

PORTSMOUTH WATER LIMITED

Climate Change Adaptation Report

December 2024





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CHIEF EXECUTIVE OFFICER'S OVERVIEW

Bob Taylor
Chief Executive Officer

December 2024





Climate change affects the sufficiency of water available for supply, levels of demand, the quality of the water we abstract and the resilience of our assets. We recognise that understanding and adaptively planning for climate change is an important part of our long-term strategic approach to maintaining high levels of service. This document sets out our assessment of current and future climate change risks and our proposals to adapt and overcome them.

The risks identified in our first round Climate Change Adaptation report published in 2011 were not new to us. Many are controlled through business-as-usual activities, whilst the current company risk mechanisms and regulatory framework ensure a forward-looking approach to managing increasing levels of climate risk. As such, the approach taken in our 2011 plan was to build further adaptive capacity.

Our second and third round reports, published in 2015 and 2021 respectively, reviewed our actions and how climate risks have been incorporated into investment decisions. They demonstrated positive progress towards increasing our resilience to climate factors. We also undertook a re-evaluation of our priority risks identified in our 2011 report, updating our climate change risks based on the latest Climate Change Risk Assessments (CCRA3) and including new risks that have emerged through our planning frameworks. Whilst some risks were reduced because of our investment, given the long-term nature and uncertainty of climate change, few risks have significantly changed since 2011.

We now present our fourth report, which builds on our first three submissions. We reviewed our progress against our action plan and updated risks based on new information obtained over the past few years. We acknowledge that the importance in adapting to Climate Change is ever greater now and we will utilise this report as a building block in the development of future plans, such as our PR29 Business Plan, continuing to further integrate climate change into our decision-making processes.

This report also provides examples of the work we have recently completed to adapt to Climate Change. We have committed to reducing leakage by 50% by 2040, ten years ahead of government targets and have made significant progress towards this ambition since 2015. We are also in the process of implementing our universal smart metering programme, which will involve installing a smart meter at the boundary of more than 320,000 customer properties over the next 10 years.

We are responsible for leading the strategic development of the Appointed Business and adapting to climate change is clearly recognised as probably the greatest global challenge in a generation. We are fully committed to doing all we can as business and within the UK water sector to mitigate the harmful and potentially devastating impacts of climate change on our communities and our natural environment.

EXECUTIVE SUMMARY

This report to the Department for Environment, Food and Rural Affairs (Defra) has been prepared under the fourth round of the climate change adaptation reporting power created by the Climate Change Act 2008. It follows and builds on the third round report submitted to Defra in 2021. This report sets out:

- Our assessment of current and future predicted effects of climate change on our operation and our customers.
- Our progress made in the previous five years (2020-2025) towards improving resilience to climate change.
- Our proposals for further adapting to climate change in 2025-2030 and beyond 2030.

This report has been structured to highlight our risks, opportunities, and actions in four main areas to ensure we can continue to:

- Provide safe and sufficient public water supply.
- Be resilient to natural hazards.
- Protect the environment and support biodiversity.
- Manage interdependencies and cascading failures.

As a UK water company operating

under the regulatory framework for England, we already manage our current climate-change related risks through operational procedures, risk management mechanisms, and regulatory commitments. We have long-term plans in place to manage our water resources and water supply systems; these have been developed taking into account the potential implications of climate change. As information on climate science and the projected effects of climate change evolve, we will ensure this is incorporated into our future plans.

In 2022, the UK experienced drought conditions following extremely hot and dry weather. Our Drought Plan proved to be effective, and we were able to maintain water supplies to customers within our water resource zone with no restrictions. With projected changes in climate in our region, it is critical that we maximise our resilience to more frequent and severe weather events.

As a member of Water Resources South East (WRSE), an alliance of six water companies, we are collaborating with our neighbouring water companies in developing strategic responses to maintaining the long-term security

of water supplies in the South East of England. This collaboration is essential due to changing economic and environmental conditions, as well as climate change.

We are already providing bulk transfers to Southern Water, but plan to share further water with them via our new winter storage reservoir, Havant Thicket, which is currently under construction and will be in operation by 2031. This will not only provide longer-term support to our neighbours but also provide us with additional long-term water security in the face of likely growth in the demand for water and the need to change some of our current abstractions to preserve environmental conditions. Both these pressures on water systems are likely to be exacerbated by climate change.

**EXCELLENCE IN WATER.
ALWAYS.
COMMITTED TO A
SUSTAINABLE FUTURE
TOGETHER.**



OUR REGION



Figure 1. Portsmouth Water Supply Area

Portsmouth Water has been supplying water since 1857. We provide safe, high quality drinking water from springs, wells, boreholes, and surface water sources.

We have a proud record of maintaining high standards of customer service whilst having the lowest water supply charges in England and Wales.

Our supply area extends through South East Hampshire and West Sussex (Figure 1) from the River Meon in the West to the River Arun in the East, encompassing 868km². Most of the population live on the coastal plain in the urban areas of Fareham, Gosport, Havant, Waterlooville, Portsmouth, Chichester and Bognor Regis.

On an average day, we supply water to around 740,000 people, but this increases in the summer due to the many tourists who visit the coast, cities and the South Downs National Park.

We sit in the South East of England which is classified by the Environment Agency as 'seriously water-stressed' and is under increased pressure from climate change, population growth, and a need to protect our environment. Addressing these pressures can only be done effectively by collaboration. We are therefore planning to share water where we can and exploring how this can be achieved sustainably without impact on our supplies or to the environment.

By 2045 we expect to supply a similar amount of water as today but to 122,000 more people. We'll be able to do this because we intend to reduce the amount of water lost to leaks and help our customers to be more efficient with the water they use.

OUR CUSTOMERS AND STAKEHOLDERS

Our approach of putting customers at the heart of our business, together with effective stewardship of our water resources over many years have enabled us to deliver outcomes we are very proud of, including:

- Strong performance during the drought event of 2022, effectively managing our resources to maintain supplies to customers within our resource zone with no restrictions and developing our understanding of how we can operate during future events.
- Consistently a top performer in customer service based on independent reviews and have the lowest water supply charges in England and Wales.
- Increased the threshold of those eligible for the [Helping Hand social tariff](#) to £21,000, benefitting an additional 15% of customers.
- Being industry leaders in interruptions to supply, water quality contacts, mains repairs and continuing to achieve upper quartile performance for customer (C-Mex), developer (D-Mex) and business experience (BR-Mex).

We regularly engage with our Customer Scrutiny Panel who represent a wide range of customers and stakeholders. Their role is to ensure we accurately reflect our customers' views in our plans.

Our customers' views have played an integral role in developing [our 25-year vision](#), shaping our approach and ambition for our [Long-Term Delivery Strategy \(LTDS\)](#). We have adapted and evolved from our PR19 approach to align with best practice not only to meet regulatory guidance, but to embed a strategy to robustly capture insight and employ this to shape our plan and to increase engagement with our customers.

To understand the needs, concerns, and priorities of our customers, we established

our Big Conversation Framework. The Framework follows five key themes to enable us to better engage with our customers: Core Service, Affordability, Resilience, Environment, and Social Purpose. Through our engagement, we have established that the primary concerns for our customers include:

- **Environment** – long-term business plans and strategies should not be at the expense of the environment, and efforts to improve biodiversity should be prioritised where cost-effective.
- **Reliable Service** – leakage should be minimised, with an overall target to halve leakage by 2040. Avoiding long-term interruptions and ensuring security of supply are considered to be critical.
- **Water Quality** – water quality performance is considered good. Improvements in performance should not be at additional cost to our customers.
- **Customer Service** – service touchpoints should be updated to improve access for vulnerable customers.
- **Affordability** – water prices are becoming an increasing concern across our customer base, with many of our customers wanting stable bills with intergenerational fairness and support for vulnerable customers.

We have integrated our learning and sought expert input from specialist research companies. This has enabled us to draw on their experience of other water company programmes, cross sector approaches and a wealth of expertise in developing strategies which fully reflect the views of customers.

We must continue to review and invest to ensure that we can continue to maintain resilience and improve customer experience. Enhancing the environment will

ultimately help us to build resilience, with biodiversity considered to be a key pathway to limiting global warming.

As an active member of Water Resources South East (WRSE), an alliance of six water companies, we engage with a range of stakeholders in water resources, land use and environmental planning. These include the Environment Agency, Natural England, Defra, and abstractors such as the Horticultural Society and National Farmers Union. We engage on regional issues including the resilience of water resources to extreme weather events and climate change.

We also undertake stakeholder consultation on our plans; our engagement strategy is detailed in our [Business Plan 2025 to 2030](#). This approach was most recently used to inform the [Water Resource Management Plan 2024](#).

The aim of this report is to demonstrate how we have committed to adapting to climate change. This report has been developed in line with the Defra reporting requirements and has been designed to be easily understood by our customers and shareholders alike. The aim is to encourage them to engage with the work we are doing to adapt to climate change.

OUR CLIMATE CHANGE RISKS

We have assessed our risk to climate change using the UK Climate Projections 2018 (UKCP18). Based on this assessment, it is expected that climate change impacts will increase, including sea level rise and an increase in the frequency and severity of severe weather events. Most of the risks we anticipate having to face are not new, but with some events likely to increase in frequency and intensity, our exposure to climate risks could increase unless we adapt.

The assessment of each risk we face due to climate change is outlined in our full Climate Change Risk Assessment. This is an update of earlier climate change risk assessments, taking into account factors influencing levels of risk that have changed since the second-round climate change adaptation report. See Appendix A and the Climate Change Adaptation Risk Methodology for more detail.

The latest independent advice report by the Committee for Climate Change identified the significant key water sector risks nationally. This advice informs the UK Governments Climate Change Risk Assessment (CCRA3). In the following table we have mapped our main risks to these key water sector risks.

What is CCRA3?

The third and latest independent assessment of the risks and opportunities facing the UK from climate change. This informs the Governments Climate Change Risk Assessment (CCRA).

What is Climate Change Adaptation?

A process of adjustment to the actual or expected climate and its effects.

Table 1 Key climate-related risks facing Portsmouth Water

Key Risk Code	Key Risk Description	Our main individual risks (mapped)
I1	Risk to infrastructure networks (water, energy, transport, ICT) from cascading failures	<ul style="list-style-type: none"> • Increased interruptions to telecommunications and telemetry • Chemical supply chain disruption from regional heatwaves and floods • Road melt events impede treatment works access • Storm damage to above ground assets (building and overhead cables)
I2	Risk to infrastructure services from river, surface-water and groundwater flooding	<ul style="list-style-type: none"> • Increased flooding of source and treatment works from rivers and groundwater • Increased flooding of pumping stations (raw and potable) and valves from rivers and groundwater • Increased regional flooding from rivers and groundwater impedes routine mains repair
I3	Risk to infrastructure services from coastal flooding and erosion	<ul style="list-style-type: none"> • Water resources asset loss from coastal change • Abstraction asset loss or outage from coastal change
I7	Risk to subterranean and surface infrastructure from subsidence	<ul style="list-style-type: none"> • Accelerated asset deterioration of mains from more extreme wetting and drying cycles and earth movement
I8	Risk to public water supplies from reduced water availability	<ul style="list-style-type: none"> • Increased demand for water at peak times from permanent resident population • Increased occurrence of drought • Increased summer abstraction by other (existing) catchment users
H10	Risk to health from poor water quality and household supply interruptions	<ul style="list-style-type: none"> • Lower river flows cause higher contaminant concentrations • Reduced cloud cover leads to increased biological growth in surface waters • Increased demand from tourist population and/or net inward migration of retirement population • Higher temperatures cause increased biological and bacterial growth in surface waters
N10	Risk to aquifers and agricultural land from sea level rise, saltwater intrusion	<ul style="list-style-type: none"> • Rising salinity at River Itchen intake • Saline intrusion of borehole sources • Saline intrusion from lower groundwater / increased abstraction
N11	Risk to freshwater species and habitats from changing climatic conditions and extreme events, including higher water temperatures, flooding, water scarcity and phenological shifts.	<ul style="list-style-type: none"> • Flow reductions due to climate change necessitate abstraction reductions to protect the aquatic environment

Most of our main risks fit into the key climate risks, some more clearly than others. For example, increases in demand due to a greater population and impact to the efficiency of our pumps could manifest in a number of ways. The greatest risk we face as a result of increased demand is the potential for supply interruptions – see key risk H10 for more detail. Individual risks linked with deterioration of pump efficiency have been mapped to I1.

OUR ADAPTATION STRATEGY

As a responsible water company, we are already managing our climate-related risks through operational procedures, risk mechanisms and regulatory commitments. We have effective long-term plans in place which have been developed to take into account the risks and uncertainties that could arise from climate change. As information on climate change evolves, we will ensure this is incorporated into our future plans. In developing these future plans, we will take into account recently published guidance and international standards on adaptation presented in ISO 14090¹ and 14091².

Business Plan

We prepare a Business Plan every five years. A key aspect of our Business Plan is the long-term resilience of our infrastructure and operations, considering a wide range of potential climate-related risks. We also outline our proposed Outcomes, Outcome Delivery Incentive (ODI)³ targets and areas of investment. Ofwat scrutinise each Business Plan and would challenge us if they did not see improvement in our adaptation to climate change. Our latest Business Plan 2025 to 2030 is available on our website here: [Business Plan 2025 to 2030](#).

Water Resource Management and Drought Plan

Our Water Resource Management Plan (WRMP) presents our long-term estimates of the demand for and supply of water, known as the supply-demand balance. It demonstrates the need for investment to maintain this, taking account of a range of factors that influence future levels of supply and demand, including the implications of climate change. Our current plan takes us up to 2075. Our Drought Plan sets out what actions we will take before, during and after a drought.

We have a statutory requirement to develop our WRMP and Drought Plan every five

years. These are reviewed annually against the targets set in our Business Plan as part of our Annual Review. Revisions are then made to our WRMP and Drought Plan as appropriate. We engage with Ofwat, Defra and the Environment Agency to develop these plans and ensure revisions are suitable. Our latest WRMP and Draft Drought Plan are available on our website here: [Water Resources Planning](#).

Drinking Water Safety Plans

Ensuring the quality of our drinking water is crucial to the service we provide to our customers. We have developed a Drinking Water Safety Plan (DWSP) which provides a source-to-tap risk management approach that identifies and proactively manages risks to drinking water quality. This approach is central to the way in which we ensure a continuous supply of safe drinking water now and in the future.

The DWSP consists of three key elements:

- Hazard characterisation and risk assessment
- Identification of control measures and associated monitoring
- Verification and review

When assessing risks to drinking water safety, we assess the likelihood and anticipated consequence of each hazard and hazardous event and implement control measures accordingly. Our risk management approach is an integral part of our Price Review and Business Planning process, helping to direct investment where it is most needed.

In addition to the DWSP, we have developed a Catchment Management programme to scale up approaches to tackling diffuse water pollution.

Net Zero Route Map

Net Zero means achieving a balance between the carbon emitted into the atmosphere, and the carbon removed from it⁴.

We have previously developed a Net Zero Route Map to ensure we achieve net zero emissions by 2040.

Our most recent decarbonisation plans were published in WRMP24, detailing how our carbon footprint is assessed and our approach to Net Zero Carbon, in alignment with the Net Zero Route Map and the Business Plan 2025-2030. Our latest carbon commitments can be found here: [Appendix 7E – Carbon](#).

Emergency Plans

We have emergency plans to help us to manage the consequence of extreme events such as loss of power, flooding, and extreme weather. These include triggers and actions we should take to minimise risks to our operation and ability to supply our customers. These are audited annually by Defra. Our most recent emergency plans include the use of Met Office weather warnings to convene the Weather Assessment Team or the Incident Management Team.

Membership of WRSE

As an active member of WRSE, we are working to develop a long-term Regional Resilience Plan; the Revised Draft Regional Plan was published in August 2023 following public consultation and forms the latest version of the Plan. WRSE will update and finalise the regional plan in 2025, once all WRMPs are finalised. This plan considers impacts based on the latest UKCP18 projections and acts as a blueprint for water supply investment by us and our partners. We aim to secure the supply of water for the public and industry across the South East whilst meeting the needs of the natural environment up to 2075. The outcomes from this Regional Resilience Plan feeds into our WRMP24 and Business Plan 2025-2030.

¹ Adaptation to climate change — Principles, requirements and guidelines

² Adaptation to climate change — Guidelines on vulnerability, impacts and risk assessment

³ Ofwat introduced the ODI framework in 2014. This allows us to propose performance commitments, which are supported by our customers. These are agreed with Ofwat and we have financial incentives and penalties to ensure these are met.

⁴ As defined by the Energy Saving Trust.

GOVERNANCE

We recognise that we need to adapt our approach to whole life asset management to manage future risks and opportunities. To address this, we recently recruited our new Chief Asset Officer, who will head our newly formed Asset Directorate. To set out how these needs will be addressed, the Asset Directorate Leadership Team has developed an AMP8 Mobilisation Plan.

The Asset Directorate acts as a compass for the business to meet our long-term aspirations and will include the capacity and capability to manage risks associated with climate change. The Directorate has five core capability areas (Figure 2): Strategic Planning, Asset Intelligence, Capital Delivery, Procurement, and Capital Programme Assurance.

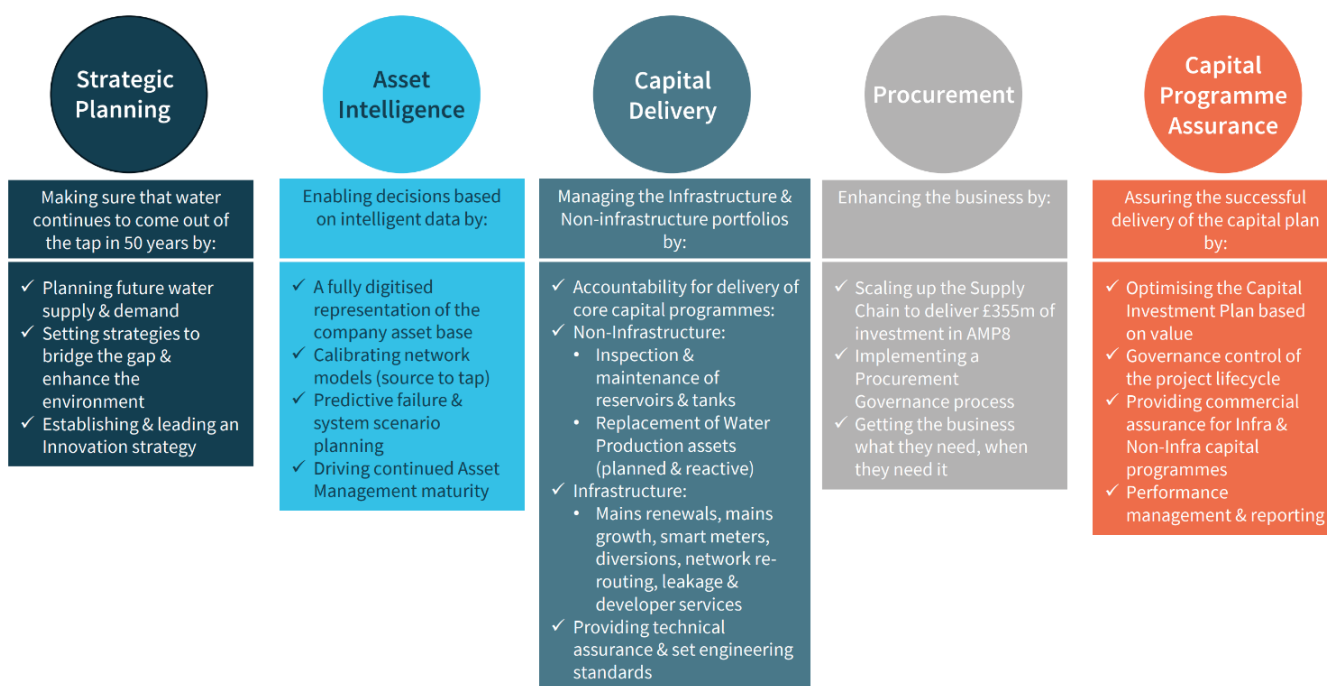


Figure 2. The Asset Directorate's five core capability areas

Our Chief Asset Officer is a member of the Executive Team, who report to the Board of Portsmouth Water Ltd. The Board has overall responsibility for Corporate Governance and, since 2020, has significantly increased their focus on Risk and Risk Management. The Board has established procedures to manage risk and oversee Portsmouth Water's system of internal control and risk management and considers risk management to be fundamental to the achievement of the business' strategic objectives. These systems and procedures are designed to allow employees across all levels within the business to identify, manage, and practicably reduce and mitigate the effects of the risk of failure to achieve business objectives.

During the past two years, the Board has highlighted the importance of risk management by explicitly adding risk to the Audit and Risk Committee title and terms of reference. Dedicated time is allocated to Risk Management at each Committee meeting, delivering an overview of ongoing key risks, a snapshot view of emerging risks, and a deep dive into the key risks that have been identified by the Board. The Board ensures all significant risks have suitable mitigation in place.

As we review and implement changes to our organisational structure, responsibility for climate-related investment decisions will fall to the Head of Strategic Planning. The new Asset Directorate will help to meet our commitments to improve the use of climate data within Asset Performance Modelling and Capital Planning.

Over the last 18 months, we have also begun using a business support tool to align goals across multiple parts of the business and ensure value based decision making. We are currently developing investment procedures, using cost data and risk assessment outcomes to identify the most appropriate solution for our needs. The investment planning process used in the next price review will be revised to make extensive use of the requirements and principles of the decision support system.



ADAPTATION REPORTING

As per the Climate Change Act (2008), Defra has set out a series of requirements which we must adhere to. This includes:

- Providing an assessment of the current and projected climate-related impacts facing our organisation; and
- Providing proposals for adapting to these climate-related impacts.

We have previously undertaken three rounds of reporting in 2011, 2015, and 2021; this report has been developed as part of the fourth round.

During the first round of adaptation reporting in 2011, we identified and prioritised our climate change risk by undertaking a Risk Assessment using the latest climate change information at

that time (UKCP09). These risks then fed into the corresponding Climate Change Adaptation Action Plan, enabling us to build further capacity for climate adaptation into our existing risk mechanisms. The work undertaken demonstrated that through our existing regulatory, legislative, and company drivers, we had capacity to adapt to risk and uncertainty.

In alignment with Defra's guidance, we re-evaluated our Risk Assessment and Action Plan for the second and third rounds of reporting in 2015 and 2021. This provided evidence of progress made towards becoming more resilient to climate change related risks. In 2021, the methodology was updated to include the use of UKCP18 data.

This fourth-round report provides an update on the progress we have made since 2021 in adapting to climate change and focuses on our ability to continue to:

- Provide safe and sufficient public water supply.
- Be resilient to natural hazards.
- Protect the environment and support biodiversity.
- Manage interdependencies and cascading failures.



PUBLIC WATER SUPPLY

As a water supply company, our main focus is continuing to deliver clean, fresh drinking water. Climate change has the potential to disrupt this, but by understanding the risk and opportunities and acting now, we can ensure this risk is minimised.

Our production, storage and distribution system is already highly resilient, with 99.7% of customers fed directly from service reservoirs. Our service reservoirs hold an average of two days of water storage; this is twice the industry standard. In addition, our strategic spine main, provides a highly interconnected system between our 21 sources, allowing the transfer of water around the network and into any areas with an operational issue or shortage. This significantly reduces the likelihood of our customers experiencing an interruption to their supplies.

We will continue to review our system and water supply's resilience to climate change.



PUBLIC WATER SUPPLY

RISK AND OPPORTUNITY

The majority of the climate change risks we face could impact our ability to supply water for temporary periods. In this section, we focus on the key risks and opportunities we may face and how sufficient supplies will be maintained.

We have already experienced some temporary reduction to the amount of water we can reliably supply due to climate change. In the summer of 2022, we experienced unprecedented temperatures and dry conditions, resulting in significant peak supply demands. Although we were able to roll out an effective communications plan to reduce demand, monthly average consumption per customer rose to over 180 litres per day in July 2022 – the highest levels since 2020. The impacts of this drought event will be used to inform our responses to future extreme weather events.

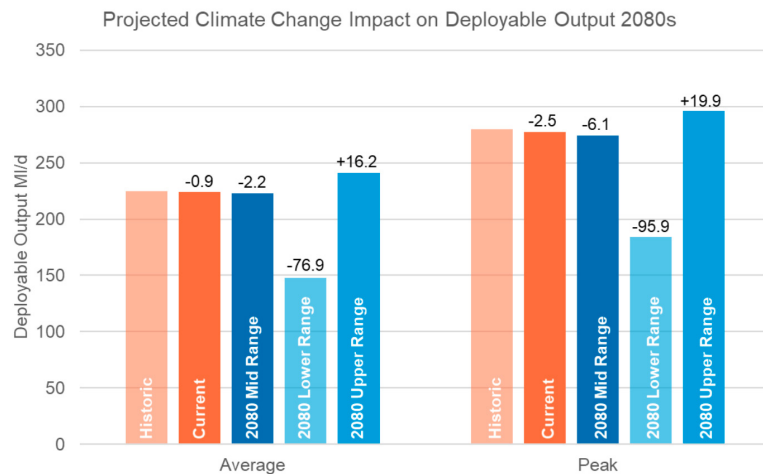


Figure 3. Projected Climate Change Impact on Deployable Output in 2080

New Risks

In ARP3, we committed to undertaking a periodic review of climate-related impacts on Deployable Output⁵ (DO). The impact of potential future climate conditions has subsequently been assessed through extensive modelling. To mitigate these impacts, our drought plan specifies different Levels of Service (LoS) that will be implemented to reduce the level of service demand putting pressure on water supplies. LoS requirements are measures based on the balance of affordability (of implementing and developing new sources) and the risk of restriction to water supplies.

The results, outlined in Figure 3, project that the probable triggers for each LoS are as follows:

- Temporary Use Bans (TUB) – 1 in 20 years or 5% annual chance
- Non-Essential Use Bans (NEUB) – 1 in 80 years or 1.25% annual chance
- Drought Permits/Orders – 1 in 125 years or 0.8% annual chance (changing to 1 in 500 years or 0.2% annual chance from 2041-42)
- Level 4 Emergency Drought Orders (such as standpipes and rota cuts) – 1 in 200 years or 0.5% annual chance (changing to 1 in 500 years or 0.2% annual chance from 2039-40)

During extreme weather events, particularly drought, DO may

be reduced. With demand management measures in place, projected mid-range reductions in DO are relatively small, with a 7.2% reduction with TUBs and an 11.9% reduction with NEUBs. However, regulatory guidelines dictate that we continue to improve our resilience up to a 1-in-500-year drought event. We are therefore developing our future approaches to be robust and adaptable, utilising measures that are effective in a range of climate futures.

To ensure that good ecological status can be achieved within our catchment, we may be subject to restrictions on abstraction from chalk aquifers and streams. These potential restrictions are our greatest uncertainty and could potentially be exacerbated by a changing climate. Since 2018, previously exempt abstractors are required to apply for an abstraction license for any abstractions over 20 m³ per day. As of 2028, the Environment Agency will have the ability to vary or revoke abstraction licenses if necessary for environmental protections.

We have worked with the Environment Agency in the development of our WRMP24 to define how we will reduce our reliance and impact on environmentally sensitive water sources. This includes waste-water reuse and desalination, which we are investigating in collaboration with WRSE, as well as the potential to cap or reduce existing supplies.

⁵ Deployable Output is the amount of water that is available from a source during a defined scenario- e.g a drought

Our main risks, linked to the key water sector risks identified by the Climate Change Committee’s independent advice which fed into CCRA3, are outlined below.

Table 2 Key climate-related risks facing Portsmouth Water

Key Risk Code	Key Risk Description	Our mapped main individual risks	Risk score (2021-2051)	Risk score (2051-2081)	Risk score (2081+)
I8	Risk to public water supplies from reduced water availability from drought and low river flows	<ul style="list-style-type: none"> Increased demand for water at peak times from permanent resident population Increased occurrence of drought Increased summer abstraction by other (existing) catchment users 	Low (5)	Medium (6)	Medium (12)
H10	Risk to health from poor water quality and household supply interruptions	<ul style="list-style-type: none"> Lower river flows cause higher contaminant concentrations Reduced cloud cover leads to increased biological growth in surface waters Increased demand from tourist population and/or net inward migration of retirement population Higher temperatures cause increased biological and bacterial growth in surface waters 	Low (4)	Medium (8)	Medium (12)
N10	Risk to aquifers and agricultural land from sea level rise, saltwater intrusion	<ul style="list-style-type: none"> Rising salinity at River Itchen intake Saline intrusion of borehole sources Saline intrusion from lower groundwater / increased abstraction 	Low (5)	Low (5)	Low (5)
N11	Risks to freshwater species and habitats from changing climatic conditions and extreme events	<ul style="list-style-type: none"> Flow reductions due to climate change necessitate abstraction reductions to protect the aquatic environment 	Medium (12)	Medium (9)	Medium (9)

PUBLIC WATER SUPPLY

ADAPTATION EMBEDDED IN OUR BUSINESS-AS-USUAL OPERATION (2020-2025)

We have embedded adaptation actions identified in our 2021 adaptation report into our business-as-usual operations through implementing the following plans.

Havant Thicket Reservoir

We continue to see good progress on construction of Havant Thicket Reservoir, despite delays due to the additional scope to support the alignment works with Southern Water's Hampshire Water Transfer & Water Recycling Project and the discovery of cracks in the clay during further ground investigations. Advanced work on tree clearance has been completed, works have begun on the main site and access roads, and pipeline design and planning is underway. Recent milestones include an agreement to change the scope of the project, to future-proof the reservoir in order to be ready to accommodate recycled water, which will significantly increase the environmental benefits of the project.

Water Resource Management Plan

Our latest WRMP was published in 2024 (WRMP24) and sets out how we plan to supply safe, reliable drinking water for the next 50 years (2025-2075). This plan is built on our previous plans, working with our neighbouring companies across the South East to ensure that we meet all the regulatory requirements. Our methodology has been assessed as in line with planning guidance from the Environment Agency.

WRMP24 is our most ambitious plan yet, reflecting Defra's acceptance of the Environment Agency's July 2021 recommendation that our area should be reclassified by the Environment Agency as being 'seriously water stressed'.

WRMP24 was developed following the completion of the WRSE alliance revised draft regional plan, published in August 2023. This alliance allows a consistent methodology and uses advanced modelling

and forecasting techniques. Through WRSE, 28 different climate change scenarios were modelled, incorporating UKCP18 Regional Climate Model (RCM) and Global Climate Model (GCM) outputs. For the majority of the 28 scenarios, there is reduced deployable output owing to lower river flows and groundwater levels.

Drought Plan

Our most recent Drought Plan was finalised in April 2022 and was developed to meet the requirements of the latest Water Company Drought Plan Guidance set out by Defra and the Environment Agency in 2020. Our Drought Plan is an operational plan that sets out the measures that we will take so that we are able to continue to maintain supplies of wholesome water to our customers with as little recourse as possible to Drought Orders and/or Drought Permits. The purpose of a Drought Plan is to set out the timely actions that a water company will take to ensure continuity of supply whilst at the same time continuing to protect the environment.

Our drought planning includes:

- Temporary use bans (hosepipe bans) once in every 20 years on average
- Drought orders to further limit water use once in every 80 years on average
- Emergency drought orders (standpipes or rota cuts restricting water to a few hours) once every 200 years on average.

The Drought Plan was implemented during the summer of 2022 and was subsequently reviewed, concluding that the plan was effective during that time.

Research into Drought Triggers for the River Test and River Itchen has also been

completed alongside Southern Water, at the request of the Environment Agency. This concluded that changes to the Southern Water drought trigger levels would not pose a risk to our current 1 in 20-year Level of Service for Temporary Use Bans. Whilst Southern Water has subsequently updated its approach to drought triggers in early 2024, our assessment is that the risk to our stated Level of Service remains low.

Leakage improvements

Reducing leakage helps us reduce our carbon emissions, as we are not treating and pumping water unnecessarily. It also helps to build resilience within our supply network by ensuring more efficient use of water. This will become even more important in the long-term as resources become less plentiful due to potential increases in water stress.

Our leakage rate currently is around 28 million litres each day – we plan to reduce this to 16 million litres per day by 2040 (50% less than our leakage in 2017-18). We have had great success at finding and fixing leaks in recent years thanks to innovative ways of working. We have already reduced leakage by more than five million litres per day to 28 million litres and extended our target to reduce it even further to 24 million litres by 2025.

For the previous two years we have missed our rolling three year average leakage target, following the very dry summer and harsh winter of 2022, which caused significant stress on our mains network. In 2023 we implemented a leakage recovery plan with significant investment associated. This is the second year of our enhanced leakage recovery plan. We have spent an

additional £1.4 million compared to last year on our leakage detection and repair, and due to our significant efforts, we have seen a 12% decrease since 2022-23 and leakage is continuing to fall.

In recent years we have increased our detection resource, including using Satellite Imagery (see case study), Electronic Listening Devices, and AI enabled Acoustic devices. These techniques, paired with our previous successful techniques such as our Acoustic Fixed Network and network calming, will allow us to not only detect leakage, but reduce leakage to record low levels.

We have also trialled our Leakbot campaign, which is focused on helping customers identify leaks on their own supplies. Having asked 16,000 customers to take part, 1,000 customers were issued with the Leakbot device and 800 were installed. The trial identified that 24% of customers had leaks and after six months, demand was reduced by 19 litres per day.

We have spent £13.2m on leak improvements including detection and repairs between 2015 and 2024.

Water Efficiency

We planned to install more than 36,000 new water meters between 2020 and 2025 and are on track to meet this target. This includes installing meters in new homes. We are also carrying out a small trial of smart meters with customers.

More than 10,000 customers have signed up for our online GetWaterFit scheme where

they can complete a survey on their water use, order free water-saving devices and take part in challenges to earn rewards for community projects. This service is accessed by visiting www.getwaterfit.co.uk and includes:

- Free water-efficient devices.
- A free online session with a water-saving expert.
- Opportunities to raise money for local charities by completing simple water efficiency challenges.

We have a target set by Government to reduce non-household water use by 9% by 2038. To explore the most efficient way to do this we are carrying out trials. We partnered with Portsmouth City Council and real estate company Avison Young to part fund a water efficiency trial at its North Harbour offices. The water savings from toilets, taps and showers alone amounted to an impressive 50%.

Resilience Schemes

In ARP3, we outlined plans to invest £2.8 million between 2020-2025 delivering three resilience schemes to help reduce the predicted demand deficit and significantly reduce the risk to customers from the loss of one or more treatment works at peak demand.

By December 2024, we had completed two resilience schemes. The remaining resilience scheme will be completed cost-effectively through a collaboration with Highways England.

Catchment Management

In ARP3, we set a performance target (ODI) to engage with 50 farmers between 2020-2025 and help them commit to undertake a Farm Management Plan; that is an annual target of 10 farmers per year. Since 2020, we supported 33 farms in undertaking activities to reduce the risk of raw water deterioration. However, preliminary assessments found that the seven farms had satisfactory nutrient levels, and did not require a Nutrient Management Plan (NMP). As such, we were currently below our target but have been successful overall in supporting local farms.

Leakage Reduction Case Study

We have committed to reducing leakage by 50% by 2040 and have made significant progress towards this ambition since 2015. Despite fluctuating leakage levels due to winter events and storms in recent years, we have remained committed to maintaining industry leading leakage performance. Following these events we launched an enhanced recovery plan, which increased resourcing and the capability to deploy wider resources earlier in the event of future breakouts.

To further progress leakage identification, we have committed to

the acquisition of satellite reporting via a third-party supplier on a minimum annual basis. Providers offer a points of interest service that detects changes in vegetation densities and composition and also exposure to chlorinated water. This is most effective after both a winter leakage breakout as well as after a long dry spell. To date the technology has proved to be highly accurate, identifying even very small leaks with a high success rate, which has aided us in reducing leakage repair time.

In addition to this measure, we are aiming to develop a smart network,

placing 4000 sensors across the network to collect pressure and flow information. From this data, trends can be identified and any step changes in water usage can also be detected, investigated, and repaired. Both of these measures will help to shrink the time from the identification of points of interest, to the repair stage. By reducing water lost to leaks, we expect to supply a similar amount of water as today but to an additional 122,000 people by 2045.

PUBLIC WATER SUPPLY

ADAPTATION ACTIONS TO BE EMBEDDED IN OUR BUSINESS-AS-USUAL OPERATION (2025-2030)

We intend to embed the adaptation actions identified in this report into our business-as-usual operations, as we implement the following plans during the period 2025 to 2030.

Water Resource Management Plan

Plans set out in the WRMP include:

- Constructing and filling Havant Thicket Reservoir by 2031 to supply water to our customers and free up supplies elsewhere to share with Southern Water in a drought
- Installing smart meters in all properties we supply and replace existing meters with smart ones by 2035 to encourage water saving, find leaks and introduce fairer bills
- Benefitting from Government action including the introduction of water efficiency labelling on devices and appliances which use water to further reduce average use to below 110 litres per day.

Our next WRMP will be completed in 2029. In line with statutory requirements, progress against WRMP24 will be reviewed annually and reported to the Secretary of State.

Drought Plan

Our next Drought Plan will be published in 2027 and will consider ground water levels under different climate scenarios. We will work closely with Southern Water on drought triggers as we begin to develop the next iteration of our Drought Plan and WRMP.

The Drought Plan 2027 will align with our WRMP24 to increase our resilience to 1-in-500-year drought events without the need to implement emergency plans. Furthermore, the WRMP24 uses a PyWR system model to assess Deployable Output and is currently being used to update our

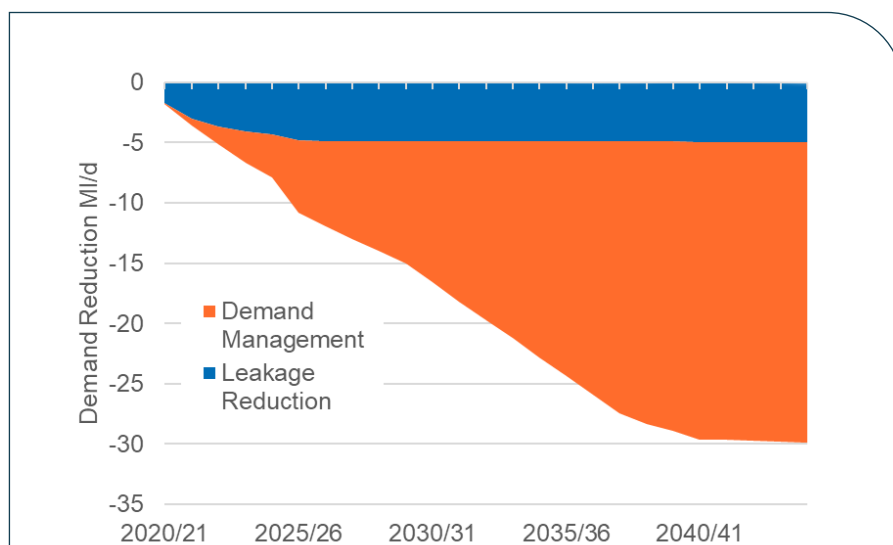


Figure 4. Demand and leakage reduction measures

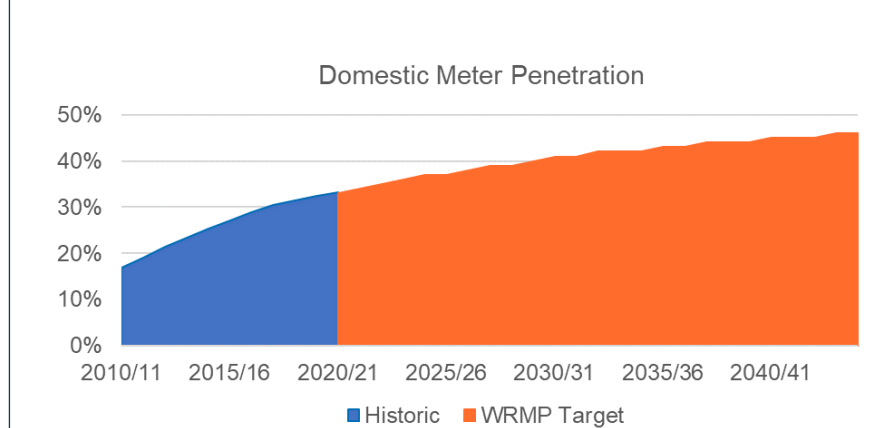


Figure 5. Historic and planned domestic meter penetration

groundwater trigger levels. Additional triggers are currently being investigated based on rainfall and surface water. As part of the WRSE drought group, we are currently undertaking research into the efficacy of a range of drought resilience measures, including demand savings from the implementation of Temporary Use Bans (TUBs) and Non-essential Use Bans (NEUBs). This will all be updated in the next iteration of our Drought Plan.

WRSE Regional Resilience Plan

Our supply area is an area classified by the Environment Agency (EA) as being 'seriously water stressed'. We plan and operate at a strategic level within the WRSE which recognises that the South East is in a region that is under increasing pressure from population growth, climate change and the need to protect fragile ecosystems. This provides risks, but also opportunities including work on the WRSE Regional Resilience Plan which aims to provide a joined up, affordable, resilient, and sustainable water supply that delivers for the public, industry and the natural environment for years to come.

Five of the WRSE water companies, including Portsmouth Water, have published their 2025 to 2075 WRMPs, while one has launched a consultation on its revised draft WRMP. WRSE will update and finalise the regional plan in 2025, once all WRMPs are finalised.

Leakage

We plan to reduce leaks by half⁶ by 2040 and by another one percent every five years until 2075. We will do this by harnessing innovative ways to find the smaller, background leaks which are currently hard to trace with existing technology, finding more leaks in customers' homes, particularly through our metering programme using smart monitoring of our

network, and using intelligent tracking of the performance of our network to proactively find leaks.

As part of WRMP24, a Leakage Strategy was developed detailing options for leakage reduction measures in AMP8 such as Digital Twin capability, AI-enabled sound loggers (FIDO bugs), and New Sounding Techniques to enable us to meet our performance commitment of a further 10% reduction in leakage.

To further reduce leakage we are proposing to deploy additional fixed network monitoring across our distribution system to improve leak detection. However, as can be seen from Figure 4, leakage reductions are only predicted to play a limited part in our demand reduction. Demand management, supported by metering and water efficiency, will play a larger role.

Metering

As specified in WRMP24, we plan to install smart meters for all our customers between 2025 and 2035 (see case study). Properties which already have meters will have them replaced with smart ones by 2035; overall, we expect to fit a smart meter in 94 percent of the properties we supply. Currently, only a third of the properties we supply have a water meter.

Installing meters both at properties and across our network of pipes will give us more insight into where water is being used and make it much easier to find leaks and faults.

We expect metering will help to reduce domestic water use by around 12 percent – nearly 20 litres per person per day. We're able to introduce metering for everyone as our supply area was reclassified as being 'seriously water stressed for metering' by the Government in 2021.

Water Efficiency

Our WRMP includes measures for saving water by helping customers to become more water efficient. The plan includes:

- Audits for homes, schools, colleges and businesses supported with advice and water-saving devices.
- Leak detection, leak alarms and support to repair leaks.
- A community reward scheme for water saving.
- Sharing knowledge with young people.
- A campaign to raise awareness.
- Tariffs to promote water saving.
- Subsidised water butts.

Our actions will help our household customers reduce their water use to 121 litres per person per day by 2050. Actions by the Government (see right) will bring this down further to below 110 litres per person per day by 2050. We will reduce non-household water use by 9% by 2038 and 15% by 2050, in line with Government targets. We also plan to leverage the benefit from Government action including introduction of water efficiency labelling on devices and appliances that use water, to further reduce average use to 110 litres per day.

Our innovative Water Lab is a partnership with Kraken Technologies (a part of the Octopus Energy Group). The Water Lab will engage across the water and energy sectors to develop and trial joint solutions particularly in areas such as energy and water efficiency that require customer participation. This approach will help our customers to not only save water but also link to the important element of energy costs where much greater financial savings can be made by customers.

⁶ The starting figure for our 50 percent reduction in leaks is 32.38 million litres of water per day (using our 2017-18 leakage value as a baseline as set by Ofwat), so our target for 2040 is 16.19 million litres of water per day. We have already reduced leaks to 28 million litres

Catchment Management

We are continuing and enhancing the grants and collaborative practices we have been implementing with local farmers and landowners. These are preventative programmes that seek to protect our sources from pollutants, such as nitrates, through a 'catchment first' approach. We have identified several opportunities for improving our environment through nature-based solutions that we can work collaboratively on with our local

communities and farmers. Further information on catchment management is provided in the Improved Environment and Supporting Biodiversity section.

As part of our engagement, we will continue to work with farmers more generally to enhance the biodiversity of the region and are working with Catchment Sensitive Farming and the Environment Agency as part of the Downs and Harbours Clean Water Partnership. Further details on grants we are making available are provided in

the Improved Environment and Supporting Biodiversity Chapter of this report.

Details on how landowners can get involved are included on a dedicated website: www.cleanwaterpartnership.co.uk.

Water Treatment Improvements

Plans for water treatment include a Nitrate Treatment Plant and an Ultraviolet (UV) Treatment Plant. Further information is provided in the Improved Environment and Supporting Biodiversity section.

Smart Meter Installation Case Study

We are in the process of implementing our universal smart metering programme which will aid us in our 50% leakage reduction target by 2040. The smart metering programme is being rolled out over the next 10 years, which will involve installing a meter at the boundary of more than 320,000 customer properties. This will provide us with additional data to give an insight into the behaviour of the network and of their customers, providing an opportunity to identify areas to work with customers to help reduce our consumption and leakage. In addition, smart meters will allow customers to view their usage data in real time, improving customer engagement,

enabling them to make better decisions about their water use, and helping to educate them on the amount of leakage they have in their own pipework.

Through the implementation of the smart metering programme, we aim to install smart meters in all non-households by 2030, and to replace over 68,000 existing household meters with smart meters by 2040. Therefore by 2035-36 it is expected that 94% of customer households will have a meter, compared to just 37% in 2021-22; this is expected to reduce water demand over the next 10 years. To facilitate the installation of smart meters, we conducted the

Big Conversation Framework, a series of public consultations to educate customers on smart metering and the benefits it will provide. Initially it was recorded that customers had low confidence in the smart metering programme, but that once they had been provided with additional information, they become more engaged. Additionally, in March 2024, we held a Customer Advisory Panel whereby focus groups and interviews with the public, who currently resided in unmetered homes, were held to gather feedback on how we can improve their advertising of smart metering and engage a wider audience in the scheme.

PUBLIC WATER SUPPLY

ADAPTATION ACTIONS TO BE EMBEDDED IN OUR BUSINESS-AS-USUAL OPERATION (2030 AND BEYOND)

Water Resource Management Plan

Plans set out in the WRMP include:

- Increase our resilience so we can reduce the likelihood of emergency drought restrictions such as standpipes to once every 500 years on average after 2039 and stop using an emergency permit to take water during droughts
- Support everyone to reduce their water use to an average of 121 litres per person per day by 2050 (about 154 litres on average today) through community rewards, water-saving devices and home audits
- Reduce non-household water use by 9% by 2038 and by 15% by 2050 through assessments and leak detection for hundreds of high water users, such as schools, colleges and businesses
- Halve leaks by 2040 and by a further one percent every five years after
- Upgrade a water supply 'booster' station in West Sussex by 2033 so we can move water more easily to where it's needed.
- Potentially receive supplies from Southern Water after 2039 so we can reduce the amount of water we take from precious chalk stream catchments.

Drought Plan

After 2039 our plans for emergency droughts orders will move to a likelihood of once every 500 years on average, so are much less likely to happen.

Leakage

Works to reduce leakage will continue with plans to reduce leaks by 50% by 2040 and by another 1% every five years until 2075.

Smart Metering

Smart meter rollout will continue through AMP9 to reach our goal of installing smart meters at the properties of all our customers between 2025 and 2035.

Upgrading our Network

Our Long-Term Delivery Strategy (LTDS) details plans for 2038-2040 to upgrade our network. To create additional flexibility in our network we plan to upgrade our Lavant Booster. This critical network enhancement will improve the way we can move water resources around our supply area. This will unlock 25 Ml/d of deployable output and enable us to harness the additional water that we are creating for the region through the Havant Thicket Reservoir. This option is critical in all of the futures we have developed; however, it is only viable following the completion of Havant Thicket Reservoir. Delivery of this activity will provide us with much needed capability in transferring water around our network and is therefore considered to be low regret.

Transfer From Southern Water

As detailed in our LTDS, we are planning a transfer from Southern Water between 2035 and 2040. We currently have the capacity to share 30 Ml/d of water with Southern Water. Following the completion of Havant Thicket Reservoir, this will increase by an

additional 21 Ml/d. We will need to begin importing water from 2038, as Southern Water's supply is offset by new sources of water from within the region. We will need to invest in a key transfer between our companies to ensure that we are able to do this.

Havant Thicket Reservoir

We're working with Southern Water on an option to put highly-cleaned, recycled wastewater into Havant Thicket Reservoir at times of need, starting in 2034. This would boost the amount of water the reservoir could supply to Hampshire during a drought and is featured in Southern Water's WRMP.



HAVANT THICKET RESERVOIR ONCE CONSTRUCTION COMPLETED AND OPERATIONAL

PUBLIC WATER SUPPLY

CLIMATE CHANGE ADAPTATION ACTIONS

During previous rounds of climate change adaptation reporting, we developed a climate change Action Plan. Specific adaptation actions linked to ensuring continued supply and good water quality are outlined below, noting progress made since 2020, and outlining actions proposed for the next five years.

Table 3 Key climate-related risks facing Portsmouth Water

Action	Owner	Progress made (2020-2025)	Progress to be made (2025-2030)
1: Incorporate climate change risks into investment decision-making	Capital Planning	<ul style="list-style-type: none"> UKCP18 data was incorporated into WRMP24 which will feed into capital planning. In 2023, Arcadis completed a Climate Change Risk Assessment on 93 assets across 51 sites within the Portsmouth Water supply area, with specific emphasis on sea level rise and storm surge, rainfall events and extreme weather events. The results fed into our Long-Term Delivery Strategy (PR24). 	<ul style="list-style-type: none"> The findings of WRMP24, which incorporate climate change, will feed into capital planning. In line with Ofwat requirements, our enhancement investment strategy is tested against a series of industry-determined common reference scenarios. These include ‘adverse’ and ‘benign’ climate change scenarios represented by Representative Concentration Pathway (RCP) 8.5 and RCP 2.6, respectively. As we review and implement changes to our organisational structure, responsibility for climate-related investment decisions will fall to the Head of Strategic Planning.
2: Build capacity within Asset Performance Modellers in understanding climate change impacts	Capital Planning	<ul style="list-style-type: none"> We have started using a new Copperleaf business support tool to support improving our resilience. This tool helps us to align goals across multiple parts of the business, including asset management, ESG and sustainability, finance, IT, and operations. It operates on a risk-based system designed to measure implementation cost against their benefits or value to the organisation, society, and the environment. Plans are optimised against constraints related to objectives or costs, with the optimiser choosing the options with the lowest level of risk. The benefits of each option are classified into six ‘capitals’: financial, manufactured, intellectual, human, societal, and environmental (natural). The Copperleaf system can provide predictions of risks mitigated and remaining risks for designated investment scenarios, allowing us to more accurately assess the overall resilience of our plans. 	

Action	Owner	Progress made (2020-2025)	Progress to be made (2025-2030)
3: Review the case for incorporating climate change impacts into Asset Deterioration Modelling	Capital Planning	<ul style="list-style-type: none"> We have completed our Business Plan for 2025-2030 and included plans to build expertise to understand climate change impacts and incorporate these into asset deterioration modelling. We have started using a new Copperleaf business support tool to support improving our resilience. 	<ul style="list-style-type: none"> In line with our Business Plan 2025-2030, we will build our expertise to understand the impacts of climate change and use this expertise in our asset deterioration modelling.
4: Continue engagement with Regional Planners and decision makers and make use of up to date climate data	Capital Planning	<ul style="list-style-type: none"> The WRSE emergency plan and stakeholder engagement report were published in 2022. WRSE regional investment modelling outputs were included in WRMP24 and PR24. WRMP19 was based on UKCP09 while the updated WRMP24 uses UKCP18 projections. WRSE has modelled the impacts that climate change will have on the supply capabilities across the Southeast in the period up to 2075. This approach follows the EA Guidance for assessing climate change impact, using UKCP18 climate projections. This guidance follows the change in supply system resilience requirements to ensure systems are resilient up to a 1-in-500-year event. We have completed our Business Plan for 2025-2030 and included plans to engage with regional planners and decision makers (such as Water Resources South East) to make sure we use the most up-to-date climate change data. 	<ul style="list-style-type: none"> We are proposing to deliver a programme which will include two region-wide studies, making use of new groundwater models only recently available to us. One to better understand the risks of saline intrusion into our groundwater aquifers posed by rising sea levels. The other to revisit our current assessments, based on previous groundwater models, of the risk of groundwater flooding impacting our production assets, driven by changing rainfall patterns. In line with our Business Plan 2025-2030, we will conduct further engagement with regional planners and decision makers to ensure we are using to most up-to-date climate change data.
5: Incorporate the water quality findings of the climate change risk assessment into the Drinking Water Safety Plans	Drinking Water Safety Planning	<ul style="list-style-type: none"> As part of WRMP24 and working with Water UK Water Quality Group, we have developed a screening process for DWSP risks identified as part of the source to tap assessment. We have completed our Business Plan for 2025-2030 and included plans to incorporate water quality findings from climate change risk assessments in Drinking Water Safety Plans. These actions are in the process of being completed by the DWSP and Catchment & Environment Team. 	<ul style="list-style-type: none"> In line with our 2025-2030 Business Plan, we will incorporate water quality findings from climate change risk assessments in Drinking Water Safety Plans.

Action	Owner	Progress made (2020-2025)	Progress to be made (2025-2030)
9: Continue to research climate change drivers of water demand at average and at peak times of the year	Water Resource Management and Drought Planning	<ul style="list-style-type: none"> WRMP24 assesses the impact of climate change on supply, demand and headroom. WRMP24 plans for an average normal year, a dry year, and a critical period (e.g., summer peak demands) in a dry year. The assessment of the Peak Demand Deployable Output (PDO) is linked to the critical period (DYCP) (peak-week summer demand) planning scenario. Based on analysis of the demand profiles used in the regional system simulator, the Peak week typically occurs in mid-August but could occur in any summer month. A key objective of the WRSE regional plan is to address the impacts of climate change on demand for water and how much is available. The impact of weather on demand was modelled in 2020, including seasonal factors, minimum and maximum temperatures and rainfall. We have completed our Business Plan for 2025-2030 which includes continuing to research climate change drivers of water demand and engagement with other regional planners on issues related to water abstraction and demand 	<ul style="list-style-type: none"> In line with our Business Plan 2025-2030, we will continue researching the climate-related drivers of water demand and will engage with regional planners on issues relating to water abstraction and demand.
10: Continued engagement with regional planners and decision makers on water demand issues.	Water Resource Management and Drought Planning	<ul style="list-style-type: none"> Our WRMP24 sets out how to supply safe, reliable drinking water for the next 50 years (2025-2075). This plan is built on our previous plans, working with our neighbouring companies in the South East to ensure that we meet all the regulatory requirements. Our methodology has been assessed as in line with best practice by the Environment Agency. The plan was developed alongside five other companies in the WRSE alliance to be effective as part of a wider regional plan for South East England. Through WRSE, 28 different climate change scenarios were modelled, incorporating UKCP18 Regional Climate Model (RCM) and Global Climate Model (GCM) outputs. For the majority of the 28 scenarios, there is reduced deployable output owing to lower river flows and groundwater levels. 	<ul style="list-style-type: none"> WRSE will update and finalise the regional plan in 2025, once all WRMPs are finalised.
11: Continued engagement with other stakeholders/ the Environment Agency on other catchment abstractors	Water Resource Management and Drought Planning	<ul style="list-style-type: none"> Development has continued to construct and fill Havant Thicket Reservoir by 2031 to supply water to our customers and free up supplies elsewhere to share with Southern Water in a drought 	
12: Research pressures on risk of breach of environmental flow requirements in water courses	Water Resource Management and Drought Planning	<ul style="list-style-type: none"> Following the EA's longer-term environmental water needs assessment as part of the Water Resources National Framework, which established potential licence reductions by 2050 for rivers to meet their environmental flow indicators (EFI), WRSE developed a series of future scenarios under differing levels of environmental protection. The outcome, a range of potential abstraction licence reductions and resulting reduced deployable output, were embedded into WRMP24. 	

Action	Owner	Progress made (2020-2025)	Progress to be made (2025-2030)
13: Continued research of impacts of climate change and seasonal aquifer characteristics	Water Resource Management and Drought Planning	<ul style="list-style-type: none"> The impacts of climate change on supply and abstraction has been included in WRMP24. 	<ul style="list-style-type: none"> Our next business planning period has commitments to assess the effects of our current abstractions and secondly implement mitigation to protect and enhance the aquatic environment. One of the main focuses is preventing future deterioration due to environmental changes i.e. linked to climate change (moving to proactive protection, rather than reactive). This includes seasonal characteristics of aquifers as a result of climate change.
14: Review Level of Service in the next water resources management planning cycle	Water Resource Management and Drought Planning	<ul style="list-style-type: none"> WRMP24 included options to reduce the level of service from a 1-in-500 to a 1-in-200 level of service from a supply side. Our levels of service are not planned to change in the future as part of WRMP24 other than for emergency drought orders, which are proposed to change to 1-in-500 years in 2038–39 to meet the requirements of the Water Resources Planning Guideline (WRPG). 	<ul style="list-style-type: none"> For WRMP29 we may consult on changing our Temporary Use Bans level of service from 1-in-20 to a 1-in-10 in order to meet demand reduction targets. This would however require customer consultation.
15: Assess impacts of climate change on our Drought Plan	Water Resource Management and Drought Planning	<ul style="list-style-type: none"> We have completed our Business Plan for 2025-2030 which includes plans to assess the impacts of climate change on our drought plan. 	<ul style="list-style-type: none"> The next drought plan will be published in 2027 and will incorporate the findings of WRMP24 and consider climate change.
16: Quantify the likely risks of saline intrusion	Drinking Water Safety Planning	<ul style="list-style-type: none"> In 2023, Arcadis completed a Climate Change Risk Assessment on 93 assets across 51 sites within the Portsmouth Water supply area, with specific emphasis on sea level rise and storm surge, rainfall events and extreme weather events. This assessment included consideration of saline intrusion at a screening level, but was not assessed at a site level. 	<ul style="list-style-type: none"> As a result of Arcadis' work, an investigation into saline intrusion will be completed between 2025 and 2030 to inform WRMP29. We are proposing to deliver a programme which will include a region-wide study to better understand the risks of saline intrusion into our groundwater aquifers posed by rising sea levels.

PUBLIC WATER SUPPLY MONITORING

We already monitor our performance under several ODI measures.

We are committed to continue monitoring these measures to assess our performance into the future as circumstances change, including the climate. We plan to incorporate into adaptation actions insight gained through this monitoring and evaluation process.

Our targets for 2025/26 will be set by the Final Determination for our PR24 Business Plan.

Table 4 Public water supply monitoring

Performance Aim / Monitor	Measurement	Performance						Target
		2010/11	2015/16 ¹	2020/21	2021/22	2022/23	2023/24	2024/25
Risk of service restrictions in a 1 in 200 year drought	% of customers at risk	-	-	84	88	92	88	32
Supplied by a single system	No. of customers	-	-	0	0	0	0	0
Unplanned outages	% loss of peak week production capacity	-	-	1.25	0.76	1.04	1.97	2.34
Water supply interruptions	mm:ss	05:13	03:30	02:49	02:21	02:21	01:31	05:00
Per capita consumption	l/p/d	161	143	157 ²	160	161	156	140
Leakage	MI/d	36	28.2	25.4	25.0	27.6	29.1	24.1
	% reduction from 2019/2020	-	-	-10.6	-12.0	-2.8	+2.5	-15.2
Mains Repairs	bursts per 1000km	100	66 ³	74	47	73	53	69
Domestic Meter Penetration	% of customers	17	27	33	34	35	38	-
Non-Domestic Meter Penetration	% of customers	90	90	88	88	89	89	-

Notes:

¹ AMP6 methodology

² Performance in 2020/21 onwards impacted by COVID, where increase working from home has increase household usage.

(-) indicates there is no available data as either wasn't assessed in this way at the time of reporting or target not set.

³ Note this was a particularly good year due to very benign weather conditions.

NATURAL HAZARD RESILIENCE

Natural hazards, such as flooding and ground movement, have the potential to have an impact our ability to operate our sites. We have been continuously investing in resilience measures to combat this, allowing us to cope well with recent extreme events. In the event of a supply disruption, all customers can be supplied through alternative sources.

The main risk mechanisms we use to plan and manage these are Resilience and Emergency Planning and Capital Planning.



NATURAL HAZARD RESILIENCE

RISK AND OPPORTUNITY

Our main risks, linked to the key water sector risks identified by the Climate Change Committee’s independent advice which will feed into CCRA3, are outlined below.

Table 5 Key climate-related risks facing Portsmouth Water

CCRA3 Key Risk Code	Key Risk Description	Our mapped main individual risks	Risk score (2021-2051)	Risk score (2051-2081)	Risk score (2081+)
I2	Risk to infrastructure services from river, surface water and groundwater flooding	<ul style="list-style-type: none"> Increased flooding to source and treatment works from rivers and groundwater Increased flooding to pumping stations (raw and potable) and valves from rivers and groundwater Increased regional flooding from rivers and groundwater impedes routine mains repair 	Medium (6)	Medium (9)	Medium (12)
I3	Risk to infrastructure services from coastal flooding and erosion	<ul style="list-style-type: none"> Water resources asset loss from coastal change Abstraction asset loss or outage from coastal change 	Low (3)	Low (3)	Low (4)
I7	Risk to subterranean and surface infrastructure from subsidence	<ul style="list-style-type: none"> Accelerated asset deterioration of mains from more extreme wetting and drying cycles and earth movement 	Low (4)	Medium (8)	Medium (12)

NATURAL HAZARD RESILIENCE

ADAPTATION EMBEDDED IN OUR BUSINESS-AS-USUAL OPERATION (2020-2025)

We have embedded adaptation actions identified in the third round into our recent business-as-usual operations. The following programmes were implemented to improve asset and system resilience against extreme weather events and climate change.

Climate Change and Flood Risk Assessments

In 2023, Arcadis completed a Climate Change Risk Assessment on 93 assets across 51 sites within our supply area, with specific emphasis on sea level rise and storm surge, rainfall events and flooding, and extreme weather events. The scope of this study included all our strategic assets that abstract, treat, pump, store, and control water. For each asset, the assessment modelled the risk of flooding from surface water, rivers and seas, and provided a prioritization rating for further action. The risk assessment incorporated UK Climate Projections (UKCP18) and the results fed into our Long-Term Delivery Strategy (PR24).

Using ISO14090:2019, CCRA3 and the outputs of Arcadis' climate change risk assessment, we have identified where we needed either a better understanding of risk across our business, a detailed understanding of risk at an individual site level or where 'no-regret' investment would provide tangible mitigation to a known risk straight away. We propose to complete studies into power resilience and climate risks to supply chains.

Flood Resilience

In 2005, we commenced a programme of increasing resilience against flooding which successfully protected assets in the floods of 2012 and 2013. Further work has since been undertaken to withstand "extreme" flooding conditions and we have enhanced our Emergency Plan accordingly. We are now confident that supplies can be maintained in such extreme flooding

conditions of a 0.1% annual exceedance probability event (1 in 1000 year return period).

Our work associated with extreme flooding has been dealt with in two ways:

- Emergency Planning: Trigger levels, timings and an outline action plan have been developed and included in our Extreme Flooding Emergency Resilience Plan. This forms a basis for decision making and enables proper management of risks.
- Capital intervention: Permanent flood defences were identified to be required at four of our sites. Protection works were completed at Lavant, West Street, Aldingbourne between 2010 and 2015 and at Walderton between 2015 and 2020.

Network Resilience

For the previous Business Plan in PR19, we conducted a comprehensive resilience assessment of our network using the well-established hydraulic modelling system Miser (provided by Ovarro). Miser is a computer-based system for modelling current and future water supply networks. In 2016-17 Ovarro built a Miser model of our network and led a resilience study quantifying the risk associated with a range of individual and combined failure scenarios (444 failure events, two supply/demand scenarios) and providing cost benefit analysis of several scheme interventions that fed into the Business Plan. In 2018, the model was updated, and the failure analysis was repeated to review bulk export options to the East and West.

The results of the study showed that our operational system already had a high level of resilience.

- No properties were at risk of loss of supply from a single source of supply failure on an average demand day.
- 100,000 properties were at risk of loss of supply, for a proportion of the day, from a single source of supply failure on a peak demand day.
- 44 properties fed via boosters were at risk of loss of supply from a single source of failure on an average and peak day.
- In 2019 the work was repeated to investigate the impact of three different schemes in relation to the Havant Thicket Water Supply Reservoir (HTWSR) under 1 in 1 (normal), 1 in 20 (dry), 1 in 200 (severe) conditions. A small number of failure events were added for this work.

These exercises demonstrated that improvements were required to bolster resilience in the overall network. Several schemes were therefore included in the PR19 Business Plan for the period 2020 to 2025. Additionally, studies have been undertaken on major above-ground assets to determine their vulnerability to external, severe circumstances such as flooding and other extreme weather conditions.

In 2018, the water sector was challenged by the "Beast from the East" and the hottest June and July to date. Our leakage rate increased as a result of these events, but by following our Leakage Recovery Plan, we were able to achieve record low leakage levels in 2019/20. Winter peak leakage in

the winter of 2020/21 was subsequently 18% lower than the previous year, and in 2021/22 we found and fixed a total of 2,755 leaks across our network.

However, a series of challenges were encountered throughout 2022. Unprecedented temperatures and dry conditions were experienced during the summer, resulting in significant peak supply demands of 180 litres per day. Following this, freeze-thaw weather conditions in December caused a significant leakage outbreak. Leakage performance deteriorated throughout 2022/23 due to a sequence of leakage breakout events resulting from drought and harsh winter weather, preventing effective recovery.

Despite this, we have rolled out a leakage recovery plan with impressive results. Following the major breakout in December 2022, an almost 25% reduction in leakage was achieved in just under four months. We have increased the number of resources and improved efficiencies to speed up the recovery process and continue to increase awareness around leakage throughout our network. Flow and pressure monitoring is divided into a number of Strategic Metered Areas (SMAs) and District Metered Areas (DMAs), and we plan to further divide DMAs to improve our leakage identification.

Asset Investment Planning

Over the last 18 months we have also begun embedding a new Copperleaf business support tool to support improving our resilience. This tool helps us to align goals across multiple parts of the business, including asset management, ESG and sustainability, finance, IT, and operations. It operates on a risk-based system designed to measure implementation cost against their benefits or value to the organisation, society, and the environment. Plans are optimised against constraints related to objectives or costs, with the optimiser choosing the options with the lowest level of risk. The benefits of each option are classified into six 'capitals':

- Financial
- Manufactured
- Intellectual
- Human
- Societal
- Environmental (Natural)

Extreme Weather Emergency Planning

In recent years, the impact of storms on water companies has led to the publication of new guidelines by Water UK and Defra for emergency planning for events that may

breach a reasonable worst-case scenario. Our Extreme Weather Emergency Plan considers climate hazards such as extreme temperatures. Recent work has included participation in strategic groups and global resilience forums and updating thresholds and trigger points for when incident teams are deployed. The plan is reviewed annually and updated as needed based on incidents that have occurred.

Our Severe Weather Plan uses Met Office weather warnings to convene our Weather Assessment Team (WAT) and Incident Management Team (IMT) in situations of severe weather. When weather warnings are issued, the Emergency Planning team communicate with the relevant team to orchestrate actions appropriate to the warning given, in order to ensure operational readiness.

We recently undertook an emergency planning exercise (Operation Albion) to test our capability of deploying alternative water supplies in the event of a large water supply interruption (see case study).

Operation Albion Case Study

As a result of increasing outages and demand for alternative water supplies due to the occurrence of storms and regional weather events in recent years, and the expected increase in number of people under Portsmouth Water's worst case scenario, we are looking to increase availability of bottled water for customers in an emergency. We have therefore been aiming to exercise our emergency plan more frequently

and undertook an emergency planning exercise (Operation Albion) to test our capability of deploying alternative water supplies in the event of a large water supply interruption.

The aim of the exercise was to provide staff the necessary knowledge and skills to effectively fulfil their role during an operational event, including how to correctly set equipment up. Volunteers

around the company took part in the exercise, which involved deploying pallets of bottled water and static tanks to two locations where alternative water hubs were established. The exercise provided valuable lessons on loading and unloading equipment together with setting up bottled water stations, which will enhance our response capabilities in the event of a real incident.

NATURAL HAZARD RESILIENCE

ADAPTATION ACTIONS TO BE EMBEDDED IN OUR BUSINESS-AS-USUAL OPERATION (2025-2030)

We will continue to ensure we are maintaining our resilience to natural hazards including extreme weather, flooding, and subsidence.

Network Resilience

Following on from the work done previously, we are re-examining the resilience of our network. Again, we are utilising the power of Ovarro's Miser system to establish the resilience of our current network. However, this time, we will be testing the likely 2030 and 2050 networks to provide insights into potential future issues. Such information will help us design our network changes and provide a basis for adaptive planning exercises.

Resilience Studies

We are proposing to deliver a programme of resilience assessments which will include:

- One study to increase our understanding of the climate change risks embedded in our wider supply chain and actions we might take to mitigate such risks.
- Two region-wide studies, making use of new groundwater models only recently available to us. One will help us to better understand the risks of saline intrusion into our groundwater aquifers posed by rising sea levels. The other will revisit our current assessments, based on previous groundwater models, of the risk of groundwater flooding impacting our production assets, driven by changing rainfall patterns.
- Four detailed flood risk assessment and mitigation plans for our highest risk production assets. These will inform the next Long-Term Delivery Strategy (LTDS), provide fully costed engineering solutions, and suggest, within an adaptive planning framework, when implementation is likely to be required.
- Seven detailed site studies to provide options and costs to deliver power

resilience and remote start or auto restarting schemes on those sites most vulnerable to the in-combination risks of power and transport network failures. We will aim to deliver as many of these power resilience schemes as possible over the next five days.

Service Reservoir Process Improvements 2025 – 2040

We are proposing to improve the ability to bypass our service reservoirs by installing variable speed drives to existing booster

pumps, enhancing our ability to control our assets and improve automation of 13 service reservoirs. This will further support our network in ensuring that we keep customers in supply during essential works such as asset cleaning and repair and maintenance activities.



Reservoir inspection and maintenance in progress

NATURAL HAZARD RESILIENCE

ADAPTATION ACTIONS TO BE EMBEDDED IN OUR BUSINESS-AS-USUAL OPERATION (2030 AND BEYOND)

Operational Resilience 2030 – 2050

Many of our site operations rely on diesel pumps for their standby operations. To ensure that we can operate these pumps in case of a power outage, the sites have diesel storage. Storing large quantities of diesel on site carries a risk, either through spillage or through the risk of theft. We are proposing the removal and decommissioning of all our diesel-powered assets and associated storage facilities, and replacing them with more environmentally friendly, reliable, and lower risk alternatives such as the electric power generators pictured below. This will also provide operational resilience to climate change risks. Maintaining resilience of our supplies is at the forefront of our customers' expectations which means we are prioritising those interventions that may have an imminent impact and will prevent an interruption to customer supplies. The measures we propose to take are to ensure that we can continue to supply our customers when essential maintenance is required.



NATURAL HAZARD RESILIENCE

CLIMATE CHANGE ADAPTATION ACTIONS

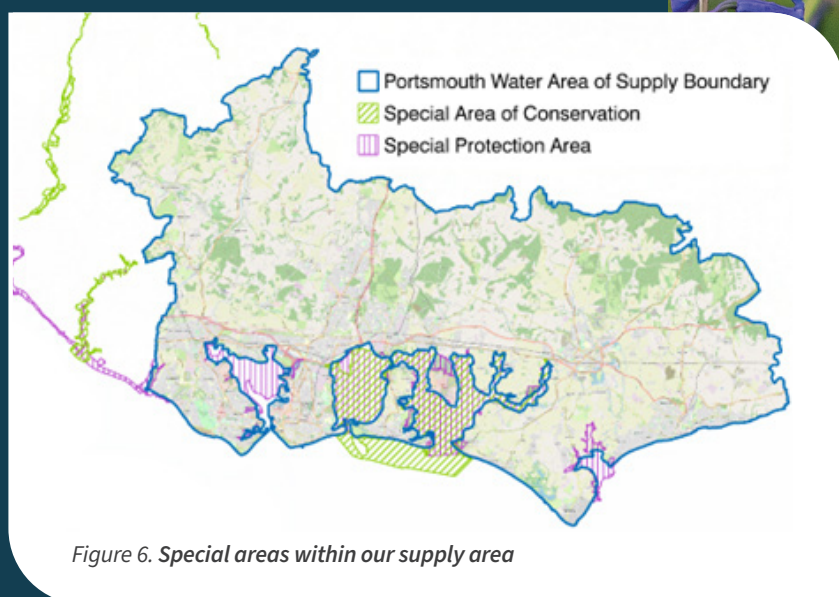
During previous rounds of climate change adaptation reporting, we developed a climate change Action Plan. The actions linked to ensuring continued resilience to natural hazards are outlined below with progress made since 2021 and progress proposed for the next five years.

Table 6 Key climate-related risks facing Portsmouth Water

Action	Owner	Progress made (2020-2025)	Progress to be made (2025-2030)
6: Review updated flood information as it becomes available	Resilience and Emergency Planning	<ul style="list-style-type: none"> In 2023, Arcadis completed a Climate Change Risk Assessment on 93 assets across 51 sites within the Portsmouth Water supply area, with specific emphasis on sea level rise and storm surge, rainfall events and extreme weather events. We have completed our Business Plan 2025-2030 which includes plans to review the latest flood information to make sure our operational sites remain resilient to floods. 	<ul style="list-style-type: none"> Using Ofwat funding, per the Draft Determination, we are proposing to deliver a programme which will include <ul style="list-style-type: none"> two region-wide studies, making use of new groundwater models only recently available to us. One to better understand the risks of saline intrusion into our groundwater aquifers posed by rising sea levels. The other to revisit our current assessments, based on previous groundwater models, of the risk of groundwater flooding impacting our production assets, driven by changing rainfall patterns. Four detailed flood risk assessment and mitigation plans for our highest risk production assets. These will inform the next Long-Term Delivery Strategy (LTDS), provide fully costed engineering solutions, and suggest, within an adaptive planning framework, when implementation is likely to be required.
7: Incorporate emergency weather event risks into investment decision making	Resilience and Emergency Planning	<ul style="list-style-type: none"> A climate change risk assessment has been completed for the construction of the new HQ building. In 2023, Arcadis completed a Climate Change Risk Assessment on 93 assets across 51 sites within the Portsmouth Water supply area, with specific emphasis on sea level rise and storm surge, rainfall events and extreme weather events. This assessment considered baseline weather conditions. The results fed into our Long-Term Delivery Strategy (PR24) 	<ul style="list-style-type: none"> Extreme weather events and climate risks are being considered for new technologies (e.g., pumps and control panels that can withstand high temperatures). To build resilience to power outages due to extreme weather, we are in the process of delivering a generator upgrade and refurbishment programme. We are also aiming to deliver battery storage solutions. Using Ofwat funding, per the Draft Determination, we are proposing to deliver a programme which will include seven detailed site studies to provide options and costs to delivery power resilience and remote start or auto restarting schemes on those sites most vulnerable to the in-combination risks of power and transport network failures. <p>We will aim to deliver as many of these power resilience schemes as possible within AMP8.</p>

IMPROVED ENVIRONMENT AND SUPPORTING BIODIVERSITY

We rely on the environment to help provide the water needed to supply our customers. Management of the environmentally sensitive area we operate in is therefore a key element of our risk and resilience management. As such we are taking steps to improve the environment and support biodiversity.



IMPROVED ENVIRONMENT AND SUPPORTING BIODIVERSITY

RISK AND OPPORTUNITY

Improving biodiversity and land/water management have been identified by the CCRA3 findings as priority actions to help limit global warming. It is therefore essential to ensure we are conserving, and where possible, improving the environment we operate within.

We operate in a special, but sensitive region. As shown in Figure 6 there are a number of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) within our supply area. Through our ongoing enhancement work we are aiming to helping to safeguard these.

We also have unique chalk stream habitats within our region which are becoming more fragile. As highlighted earlier in this report one of our biggest new risks is the likely reduction in our ability to abstract from these sources. However, this risk is also an opportunity for us to be more innovative and implement further efficiencies through leakage and demand management. We are also taking steps to strengthen our supply through development of the Havant Thicket Reservoir and will work to implement further improvement measures that come forward through the WRSE Regional Resilience Plan.



IMPROVED ENVIRONMENT AND SUPPORTING BIODIVERSITY

ADAPTATION EMBEDDED IN OUR BUSINESS-AS-USUAL OPERATION (2020-2025)

In the last five years we have taken the following actions to protect our natural capital.

Habitat Management Plans

As part of our wider commitment to improving the environment, we aim to maintain and enhance biodiversity on our 44 operational sites and other land that we currently own. These sites are in a variety of habitats including chalk downland, river catchments and coastal margins. We have habitat management plans in place for all operational sites and several other land parcels, as well as continued management of one Site of Special Scientific Interest (SSSI) at the River Itchen Water Treatment Works, which we manage in conjunction with Itchen Valley Country Park. Through a Natural England High Level Stewardship agreement, we allow cattle grazing of the meadow to maintain the wet grassland habitat.

Catchment Management

As part of our catchment management programme, we have collaborated with the Downs and Harbours Clean Water Partnership, and have provided funding for grants to farmers and landowners to aid them in reducing environmental pollution, such as nitrates, in our catchments. Figure 7 highlights the main rivers we are working with farmers to protect.

We also work collaboratively to develop catchment and nature-based strategies and work delivery plans. As an example, we are part of the Arun and Western Streams Catchment partnership on the River Ems to create and develop the River Ems Chalk Restoration Scheme, which will provide a sustainable river restoration plan to be delivered over the next 25 years.

Water Industry National Environment Programme

We currently have 18 schemes in the Water Industry National Environment Programme

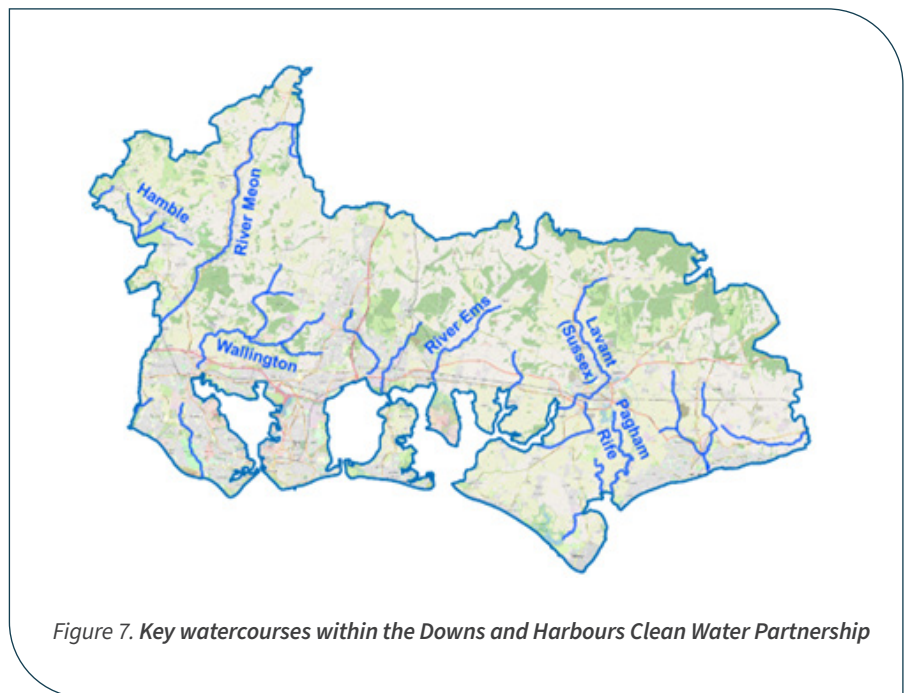


Figure 7. Key watercourses within the Downs and Harbours Clean Water Partnership

(WINEP) for 2020 to 2025. Seven of these schemes were completed by March 2024 as scheduled. Progress on all of our agreed WINEP schemes is positive, including those being jointly undertaken with Southern Water and South East Water.

Biodiversity Grant Scheme

In 2020-21 we introduced a Biodiversity Grant Scheme, which provides £50,000 per annum towards environmental improvement projects in the habitat network surrounding our land. These projects will help organisations that want to maintain, improve existing or create new biodiversity projects, such as biodiversity and habitat improvements, invasive non-native species control, species and habitat survey projects, restoration projects, and habitat creation. During 2023-24, we entered the fourth year of our Biodiversity Grant Scheme, whereby we supported seven applications. These included grants for:

- Staunton Country Park, to convert a WW2 arms store into a bat hibernaculum and summer roost.
- The South Downs National Park, to restore two dew ponds to create ecological stepping stones.
- The Hampshire and Isle of Wight Wildlife Trust, to improve Farlington Marshes as a secure roost site for wader and wildfowl and buy equipment to monitor key species and improve predator control on St Clair's Meadow Nature Reserve.
- The National Trust, to improve woodland rides at Slindon Mid Common, to allow natural regeneration of a diverse ground flora, which in turn improves biodiversity.
- Bidbury Mead Friends, to plant trees in a park to replace lost mature trees and to plant wildflower strips as corridors for invertebrates, birds and small mammals.

Currently we have granted £148,565.50 and we expect to reach our target of £250,000 by 2024-25.

Biodiversity Management Maps

We positively manage all our priority habitat sites to encourage and enhance biodiversity, which is documented and driven by Biodiversity Management Maps (BMMs). Each year, both BMMs and sites are audited to demonstrate that through good stewardship, positive management and completion of actions, there has been no reduction in biodiversity. In 2022-23 we completed 99.7% of actions required, significantly higher than our 90% target.

Downs and Harbours Clean Water Partnership

As part of the Downs and Harbours Clean Water Partnership which is focused on reducing the amount of polluting nutrients, particularly nitrate, currently entering the water environment, we have delivered a number of projects. These include habitat improvement and connectivity which in turn has improved biodiversity on our land, including the planting of native trees, hedgerows, the creation of ponds, converting disused underground reservoirs to bat caves, restoring chalk grasslands, as well as creation of bat and bird resting and breeding places.

The partnership aims to ensure that the rivers, lakes, groundwater and coastal waters of East Hampshire and West Sussex are protected and improved, which will reduce pressures on the ecology of local rivers such as the Meon, Wallington, Ems and Lavant. In addition, as part of our Business Plan 2025-2030, we aim to reduce algal growth in the Portsmouth, Chichester, Langstone Harbours and River Hamble estuary, the efforts of which have already been seen through reduced amounts of algae in several Solent estuaries. Efforts to sustain this improvement are ensured through continued catchment management work.

Conservation

During 2023-24, we carried out key conservation activities and site enhancements on our own land which included:

- Employing a botanist to carry out detailed vegetation monitoring on 13 sites.
- Monitoring species with cameras to ensure we understand and mitigate any potential risk to our local habitats – these included otters, badgers, mice, voles, shrews, birds and invertebrates.
- Planting and improving hedgerows, woodland thinning, coppicing,

reed cutting and water and scrub management at 8 sites to create habitats and improve connectivity.

- Caring for rare Black Poplar and Elm trees planted three years ago to support wildlife.
- Removing non-native Himalayan Balsam during staff volunteer days and carrying out a Himalayan Balsam survey on the Hermitage Stream in Havant, so we can collaborate with others to develop a removal plan.
- Controlling non-native invasive Japanese Knotweed at several sites.

Sustainable Resource Use

We currently have the lowest volume of carbon per unit of water delivered within the industry. We plan to maintain this position and have also committed to be net zero by 2040. This means we will take steps to reduce our avoidable greenhouse gas emissions as much as possible and ensure our essential operations have minimal environmental impacts.

To help us achieve this, we have undertaken a carbon footprint assessment to understand our emissions hotspots and identify realistic options for decarbonisation. To address this, we have developed a Net Zero Route Map. We currently produce around 95 kg of carbon dioxide equivalent (CO₂e) per million litres of water we supply. With an average of around 175 million litres of water per day being abstracted, treated, and pumped, we produce around 16 tonnes of CO₂e per day through our day-to-day operations.

Since 2011, when we became early adopters of solar power, we have saved around 800 tonnes of CO₂e. Furthermore, we purchase 99% of our grid electricity from renewable sources, reducing our Scope 2 emissions. We update our emissions calculations annually to track our environmental impact and progress towards our net zero targets. Carbon emissions for 2024-25 have not yet been quantified, but we will be further developing the reporting tools to provide a more detailed carbon report.

Havant Thicket

The Havant Thicket Reservoir project has seen significant developments. Some of the most notable milestones achieved include:

- Agreement to change the scope of the project, to future proof the reservoir in order to be ready to accommodate recycled water, which will significantly increase the environmental benefits of the project.

- Progressing the portfolio of projects and commercial agreements which will ensure that the project delivers a net gain to wildlife habitats.
- Ongoing Maintenance of the existing 'phase 1' woodland planting.
- Translocation of wildlife from the reservoir site to receptor sites in Southleigh Forest, including 67 lizards, six snakes, over 800 frogs and toads, one hedgehog, 220 fish, and 23 eels.
- Signing an 80-year agreement with Pig Shed Trust to rewild 80-hectares of agricultural land at South Holt Farm. This approach has been commended by the Forestry Commission, Natural England and HCC Ecology,
- Surveys at Southleigh Forest will inform a forestry management plan. In the meantime, an access track and winter maintenance works have been completed,
- Delivery plans have progressed for the Aquatic Mitigation Works and a proposal for detailed design has been submitted by Atkins,

A target had been set with local stakeholders to save 80 trees from being felled, going over and above our planning permission commitments. With support from volunteers and contractors, over 250 saplings were saved, a further 200 small saplings and bushes were translocated, and 200 saplings were grown from acorns gathered on the site.

The project 'Stop the Chop' began in 2021. Working alongside local community and campaigning groups, we developed a plan to save and relocate 80 trees before work began. The work has delivered well in excess of the original target. The trees, saplings and plants we have relocated are now thriving in their new location on the edge of the reservoir site, in woodland soils moved from the Avenue. Following the project, 'Stop the Chop' has transformed to 'Havant Thicket for Nature' and plays an active role in our Stakeholder Advisory Group and Environmental Subgroup that meets regularly.

IMPROVED ENVIRONMENT AND SUPPORTING BIODIVERSITY

ADAPTATION ACTIONS TO BE EMBEDDED IN OUR BUSINESS-AS-USUAL OPERATION (2025-2030)

Our 2025-2030 Business Plan addresses a 10-point plan for the next five years, covering topics such as supporting wildlife on our site, investigating all water sources to make sure the environment thrives over the long term, and delivering Havant Thicket Reservoir.

Our customers have encouraged us to go further than the legal minimum and expressed a willingness to pay for additional benefits. One of our proposed performance outcomes is therefore an improved environment, supporting biodiversity.

Over the past five years, we have worked closely with the Environment Agency and Natural England to develop six ODI targets for 2020 to 2025 to help ensure we deliver on environmental benefit. These are expanded on in the monitoring section, and include Biodiversity, Catchment Management, Grant Scheme, WINEP, Carbon, and Abstraction Incentive Mechanism (AIM). We are held accountable for achieving these by Ofwat and our customers.

From 2025 onwards we will be monitored on a single ODI, Biodiversity Net Gain. However, we will continue to monitor internally against the other metrics.

Biodiversity

Within our supply area there are a series of areas that are of vital importance to nature and wildlife conservation, such as rare chalk streams, a large expanse of coastline including protected marine harbours, and Sites of Special Scientific Interest such as the South Downs National Park. We aim to support biodiversity and wildlife to be more resilient to climate impacts including heat waves, increasing droughts. At the same time, we also want to reduce reliance and impact upon the chalk-based environment that characterises our

Biodiversity Net Gain	Littleheath Reservoir	Soberton WTW	Walderton WTW	Total
Year Surveyed	2022	2023	2023	-
Area Size (km ²)	0.027	0.019	0.012	0.058
Base Biodiversity Units	10.17	10.76	6.37	27.30
Target Biodiversity Units	12.53	11.56	8.53	32.62
Target Biodiversity Unit Net Gain	2.36	0.80	2.16	5.32
Biodiversity Improvement from Baseline	23.2%	7.4%	33.9%	19.5%
Target Biodiversity Unit Net Gain / 100km ² of land in the water supply area (864km ²)	0.27	0.09	0.25	0.62

Table 7 Biodiversity Net Gain

supply area. Increasing water demand and changes to land due to climate change can put sensitive environments, such as chalk streams and wildlife that depend on them, at risk.

Over the next five years, we will focus on ensuring we achieve our commitment to conserving and enhancing biodiversity. This will include gaining a greater understanding of the entirety of the sites we own, including watercourses and hedgerows, whereby we will carry out maintenance and improvement measures to at least 90% of our sites and respective wildlife.

We agreed with Natural England a programme of work on our sites to maintain the good status we achieved previously. For 2023-24, the percentage of sites in good stewardship, as agreed and endorsed by Natural England, was 98.1%, exceeding the target of 90%.

Biodiversity Net Gain

We have a target to achieve maximum biodiversity net gain potential on selected

sites, whilst ensuring no deterioration in biodiversity at all sites. All sites have been assessed through surveys and site visits, using the baseline pre-intervention assessment from the Natural England joint publication Biodiversity Metric 4.0 of March 2023. From these surveys, three sites were selected to take forward for biodiversity improvements for the next five year period: Littleheath Reservoir, Soberton Water Treatment Works, and Walderton Water Treatment Works. The table above shows that for these three sites, we expect to see an average biodiversity improvement of 19.5%.

Biodiversity Grant Scheme

Our Biodiversity Grant Scheme currently provides £50,000 per annum towards organisations that want to maintain, improve existing or create new biodiversity projects, surrounding our land. Moving forward we will increase our Biodiversity Grant Scheme to £100,000 per annum through base expenditure from 2025-26.

Catchment Management Programme

Our catchment management programme for 2025 – 2050 looks to protect our water sources through collaborative practices we have been implementing with local farmers and landowners to reduce nutrient losses to groundwater and increase biodiversity. This will act as a preventative programme that seeks to protect our sources from pollutants through a ‘catchment first’ approach. We have identified several opportunities for improving our environment through nature-based solutions that we can work collaboratively on with our local communities and farmers.

Water Industry National Environment Programme

Between 2025 and 2035, we’ll be carrying out environmental assessments for all the river catchments – including those for the Itchen, Ems, Meon and Lavant. This is under the statutory Water Industry National Environment Programme (WINEP). The aim is to understand what it would take for all water bodies to reach ‘good’ environmental status.

It’s possible we may lose between 39 and 122 million litres of water per day from our existing supplies by 2050. However, this could be reduced significantly with improvements to our network to move water from elsewhere into sensitive areas and even further by nature-led schemes to restore rivers and improve the landscape they sit in.

We’re already working with the Arun and Western Streams Catchment Partnership on the River Ems to create a sustainable river restoration plan to be delivered over the next 25 years.

Additionally, these investigations will inform where we need to reduce our abstraction or if we are able to implement measures to protect this precious resource.

Following agreement with the EA, we are proposing to conduct 10 studies over the next 10 years. These will allow us to better understand the impact our abstraction is having on the Water Framework Directive classification of the waterbody status within those catchments, both currently and in the future.

Nitrate Blending

Our Nitrate Blending 2025 – 2030 treatment programme will enable us to provide additional investment to effectively manage nitrate levels in rivers, for which we have already identified two sources. Lovedean Water Treatment Works requires a network upgrade that will enable us to manage nitrate levels through blending at our Nelson Service Reservoir. We recognise that treatment for nitrate can be a capital-intensive intervention. By utilising operational interventions such as blending we are able to manage the rising levels of nitrate more cost effectively.

AIM

Our abstraction incentive mechanism (AIM) has been established to ensure that our abstraction from the River Hamble does not detrimentally impact the environment. We have agreed that if water levels fall below an agreed trigger level, we will reduce abstraction. We continually monitor river levels to ensure we can do this.

Havant Thicket

The Havant Thicket Reservoir project will undoubtedly change the existing habitat, but through intervention we hope to improve this. As well as providing us with the chance to create an exciting new leisure facility for local communities, we want the reservoir to include a new wildlife conservation area and provide a positive biodiversity impact. We will provide a new 10-hectare wetland area, sustainable wildlife habitats, parkland, and a diverse ecosystem by connecting

on-site habitats. Although we have had to remove 12.5 hectares of existing woodland, we will be replanting at least 110 hectares of woodland and grassland close to the reservoir.

Wetlands are a vital habitat for wildlife, but they are coming under increasing pressure from pollution and droughts. We want to create a sustainable wetland along the northern shore of the reservoir to offer a new home for a wide range of water plants, wetland birds and other wildlife. A grant scheme will also support wildlife across Hampshire and West Sussex.



IMPROVED ENVIRONMENT AND SUPPORTING BIODIVERSITY

ADAPTATION ACTIONS TO BE EMBEDDED IN OUR BUSINESS-AS-USUAL OPERATION (2030 AND BEYOND)

Water Industry National Environment Programme

Under the statutory WINEP, we will be carrying out environmental assessments for all the river catchments – including those for the Itchen, Ems, Meon and Lavant, to understand what it would take for all water bodies to reach ‘good’ environmental status. This may mean limits need to be placed on how much water we abstract in the future. We’ll know more by 2035 and include updates in our next water resources plan.

To allow us to better understand the impact our abstraction is having on the Water Framework Directive classification of the waterbody status within those catchments, both currently and in the future, we will be conducting 10 studies across the next 10 years. Nine out of 10 investigations will take place during AMP8 with a small residual carry over to AMP9. This is a profile that has been agreed with the Environment Agency.



IMPROVED ENVIRONMENT AND SUPPORTING BIODIVERSITY

CLIMATE CHANGE ADAPTATION

ACTIONS

We do not have any specific climate change adaptation actions related to improving the environment or supporting biodiversity. Our business-as-usual schemes are adequately monitored through our ODI reporting.



IMPROVED ENVIRONMENT AND SUPPORTING BIODIVERSITY

MONITORING

We already monitor our performance under several ODI measures.

We will continue monitoring these measures to assess our performance into the future as circumstances change, including the climate. We plan to incorporate into adaptation actions insight gained through this monitoring and evaluation process.

Table 8. Environmental Monitoring

Performance Aim / Monitor	Measurement	Performance						2024/25 (target)
		2010/11	2015/16	2020/21	2021/22	2022/23	2023/24	
Biodiversity	% of priority habitat land in good stewardship	-	20	30 ²	91	100	98	90
WINEP	# of schemes	-	-	2	3	7	7	18
Grant Scheme	£000s	-	-	50	99	148	200	250
Catchment Management	# of farmers we have worked with to create Farm Management Plans	-	-	10	20	30	33	50
AIM	MI/d	-	-	0	0	0	0	0
Carbon	% reduction in GHG emissions	-	-	-25	-30	-15	-8	-5

Notes:

¹ AMP6 methodology

² 2020/21 performance impacted by COVID and in 2019/2020 we achieved 98%.

(-) indicates there is no available data as either wasn't assessed in this way at the time of reporting or target not set.

INTERDEPENDENCIES AND CASCADING FAILURES

As part of our process of building on earlier adaptation reports, we continue to develop a greater understanding of the climate-related impacts that could affect infrastructure and systems performance. The main interdependencies we have identified, in our assessment of climate risks relate to energy, transport, and information and communication technology (ICT).

We note that some of these infrastructure providers have also published reports on how they are adapting their services and infrastructure to be resilient to extreme weather events and account for climate change. We plan to review, periodically, findings by the National Infrastructure Commission on interdependencies and cascade risks and to use reports prepared under the climate change risk assessment programme to ensure that we are planning to develop appropriate levels of resilience within our water service systems.

INTERDEPENDENCIES

Are points of interaction. As we do not operate in isolation, we have interdependencies. These interdependencies have the potential to alter the nature and magnitude of our climate change risks.

CASCADING FAILURES

These are impacts in one or more parts of an interconnected system that trigger impacts in others e.g. flooding causes a national power outage, which in turn causes impacts operation at a water treatment works.

INTERDEPENDENCIES AND CASCADING FAILURES

RISK AND OPPORTUNITY

Interdependencies and cascading failures are a key risk and focus of the independent advice which has fed into the CCRA3. This has highlighted their significance within the water sector and reinforces the need for adaptation actions to be developed to address these cross-cutting risks and our exposure to them. Examples of such actions are given below.

Our main risks, mapped to the key water sector risks identified by the independent advice review which will feed into the CCRA3, are presented in the table below.

Table 9. Key climate-related risks facing Portsmouth Water

CCRA3 Key Risk Code	Key Risk Description	Our mapped main individual risks	Risk score (2021-2051)	Risk score (2051-2081)	Risk score (2081+)
I1	Risk to infrastructure networks (water, energy, transport, ICT) from cascading failures	<ul style="list-style-type: none"> Increased interruptions to telecommunication and telemetry Road melt events impede treatment works access Chemical supply chain disruption from regional heatwaves and floods Storm damage to above ground assets (building and overhead cables) 	Medium (6)	Medium (6)	Medium (9)

INTERDEPENDENCIES AND CASCADING FAILURES

ADAPTATION EMBEDDED IN OUR BUSINESS-AS-USUAL OPERATION (2020-2025)

Supply Chain

In 2023 Arcadis were engaged to undertake a Climate Change Risk Assessment (CCRA) that accorded with the Ofwat guidance, on 93 assets across 51 sites within the Portsmouth Water supply area, which was used in conjunction with CCRA3 to identify where we needed a better understanding of risk across our assets. These assessments helped to identify key elements in our supply chain that might be impacted by climate change and gauge the preparedness of those elements to mitigate those impacts. Interventions we could make to increase our resilience to risks were therefore identified.

We now have a mature process and model for the assessment and management of our increasingly complex supply chain which we use to source a wide range of critical materials and services. We have reviewed many critical suppliers for the reliability of the supply chain, highlighting risk of interruptions. In response to past events, we have taken action to improve resilience, identifying alternative suppliers and embedding sustainability checks in our standard processes, as well as an assessment of safety and environmental performance.

Power Generation

The movement and treatment of water is energy intensive and so over the past three years we have made significant additions to our solar array to increase the power generated to 2.33 Giga Watt Hours (GWh). We have also, alongside other companies, developed a power outage visualisation tool. The energy disruption visualisation tool supports good operational decision-making, thus reducing the impact of energy disruption on customers, including to the most vulnerable customers. Our tool predicts which assets will lose power in the event of a national power outage (NPO) and therefore allows companies to provide those customers, particularly those who are vulnerable or on the priority service register, with bottled water first.

WRSE

We form part of the WRSE, an alliance of six water companies in the South East of England working collaboratively to secure water supplies for future generations. Our WRMP24 will feed into the WRSE Regional Plan which, in turn, will feed into national plans.

Site Resilience Measures

At present, we have implemented the following resilience measures at our works:

- We have standalone water tanks that can be supplied should a cascading failure impact.
- Operational equipment at our works is not connected to our IT network and is therefore subject to limited threat. Note that to ensure we can still access our sites in an extreme weather event, we have assessed flood risk for each site to ensure we can gain entry at each works.

Extreme Weather Emergency Planning

Recent work to enhance our Extreme Weather Emergency Plan has included participation in strategic groups and global resilience forums and updating thresholds and trigger points for when incident teams are deployed. The resilience forums are cross-sector, including organisations such as transport providers, local authorities, emergency services, highways and volunteer services.

INTERDEPENDENCIES AND CASCADING FAILURES

ADAPTATION ACTIONS TO BE EMBEDDED IN OUR BUSINESS-AS-USUAL OPERATION (2025-2030)

Power Generation

The movement and treatment of water is energy intensive and so to combat this we are expanding our solar arrays across our area of supply to create a grid to enable us to supply all the energy we need to power our buildings and over 30% of our pumping costs. Over the next five years we are rolling out schemes to increase the power generated from arrays by a further 4.8GWh, and to replace a significant proportion of grid electricity demand at our sites with locally generated renewable electricity of 12% by 2025 and 20% by 2030. A 150MW battery at our largest site will capture grid and locally produced solar energy with an 11Kv private 'micro grid' to move low carbon energy to where it is needed (see case study).

Supply Chain

A region wide study will occur in 2025 – 2026 to increase our understanding of the climate change risks embedded in our wider supply chain and actions we might take to mitigate such risks. This will help in protecting us from risks that climate change may be introducing to our supply chain.

Resilience Studies

We are aiming to deliver a programme of resilience studies, two of which are:

- One study to increase our understanding of the Climate Change risks embedded in our wider supply chain and actions we might take to mitigate such risks.
- Seven detailed site studies to provide options and costs to delivery power

resilience and remote start or auto restarting schemes on those sites most vulnerable to the in-combination risks of power and transport network failures. We aim to deliver as many of these power resilience schemes as possible within AMP8.

The outcome of these studies will provide a clear investment plan to achieve power resilience and self-start capability to key production sites.

Battery Storage Case Study

Portsmouth Water aims to deliver enhancements to resilience through battery storage solutions and purchased energy obtained from locally sourced green energy and renewable sources. The energy supply resilience for each site needs to take into consideration a wide range of climate impacts including local, regional, and national storms for both short- and long-term scenarios. The traditional solution for this has been to deploy diesel generators around key strategic assets, however over the last four years Portsmouth Water have been implementing a programme to

refurbish and renew some of these generators. As part of this development, Portsmouth Water plan to move towards Hydrotreated Vegetable Oil solutions as a partial mitigation to power these generators. So far, four HVO-compatible generators have been installed at Soberton, Aldingbourne, Walderton and Havant HQ.

To date, current technology is not yet advanced enough to allow for us to have power resilient solutions that can last for up to eight days off grid. However, through upscaling to a large-scale

battery storage solution, combined with micro grid and large scale solar, an off-grid solution can be created, enabling us to have less reliance on the bigger diesel generators. Subject to planning permission, we are in the process of developing a large 150MW battery at our Hampton site. The installation of batteries would provide the additional benefit of removing the manual approach of turning generators on for some sites, excluding those that have technical constraints requiring manual intervention.

INTERDEPENDENCIES AND CASCADING FAILURES

ADAPTATION ACTIONS TO BE EMBEDDED IN OUR BUSINESS-AS-USUAL OPERATION (2025-2030)

Southern Water Transfer

We currently have the capacity to share 30 Ml/d of water with Southern Water, which will increase by an additional 30 Ml/d following the completion of Havant Thicket Reservoir. However, we will need to begin importing water from 2038, as Southern Water's supply is offset by new sources of water from within the region. We will therefore need to invest in a key transfer between our companies to ensure that we are able to effectively manage the transfer of water between our two companies. The interdependency of our operations and the ability to share water is a vital component in the future planning of our WRMP.



INTERDEPENDENCIES AND CASCADING FAILURES

CLIMATE CHANGE ADAPTATION ACTIONS

During previous rounds of climate change adaptation reporting, we developed an adaptation action linked to addressing risk from cascading failures; this was to incorporate heat wave and road melt events into Emergency Plans. This has not yet been progressed but will be over the next five years. We also plan to incorporate two additional actions linked to our adaptation to cascading failures as outlined in the table below.

Table 10 Key climate-related risks facing Portsmouth Water

Action	Owner	Progress made (2020-2025)	Progress to be made (2025-2030)
8: Incorporate heat wave and road melt events into Emergency Plans	Resilience and Emergency Planning	<ul style="list-style-type: none"> The Severe Weather Plan includes Met Office weather warnings, but does not explicitly mention climate change. Met Office weather warnings are used as a mechanism to convene our Weather Assessment Team (WAT) and Incident Management Team (IMT) in situations of severe weather. The Met Office provide weather warnings up to seven days ahead of rain, thunderstorms, wind, snow, lightening, ice, extreme heat and fog. 	
17: Investigate additional steps we can take to help build systemic resilience	Regulation Team	<ul style="list-style-type: none"> Using ISO14090:2019, CCRA3 and a detailed risk assessment completed by Arcadis in 2023, we have identified where we needed either a better understanding of risk across our business, a detailed understanding of risk at an individual site level or where ‘no-regret’ investment would provide tangible mitigation to a known risk straight away. We propose to use additional funding set out in Ofwat’s Draft Determination to complete the works identified, including studies into power resilience and climate risks to supply chains. 	<ul style="list-style-type: none"> Using Ofwat funding, per the Draft Determination, we are proposing to deliver a programme which will include <ul style="list-style-type: none"> - One study to increase our understanding of the Climate Change risks embedded in our wider supply chain and actions we might take to mitigate such risks. - Seven detailed site studies to provide options and costs to delivery power resilience and remote start or auto restarting schemes on those sites most vulnerable to the in-combination risks of power and transport network failures.
18: Investigate how resilience to power outages can be strengthened.	Resilience and Emergency Planning	<ul style="list-style-type: none"> A backup generator renewal programme has been conducted over the last few years to improve resilience to power supply interruptions from weather events. 	<ul style="list-style-type: none"> Renewable energy is incorporated into the long term strategy, however, this alone won’t provide power resilience for longer periods of power outage. Numerous solutions are being considered including a battery park to be implemented in 2025-2030 (pending planning permission). Planning permission would allow a 150MW battery and solar panels floating on reservoirs. Using Ofwat funding, per the Draft Determination, we are proposing to deliver a programme which will include seven detailed site studies to provide options and costs to delivery power resilience and remote start or auto restarting schemes on those sites most vulnerable to the in-combination risks of power and transport network failures. We will aim to deliver as many of these power resilience schemes as possible within AMP8.

Our promise to all of our customers:

**‘WE AIM TO SUPPLY DRINKING
WATER OF THE HIGHEST QUALITY,
PROVIDING HIGH LEVELS OF
CUSTOMER SERVICE AND
EXCELLENT VALUE FOR MONEY.’**

