stages of the plan set out the additional solutions needed to protect and meet the future environmental requirements, climate change and population growth.**

The investment modelling identified the least cost solution to meet the future supply and demand needs across the region. For the emerging regional plan, only factors with a monetary cost were considered. For the draft regional plan, WRSE has used best value metrics within the investment model.

The model managed future uncertainties through the use of adaptive pathway trees, with each branch representing a different set of future conditions.

For each branch, the model seeks to minimise the cost associated with meeting the need on that branch, while ensuring that sufficient activity is carried out before the break point to allow future branches to build on that investment. The lowest cost plan is the one that does this for the lowest total expected programme expenditure.

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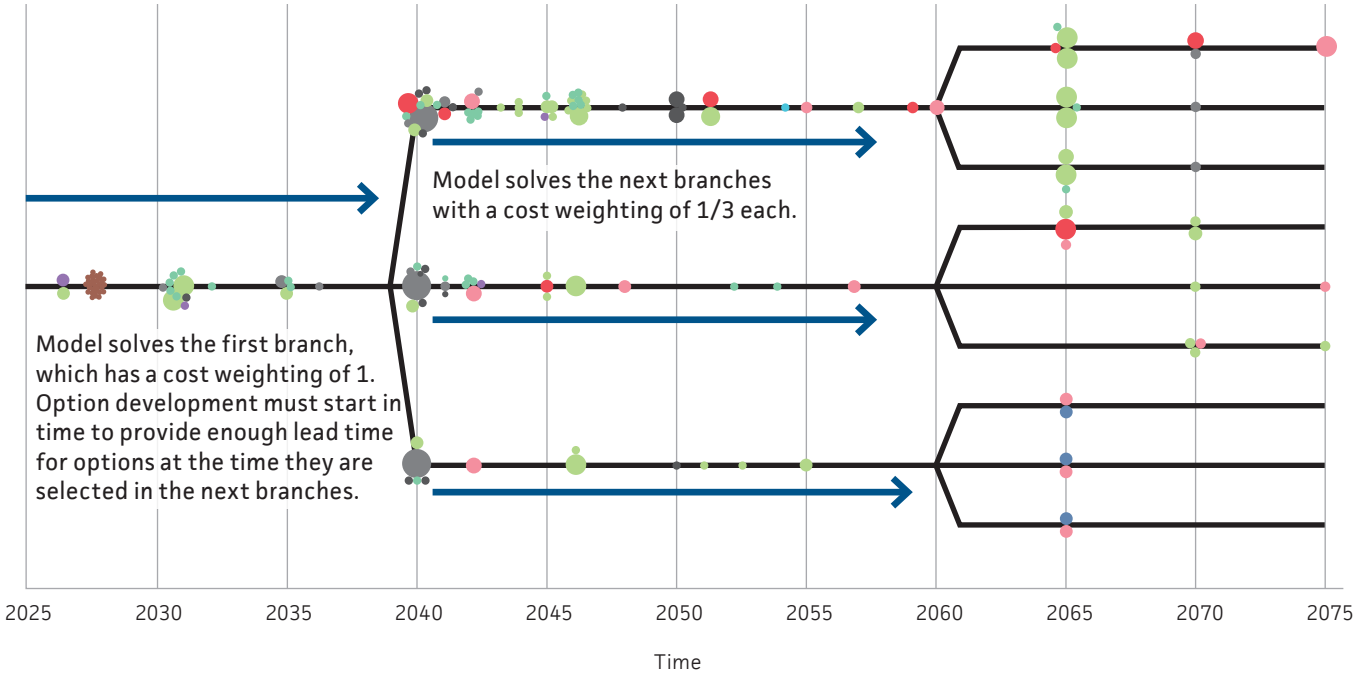
The regional approach and decision-making process continued

The cost-efficient adaptive solution is the one that balances delays in expenditure in 'long lead time' (but more efficient) options in the first branch against the cost risks that causes the adverse futures in the next set of branches.

Illustration of investment modelling approach



The coloured dots are provided for illustrative purposes and represent the size, type and timing of different schemes.

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The regional approach and decision-making process continued

The adaptive plan

WRSE's investment model used an adaptive situational tree to derive a series of best value investment plans to meet the needs of the south east.

This timeline sets out the journey from the first upload of data to the regional investment model through to the draft regional plan:

WRSE's journey to the best value plan

Upload data and start the process

- Option appraisal
- EBSD runs
- Adaptive plan branches
- Least cost runs
- Regional reconciliation
- Adaptive plans

Emerging cost-effective plan

- Consultation feedback
- Adaptive plan update
  - Scheme updates
  - SRO gate 2 updates
  - Revision of branches
- Regional reconciliation process
  - Updated SDB position
  - Scheme exclusions from other regions
  - BVP and cost analysis

Least cost plan

- Pareto runs on individual BVP metrics
  - Program review
  - Threshold analysis
- BVP runs
  - Increase lower metric thresholds
- Program review
  - Axiom plots
- Fixed Sesro capacity BVP runs
  - Sesro 75: 100; 125 and 150

Draft regional best value plan

- Sensitivity runs
  - Drought resilience
  - Government interventions
- Scenarios
  - Exclusion of Sesro
  - Exclusion of Sesro and other upper Thames reservoirs
- Exclusion of other SROs
- Inclusion of catchment solutions

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The regional approach and decision-making process continued

An adaptive plan considers the uncertainties of forecasting future supply, demand and environmental policy conditions, and has four elements:

- **A preferred set of pathways that show how we invest and build in response to changing conditions**
- **short-term actions to start now, and longer term investments in each pathway**
- **any preparatory actions needed now to allow the longer term options to remain open**
- **a monitoring plan for tracking the situation and the triggers that would take us from one pathway to another.**

The aim is to find the optimum set of solutions over the longer term across many different potential futures. WRSE used an investment model to find the best combination, from more than 2,000 options, to solve the future challenges, based on a branched pathway. The approach used real options and progressive hedging techniques to show how an investment programme would change if key uncertainties were resolved in the future, taking into account the time needed to develop some options. This model has provided an objective dataset to help determine the best mix of solutions, based on the method statements developed through consultation with stakeholders.

Forecasts are used to derive pathways (or situations) which define how much water is required but these are influenced by external factors and policy decisions. The adaptive plan therefore has to highlight potential trigger points and where/how the plan might need to change from one path to another. A fully adaptive plan aims to identify a flexible strategy that sets us up the longer term. It looks across all the branches and uncertainty points to create a set of schemes that can adapt efficiently to these uncertainties. Branching is a balancing act which needs to happen at the right time, not too soon and not too late. There are two ways to look at the timing of branching. It can happen:

1. **Once acceptable levels of risk are exceeded ie where future uncertainty exceeds the uncertainties accounted for in the initial strategy**
2. **at a natural break point ie when we have a substantially more definitive answer to key uncertainties.**

As the WRMP process is a five-yearly cycle, there are natural branch points at the start and end of planning periods. In addition, WRSE looked at triggers based on risk and policy decisions:

- **Risk-based triggers – when do the future uncertainties caused by environmental, climate and growth exceed target headroom?**
- **policy decision-based triggers – when can a decision regarding the final environmental decision be made?**

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The regional approach and decision-making process continued

WRSE is using a series of runs to determine the best time to introduce the one in 200-year and one in 500-year drought resilience policies. For policy decisions about environmental destination, there are several uncertainties that need to be explored before the final policy positions are known. This will be key to deciding when an environmental decision can be made but there are two likely times for the decision – 2035 and 2040.

Until the proposed environmental destination investigations are complete, companies will continue with their existing abstraction reduction commitments and continue to explore further licence reductions with regulators.

With the introduction of risk-based triggers, a new situation tree configuration has been developed since the emerging plan (see 2075 – The challenge section). The updated tree branches on different growth scenarios by 2035 and different environmental destinations by 2040. This means that by 2040, the plan will accommodate nine different potential pathways.

Selecting a plan

The process followed by WRSE to prepare and develop a regional plan for consultation has ensured that we have robust plans that have been tested against a range of scenarios. The process was also used to improve the value of the plan, as set out in WRSE's best value plan approach, which was consulted on in July 2020.

Although one plan has been put forward as the draft regional plan, there are alternative plans. Feedback from stakeholders and customers has helped to inform the further development of the regional plan.

In developing least cost and best value plans, WRSE has explored a series of policy expectations. Many of WRSE's policy decisions are based on the UKWIR approach to developing a best value plan. This revolves around finding the most advantageous combination of cost, quality and sustainability to meet current and future needs through secure, high-quality and resilient water supplies. Best value also considers social and environmental benefits and customer and stakeholder preferences, alongside cost.

WRSE's policy expectations (including government and regulatory policies), used to develop the regional best value plan, are set out below. WRSE has also explored the impact these policies have on the development of the plan, testing the plan's sensitivity to the policies shown below, by using investment model runs.

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The regional approach and decision-making process continued

Leakage WRSE
Plans to reduce leakage by 50 per cent by 2050; after 2050 reductions will be based on best value.

Personal water use (Per Capita Consumption)
We'll define a path to reduce Per Capita Consumption (PCC) based on evidence, best value, local circumstances and engagement with customers and stakeholders. Individual company ambitions will be combined into a regional PCC target and we're looking to take a broader approach which also includes non-household water use and focuses on environmental sustainability.

Carbon
WRSE will follow national best practice to reach net zero carbon emissions by 2030 for operational carbon. We'll develop an approach for embodied carbon and operational carbon beyond 2030, again following national best practice and industry guidance as it develops.

Environmental ambition
Environmental ambition has never been as important as it is now. We're pursuing our strategic and technical work, as well as our engagement with customers and stakeholders, to understand how we can play our part to identify and deliver a progressive level of environmental protection, enhancement and adaptation for our region. We'll continue to work with regulators and government to discuss how to make this a practical reality, including the best way to secure funding.

Levels of service
The WRSE water company members plan to work towards a common service level for all customers in the South East for Temporary Use Bans and also potentially Non Essential Use Bans.

Private water supplies in droughts
We plan to work with other sectors to make provision to support private water supplies where public health or the welfare of animals could be at risk in a severe drought.

Drought permits and orders
WRSE plans to align with the approach set out in the Environment Agency's National Framework on the use of drought permits and drought orders and the role they may play to improve levels of service and drought resilience to one in 500-years in the next plan. That is, we will only plan to use them if they don't unnecessarily harm the environment.

Resilience
We plan to increase resilience to drought so the need for rota cuts and standpipes reduces to no more than once every 500 years on average. We'll use our resilience framework to decline other resilience standards supported by customers and stakeholders.

Ethical, buying, social equity and public value
We believe water transfers or shared infrastructure with other regions should meet the same principles and standards which form the basis of our plan. We plan to include social and public value in our approach and we'll work with regulators on how this should be done.

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The regional approach and decision-making process continued

As a result, WRSE concluded that the draft regional best value plan should be based on:

- Government water efficiency policy B
- achieving the one in 500-year drought resilience by 2039/40
- the inclusion of TUBS and NEUBs, in line with company drought plans
- decarbonisation of electricity from the national grid
- the inclusion of less environmentally damaging drought permits up until the time that we achieve the resilience standard of one in 500-year.

Least cost plan

A least cost plan was developed using a computerised investment model to find the most cost-efficient solutions across all nine situation branches for different conditions ie normal year, dry year (one in 100-year), drought year (one in 500-year annual average) and a drought year (one in 500-year critical period). The model generated a series of alternative least cost plans. WRSE explored the performance of these plans using best value plan criteria and cost (carbon and financial) before conducting best value modelling.
A total of 25 different adaptive regional least cost plans were explored. This modelling provided the basis for comparing various plans and for considering the trade-off between resilience and the environmental and societal choices as part of the best value plan.

Best value plan runs

The investment model was used to explore how the regional plan would change with better best value scores for each of the metrics below. This approach generated several alternative programmes for review which were taken forward for final decision-making and selection of the best value plan.

Customer preferences	SEA benefit and disbenefit	Natural capital
Biodiversity net gain	Carbon	Reliability, adaptability and evolvability

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The regional approach and decision-making process continued

Selection of the best value plan

The many least cost and best value model runs the WRSE has undertaken provide us with a significant quantity of comparative information on the performance of different potential plans.

Given the wide range of model runs we can easily compare how the plans change with different policy choices and assumptions, with the different best value metrics prioritised, and with individual options included or excluded. All of this comparative assessment helps to underpin our decision making processes, and results in the endorsement and selection of the regional best value plan we consider represents most appropriate to form the basis of the regional consultation.

Using this information, we have compared and assessed these plans in detail as well as had discussions with other water companies and our regulators.

The draft regional best value plan that has been selected is a robust and adaptive framework to respond to the uncertainty we face over the planning period from three drivers; population growth, the amount of abstraction reduction we will need to deliver to protect and enhance the environment and climate change impacts on our water resources.

The regional plan is specifically designed with adaptive pathways and decision points to enable us to take account of the uncertainty and future decisions around growth, environmental protection and climate change. We have stress tested the plan to ensure that the options we have selected are needed under alternative futures, and remain the most appropriate set of solutions should the cost and timing of individual options change in the future.

The best value plan, together with the least cost plan and the best environmental and societal plan, are then reported in the draft regional plan that is being consulted upon.

Find out more

▷ **Draft Regional Plan – Water Resources South East Technical annex 1: The challenge we face and how we prepared our plan**

Ardingly Reservoir, West Sussex

The regional solution

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The regional solution

WRSE has developed a best value plan for consultation, which sets out a regional solution to securing the south east's water supplies from 2025 to 2075, based on four priorities:

1. Efficient use of water and minimal wastage across society
2. new water sources that provide sustainable and resilient supplies
3. a network that can move water around the region
4. catchment and nature-based solutions that improve the water environment we rely upon.

The regional plan represents the best value combination of options to meet the future challenges the region faces and that perform most favourably against WRSE's assessment criteria.

Resilience framework

Our water supplies need to be resilient to a wide range of shocks and stresses, including drought, freezes, floods and pandemics. As outlined in section 4 of our technical overview, resilience framework has been developed to help achieve this.

The options in the regional best value plan have been assessed against the following resilience criteria:

- Reliability – the ability of the system to withstand short-term shocks without actively changing its performance
- adaptability – the ability to adapt to a short-term change or the impact of a shock
- evolvability – the ability to change to cope with long-term trends.

Snow covered Kent in 2018

The regional solution continued

The draft regional best value plan addresses the four priorities above in the following ways:

Efficient use of water and minimal wastage across society

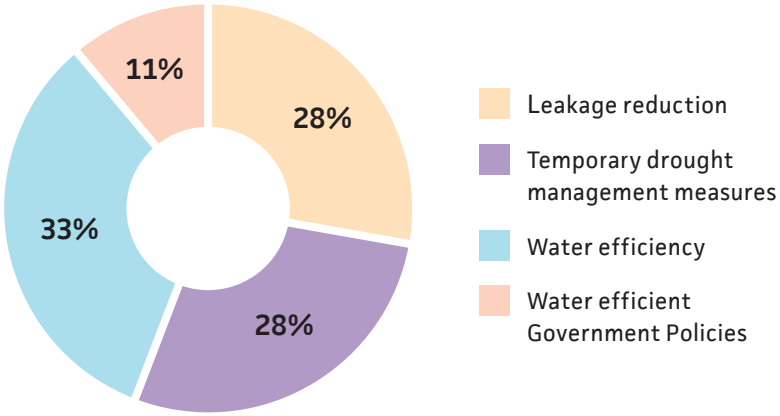
Reducing the demand for water is a priority for the draft regional best value plan. This is particularly important in the first ten years of the plan while new water sources are being developed and while we determine the level of long-term environmental improvement through abstraction reduction.

The draft regional best value plan includes long-term targets for leakage reduction and water efficiency. A range of demand management approaches have been prepared by water companies to achieve these targets, including smart metering, new tariffs, behaviour change programmes and state-of-the-art leak detection technology.

By 2050, achieving the level of demand reduction set out in the plan could provide more than half the additional water needed to address the shortfall in water supplies. This would enable water companies to meet the government's target to reduce per capita consumption (PCC) to an average of 110 litres per person per day. The draft regional best value plan also relies on the government implementing new policies to support long-term, sustainable demand reductions through:

- **Water labelling of all water-using products by 2024 (already committed to by government)**
- **minimum standards for all water-using products by 2040 at the latest**
- **improved building regulations for new homes and retrofits by 2060 at the latest.**

Percentage contribution of schemes to reduce demand



The draft regional best value plan continues to rely on temporary restrictions on customers' water use during droughts. Water companies have existing commitments to these temporary use bans (TUBs) or 'hosepipe bans' for households and non-essential use bans (NEUBs) for businesses. These temporary solutions reduce water use, contributing nearly 300 million litres of water per day to the draft regional best value plan. Without them, we would need to develop more new sources of water which would add further significant cost to the plan.

New water sources that provide sustainable and resilient supplies

Demand management measures will contribute a significant proportion of our future water resources needs, but a number of potential new resource development schemes will also be required to provide new water supplies for the future. These include transfers from other regions, new reservoirs, water recycling schemes, desalination plants, groundwater abstraction improvement programmes and opportunities to share water resources with other sectors (multi-sector options).

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The regional solution continued

Transfers from other regions

WRSE has been working with the other regional groups to identify opportunities to share water between regions and provide a more joined up national solution to the country's future water needs. Two transfers from the Water Resources West region into the south east are contained in the draft regional best value plan.

Reservoirs

Building additional water storage (reservoirs) will help us to adapt to climate change, capturing more excess water during intense rainfall periods. There are a limited locations across the south east where reservoirs can be built due to water availability, geology, and social and environmental factors. The draft regional best value plan has identified the need for some new reservoirs and schemes that will increase the size of the region's existing reservoirs.

Broad Oak reservoir, near Canterbury, in Kent is needed in the reported and high pathway by 2036, and ten years later in the low pathway. Preparatory work for this scheme is already under way and construction will need to start by 2031 to deliver the scheme by 2036. Other schemes in the WRSE area include a capacity increase at Bough Beech Reservoir in Kent and Broyle Place Reservoir, near Lewes in East Sussex.

Water recycling

Water recycling is where highly treated wastewater is returned to the environment and used to supplement our natural water supplies. Six water recycling schemes are identified in the draft regional best value plan for completion by 2035, with a further eight by 2075. This includes the Peacehaven scheme, in East Sussex, in 2041 which will use recycled water to supplement supplies in Arlington reservoir. Water companies are already progressing these schemes, and will provide a resilient supply of water to replace existing water sources and are in areas where extra water is needed.

Desalination

The need for desalination plants, that turn seawater and brackish water into drinking water by removing the salt, is driven by the long-term need to protect and improve the environment. Therefore, a decision on future abstraction reductions will inform future decisions about the extent of desalination schemes that will be needed.

Cost and the environmental impact of these schemes, such as Reculver desalination, in east Kent, mean that it is not always a best value solution for many, but WRSE will continue to work with water companies to investigate these options further, as necessary.

Improved groundwater abstraction and storage

The draft regional best value plan identifies six schemes before 2035 that could improve the way groundwater sources are currently configured so they can be used more efficiently and produce more water. A further 11 groundwater schemes to improve or recommission existing groundwater sources are identified before 2050. Groundwater schemes are needed in all the alternative pathways, although the more challenging pathways require more to be delivered. Managed aquifer recharge and aquifer storage recovery schemes can be developed in a small number of places due to the specific ground conditions required.

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The regional solution continued

Multi-sector options

WRSE has identified opportunities to share water resources with other sectors including:

- An abstraction licence trade with an energy provider in Oxfordshire
- a water recycling scheme to provide water to a paper producer in Kent
- a scheme to trade licences with farmers who currently abstract from the Western Rother and fund the development of new on-site reservoirs
- a scheme to repurpose a Canal and Rivers Trust reservoir for public water supply in north London.

Swinley Forest, Berkshire

A network that can move water around the region

Water companies already share some of the region's water supplies, moving up to 115 million litres of water per day through interlinking pipelines. Pipelines also exist to move water within water companies' own supply areas, through their water resource zones. The draft regional best value plan has identified new transfers to increase how much water can be moved around the region by 2075, depending on the future scenario we face. By 2075, an additional 1,900 million litres of water per day could be moved through the enhanced regional water network.

This will increase the connectivity of the region by moving water from areas where more is available to those where there is less; and they will help make supplies to homes and businesses more resilient as water companies will have more sources to rely upon.

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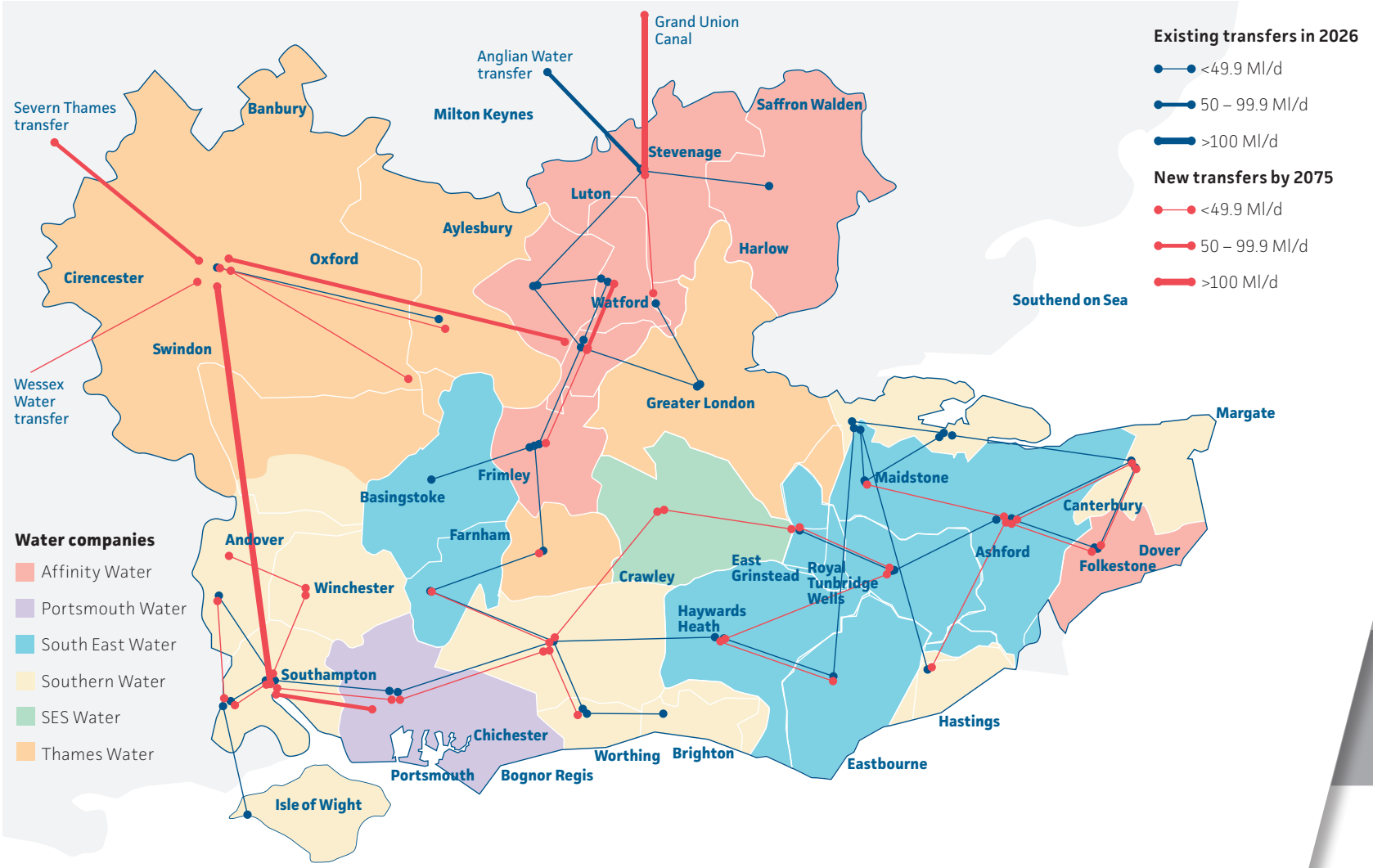
The regional solution continued

As part of this network, the plan identifies that some new strategic transfers are required, to enable water produced by other major schemes outside of our region to be transferred into our area.



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The regional solution continued

Catchment and nature-based solutions

Water companies in the south east abstract water from 28 river catchments across the region along with other users who have their own licences to abstract the water they need. WRSE's environmental forecasts show that by 2050, we may need to leave 1.1 billion litres of water per day in the environment that we currently use to supply our customers.

This will require a significant reduction in abstractions. The draft regional best value plan advocates exploring a more integrated approach that combines the use of catchment and nature-based solutions with more moderate levels of abstraction reduction.

This may deliver better outcomes for our rivers at a more efficient cost and deliver wider environmental benefits such as improving water quality and reducing flood risk.

Working with stakeholders, WRSE has identified more than 200 potential catchment and nature-based schemes across 20 catchments, which were included in the emerging regional plan.

The nature-based schemes in the draft regional best value plan include the following activities:

- River restoration
- nutrient and sediment reduction
- working with farmers to improve land management practices
- water retention measures such as natural flood management and wetland creation
- Sustainable Drainage Systems (SuDS) schemes.

Some of these options will help catchments to function more naturally, and to allow groundwater catchments to function so that rainwater stays on the land longer and replenishes groundwater stocks (which in turn support the flows in rivers). WRSE also want to work with other land and water users to reduce their water demand and reduce the impact of their own activities on raw water quality (which will mean that water is easier to treat, using less chemicals, carbon, waste) and provide a long-term biodiversity benefit.

For the draft regional best value plan, WRSE has applied the regulatory guidance and only included schemes that secure water resources. This results in integrated catchment activity being required on the River Itchen and River Test in Hampshire in the first five years of the plan.

Working with farmers to help manage catchments

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The regional solution continued

Cost and carbon impact

The cost of the draft regional best value plan for the pathway reported in this consultation is £15,590 million between 2025 and 2075. This includes the cost to build and operate new infrastructure and transfers, deliver leakage reduction and water efficiency activities and develop the nature-based schemes in our catchments.

The cost range of the WRSE full adaptive plan (covering more or less challenging futures) is £10,700 million to £16,400 million. Investment in water resources is largely funded through customer water bills.

Building and running new critical water resources infrastructure will generate carbon emissions. In the development of this plan, we have estimated the carbon footprint of the proposed programmes.

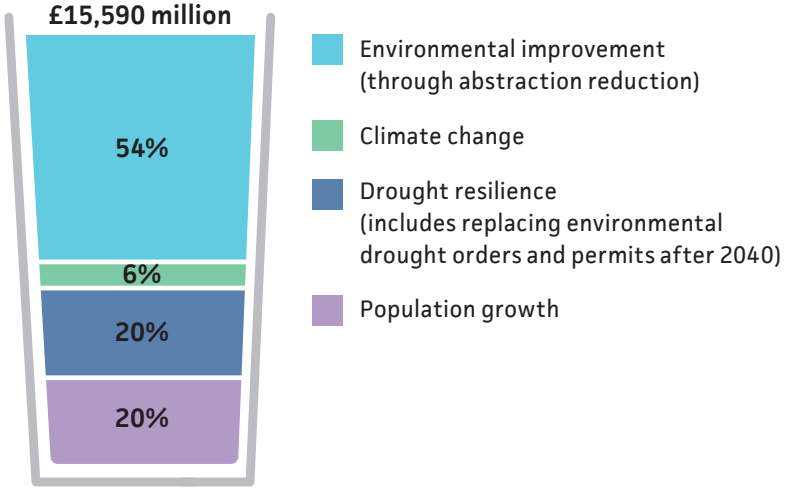
This includes the carbon emissions created through:

- The construction process, and activities associated with processing and transporting raw materials
- the replacement of assets and components at the end of their asset lives
- the ongoing operation of assets, this includes considering the energy requirements (accounting for projected decarbonisation of the UK electricity grid), chemical consumption and maintenance activities.

By measuring carbon in the development of the draft regional best value plan, lower carbon options can be selected, helping to avoid some emissions.

WRSE have also identified where there is potential to further reduce carbon emissions for the selected options. This could include using new construction techniques, powering construction machinery with green energy and using more environmentally friendly materials. There is also the potential for even greener options, such as green hydrogen, to be used later in the planning period.

Factors that are driving the investment in the draft regional best value plan



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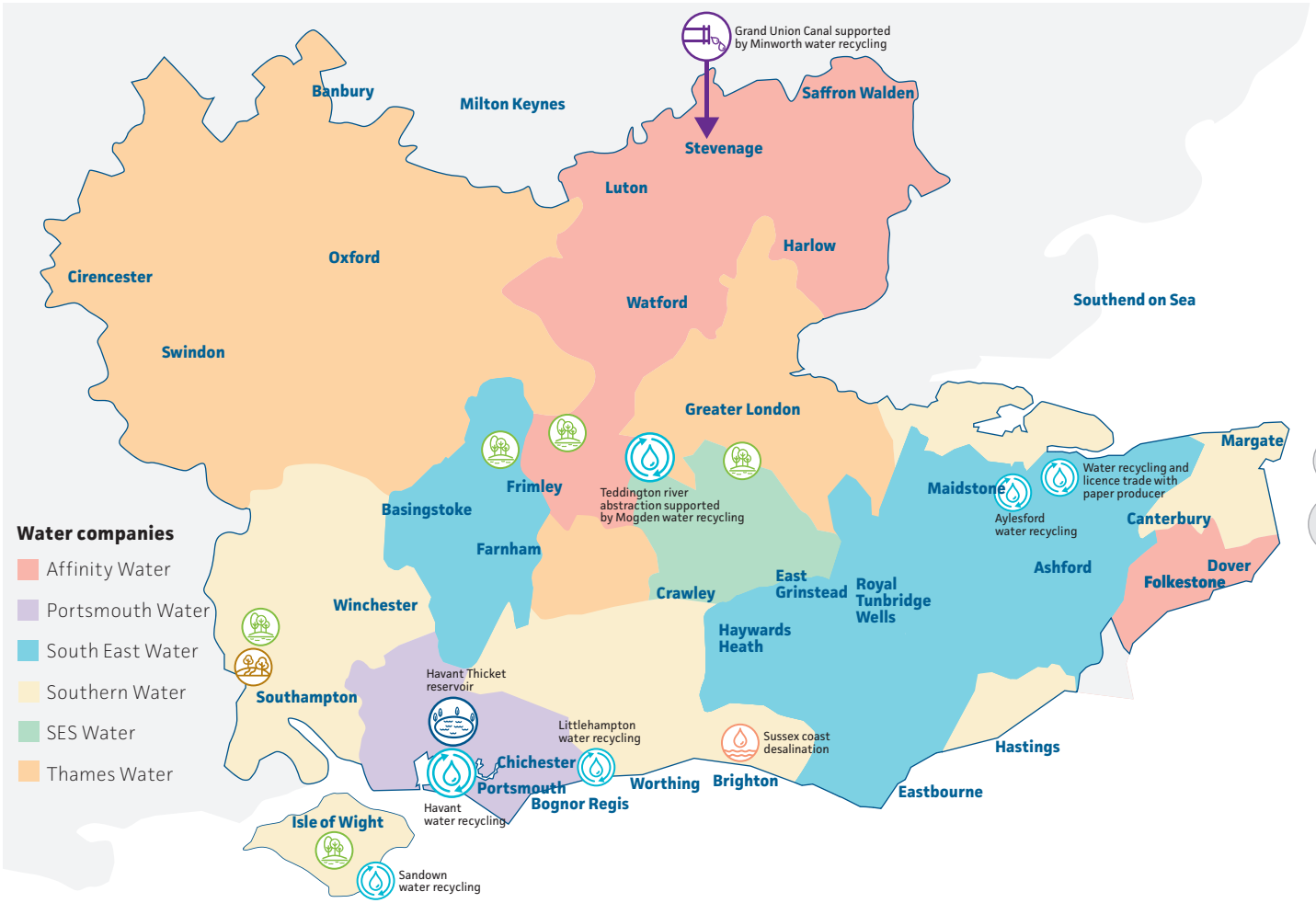
The regional solution continued

WRSE has considered the carbon cost of all the schemes, including the carbon emissions created through the construction process and the emissions produced through their ongoing operation. This has taken account of the carbon reductions that will come as a result of the decarbonisation of the electricity network in our modelling.

WRSE's draft regional best value plan 2025 to 2035

This shows the location of schemes identified in WRSE's best value plan.



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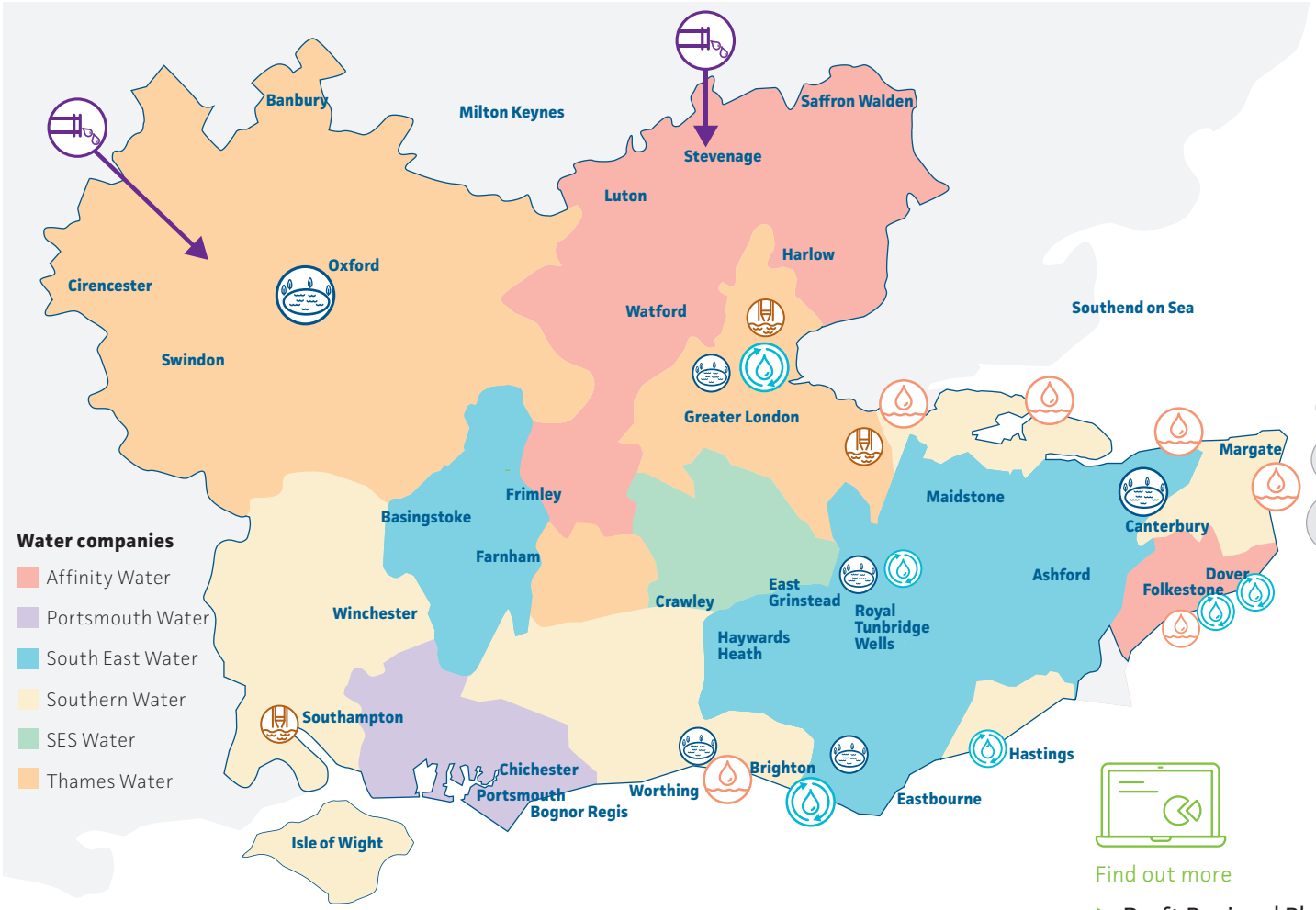
The regional solution continued

WRSE's draft regional best value plan 2035 to 2075

This map shows the main schemes in the reported pathway.



Key

Water efficiency and leakage

REGION WIDE

- Transfer from other regions
- Reservoir
- Water recycling
- Desalination
- Catchment management
- Ground water improvement

Amount of water available

- <20 Ml/d
- <20 to 99 Ml/d
- <99 Ml/d

Find out more

▷ Draft Regional Plan – Water Resources South East Technical annex 2: Our draft regional plan proposals

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Arlington Reservoir, East Sussex

Our Preferred Plan

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Our Preferred Plan

This section sets out Our Preferred Plan for the period 2020 to 2075 to ensure a reliable and environmentally resilient water supply for our customers.

The preceding sections of this technical overview have explained the regional approach to developing a Preferred Plan.

The starting point for our decision-making has been to develop a least cost plan from our supply demand balances and feasible options list, using the regional Water Resources South East (WRSE) economic optimisation model.

From this, WRSE have developed a long-term best value plan which has become Our Preferred Plan. This considers wider factors beyond least cost, including environmental, natural capital, resilience and customer acceptability.

We then considered whether it is possible to go one step further and deliver additional resilience, water supplies as well as community and environmental benefit sooner. Those options identified have formed our alternative plan.

This section sets out our preferred plan in four stages:

Stage one: Our Preferred Plan

Developed through our work with WRSE to meet the requirements for the 'reported' pathway (also called pathway four) of our adaptive plan

Stage two: Our adaptive plan

Developed through our work with WRSE to meet the requirements of all nine pathways of the adaptive plan. This allows us to adjust to future uncertainty by adapting to an alternative plan if changes are needed

Stage three: Comparison of model runs

Completed by the WRSE work during the programme appraisal stage to allow comparison against other plans

Stage four: Our alternative plan

Our company view of changes we could make to the regional (WRSE) work to provide additional 'local' value to Our Preferred Plan

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Our Preferred Plan continued

Stage one: Our Preferred Plan

We consider pathway four best meets the regulatory and guidance requirements and addresses the shortfall in water available for the 'reported' pathway of our adaptive plan, resulting in a final supply demand balance in Dry Year Annual Average (DYAA) and Dry Year Critical Period (DYCP) scenarios between 2025 and 2075.

Our Preferred Plan supply demand balance (DYAA):

Supply demand components for DYAA	2025/26	2030/31	2050/51	2074/75
Total WAFU (own sources)	602.35	548.12	405.40	400.95
Total demand	563.38	579.96	615.64	650.08
Baseline supply demand balance	38.97	-31.84	-210.24	-249.13
Preferred plan schemes (including bulk supplies)	52.06	55.96	222.60	277.27
Final supply demand balance	**91.02**	**24.12**	**12.36**	**28.14**

Our Preferred Plan supply demand balance (DYCP):

Supply demand components for DYCP	2025/26	2030/31	2050/51	2074/75
Total WAFU (own sources)	718.00	694.34	659.78	656.38
Total demand	702.98	721.58	778.81	831.11
Baseline supply demand balance	15.03	-27.24	-119.03	-174.73
Preferred plan schemes (including bulk supplies)	51.18	63.50	128.27	192.97
Final supply demand balance	**66.21**	**36.26**	**9.24**	**18.24**

Our Preferred Plan continued

Butler Water Treatment Works, Kent

2025 to 2030

Our Preferred Plan for 2025 to 2030 includes a mix of demand management initiatives (leakage reductions and water efficiency) that provide an additional 14.9 Ml/d above the assumptions already made in our baseline activities.

Reducing demand by this amount requires new approaches and technology and there is uncertainty on the level of savings that can be achieved.

We have discussed this with regulators and need to ensure that, while we aim to meet these stretching targets, we do not put unnecessary risk on our levels of service or security of supply.

During this period, and in addition to our demand management initiatives, we will continue the development of our Broad Oak Reservoir alongside a number of new company transfers ready for delivery when they are needed post 2030.

We will also start to see the benefit from our WRMP19 water supply option in Kent where we are constructing a new water treatment works at the former Aylesford Newsprint site. This will provide an additional 18.2 Ml/d.

In 2025 we are due to begin a new bulk supply to Southern Water of up to 2 Ml/d of water from our site at Kingston in Kent. Continuing all our bulk supplies arrangements with neighbouring companies, alongside the above interventions, will ensure that we are able to address any short-term deficits up to 2030.

From 2026, in WRZ4 (Bracknell), we will reduce our existing Egham to Surrey Hills import agreement to 26 Ml/d. This will allow Affinity Water (AFF) to forecast an increase of 10 Ml/d to their supply demand balance during this period.

Our Preferred Plan continued

2031 to 2040

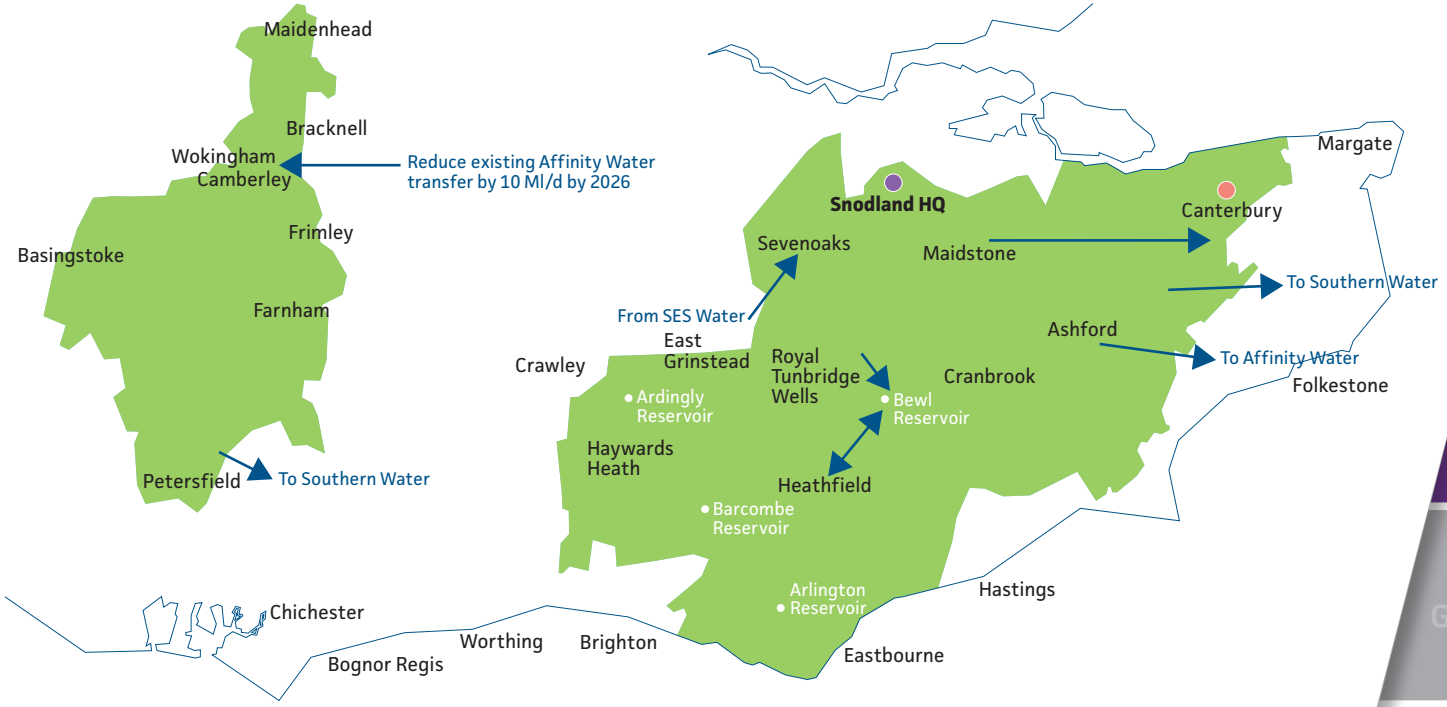
From 2031 to 2040 we will continue our demand management initiatives to achieve further leakage and water efficiency savings. However, by this stage we will need the following additional water supply options to meet the shortfall in our supply demand balance:

- Developing regional water transfer schemes:
  - importing water from SES Water to WRZ2 (10 Ml/d)
  - exporting water from WRZ5 to Southern Water (SWS) (10 Ml/d)
  - exporting water from WRZ8 to Affinity Water (AFF) (6 Ml/d)
- building a new reservoir at Broad Oak in WRZ8 (Ashford) (22 Ml/d) and a new improvement scheme to our pipe network to improve the connectivity within the local area
- developing four new company transfers between our water resource zones
- developing a new groundwater source, via a licence trade in WRZ6 (Maidstone) (1.2 Ml/d) and local network improvements.

Reducing leakage
by 36% by 2040*

Reducing customer demand
to 124 litres a day by 2040

*% Reduction (from 2017/18 levels)



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Our Preferred Plan continued

2041 to 2075

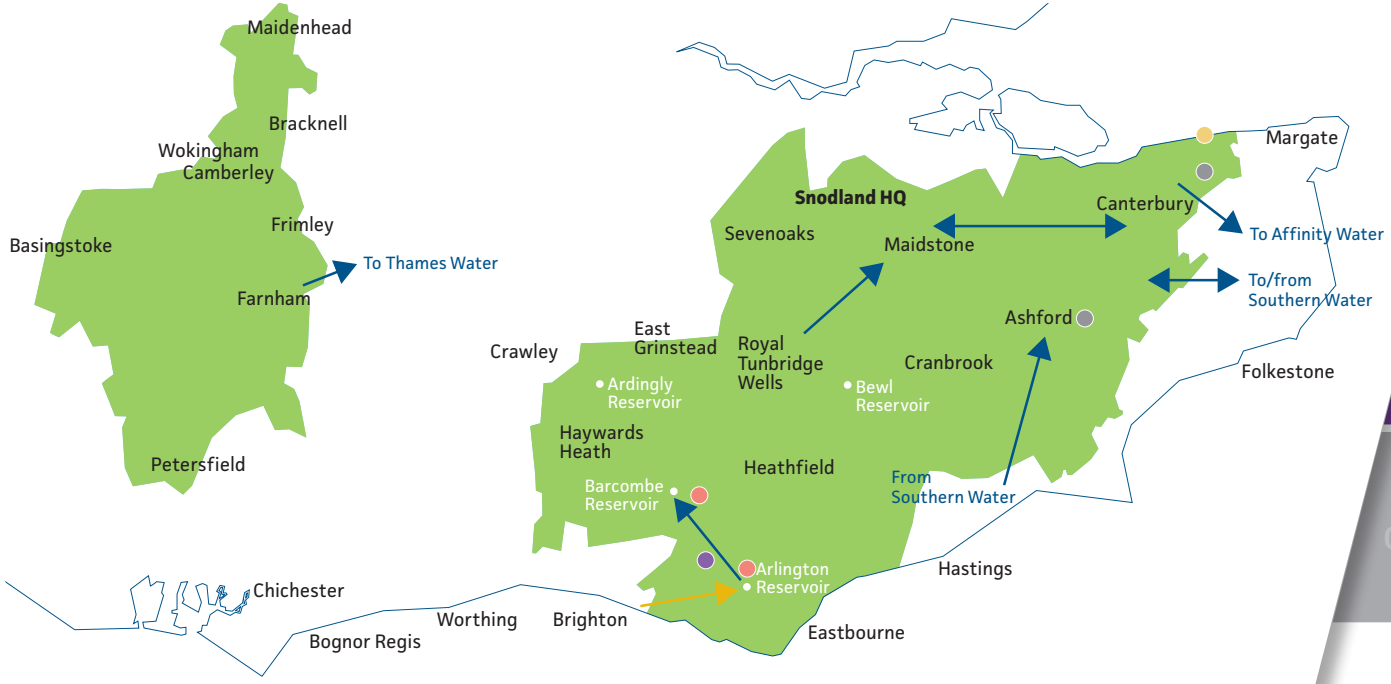
From 2041 to 2075 we envisage:

- Developing regional water transfer schemes:
  - two imports of water from Southern Water to WRZ8 (10 Ml/d and 20 Ml/d)
  - exporting water from WRZ8 to Southern Water (20 Ml/d)
  - exporting water from WRZ8 to Affinity Water (4 Ml/d)
  - exporting water from WRZ5 to Thames Water (TWU) (10 Ml/d)
- developing two new company transfers between our water resource zones
- developing a scheme to operate our surface water and groundwater sources more conjunctively on the River Ouse in WRZ2 (Haywards Heath) (6 Ml/d)
- developing a new water recycling facility to treat effluent from Peacehaven waste water treatment works in WRZ3 (Eastbourne) (30 Ml/d)
- upgrading an existing groundwater source in WRZ8 (Ashford) (1 Ml/d) and local network improvements
- building a new desalination scheme at Reculver in WRZ8 (Ashford) (30 Ml/d) and a new improvement scheme to our pipe network to improve the connectivity within the local area
- building a new reservoir at Broyle Place, East Sussex in WRZ3 (Eastbourne) (18 Ml/d).

Reducing leakage
by 50% by 2050, then 56% by 2075*

Reducing customer demand
to 112 litres a day by 2050

*% Reduction (from 2017/18 levels)



Key

- Desalination
- WTW improvements
- Conjunctive use of ground and surface water on the River Ouse
- Water transfers
- New reservoir at Broyle Place or Arlington
- Water recycling

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Our Preferred Plan continued

dWRMP24 Preferred Plan supply side schemes

Option name	WRZ	Capacity	Year
New bulk supply: SES Bough Beech to SEW Riverhill	WRZ1	10.00	2040
WRZ1 zonal scheme – additional storage at Blackhurst	WRZ1	-	2041
New company transfer: WRZ7 to WRZ2 transfer – Bewl to Cottage Hill	WRZ2	[5.00]	2034
New company transfer: WRZ3 to WRZ2 – Arlington to Barcombe	WRZ2	[10.00]	2041
Conjunctive use of surface water & groundwater – River Ouse	WRZ2	6.30	2053
Broyle Place Reservoir	WRZ2	18.00	2075
Water recycling – Peacehaven to Arlington	WRZ3	30.00	2041
New bulk supply: WRZ4 reduction in Egham bulk supply	WRZ4	-10.00	2026
New bulk supply: SEW Tilmore to SWS Hardham	WRZ5	-10.00	2031
New bulk supply: SEW WRZ5 to TWU Guildford	WRZ5	10.00	2050
Groundwater licence trade – Folkestone beds abstraction, Halling	WRZ6	1.22	2040
WRZ6 zonal scheme - reinforcement to Halling Reservoir	WRZ6	-	2040
New company transfer: WRZ1 to WRZ6 transfer – Blackhurst to Aylesford	WRZ6	[4.00]	2041
New company transfer: WRZ8 to WRZ6 transfer – Canterbury to Maidstone	WRZ6	[10.00]	2051
New company transfer: WRZ1 to WRZ7 transfer – Blackhurst to Bewl	WRZ7	[4.00]	2031
New company transfer: WRZ2 to WRZ7 transfer – Cottage Hill to Bewl	WRZ7	[5.00]	2031
New bulk supply: SEW Kingston to SWS Wingham	WRZ8	-2.00	2026
New company transfer: WRZ6 to WRZ8 transfer – Maidstone to Canterbury	WRZ8	[10.00]	2031
Broad Oak Reservoir	WRZ8	22.00	2036
WRZ8 zonal scheme – distribute water from Broad Oak	WRZ8	-	2036
New bulk supply: SEW Aldington to Affinity Water (AFF) Saltwood	WRZ8	-6.00	2040
Ford water treatment works (WTW) upgrade	WRZ8	1.00	2061
Reculver desalination	WRZ8	30.00	2046
WRZ8 zonal scheme – transfer of water from Ford WTW	WRZ8	-	2046
New bulk supply: increase in AFF bulk supply at Kingston	WRZ8	-4.00	2050
New bulk supply: SWS Brede to SEW Kingsnorth	WRZ8	10.00	2051
New bulk supply: SWS Wingham to SEW Canterbury	WRZ8	20.00	2051
New bulk supply: SEW Canterbury (Broad Oak) to SWS Wingham	WRZ8	-20.00	2051

Note: square brackets [xx] are used to denote where water is moving between water resource zones and not an increase in the availability of new water.

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Our Preferred Plan continued

Demand reduction strategy

Reducing the demand for water is a priority in the first ten years of our plan. This is essential while new water sources are developed, and the level of environmental improvement through abstraction reduction is agreed.

We have followed the regional WRSE framework for developing demand reduction strategies.

Through the decision-making process to develop our best value plan, the regional modelling work identified the need for a medium demand strategy to achieve the optimal solution and meet regulatory targets.

This is set out below:

	Target up to 2049/50	Targets post 2049/50
Water Efficiency	2049/50 target: reduction in projected demand by 7.5% from base year [2017/18]	2050 to 2075 target: 0.75% reduction each five-year planning period from 2049/50 level
Leakage	2024/25 target: achieve WRMP19 reduction 2049/50 target: 50% reduction from base year [2017/18]	2050 to 2075 target: 2% reduction each five-year planning period from 2049/50 level

Leakage

Since 2010 we have met or beaten our target to reduce leakage each year, driving our total leakage down from 95.9 Ml/d to 88.7 Ml/d in 2021/22 – a total reduction of eight per cent which represents upper quartile performance across the industry.

In WRMP19 we set ourselves a target of reducing leakage by 15 per cent by 2025. We are on course to achieve this ambitious challenge.

This concerted leakage reduction effort reflects our customers' preferences. Of all the options available, customers have indicated that they would be most willing to pay for leakage reduction.

However, reducing leakage is challenging, as most of the leaks that occur are small and invisible. Our technological and system advances, including the use of satellite technology, are enabling us to find more, smaller leaks. For dWRMP24, we are continuing our ambitious approach and we remain committed to reducing leakage levels by 50 per cent by 2050 and then to continue to make further reductions by 2075.

Leakage Benefits	by 2030	by 2035	by 2040	by 2050	by 2075
Leakage Reductions (Ml/d)	7.54	14.24	20.60	34.14	39.34
% Reduction (from 2017/18 levels)	**22%**	**29%**	**36%**	**50%**	**56%**

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Our Preferred Plan continued

Our Preferred Plan leakage options will result in the following maximum savings:

Leakage option	Total Reduction (Ml/d)
Smart networks programme	8.94
Calm networks programme	5.24
New technology implementation	0.80
Trunk main metering improvements	2.19
DMA integrity	1.37
DMA remainder improvement	0.52
Communication pipe replacement	3.72
Pressure boosters for customers	0.55
Mains replacement	26.84
Grand total	**50.17**

Water efficiency

Following further consultation during dWRMP24, we continue to include ambitious targets to reduce per capita consumption (PCC) over the short and longer term.

In line with our WRMP19, we plan to reduce PCC to 137.2 l/h/d by 2025, with the aim of closing in on our ambition of 110 l/h/d by 2050. Wider water efficiency initiatives and the government's commitment to water labelling on water-using products will be required to help us achieve our forecast.

We will continue to collaborate with others and will play a leading role to help the water industry to prepare to deliver these ambitious longer-term reductions.

Our focus will be on behavioural change initiatives, free water-saving devices for customers, partnership and community campaigns, and communications campaigns. In addition, we will introduce home and virtual audits as another key workstream.

Our water efficiency programme includes initiatives such as targeted audits, innovative tariffs, leaky loo find and fix, and smart metering. Our Preferred Plan consumption reduction is shown below:

Water Efficiency Benefits	by 2030	by 2035	by 2040	by 2050	by 2075
Company-led consumption savings (Ml/d)	3.47	9.11	13.14	24.77	39.27
Government-led consumption savings (Ml/d)	3.94	10.13	15.62	27.51	70.86
Total consumption savings (Ml/d)	**7.41**	**19.24**	**28.76**	**52.27**	**110.13**
PCC l/h/d	*135.90*	*129.67*	*123.93*	*112.46*	*93.95*

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Our Preferred Plan continued

Innovation and collaboration

Our ambition is to continue playing a leading role within the industry to drive forward change that will reduce water use. We will work in partnership with developers and local planning authorities to support the implementation of government led water efficiency activities including trials in Ashford, Kent and Basingstoke, Hampshire to deliver water neutrality within new housing developments.

A key part of achieving water neutrality will be rainwater harvesting and we will undertake proof of concept trials across our supply area with housing developers to understand how systems can be best integrated into greywater harvesting systems, social capital benefits as well as share ideas, learnings and understand costs.

Alongside working with housing developers we will also work with non-household customers in priority chalk catchments to increase their own water resilience by investing in new infrastructure. Through trials with golf courses, viticulture, brewing, farming, plant nurseries and polytunnel enterprises we will look at rainwater harvesting systems, the creation of attenuation ponds and leakage management. Similarly to household customers, the proof of concept will establish the costs, benefits, wider societal and natural capital benefits.

We hope these household and non-household trials will establish whether these interventions are a blue print for future government intervention.

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Smart metering

Smart metering using state-of-the-art technology to transform how we operate

Since 2011, we have installed water meters for around 90 per cent of our household customers. Most of these meters are simple manual meters. Smart metering is set to become the 'default' household metering approach over the next 20 years. Our plan assumes a three per cent saving on household consumption for properties upgrading from a simple meter to a fully smart meter.

Our smart water network programme will allow us to capture real-time data using intelligent digital solutions, leading to operational, system and customer service improvements. Between 2025 and 2030, we plan to complete the targeted trial deployment of different types of smart meters to compare and test them before a potential roll-out post-2030.

Our smart metering trials will start in our Sussex region which will provide us with the data needed for larger scale investment and roll-out if the technology proves to be successful.

Groundwater

Our plan includes one small groundwater scheme in 2040, involving the purchase of an existing abstraction licence and borehole, and the upgrade of an existing water treatment works (and infrastructure) to deliver a yield of 1.2 Ml/d into our WRZ6 (Maidstone).

In line with one of our key aims within our 25 year Environment Plan we will work with partners in our groundwater catchments on the North and South Downs to ensure land use and management supports the recharge of groundwater.

The wider benefit of this work will result in net gains in biodiversity, lock in carbon and provide wider societal benefits.

Catchment management

Two catchment management programmes, included in our WRMP19, to secure 3.3 Ml/d from our existing groundwater sources, continue to progress well. These were required as part of our current agreed Water Industry National Environment Programme (WINEP).

We have engaged with agricultural stakeholders and developed a targeted catchment management scheme covering more than 1,387 hectares of farmland in the Woodgarston catchment (WRZ4 – Bracknell). This has led to a reduction of 14,684 kg of nitrate in groundwater.

Rainwater harvesting system at a Sussex farm

We are proud of our longstanding commitment to innovative catchment management projects and are actively developing our programme to focus on addressing particular risks and protecting water quality from deterioration within specific catchment areas. There are also statutory catchment schemes (through our developing WINEP24) which will focus on preventing deterioration of raw water quality and improving it. Engagement workshops have been held with our regulators and environmental stakeholders to encourage more schemes to be put forward.

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Our Preferred Plan continued

Regional transfers

Imports

Our Preferred Plan includes three new regional transfer import schemes from our neighbouring companies, which will generate 40 Ml/d transfer capacity by the end of 2075.

This is in addition to the continuation of existing bulk supply agreements that we have in place with Affinity Water and Southern Water.

Option	WRZ	1 in 500 DYAA Yield	Year
SES Bough Beech to SEW Riverhill (WRZ1) transfer	WRZ1	10.00	2040
SWS Brede to SEW Kingsnorth (WRZ8) transfer	WRZ8	10.00	2051
SWS Wingham to SEW Canterbury (WRZ8) transfer	WRZ8	20.00	2051

Exports

Our Preferred Plan includes seven regional transfer export schemes to provide up to 62 Ml/d of surplus water to neighbouring water companies.

Option	WRZ	1 in 500 DYAA Yield	Year
SEW (WRZ4) reduction in Egham bulk supply	WRZ4	-10.00	2026
SEW (WRZ8) Kingston to SWS Wingham transfer	WRZ8	-2.00	2026
SEW (WRZ5) Tilmore to SWS Hardham transfer	WRZ5	-10.00	2031
SEW (WRZ8) Aldington to AFF Saltwood transfer	WRZ8	-6.00	2040
SEW (RZ5) to TWU Guildford transfer	WRZ5	-10.00	2050
SEW (RZ8) increase in AFF bulk supply at Kingston	WRZ8	-4.00	2050
SEW (RZ8) Canterbury to SWS Wingham transfer	WRZ8	-20.00	2051

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Reservoirs

Our Preferred Plan includes two reservoirs providing 40 Ml/d of new surface water sources by 2075:

- **Broad Oak, near Canterbury, in WRZ8 (Ashford) – yielding 22 Ml/d by 2036**
- **Broyle Place, East Sussex, in WRZ2 (Haywards Heath) – yielding 18 Ml/d by 2075.**

The Broyle Place scheme has been selected in Our Preferred Plan through the regional decision-making process, although we do have an alternative scheme (New Arlington Reservoir) that we are continuing to investigate (see alternative plan).

We have undertaken further work on the Broad Oak reservoir option since WRMP19 including yield assessments, draft planning applications, early survey work and stakeholder engagement.

We have also carried out an SEA environmental assessment of the reservoir scheme that shows while there will be some adverse environmental affects during construction, it has the potential to produce significant benefits through habitat creation and drought resilience as well as health and wellbeing for the local community.

Water treatment works

Our Preferred Plan includes improvements to one of our existing water treatment works at Ford, allowing the delivery of 1 Ml/d of new water in WRZ8 (Ashford) by 2061.

Inter-zonal and zonal transfers

We have included seven inter-zonal transfers (between our water resource zones) in our plan to provide an additional inter-zonal transfer capacity of 48 Ml/d by the end of 2075. We will be undertaking further work to define the route of these transfers to take account of environmental constraints.

We also plan to improve our water network within each WRZ to ensure the extra water from the source of each option can be transferred to the location within the WRZ where it is needed. Our Preferred Plan includes seven zonal transfers by the end of 2075.

Improvements to both these types of transfers will significantly increase the existing capacity within our supply area, enabling us to transfer large quantities of water when required.

Water recycling

Our Preferred Plan includes one water re-use scheme (using treated effluent) providing 30 Ml/d of new water by 2041 into WRZ3 (Eastbourne). The Peacehaven water recycling option involves treating waste water effluent from Peacehaven WTW to a suitably high standard to allow the treated effluent to be transferred inland to Arlington Reservoir to supplement the water supply into Arlington Water Treatment Works.

Conjunctive use

One new conjunctive use scheme is included in Our Preferred Plan, to provide a yield of 6.3 Ml/d on annual average in 2041 into our WRZ2 (Haywards Heath). This scheme proposes the use of the relatively higher flows in the River Ouse to enable a rest period for our groundwater sources in WRZ2.

Desalination

Our Preferred Plan includes a desalination scheme at Reculver, East Kent, in 2046, providing a yield of 30 Ml/d in WRZ8 (Ashford). This scheme will use reverse osmosis technology to treat saline water to a suitable standard to allow distribution into our water network.

The SEA environment assessment of the desalination plant has shown that there would currently be significant adverse affects affecting water biodiversity, water quality and the habitats and species living in the area.

We recognise and understand concerns about environmental risk and the high operational costs of desalination schemes which is why we have partially constrained the delivery of this project to later in our plan to allow time for investigation and technological advances.

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Sub-zonal schemes

Across our eight water resource zones there are 72 sub zones. Assessment has shown 21 sub zones have unresolved supply deficits due to unresolved constraints on network capacity. We have identified 23 schemes which will resolve the supply/demand deficit which will need to be delivered by 2030.

The 23 sub-zonal schemes identified to resolve the supply/demand deficit

Scheme No.	Description	WRZ	Sub Zone	Date Required
Scheme 1	Tonbridge to Bloodshots reinforcement	WRZ1	Groombridge	2030
Scheme 2	Bloodshots to Darnley boosters	WRZ1	Groombridge	2030
Scheme 3	Groombridge reinforcement	WRZ2	Tilkhurst, Wych Cross, Groombridge	2025
Scheme 4	Clayton reinforcement	WRZ2	Underhills	2025
Scheme 5	Sedlescombe to Clayton PRV	WRZ2	Underhills	2025
Scheme 6	Combe Down to Offham PRV	WRZ2	Underhills	2025
Scheme 7	Coombe High area reinforcement	WRZ2	Underhills	2025
Scheme 8	Poverty Bottom reinforcement	WRZ2	Firle	2030
Scheme 9	Amberstone to Windmill Hill reinforcement	WRZ3	Firle, Burwash	2027
Scheme 10	Amberstone Pumping Station upgrade	WRZ3	Firle, Burwash	2027
Scheme 11	Standard Hill Service Reservoir upsize	WRZ3	Firle, Burwash	2030
Scheme 12	Hazards Green to Standard Hill reinforcement	WRZ3	Firle, Burwash	2030
Scheme 13	Britty Hill area reinforcement	WRZ4	Britty Hil	2025
Scheme 14	Surrey Hills to Fleet reinforcement	WRZ4	Hog's Back, Hale, Swainshill, Tilmore	2030
Scheme 15	Lasham reinforcement	WRZ4	Swainshill	2031
Scheme 16	Cliddesden Service Reservoir upgrade	WRZ4	Cliddesden	2030
Scheme 17	Surrey Hills Service Reservoir to Ewshot Service Reservoir reinforcement	WRZ5	Hog's Back, Hale, Swainshill, Tilmore	2030
Scheme 18	Oakhanger pump, non return valve and rising main upsize	WRZ5	Swainshill, Tilmore	2030
Scheme 19	Oakhanger to Alton reinforcement	WRZ5	Swainshill	2030
Scheme 20	Butler WTW reinforcement to Kingshill and Beech	WRZ6	Bewl, Weald	2027
Scheme 21	Kingston reinforcement to support export to Southern during peak periods	WRZ8	Canterbury	2027
Scheme 22	Detling Service Reservoir to Hollingbourne Service Reservoir reinforcement	WRZ8	Charing, West Ashford	2027
Scheme 23	Aldington Service Reservoir construction and connecting mains and pumping station	WRZ8	Charing, West Ashford, East Ashford	2030

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Preferred plan costs

The capital expenditure costs (CAPEX) for the supply side schemes included in our best value Preferred Plan are set out as shown.

CAPEX costs include initial CAPEX, future capital maintenance costs and optimism bias/risk. All costs below assume a 2020/21 price base.

Option Type	CAPEX (£m) 2025 to 2030	CAPEX (£m) 2030 to 2035	CAPEX (£m) 2035 to 2040	CAPEX (£m) 2040 to 2050	CAPEX (£m) 2050 to 2075	CAPEX (£m) Total
Company Transfers	£50.72	£1.45	£46.87	£2.05	£6.23	**£107.33**
Regional Transfers	£0.00	£1.38	£12.44	£21.51	£4.48	**£39.81**
Reservoirs	£26.11	£125.50	£0.05	£20.34	£170.90	**£342.90**
Desalination	£0.90	£0.00	£14.56	£73.26	£84.57	**£173.29**
Other	£0.00	£0.00	£6.70	£11.90	£46.28	**£64.88**
Water Recycling	£2.07	£24.12	£112.05	£32.23	£134.32	**£304.79**
Zonal Schemes	£1.05	£34.25	£4.37	£3.93	£4.34	**£47.94**
Sub Zonal Schemes	£124.31	£93.23	£93.23	£124.31	£155.38	**£590.45**
Total	**£205.15**	**£279.92**	**£290.27**	**£289.54**	**£606.51**	**£1,671.40**

The table shown sets out the operating expenditure costs (OPEX) for the supply side schemes included in our best value Preferred Plan. These include both fixed and variable costs.

Option Type	OPEX (£m) 2025 to 2030	OPEX (£m) 2030 to 2035	OPEX (£m) 2035 to 2040	OPEX (£m) 2040 to 2050	OPEX (£m) 2050 to 2075	OPEX (£m) Total
Company Transfers	£0.00	£0.69	£0.62	£3.30	£5.92	**£10.54**
Regional Transfers	£0.00	£0.00	£0.34	£4.39	£21.36	**£26.10**
Reservoirs	£0.00	£0.00	£7.12	£14.24	£36.18	**£57.54**
Desalination	£0.00	£0.00	£0.00	£16.83	£84.17	**£101.00**
Other	£0.00	£0.00	£0.00	£0.62	£24.52	**£25.13**
Water Recycling	£0.00	£0.00	£0.00	£63.48	£170.65	**£234.13**
Zonal Schemes	£0.00	£0.00	£0.67	£1.42	£3.65	**£5.74**
Sub Zonal Schemes	£0.24	£2.59	£2.59	£5.18	£12.95	**£23.56**
Total	**£0.24**	**£3.29**	**£11.34**	**£109.47**	**£359.41**	**£483.75**

At the time of preparing and writing our dWRMP24, a review and update of the cost rates, and data that informs our Unit Cost Database (UCDB) is in progress as part of our PR24 business plan programme. Therefore, we expect that our costs presented for our dWRMP24 will change when we update next year for our revised WRMP.

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The table opposite sets out the CAPEX and OPEX costs for the leakage schemes included in our best value Preferred Plan.

The OPEX associated with our leakage strategy is split into two lines:

1. **The detection and repair costs associated with maintaining leakage at the reduced levels. We have developed ALC cost curves for each water resource zone (WRZ) that we use to assess the steady state costs of maintaining leakage at decreasing levels.**
2. **the expenditure required to operate the new technology and interventions that reduce our leakage.**

Leakage	2025 to 2030	2030 to 2035	2035 to 2040	2040 to 2050	2050 to 2075	Total
CAPEX (£m)	£26.00	£31.60	£188.07	£863.39	£414.55	**£1,523.61**
OPEX – detect and repair (£m)	£24.27	£42.25	£66.97	£269.42	£2,006.03	**£2,408.94**
OPEX – new options (£m)	£11.23	£13.08	£13.61	£23.88	£51.68	**£113.48**
Total	**£61.51**	**£86.92**	**£268.65**	**£1,156.69**	**£2,472.24**	**£4,046.01**

This table opposite sets out the CAPEX and OPEX costs for the water efficiency options included in our best value Preferred Plan.

Water Efficiency	2025 to 2030	2030 to 2035	2035 to 2040	2040 to 2050	2050 to 2075	Total
CAPEX (£m)	£7.40	£119.79	£118.79	£73.12	£117.36	**£436.47**
OPEX (£m)	£4.88	£20.10	£47.55	£115.09	£319.89	**£507.51**
Total	**£12.29**	**£139.89**	**£166.34**	**£188.21**	**£437.26**	**£943.98**

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Preferred Plan Benefits

The table opposite sets out the benefits associated with all the schemes included in our best value Preferred Plan. For supply side schemes, it provides the yield that would be expected under a dry year annual average (DYAA) scenario for a 1 in 500-year drought.

Option Type	1:500 DYAA BENEFIT by 2030 (Ml/d)	1:500 DYAA BENEFIT by 2035 (Ml/d)	1:500 DYAA BENEFIT by 2040 (Ml/d)	1:500 DYAA BENEFIT by 2050 (Ml/d)	1:500 DYAA BENEFIT by 2075 (Ml/d)
Company Transfers	0.0	4.7	6.8	12.7	12.0
Regional Transfers	0.0	0.0	8.0	12.4	26.0
Reservoirs	0.0	0.0	12.6	12.6	20.8
Desalination	0.0	0.0	0.0	30.0	30.0
Other	0.0	0.0	0.0	1.2	2.2
Water Recycling	0.0	0.0	0.0	27.8	25.1
Demand Management	14.9	33.5	49.4	86.4	149.5
Total	**14.9**	**38.1**	**76.7**	**183.1**	**265.5**

Preferred Plan Carbon

Table opposite sets out the embodied and operational carbon emissions associated with the development and operation of all schemes and interventions included within our best value Preferred Plan.

Carbon Type/ Stage	2025 to 2030	2030 to 2035	2035 to 2040	2040 to 2050	2050 to 2075	Total
Embodied Carbon (CO_2e)	6,825	19,580	61,113	35,695	84,449	**207,662**
Fixed Operational Carbon (CO_2e)	1,961	3,879	15,152	63,640	73,737	**158,369**
Variable Operational Carbon (CO_2e)	0	6	47	12,234	73,968	**86,256**

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Stage two: our adaptive plan

Our Preferred Plan is based on an adaptive planning approach to help us make the right investment decisions. This includes setting out nine adaptive pathways, covering the full range of scenarios between 2025 and 2075 and our projections of how much additional water would be needed in each scenario.

Regulatory guidance requires us to outline a 'reported' pathway on which to base the first 25 years of our dWRMP. This is pathway four of the nine, which reflects local authority growth plans, reflects the expectations of our regulators for a level of abstraction reduction expected in the future, follows medium climate change projections, and achieves the one in 500-year level of drought resilience.

If we experience a different future to the one we are planning for in our reported pathway, we will need to move to an alternative pathway. We have included decision points where we will decide if we need to change course. If we do, there will then be a branching point at which we will move to the appropriate pathway. The alternative pathways that have been identified allow us to adapt to future scenarios that may be different to our reported pathway, due to changes in population growth, environmental improvements or climate change.

Although we have set out what we consider to be our reported Preferred Plan in this section (full details of the Preferred Plan outcomes are provided in our technical reports), it is important that we use the adaptive planning outputs to develop a monitoring plan such that we can adjust to an alternative pathway to adapt to changes in future uncertainty. Full details of our adaptive plan outputs are provided in our technical report.

Stage three: comparison of model runs

We have carried out sensitivity testing and scenario testing of our preferred programmes to demonstrate the key factors which have influenced our decision-making and preferred and alternative plans. This appraisal has involved consideration of a 'least-cost plan' and a 'best environment and society' plan.

We produced a least-cost plan to use as a benchmark for appraising our other plans. Then we produced a 'best environment and society plan' to measure our overall best value plan against. This reflected the latest guidance, including SEA and HRA, biodiversity net gain and natural capital, as appropriate. These comparisons included costs and benefits analysis.

Due to the complex issues we face in the south east, we also carried out a large number of other regional modelling runs to test alternative plans that could offer benefits to customers, stakeholders and the environment at a more local level.

When we undertook best value modelling that focussed on environmental benefits, natural capital and customer preference, we started to see the selection of some of our schemes change. For example, New Arlington Reservoir was chosen in preference to Peacehaven recycling scheme in our East Sussex region. This demonstrates that, although we are presenting outputs from the regional best value plan as Our Preferred Plan, there are decisions we need to make at a more localised level to determine the appropriate choice of scheme/s as we work towards our revised and final plans.

Stage four: our alternative plan

Our alternative plan is our view of changes we could make to the regional best value plan as our preferred company plan. This alternative plan would seek to deliver both additional resilience and water supplies during the next 50 years, as well as local benefits to customers, communities and the environment.

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We work 24/7 to reduce the amount of water lost through leaks

Our alternative plan

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Our alternative plan

Laying a two strategic water pipelines in at Aylesford, Kent

Our preferred best value plan demonstrates a high level of ambition to reduce both customer water use and leakage in order to meet the current government targets. It also includes schemes which will add environmental and social value to our communities.

When reviewing the plan, we were keen to see whether we could go one step further.

To achieve the government's targets to reduce water use and leakage requires technological advancements and customer behaviour change. While we will do our best to achieve these targets, there are a number of schemes we could introduce and/or bring forward in our plans, in the next 15 years to reduce the risk of not achieving these by the desired date.

Two of these schemes would also add considerable social and environment benefits to our customers.

These include:

- **Bringing forward by three years plans to build a new reservoir at Broad Oak, Kent to 2033 providing an additional 22 million litres of water a day**
- **a second reservoir at Arlington, East Sussex to be built by 2041 providing an additional 18 million litres of water a day**
- **a series of new pipelines which would transport large volumes of water around our supply area, improving resilience and increasing network flexibility.**

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Our alternative plan continued

Improved resilience and benefits in East Kent

The regional plan has identified a delivery date of 2036 for our new Broad Oak Reservoir. To provide increased resilience, public amenity value and support wider benefits to the environment, customer and communities in East Kent, we have proposed, in this alternative plan, that the reservoir could be delivered earlier in 2033.

This proposal is supported by the engagement feedback we received and presented in our previous published WRMP19, which identified a delivery date of 2033. Since then, we have continued the development of the scheme to meet this date, alongside positive dialogue, with key stakeholders and Canterbury City Council who will be consulting on a local plan that includes Broad Oak Reservoir as a key strategic solution for Canterbury and the surrounding area.

Local best value and environmental benefit improvements in East Sussex

A key decision in the appraisal of our best value Preferred Plan is the selection of Peacehaven recycling scheme versus a reservoir in East Sussex (Arlington or Broyle Place). Peacehaven recycling scheme has a larger yield (30 Ml/d) compared to Arlington Reservoir (18 Ml/d). For this reason, Peacehaven recycling is currently selected in our reported pathway, in 2041, primarily due to its lower overall cost-to-benefit ratio.

However, there has been more specific decision-making that we have undertaken that has selected Arlington Reservoir as a preferred scheme based on environmental and customer-focussed best value metrics.

In this alternative plan, we propose to include the scheme, in 2041, to extend our existing reservoir at Arlington in WRZ3 (Eastbourne), through the creation of a bunded reservoir north of the existing site.

We consider that there could be significant benefits associated with this reservoir option to create new habitats and recreational opportunities, building on the experience and local knowledge gained from managing our existing reservoir which has been designated a SSSI since its construction.

Demand strategy resilience

Our preferred best value plan demonstrates a high level of ambition to achieve the levels of demand reduction required to meet the current policy targets.

As outlined earlier, we have carried out sensitivity testing in our decision-making and programme appraisal to look at the potential impacts and adjustments that would be required if lower levels of demand reduction are realised.

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Although limited, there are a number of supply side schemes that we could introduce and/or bring forward in our plans, in the next 15 years, to mitigate against the risk of not achieving these high levels of savings in water use and leakage. These are set out below.

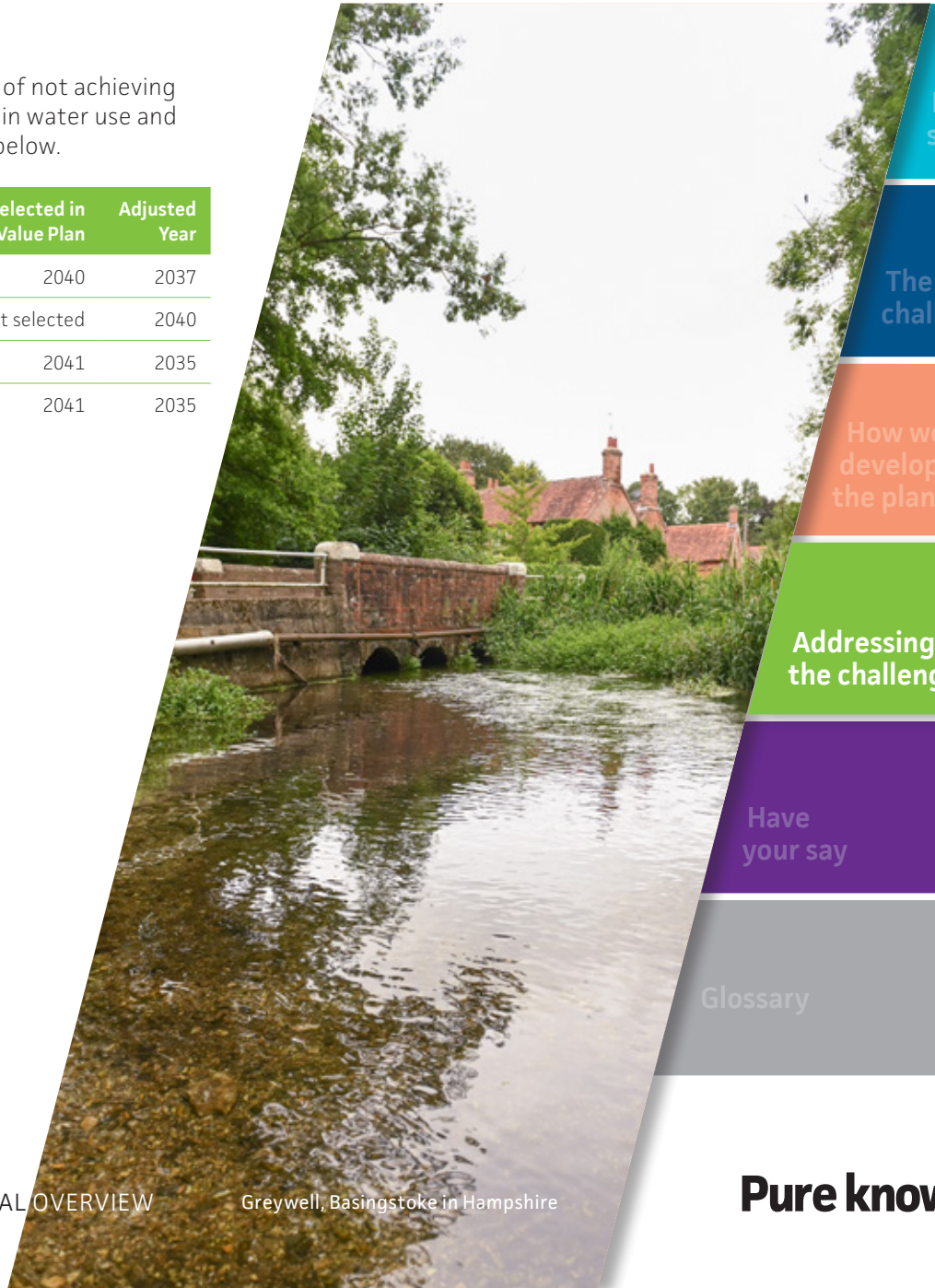
Name	Zone	Year Selected in Best Value Plan	Adjusted Year
New bulk supply: SESW to SEW WRZ1 transfer – Bough Beech to Riverhill SR	WRZ1	2040	2037
New bulk supply: SESW Outwood to SEW Whitely Hill	WRZ2	Not selected	2040
Groundwater licence trade – Folkestone Beds Abstraction, Halling	WRZ6	2041	2035
WRZ6 zonal scheme – Halling to Halling Reservoir	WRZ6	2041	2035

In this alternative plan, we propose to undertake all the planning and development work needed, in the next five years, to enable us to deliver the schemes in accordance with the adjusted dates set out above.

We would use our adaptive monitoring plan to track the progress of our demand reduction strategy so that we can make appropriate adjustments and decisions for our next WRMP.

Find out more

- Our Preferred Plan
- Correspondence with neighbouring companies



Greywell, Basingstoke in Hampshire

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Ardingly Reservoir, East Sussex

Water resource planning tables

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Water resources planning tables

The water resources planning tables have been generated in collaboration with the regional work and contain the numerical outputs of our dWRMP24.

The tables report data at a WRZ level for both dry year annual average and critical period scenarios. The tables also present an assessment, for each resource zone, for a one in 500-year drought event.

Together the water resources planning tables present the key data associated with our dWRMP. Each set of tables contains information for:

- Baseline water resources
- baseline water supplies
- baseline demand
- baseline supply demand balance
- feasible options
- preferred options
- final planning water supplies
- final planning demand
- final planning supply demand balance
- drought plan links.

There is also a summary of the baseline and final planning supply demand balance for the WRZ.

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Board assurance and governance

One of our 87 water treatment works

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Board assurance and governance

In this section we describe the quality assurance process we have followed in producing this plan.

Introduction

For dWRMP24 we have adopted a comprehensive quality assurance process consistent with our company monitoring framework which we follow for all our statutory reporting. This framework captures how we collate, scrutinise and assure all publicly published data.

It has been tailored to meet the requirements set out in the Water Resources Management Plan Direction 2022 (with reference to the relevant sections of the Water Industry Act 1991) with particular focus on the challenges the dWRMP24 is addressing.

Overall plan assurance and governance

As in WRMP19, our dWRMP24 has a clear ownership structure and every component of the plan has a technical lead accountable to the Head of Water Resources. We continue to manage the WRMP development by integrating it within our Price Review 2024 (PR24) business programme. Our WRMP and Price Review programmes are overseen by a joint WRMP-PR24 Steering Group and the responsibility for the overall strategy rests with the Regulation and Strategy Director.

The WRMP-PR24 Steering Group is accountable to the Regulatory Strategy Group (RSG), which has full Executive team membership and is chaired by the Regulation and Strategy Director.

To ensure full Board influence and oversight, the dWRMP24 has been discussed with the Board on six separate occasions. In addition, an Independent Non-Executive Director has had separate 'deep dive' one-to-one sessions with the team as the plan has developed.

dWRMP24 programme quality assurance plan

A key part of our assurance process has been developing a close working relationship with our Environmental Scrutiny Group (ESG), which has provided independent challenge and feedback on all the key building blocks of our plan. The ESG has had the opportunity to input to our decision-making process and the selection of a Preferred Plan.

Similarly to our ESG, our Customer Challenge Group (CCG), holds us to account to ensure our customer and stakeholder engagement is meaningful and has provided feedback and challenge at key points of the plan's development.

We have also worked closely with the Environment Agency and Natural England throughout the development of dWRMP24, through a programme of regular review and update meetings.

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Board assurance and governance continued

We have shared the building blocks of dWRMP24 with the ESG from the start of the plan development and throughout its development. They have been given the opportunity to challenge and provide input to the baseline data and to the assumptions we have made. Through their considered challenge, this group has not only helped shape our plan, but has also given us a level of stakeholder buy-in and assurance of the technical content on which we have built our dWRMP24.

Our quality assurance strategy is explained in the WRMP24 - Quality Assurance Plan (the QA plan) to ensure that the WRMP24 programme is completed on time, to budget and quality. The QA plan describes the programme controls, programme plan, its quality management strategy and how we manage risk. The WRMP24 Programme Manager is responsible for the implementation and adherence to the QA plan.

The technical leads are responsible for the preparation and reporting of the baseline data and key assumptions. All outputs are subject to stringent quality assurance described in detail in the QA plan and include check, review and approval, followed by acceptance by the WRMP-PR24 Steering Group and Regulatory Steering Group. All key assumptions made when compiling the baseline data are described within the associated technical reports that underpin the WRMP24 and are included in appendices.

As described in our Company Monitoring Framework and the QA plan, the level of assurance required is determined by the risk associated with the activity and the importance to stakeholders or customers. As part of our quality assurance process, we have assessed the risk associated with every element of dWRMP24 and each has been assigned a risk rating of low, medium or high.

Specific assurance

In addition to the extensive internal assurance processes described above, we have commissioned assurance partners to review the key inputs and outputs that informed our dWRMP24. Our independent assurance partners have assured the data set out below:

- **Options details and demand reduction strategy**
- **demand forecast and headroom**
- **supply forecast, outage and environmental destination**
- **translation of WRSE/regional outputs into our dWRMP24.**

These findings and recommendations were used to inform our dWRMP24. The assurance report did not find any areas of material concern together with the internal quality assurance processes described above, this provided the Board with confidence of the robustness of dWRMP24.

Water resources planning (WRP) tables

The WRP tables, which were generated by WRSE, contain all key numerical outputs of dWRMP24 and are very extensive in nature. We have undertaken specific assurance of these tables to give us the confidence that the processes used for their completion were stringent and that all the data in the tables was correct and consistent with other dWRMP24 documents. This focussed on the robustness of the processes used to compile the tables and included data spot checks to ensure consistency.

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Concluding statement

As directors of South East Water Ltd, we have relied on the established systems of internal control described in this statement to ensure the robustness, accuracy and completeness of the data reported. This information and data has also been externally reviewed by assurance partners.

Based on these well-established and thorough processes, which we operate within the wider framework of assurance and transparency of our company monitoring framework, we have a high degree of confidence in the information presented in the dWRMP24 and the supporting data and are satisfied that the dWRMP24 has been compiled in accordance with the statutory requirements of Section 37A to 37D of the Water Industry Act 1991 and the Water Resources Management Plan (England) Direction 2022.

We are satisfied that South East Water has met its obligations in the development of the dWRMP24. It reflects the relevant regional plan, which has been developed in accordance with the national framework and relevant guidance and policy (and provides a clear justification for any differences). It is a best value plan for managing and developing water resources to enable the company to continue to meet its obligations to supply water and protect the environment. The plan incorporates the feedback received from customers and stakeholders and is based on sound and robust evidence, including in relation to costs.

Signed on behalf of the South East Water Ltd Board

Chris Train
Independent Chair

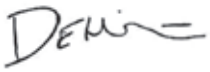
Chris Girling
Independent Non-Executive Director

John Barnes
Independent Non-Executive Director

Célia Pronto
Independent Non-Executive Director

Anne-Noëlle Le Gal
Non-Executive Director
– Shareholder Nominated

Mark McArdle
Non-Executive Director
– Shareholder Nominated



David Hinton
Chief Executive Officer

Andrew Farmer
Chief Financial Officer

Find out more

- Quality assurance plan
- Water Resources South East regional assurance

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Planning for the future

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Talking to our customers and listening to their views helps us build more deliverable and acceptable plans

DRAFT WATER RESOURCES MANAGEMENT PLAN (2025 TO 2075) TECHNICAL OVERVIEW

Tell us your views

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Tell us your views

Water is our most precious resource and it's our responsibility to make sure there's enough for all life.

As you've read, this plan sets out what investment is needed between 2025 and 2075, to secure drinking water supplies into the future.

The plan strikes the delicate balance between ensuring there is additional water to supply a growing population, protecting and enhancing the environment while adding value to society.

To help finalise our plan, we would like to hear your views on the following questions:

Alongside embedding the ambitious regional best value plan within our draft water resources management plan, we have also proposed an alternative plan for our supply area. This alternative plan brings forward two new supply schemes which would deliver additional resilience and water supplies during the next 50 years, as well as local benefits to customers, communities and the environment.

Q Do you support our alternative plan?

Q Is there additional local information we should consider when creating our final water resources management plan?

Q Are there any additional cost-effective benefits we should consider and include in the plan?

Q Would you or your organisation be interested in collaborating with us to reduce water use?

You can answer these questions, as well as leave dedicated feedback, on our consultation hub.

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Tell us your views continued

What we've published

To help answer these questions, we've produced a range of documents to provide you with as much information as possible:

- Non-technical magazine
- the technical overview
- dWRMP24 data tables
- a range of technical reports.

You can find links to all these documents, including a fully accessible document, on our website: **southeastwater.co.uk/futurewater**

There is also an online form to use to submit your comments on the plan directly to the Department for Environment, Food and Rural Affairs (Defra).

We recognise that this may not be possible for everyone so, if you prefer, you can view hard copies of the documents at our offices:

South East Water
Rocfort Road, Snodland, Kent, ME6 5AH

South East Water Scientific Services
Orion Building, 3 Columbus Drive, Southwood, Farnborough, Hampshire, GU14 0NZ

We are open Monday to Friday: 9:00am – 5:00pm; closed on Saturday and Sunday.

Our customer research and consultation with Members of Parliament, parish councils, local authorities and other key parties will also continue during the public consultation period.

Making your views known

We invite all interested parties to read our draft plan and make comments to the Secretary of State for the Department for Environment, Food and Rural Affairs by 20 February 2023.

Comments can be sent directly to the Secretary of State:

By email:
water.resources@defra.gov.uk

By post:
Water Resources Management Plan
Water Services
Department for Environment, Food and Rural Affairs
Seacole 3rd Floor
2 Marsham Street
London SW1P 4DF

Online:
Via our website at: **southeastwater.co.uk/futurewater**
or our consultation hub at:
getinvolvedsoutheastwater.uk.engagementhq.com/wrmp

Your comments will be automatically sent to ourselves and Defra.

The closing date for comments is 20 February 2023.

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Next steps

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Next steps

What happens next?

When the 14-week consultation period ends, we will consider all comments made and publish a Statement of Response document. This will detail all feedback received, how we have considered each comment in turn, and how that feedback may have influenced our revised plan. Alongside the statement of response, we will also publish a revised draft plan which will include any updates we needed to make due to the feedback we have received, or due to other changes and new information that has arisen since we published our draft plan.

Both the statement of response and the revised dWRMP24 plan must be submitted to Defra and published on our website within 26 weeks of the publication of this dWRMP24.

When we publish our statement of response and revised plan, we'll inform everyone who responded to our draft plan.

The Secretary of State for Defra will review our draft plan, all the feedback on it, and our statement of response before deciding whether our revised plan is fit for purpose and can be published as a final WRMP.

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Planning for the future

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Acronym	Term	Definition
1:500	1:500-year level of drought resilience	Being resilient to a drought that would happen on average once every 500-years – or it has a 0.2% chance of happening every year.
–	Abstraction	Taking water from the environment (under license from the Environment Agency) for use in the public water supply or industry.
AP	Adaptive Planning	Adaptive planning allows us to account for uncertainty, such as different impacts of population growth and climate change, which is useful when planning for the future. For each new plan, we monitor how previous ones have been implemented and incorporated new forecasts into modelling. We're then able to adapt future plans to meet different scenarios, based on this understanding.
DYAA	Average Deployable Output	Annual average deployable output from a source.
AMP	Asset Management Plan	Water company business plan (prepared on five yearly cycle).
AMR	Automatic Meter Reading	Type of water meter that can be read remotely using drive-by technology.
AONB	Area of Outstanding Natural Beauty	Area of countryside in England, Wales and Northern Ireland, that has been designated for conservation due to its significant landscape value.
ASR	Aquifer Storage and Recovery	Injecting additional fresh water from other parts of an aquifer or from the rivers into a confined area within the aquifer. It can then be stored and pumped back to the surface and treated when needed.
BVP	Best Value Plan	The consideration of non-monetised factors alongside cost to develop a plan that delivers best value.
BNG	Biodiversity Net Gain	An approach which aims to leave the natural environment in a measurably better state than beforehand.
BP	Business Plan	Water companies develop and submit business plans every five years to Ofwat, the economic regulator. These plans set out the commitments companies make to their customers and how they will meet them.
CaBA	Catchment Based Approach	An initiative that works with government, local authorities, water companies, businesses and more, to maximise the natural value of our environment.
Ca	Catchment	The area from which precipitation (rainfall) and groundwater would naturally collect and contribute to the flow of a river.
CCG	Customer Challenge Group	A group of independent stakeholders representing different customer groups and scrutinising water companies' business plan development.
CCW	Consumer Council for Water	The statutory consumer body for the water industry.
CE	Cost-efficient	A cost-efficient planning process assesses all options which meet both company and WRSE feasibility threshold against whole life delivery costs including the cost of carbon. The resulting plan therefore represents the lowest programme costs to deliver required policy outcomes and core strategic objectives. A cost-efficient plan does not include, in its selection processes, other benefits, additional value and/or wider objectives.

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Acronym	Term	Definition
Defra	Department for Environment, Food & Rural Affairs	UK government department responsible for environmental matters – including water resources.
–	Desalination	A process where seawater or brackish water is turned into drinking water by removing the salt, providing a reliable source of water including during droughts.
DM	Demand management	Measures taken by water companies to support customers reduce the amount of water the use and leakage.
DO	Deployable Output	The output of a source or bulk supply as constrained by licence (if applicable); pumping plant and/or well/aquifer properties; raw water mains and/or aqueducts; transfer and/or output main; treatment; water quality.
DI	Distribution Input	The flow entering the water supply distribution network.
dWRMP24	Draft Water Resource Management Plan 2024	A draft plan published by each water company in 2024 that follows a statutory process and sets out how they will provide water over the long-term.
DP	Drought Permit	An authorisation granted by the Environment Agency under drought conditions, which allows for abstraction/impoundment outside the schedule of existing licences on a temporary basis.
DO	Drought Order	Injecting additional fresh water from other parts of an aquifer or from the rivers into a confined area within the aquifer. It can then be stored and pumped back to the surface and treated when needed.
DWPA	Drinking Water Protected Area	Where water abstracted from rivers and reservoirs needs to be protected to ensure it is not polluted which could lead to additional treatment.
DYAA	Dry Year Annual Average	Represents a period of low rainfall and unrestricted demand and is used as the basis of a WRMP.
DYCP	Dry Year Critical Period	The period(s) during the year when water resource zone supply demand balances are at their lowest.
EA	Environment Agency	The regulator responsible for environmental protection and enhancement – part of the Defra family.
ELMS	Environmental Land Management Scheme	Projects to encourage sustainable farming, nature recovery and landscape recovery.
ESG	Environment Scrutiny Group	A forum open to expert individuals and groups interested and impacted by the company's environmental activity, such as the implementation of our future water resource and environmental plans.
–	Groundwater	Water held underground in the soil or in voids in rock.
HRA	Habitat Regulations Assessment	Assessment to consider the likely significant effects on designated European sites.
–	Headwater	Permanently flowing tributaries feeding a river system.
INNS	Invasive Non-Native Species	Any non-native animal or plant with the ability to spread, causing damage to the environment and the way we live.
MCA	Multi-criteria analysis	A process to identify and compare different policy options by assessing their effects, performance, impacts, and trade-offs.
MDO	Minimum Deployable Output	Deployable output for the autumn period in a dry year when groundwater levels and river flows are at their lowest and sources are constrained to their minimum deployable outputs.
Ml/d	Mega litres per day	Millions of litres per day. Unit of measurement for flow in a river or pipeline.
mtCO_2e	Metric tons of carbon dioxide equivalent	The unit "CO_2e" represents an amount of a greenhouse gas whose atmospheric impact has been standardized to that of one unit mass of carbon dioxide (CO_2), based on the global warming potential of the gas.
NC	Natural Capital	Our stock of natural resources, including, soils, air, water and all living organisms. Some natural capital assets provide "goods and services", often called ecosystem services.
NBS	Nature-based solutions	Sustainably managing natural features and processes to deliver wider benefits for customers – such as catchment management or river restoration.

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Acronym	Term	Definition
NE	Natural England	The government's adviser for the natural environment in England.
NEP	National Environment Programme	A list of environment improvement schemes that ensure water companies meet European and national targets related to water.
NFWR	National Framework for Water Resources	An Environment Agency document that sets the strategic direction for long-term regional water resource planning.
NIC	National Infrastructure Commission	An impartial, expert body commissioned by the government to advise on infrastructure priorities and long-term challenges.
NZOCE	Net zero operational carbon emissions	The water sector, through Water UK, has pledged to achieve net zero carbon emissions from its operations by 2030.
NEUB	Non Essential Use (Ban)	A drought order approved by the Secretary of State to restrict specific water uses by businesses.
NH	Non-household	Use by businesses and public bodies such as schools and hospitals.
NYAA	Normal Year Annual Average	This is the demand for water expected under normal conditions.
Ofwat	Office of Water Services	The economic regulator of the water sector in England and Wales.
–	Outage	Temporary loss of deployable output.
PCC	Per Capita Consumption	Amount of water a person typically uses every day.
DYCP	Peak Deployable Output	Deployable output for the period in which there is the highest demand.
QA	Quality Assurance Plan	Assurance and verification that data meets data-quality objectives.
RAPID	Regulatory Alliance for the Progression of Infrastructure Development	An organisation formed by Ofwat, Environment Agency and Drinking Water Inspectorate to help accelerate the development of new water infrastructure and design future regulatory frameworks.
RBMP	River Basin Management Plan	Management tool within integrated water resources management containing descriptions of water resources within drainage basin and water allocation plans.
RG	Regional groups	The five regional groups outlined in the water resources framework – Water Resources South East, West Country Water Resources, Water Resources East, Water Resources North and Water Resources West.
RC	Regional reconciliation	The process to understand how each region could support the others' developing plans.
RSA	Restoring Sustainable Abstraction	Environment Agency programme to identify abstractions that are unsustainable or potentially damaging and to restore sustainable abstraction.
RR	River Restoration	The process of managing rivers to reinstate natural processes.
SSSI	Sites of Special Scientific Interest	An area designation for conservation, usually due to particular interest to science due to the flora and fauna within it or important geological features.
SRO	Strategic Resource Option	Large-scale infrastructure solutions for securing additional water.
STPR	Social Time Preference Rate	A method used to put a present value on costs and benefits that occur at a later date.
–	Source	A named input to a water resource zone where water is abstracted from a well, spring or borehole, or from a river or reservoir.
SEA	Strategic Environmental Assessment	Assessment of likely significant effects of certain plans and programmes.
SDB	Supply demand balance	The difference between total water available for use (as supply) and forecast distribution input (as water demand) at any given point in time over the planning period/horizon.
SR	Sustainability Reduction	Reductions in deployable output required to meet statutory and/or environmental requirements.

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Acronym	Term	Definition
–	Technical overview diagram	A guide to the technical documents which provide further information on this Technical Overview.
TUB	Temporary Use Ban	Drought management measures imposed by water companies on customers – previously known as hosepipe ban.
UKWIR	UK Water Industry Research	The research platform for UK Water Companies, addressing the Big Questions facing the industry.
WAFU	Water Available for Use	Combined total of deployable output; future changes to deployable output from sustainability changes, climate change etc.; transfers and any future inputs from a third parties; short term losses of supply and outage; and, operational use or loss of water.
WFD	Water Framework Directive	Environmental Legislation relating to river basin management and committing all EU member states to achieving good water bodies and retained as UK law following Brexit.
WINEP	Water Industry National Environment Programme	A programme issued to water companies by the EA which outlines what regulators expect companies to include in future investment plans to meet environmental obligations.
–	Water recycling	A process where wastewater is treated above usual standards to be returned to the environment and then abstracted downstream to process for drinking water.
WRMP	Water Resource Management Plan	A plan produced by each water company every five years that follows a statutory process and sets out how they will provide water over the long-term.
WRPG	Water Resources Planning Guideline	Published Guidance for the preparation of WRMP and Regional Plans from the Environment Agency, Natural Resources Wales and Ofwat.
WRSE	Water Resources South East	Partnership of water companies and regulators in South East England working together to make best use of available water resources.
WRZ	Water Resource Zone	The largest possible zone in which all resources, including external transfers, can be shared and hence the zones in which all customers experience the same risk of supply failure from a resource shortfall.
WUK	Water UK	The trade association for water companies.

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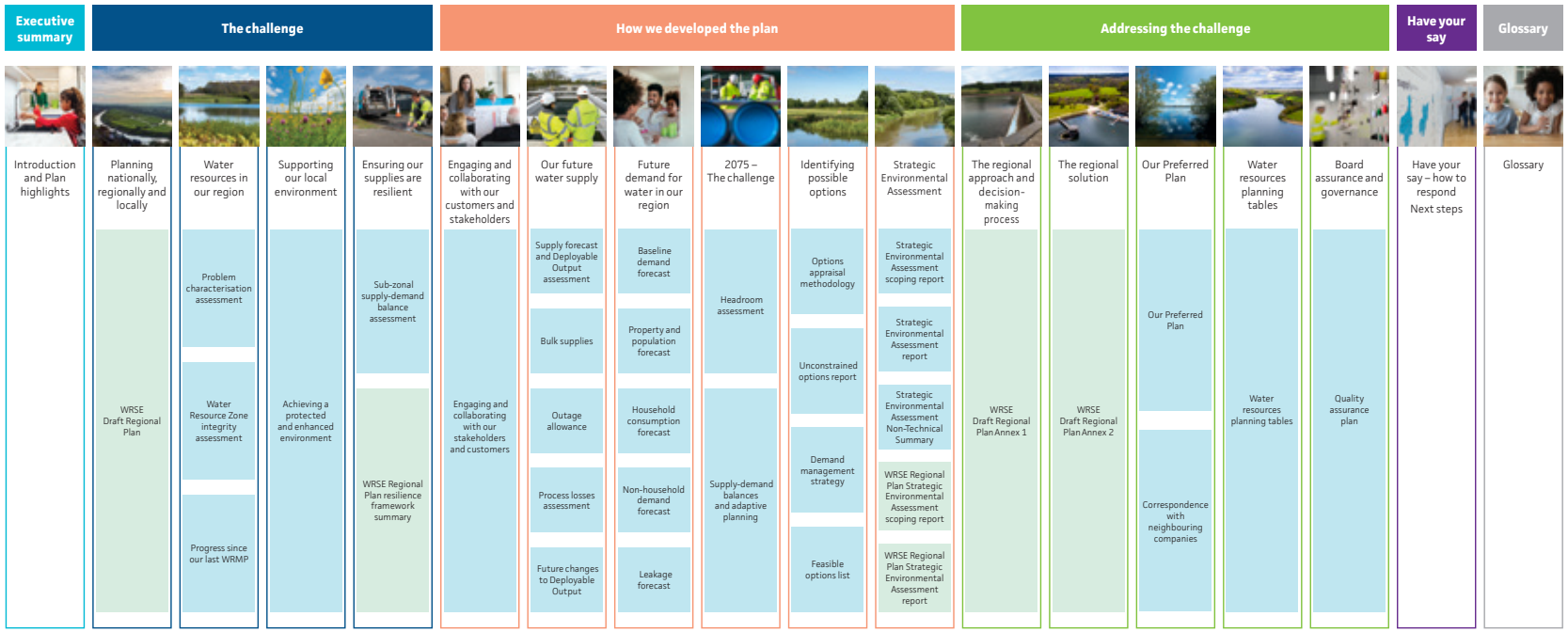
Technical reports diagram

Please zoom in to better view this diagram



Key

Written by WRSE (Water Resources South East)

Written by South East Water

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