Business Plan 2025-30:

Stepping up to the challenge

PR24 BUSINESS PLAN 25/30

Dŵr Cymru Welsh Water

October 2023

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Introduction

At Welsh Water, we provide essential services to our customers every day of the week, all through the year. Our customers rely on us for their drinking water and daily water use in the home or at their business. Our vision is simple: to earn the trust of our customers, every day.

Our sewerage network and treatment works play a crucial role in protecting the environment from human activities, so that our customers do not have to worry about what happens to their wastewater. All of this is provided for an average household charge of around £1.50 a day.

> Our world is changing and we must change with it.

This document sets out our Business Plan for 2025-30, itself part of a longer-term plan to ensure that we continue to provide high-quality, sustainable and resilient water and wastewater services long into the future.

Our world is changing and we must change with it. We have big ambitions to improve outcomes for the environment and the quality of services delivered to customers, minimising service failures. To achieve this we must also adapt to meet the challenges posed by the trends that are working against us, notably climate change.

Planning

Planning involves making tough trade-offs between investing to deliver long-term ambitions and keeping bills as low as possible for customers. Whilst we have a duty to respond to the legal obligations imposed by our regulators, particularly on environmental and tap water quality compliance, we recognise that society is also deeply concerned about these issues and wants to see them addressed as quickly as possible.

Our customers have indicated that the substantial increase in investment in our wastewater business in particular should not be postponed just to keep bills down. Equally for our part we will strive to improve efficiency and do more for less, while carefully managing the impact on the affordability of water bills.

> To make the required progress towards achieving our vision for 2050 we will need to stretch ourselves more than ever before.

This Executive Summary provides the background to our five-year plan, including how it fits into our vision for 2050. It then sets out a summary of the plan for 2025-30 in terms of what we will deliver, how much it will cost, and the impact on customer bills. The plan has been carefully developed through a collaborative process in Wales embodied by the PR24 Forum, which is led by the Welsh Government and includes all of our key regulators. It has also had widespread input from customers and wider stakeholders. After its submission in October 2023 the plan will be subjected to a rigorous process of challenge and scrutiny by Ofwat, before being finalised in December 2024.

Ambition

We are proud of the role we play in the Welsh economy and society, and our model as the only non-shareholder utility company in England and Wales. But to make the required progress towards achieving our vision for 2050 we will need to stretch ourselves more than ever before. We believe this plan responds with ambition to that challenge, and will ensure we continue to meet our obligation to 'earn the trust of our customers, every day', both tomorrow and for years to come.

Key highlights

- £3.5 billion capital investment programme (68% bigger than forecast AMP7 total).
- £1.9 billion of wastewater investment to protect the environment.
- Return to 4-star Environmental Performance Assessment.
- Investing to prevent 186 priority Storm Overflows causing harm to the environment.
- Pollution incidents cut by more than 13% from 78 to 68 per annum.*
- 10% reduction in leakage.*
- Tap water quality contacts cut by 43%.*
- Average bills up by 26%.* Social tariffs extended for eligible customers on low incomes.

* From 2025 forecast

Background

Welsh Water (Dŵr Cymru) provides water and wastewater services to 1.4 million households, businesses and others in most of Wales and some adjoining parts of England. We are the sixth largest of the 11 combined water and sewerage companies in England and Wales in terms of customers served.

The 'Glas advantage'

Since 2001 we have been owned by Glas Cymru, a single purpose non-shareholder company. The absence of shareholders has enabled us to invest additional funds of over £570 million for the benefit of society through accelerated investment to improve service delivery, and social tariffs to support our most vulnerable customers.

We invest over £1 million a day in maintaining and upgrading the infrastructure that underpins the services we provide, across thousands of miles of pipes, and hundreds of treatment works and pumping stations.

Our biggest asset, however, is our people, the 3,500 highly trained staff who are out in all weathers keeping things flowing smoothly, or in the office ensuring customers get the great service they deserve.

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A unique set of challenges

The characteristics of our operating area pose a unique set of challenges for us as a water company. While the high rainfall levels compared to eastern parts of the UK are a positive in terms of water resources, they also pose challenges in terms of flooding and the management of surface water and our wastewater networks.

Much of our population is highly dispersed in rural areas, meaning more kilometres of pipes and more treatment works per customer. Our water network, dominated by upland reservoirs and gravity-fed systems, means pipelines working under very high pressure, exacerbating the challenge in relation to mains bursts. We also have a long length of coastline and many small and ecologically sensitive rivers compared to other WASCs.

Over the past 20 years we have invested billions to deliver huge improvements to customers and the environment, meaning cleaner rivers and seas, a more reliable water network, and fewer service failures. In the last decade, thanks to efficiency, innovation, and lower financing costs, bills have been flat or declining in real terms.

Meeting expectations

Despite this transformation in the past, we recognise fully that there are key areas where we need to do more to meet the needs of the environment and the expectations of our customers and regulators.

It is clear from our interactions with customers and other stakeholders that the quality of water in our rivers and coastal waters is the most urgent challenge.

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There are also elements of our drinking water service where we are 'behind the pace' and are targeting big improvements. These areas, in particular drinking water quality compliance and water supply interruptions, are primary areas of focus in our plan, alongside the protection of the quality of water along our rivers and coasts. We are also very conscious of the challenges presented by climate change, and the emerging risks exposed by improved research and monitoring. We discuss these issues further in subsequent sections.

Collaboration

We are fortunate in Wales that we have strong collaborative frameworks, including the PR24 Forum, to enable us to tackle these challenges and work through the difficult trade-offs jointly with government, regulators and other stakeholders. The Welsh Government and Natural Resources Wales have responsibility for most of the relevant policy and regulatory decision-making, while the Drinking Water Inspectorate, the Consumer Council for Water and Ofwat continue to cover both England and Wales, but with a significant presence in Wales.

The Wellbeing of Future Generations (Wales) Act, the Environment (Wales) Act, the Welsh Government's Strategic Priorities Statement to Ofwat, and the PR24 Forum 'Strategic Steers' provide a clear guide to the policy objectives and approaches in Wales that underpin our plans.

The challenge on the environment

The environment in Wales is under threat as never before. The Climate Emergency declared by the Welsh Government in 2019 underlined the importance of everyone playing their part in reducing greenhouse gas emissions. Meanwhile, extreme weather events are becoming more frequent, with devastating floods hitting parts of Wales repeatedly, combined with more extended periods of dry weather in the summer.

In June 2021 the Senedd declared a Nature Emergency and called for statutory targets to be set to halt and reverse the decline in biodiversity. We are committed to playing our part in the government's Nature Recovery Action Plan to increase the health and resilience of the ecosystems on which we all depend.

Taskforce

The health of our rivers and coastal waters in particular is a huge public concern and is a clear priority for the Welsh Government. Whilst this is something that can only be addressed by all those who contribute to the issue working together, we recognise that we have a leading role to play as set out in our Manifesto for Rivers in Wales (2023). We are fully involved in the Wales Better River Water Quality Taskforce, established by the First Minister in 2022.

We have been clear that the current situation is unacceptable and have apologised publicly for any environmental harm that we cause linked to delivering our wastewater services.

Two key areas for the Taskforce are reducing the levels of nutrients, notably phosphates, in the most ecologically sensitive rivers, and the operation of Storm Overflows (SOs). We now have much better data on how and when SOs

are operating, following the installation of monitors since 2015 on which we led the industry.

The resulting data has been met by an understandable outpouring of public and media concern. We have been clear that the current situation is unacceptable and have apologised publicly for any environmental harm that we cause linked to delivering our wastewater services. We are investing an additional £140 million in 2020-25, of which £100 million has been made available through our non-shareholder model.

Ecological benefit

The Welsh Government has been absolutely clear that the focus of investment should be on maximising ecological benefit. This is in contrast to the approach in England where government targets are articulated in terms of reducing the number of SO spills. Concentrating solely on spill numbers risks obscuring some important distinctions, and driving sub-optimal decision-making as regards prioritising action and investment. We therefore fully support the Welsh Government's approach and have prepared our plan accordingly.

While many SOs are operating more frequently than customers expect, the majority are operating as designed and having a minimal impact on receiving waters due to high dilution levels.

We are working closely with the Welsh Government and regulators to establish the facts and determine where investment can have the maximum ecological benefit. We will make progress as fast as we can, while being fully transparent about our plans, about the pace of delivery, and the resulting performance. This is a complex issue, with significant implications for the level of customer bills over the long-term. We set out in this Business Plan the plan agreed with our regulators and the next steps.

These environmental challenges are set against a difficult economic outlook and a current cost of living crisis putting severe financial pressure on many of our customers.

Drought

In 2022 Wales saw the most severe drought since 1976. While the vast majority of customers did not experience restrictions on water use, the drought highlighted the long-term challenge of maintaining sufficient water resources over the long-term. We learned valuable lessons about how better to manage our water network to increase resilience and we have taken these fully into account in this plan.

These environmental challenges are set against a difficult economic outlook and a current cost of living crisis putting severe financial pressure on many of our customers. Water bills are a small but still important proportion of household outgoings, particularly for poorer families, and we will not increase water bills by any more than absolutely necessary.

However, there is no other source of income to fund investment, and our customers say they do not want us to postpone the investment needed to provide a sustainable service over the long-term. Our focus must, therefore, be on ensuring that bills are affordable for all, providing appropriate support for those who have difficulty paying.

Setting the long-term ambition

Our five-year Business Plan for 2025-30 is set in the context of the long-term challenges and our ambition for 2050. We have worked with Hafren Dyfrdwy, the Welsh Government and our key regulators to develop a Wales Water Sector

Vision. This shows the kind of water sector we want to be, and the service we will provide, now and in the future.

Future generations

Our long-term mission as set out in Welsh Water 2050 is "to deliver a world-class, resilient and sustainable water service for the benefit of future generations." Never has this ambition been more important given the challenges we see all around us. Welsh Water 2050, published in 2018, set out the long-term trends affecting our activities, and the 18 Strategic Responses that we need to implement to respond to those challenges and opportunities over the long-term.

In 2022 we published our five-yearly review of that document, taking into account the major events and developments of recent years. The Welsh Water 2050 Review highlighted in particular the need to invest for the future, given the growing evidence of climate change as manifested in extreme weather events and their impact on both our environmental and drinking water services.

> Our AMP8 plan represents part of a long-term strategy to 2050 and beyond.

Alongside this Business Plan, and in line with Ofwat guidance, we have developed our Long Term Delivery Strategy (LTDS) which builds on Welsh Water 2050, setting out in detail the investment needed to improve service and respond to long-term trends, as well as the outcomes and performance commitments that we plan to deliver to 2050. This brings together all our long-term plans into one place and spells out how we would respond to the key risks and uncertainties facing the business.

Adaptive planning

The LTDS confirms that if we are to deliver our ambitions for 2050, given the challenges we face, investment will have to increase not just in the next five years but over the longer term as well. This step up in investment will need to be appropriately phased in order to ensure we and our partners have the capacity to deliver the capital projects required while managing the impact on customer bills.

We have prepared the strategy in line with the principles of adaptive planning, which helps to ensure that we are not spending customers' money until we have sufficient certainty about the requirements and the best way of delivering the long-term solution.

Best value

Whatever the future holds, we are committed to providing the best possible value to our customers, in the way that we assess investment options and deliver solutions. The Business Plan has been built up using multi-capital valuations wherever possible so as to take account of the wider benefits of different solutions, including greenhouse gas emissions and the impact on biodiversity and other environmental impacts over the long-term.

Our customers expect us to do the right thing for the long-term, and free from any short-termism imposed by shareholders we can genuinely commit to this approach. The AMP8 Business Plan, however, represents a significant increase in investment from previous periods, almost exclusively driven by statutory or other regulatory requirements, and includes minimal discretionary expenditure, this to minimise the impact on bills.

Joint Vision for the Water Sector in Wales

We will establish the water sector in Wales as a model of **effective collaboration** for delivering **excellent performance** against the backdrop of the climate and nature emergencies.

We will work with communities, stakeholders and regulators to **co-create and deliver solutions in the most efficient way over the long-term** having taken full account of the needs of our customers, the environment and society. We will seek to reflect the diversity of the people we serve in our workforce.

We will both engage and inform customers, helping them to play their part in addressing future challenges. We will always be responsive to their changing needs and expectations, paying particular attention to customers in vulnerable circumstances.

We will deliver **excellent drinking water quality**, working in catchments to protect raw water quality. We will **upgrade our network** to ensure it is fit for the future and resilient to current and future threats.

We will support a **thriving environment** in our rivers and seas by effectively managing and treating wastewater, upgrading treatment and network capacity where required and dealing with changing rainfall patterns. We will achieve net zero carbon emissions and seek to go further.

We will harness **innovation** and adapt to the world as it changes, while keeping bills as affordable as possible. We will provide a world-class, resilient and sustainable water service for future generations.

Protecting and improving the environment

Wales is famous for its dramatic landscapes, beautiful countryside, iconic rivers and coastlines, and thriving farming communities. It welcomes millions of visitors every year to enjoy the natural environment and experience its culture, thereby supporting rural incomes and local businesses across Wales. Protecting and enhancing this precious inheritance is critical for its own sake, but also for supporting livelihoods and social wellbeing more generally.

Our Business Plan for 2025-30 is entitled: "Stepping Up to the Challenge". Nowhere is this more relevant than in our plans to do more to protect the environment, in particular to reduce materially the impact of our operations on river water quality. We fully recognise and share the increasing public concern relating to the health of rivers and we will not shy away from this challenge. We also need to play our part in facilitating housing and commercial development where there are constraints created by river nutrient levels.

> We will target the storm overflows having the biggest impact, and ensure none are causing ecological harm by 2040.

Commitment

Our customers tell us that they care deeply about the environment and are concerned about the problems that they see. Whilst restructuring the existing sewerage system will require multi-AMP investment, as set out in our Long Term Delivery Strategy, our plan for the next five years represents a step change in our commitment to the environment. At the same time we must respond to the need to improve tap water quality, make progress on climate change adaptation, and stay on track to achieve net zero carbon.

Our plan for the environment goes as fast as we believe is possible if it is to be deliverable, affordable, and financeable. Our ambition is to achieve more for less through innovative new approaches, both on our own and working with partners.

River water quality

Total wastewater investment to protect the environment is £1.9 billion over five years, compared to £1 billion in AMP7. The expenditure will be focused on where it can make the biggest difference in terms of environmental benefit. It will also be an important enabler to support new social housing and commercial development that is a key objective of the Welsh Government.

The vast majority of the planned enhancement investment is required to meet our regulatory obligations under the National Environment Plan (Wales), and the Water Industry National Environment Plan (for our areas in England). This includes our obligation to protect biodiversity and Sites of Special Scientific Interest (SSSIs), by which we will replace the South East Coastal sewer main between Magor and Newport at a cost of £78 million.

We have been working for some time with Natural Resources Wales (NRW) and others to develop a long-term approach to investigating and tackling the impact of our 2,300 SOs on the environment. The approach is based on the data available from the monitors on all SOs installed since 2015, and the more recent and continuing ecological impact assessments of high spilling SOs.

This information will allow us to target SOs causing the most harm first, and maximise ecological benefit. We are not simply targeting a reduction in the number of spills, as so doing may make minimal difference to the environment. Investing in SOs are part of a wider programme of work to improve river water quality in Wales, notably by reducing phosphorous levels.

We will:

- Deliver our part of the Wales Phosphate Summit Action Plan by drastically reducing phosphorous discharges into rivers in Special Areas of Conservation, achieving 90% of the reduction required to eliminate harm to these rivers caused by phosphates from wastewater treatment works discharges, on an agreed 'fair share' basis.
- Meet our commitment set out in our Manifesto for Rivers in Wales by tackling the Storm Overflows that are having the biggest environmental impact, moving 186 SOs from the 'high' or 'severe' harm categories to the lowest category, with the proportion of SOs causing no harm increasing from 53% to 61% by 2030, and to 100% by 2040.
- Reduce the number of pollution events (category 1, 2 and 3) we cause from 89 in 2022 to 68 in 2029, and tackle those assets that cause growing risks of 'serious' pollution incidents (category 1 and 2), including the South East Coastal sewer main.
- Return to a 4-star Environmental Performance Assessment rating.
- Collaborate with our regulators and partners to trial catchment-based permitting systems, and market-type mechanisms, to achieve the maximum improvement in river water quality from the best value source.

Safe and high-quality drinking water

Clean and safe water for drinking and for household or business use is essential for daily life and a core part of our mission. We take a 'source to tap' approach to ensuring tap water is great quality every day, covering everything from the uplands where rainwater falls, to the pipes taking water into customer properties.

Trust and confidence

The safety and quality of tap water is closely monitored and enforced by the Drinking Water Inspectorate (DWI) so that customers can have full trust and confidence in what comes out of the tap. The Compliance Risk Index (CRI) measure is designed to quantify risks based on numbers of sample failures. Despite improvements in 2022, we need to improve our performance on CRI, with to a range of issues including bacteriological failures at water treatment works and maintenance of treated water reservoirs affecting recent performance.

Our plan will ensure progress on drinking water quality compliance risk is sustained to 2030 and beyond.

A Drinking Water Recovery Plan is being implemented, which includes a focus on cleaning and inspection of tanks, with the aim of bringing performance back into line with expectations by 2025. The Business Plan will ensure this progress is sustained to 2030 and beyond, with measures including investment to reduce the presence of iron linked to cast iron pipes.

Discolouration

Performance on tap water discolouration incidents continues to present a challenge, with proportionately more contacts from customers on this issue than other companies. This is a complex issue, related to the changing quality of raw water in our reservoirs, high flows in the network in dry periods, and the interaction of compounds in the water with pipe materials.

One of the principal causes is the level of manganese, a naturally occurring substance in the water, which we are planning to reduce with targeted investment at water treatment works, whilst at the same time managing the quality of raw water in the catchments. However, sustained improvement is not achievable without an acceleration of the replacement of old mains made of cast iron. Our Business Plan therefore includes a further investment of £150 million to replace some 100 kilometres of cast iron mains with modern pipe materials.

Lead

Quality at the tap is also affected by the water supply pipes on customers' properties and owned by them. While these are not water company responsibility, we have the expertise

and capability to support a societal effort to address the damaging legacy of lead water supply pipes. In AMP8 we will continue to replace customers' lead supply pipes for free as part of a long-term programme, while seeking ways to do so more cost effectively.

We will:

- Bring our tap water quality compliance (CRI) score back into line with the rest of the industry by 2025 and sustain this, ensuring we meet the regulatory notices and guidance issued by the DWI.
- Reduce the number of "acceptability of water" contacts from 1.75 per 1,000 customers (forecast) in 2025 to 1.0 in 2030 by managing raw water quality, reducing levels of manganese at treatment works, and replacing some 100 kilometres of cast iron mains with new pipe materials.
- Replace 7,500 lead pipes between customer properties and our network to safeguard health and support Welsh Government aspiration for a 'lead-free Wales'.
- Work with farmers and other land managers in upland catchments to prevent deterioration of raw water entering our reservoirs.
- Pursue further research with our academic partners (including Cardiff and Aberystwyth Universities, and the Centre for Ecology and Hydrology) to better understand the change in raw water quality over time, its causes and triggers, and how we can meet this challenge through better forecasting and treatment processes.

A secure and reliable water supply

Customers should be able to rely on water being available whenever they need it, now and in the future.

Customers on the whole do not cite short-term supply interruptions as a major concern but they can be a major inconvenience when they do occur. When mains burst and supplies are affected we work hard to get customers back on supply as quickly as possible, while making bottled water available and delivering it to vulnerable customers.

Supply

Our regulatory target is to achieve an 'average minutes lost' score of 5:00 minutes by 2025, from 17:46 in 2020. This level of improvement is challenging with recent performance being affected by a few major bursts, not helped by the unusual weather conditions in 2022. We anticipate that we will, therefore, out-turn AMP7 with a performance of around 8 minutes. This will still lag smaller water only companies with more integrated networks, who are better able to achieve the regulatory target of 5:00 minutes.

We are determined to close this gap, and despite our larger and more disparate network will set ourselves a regulatory target of 5:00 improving to 4:30 by 2030 with the help of resilience investment of £66 million to replace asbestos cement (AC) mains. These mains are bursting more and more frequently, due to a range of factors including age and ground conditions. AC is the primary pipe material in West Wales which experiences significant spikes in demand stimulated by tourism.

We will invest an extra £66 million to protect asset health by replacing mains materials which are bursting more frequently due to a range of factors including changing ground conditions.

Freeze-thaw

We understand the highest priority of our customers in this area to be mitigating the risk of major extended interruptions to communities large or small, by building more resilience into our networks over the long-term and implementing the learnings from major events such as the freeze-thaw of December 2022. Here, again, we need the support and cooperation of customers, as many of the issues that occurred then were caused by bursts on

customer-owned pipes. We include in this plan £51 million of investment to strengthen resilience with new network interconnectors, as part of the long-term strategy in this area.

Water resources

Underpinning all of the above is the need to ensure the availability of sufficient water supplies over the long-term, as the climate changes. Our Water Resources Management Plan is the strategic planning framework that ensures this. Our modelling shows that we should be able to balance supply and demand mostly through incremental measures such as reducing leakage and encouraging customers to use less water, without major investment. The priority therefore is ensuring that our historic estate of dams and reservoirs remains fit for purpose over the long-term, and capable of meeting the challenges of climate change in line with the latest regulations.

We will:

- Achieve a supply interruptions average 'minutes' lost target of 4.5 minutes.
- Reduce by 10% the leakage in our network, and help customers address leaks in their homes and businesses.
- Work with customers to bring down household consumption per capita by 7% by 2030.
- Accelerate our long-term metering programme, which will provide better data on water use for customers, without moving to compulsory metering. By 2030 we aim to have 78% of our household customers on meters, compared to a forecast 51% in 2025.
- Invest £66 million to replace 174 kilometres of ageing asbestos cement mains pipes.
- Invest £51 million to connect supply zones, building more resilience against the increasing background risk of low probability, high risk incidents that threaten supplies.
- Continue with our long-term dam maintenance and upgrades programme. The upgrades programme increases safety of 29 priority dams at a cost of £79 million.

Wider environmental and social value

As one of the biggest companies in Wales, a major energy user, and a provider of essential public services, we have a responsibility to society to contribute to tackling the climate and nature emergencies. Although we are not legally a 'public body' we adhere to the Well-being of Future Generations (Wales) Act, and our plans support the achievement of the seven Well-being Goals.

Carbon neutral

Our wastewater operations are fundamentally concerned with reducing society's impact on the environment. That is not, however, our only impact and we also have ambitious objectives in this plan to minimise the footprint of the water supply by tackling environmental leakage, minimising abstraction from rivers, and bringing down energy consumption used in treating and pumping water.

Beyond core service delivery we do much more to contribute to societal and environmental well-being. We aim to become a carbon neutral company by 2040, including embedded carbon, which will mean finding ways to deliver our major capital investment programme in low carbon and nature friendly ways. As a major landowner and user, we can have a real impact on the nature emergency too and are working closely with NRW and others to boost biodiversity and protect and enhance peatlands. Our partnership work in upland water catchments helps to protect ecosystems from the impacts of diffuse pollution.

We aim to become a carbon neutral company by 2040, including embedded carbon, which will mean finding ways to deliver our major capital investment programme in low carbon and nature friendly ways.

Well-being

Our Community Fund supports local groups looking to enhance their communities across our area. In 2022 alone, over 252 charities and organisations from all around Wales and Herefordshire benefited.

In 2023 we opened a new visitor and recreation centre in north Cardiff to add to our existing four centres at reservoirs across Wales, providing the public with access to nature and top-class recreation facilities. Our Community Fund has donated over £450,000 to support local initiatives across Wales since its launch in 2017. We continue to deliver education programmes on the water cycle to school children, moving to online sessions during the pandemic.

In this Business Plan we set out details of our long-term goals to step up our contribution to achieving Wales's environmental and societal goals.

We will:

- Reduce total greenhouse gas emissions to net zero by 2040.
- Work in partnership with our stakeholders to improve biodiversity on our land holdings by restoring degraded habitats.
- Welcome over 900,000 visitors a year to our visitor and recreation centres and provide 80,000 children a year with information on the water cycle through our education programme.
- Continue to lead on collaborative efforts to better understand how society can tackle environmental efforts fairly and effectively, such as our recent work on pollution source modelling, the results of which we have made publicly available to all sectors.
- Continue to contribute actively to the river Nutrient Management Boards recognising that river water quality can only be tackled by all concerned working in partnership.
- Accelerate efforts, through research and trials, to find new ways to operate more sustainably. Our long-term objective is for nature-based and catchment solutions to become the default, and we will continue to work with our regulators to seek the regulatory innovation and flexibility required to enable this.

Excellent customer service

Our customer service vision is "to earn the trust of customers, every day". Our reputation with our customers is vital, not just as a matter of pride, but because we need their trust and cooperation to meet the challenges ahead.

We are a strong performer on Ofwat's industry household customer service measure, C-MeX, having achieved a top five placing in each of the last four years 2019-23. Our ambition is to be one of the best performing companies in England and Wales, every year.

All customers, including business and developer customers, equally deserve great service and we are determined that they receive it. Our

average business customer satisfaction score was 88% (4.4/5) over the last 3 years, and we will strive to retain and improve on that strong position going forwards. We also strive to provide great service to our diverse developer customers, particularly given the additional regulatory requirements and constraints on developers in Wales.

Changing expectations

To maintain the highest levels of service, our whole business needs to work together effectively, from call handlers through to the operational teams. Customer expectations are changing, as technology raises the bar across the retail and services sector. This plan continues to invest to deliver against these changing expectations, at no additional cost to customers, moving more customers into a seamless digital engagement, while maintaining alternative channels for those who prefer to pick up the phone.

In the last five years we have quadrupled the number of customers on our Priority Services Register.

Customers with additional needs

As a provider of essential services, we have a duty to meet the requirements of our customers in vulnerable circumstances or with particular needs. In the last five years we have quadrupled the number of customers on our Priority Services Register. And as of the end of May 2023 we are supporting 133,000 customers by offering them a lower bill through social tariffs (including the Water Sure scheme).

Our work with other utilities, local authorities and partner organisations is crucial to increase awareness of our priority services register and maximise opportunities to share data, so that we can proactively identify customers that need additional support from us. We will continue to train our people to recognise the signs that customers may be vulnerable and empower them to take the decisions needed to ensure that every vulnerable customer gets the help they need.

Businesses

Our non-household customers range from small shops to local authorities and huge industrial sites. Unlike the situation in England where retail services are subject to market competition, we are able to provide a fully integrated service to the majority of these customers across both wholesale and retail. We are committed to ensuring that our business customers receive a service at least as good as the best available in England.

Great customer service means doing the basics well but also going above and beyond in line with our vision. Our Business Plan explains how we are doing this in areas such as social tariffs, additional services for vulnerable customers, and fair bills for customers suffering repeated service failures.

We will:

- Maintain upper quartile performance on the C-MeX household customer experience measure.
- Maintain our record of strong customer satisfaction from non-household customers, ensuring we meet their diverse needs while matching the best levels of customer service available in England.
- Aim to be a top performing company on developer customer satisfaction.
- Ensure that our services remain accessible to all customers, retaining our Wales-based contact centre so that our customers can always call and speak to a real person in English or Welsh who can help them.
- Expand our online service provision and ensure that we quickly embrace new customer service technologies that can deliver better outcomes and value.
- Tackle causes of nuisance and poor customer satisfaction such as odour problems at Swansea WWTW, and 'worst served customers' for flooding.

Resilience and security

Everything we do is intended to ensure the continuity of service to customers and prevent harm to the environment – and to recover quickly and put things right when things go wrong. 'Resilience' therefore encompasses all of our operational activity, plus the mechanisms that underpin financial and corporate resilience. In addition we are increasingly concerned with the prevention and mitigation of low probability high-impact threats, particularly where risk levels are increasing over time.

To respond to this, as noted above, we are investing significantly in resilience in the water network in AMP8, for example by increasing the rate of AC mains replacement and enhancing our ability to move water between supply zones. On the wastewater side the focus is on rising mains, which pose a growing risk to environmentally sensitive areas.

> Everyone who works for Welsh Water, or on our behalf, has a fundamental right to return home safely at the end of each day.

We have statutory duties as operators of critical national infrastructure (CNI), and have to meet the requirements of the Security and Emergency Measures Direction (SEMD). Upgrades to sites including those newly designated as CNI will see investment of £23 million in AMP8. Our security programme will strengthen protection against intruders, reducing the risk of harm to members of the public and of damage to assets or the water supply.

Flooding

Our PR24 plan is part of a long-term programme to ensure we are managing these risks appropriately and remaining resilient, with a particular focus on climate change adaptation.

We have seen a number of major flooding events in Wales since PR19, notably storm Dennis in February 2020 and storm Christoph in January 2021. We successfully minimised the impact on services to customers, but will invest £5 million to protect critical water treatment works from flooding before 2030, and embark on a longer term programme for flood protection of wastewater treatment works in AMP9 and beyond.

Cybersecurity

Cybersecurity attacks are another growing threat. Under the Networks & Information Systems Regulations we are considered an Operator of Essential Services, and are required to meet the evolving guidelines and regulations on cybersecurity. We will continue to invest as necessary to manage this risk and protect customer data, including by improving our threat detection and response capabilities, and have £11 million in our plan to enhance security measures against cyberattacks.

Safety

Providing a reliable and resilient service depends on our employees, who work in incredibly challenging conditions during periods of bad weather to maintain services to customers. The current high vacancy rate in the economy is a reminder of the importance of being a great employer in order to attract and retain the talent and loyalty that we need over the long-term.

We believe that everyone who works for Welsh Water, or on our behalf, has a fundamental right to return home safely at the end of each day. We are striving to achieve an injury-free environment and have a long-term health, safety and wellbeing improvement strategy. We will continue to make progress in AMP8 towards zero lost time injuries by eliminating hazards and minimising health and safety risks.

We will:

- Invest £157 million to strengthen the resilience of the water supply system.
- Invest £131 million to reduce the background risk of serious pollution incidents.
- Invest £23 million to upgrade security and other arrangements at our sites, to meet CNI and SEMD requirements.
- Invest £5 million by 2030 to protect all critical water treatment works from 1 in 30 year storm flooding.
- Prepare a long-term programme of investment to protect wastewater treatment works from flooding as the climate changes.
- Invest £11 million to enhance our systems and cybersecurity capabilities while remaining agile to respond to new threats.
- Continue to refine and develop our Resilience Framework to ensure we deliver a world-class service covering all elements of resilience.

Efficiency and innovation

Like most other businesses, we are currently dealing with an inflationary cost environment which is posing a major challenge to the bottom line. While soaring energy prices have had a limited direct impact on our energy costs so far owing to our successful hedging strategy, they have fed through into other key inputs such as chemicals, and the impact on AMP8 could be significant. The challenging cost environment has been exacerbated by the additional costs expended to deal with extreme weather, particularly on the water supply side.

Innovation is crucial both to meeting the cost challenge and delivering on our long-term ambitions against the background of a changing climate and growing customer expectations.

Technology

Given the increase in costs in this period, the backdrop of customer hardship and the step up in investment needs, we will have to go above and beyond in the next period to ensure that we are delivering services in the most efficient way possible. Our Business Plan includes a commitment to reduce operating costs by £42 million per annum cost by 2029/30 (11%) and are developing a flagship programme to achieve this. Accordingly we will be seeking to adopt innovative technology and find better ways of working, including through closer collaboration with partners and stakeholders.

Innovation is crucial both to meeting the cost challenge and delivering on our long-term ambitions against the background of a changing climate and growing customer expectations. During AMP7 we have strengthened our relationships with other water company innovation and research professionals, universities and research companies. The new centre of excellence for innovation in the water industry - Spring Innovation - has provided additional opportunities for collaboration.

Our Innovation Strategy, refreshed in 2022, sets out how we will maximise the four key enablers of innovation: resources, co-creation and communication, processes and systems, and people and culture. We have been engaged in Ofwat's Innovation Fund since its launch in 2020, leading on 4 and supporting 24 other projects as of August 2023.

Partnerships

We are the only water company to have a strategic Memorandum of Understanding with the Natural Environment Research Council (NERC). We also have a strategic partnership with Cardiff University and are progressing a range of well leveraged initiatives with them. This partnership working has enabled a number of secondments into the business for catchment studies and ensures that NERC research calls are focused on our needs and the needs of the wider water sector.

Overall we are working with over 100 partner organisations and have leveraged £95 million of Research and Development funding so far in

AMP7. The Innovation Fund is increasing in size to £300 million during AMP8 and there will be a new £100 million funding scheme focused on water efficiency. We will be seeking to exploit all available opportunities to find more effective ways of tackling the challenges that we face, sharing the learnings with the wider sector, and reducing costs to customers.

We will:

- Achieve reductions in our operating costs of £42 million a year by 2030.
- Target an upper quartile position in the industry on wholesale operations and base maintenance costs.
- Implement findings of the research and investigations funded in AMP7 to allow us to optimise value delivered in AMP8 and beyond.
- Seek to leverage the opportunities from the Innovation Fund and the new Water Efficiency Fund.
- Hold a biennial Innovation Conference to celebrate success, explore emerging opportunities and develop new partnerships.
- Build on our Memorandum of Understanding with the Natural Environment Research Council (NERC) and with Cardiff University.

Bills and affordability

With our Long Term Delivery Strategy we have taken a 25-year view of the challenges ahead and the investment needed. It has made clear that significantly more investment is needed not just now but over the long-term, which will need to be phased so that it is deliverable, affordable, and financeable.

AMP8 will see a step change in levels of investment, the vast majority of which is obligatory expenditure needed to meet new statutory environmental standards, maintain regulatory compliance, protect the safety of our dams and reservoirs, and adapt to climate change.

Bills

This will present a significant challenge in terms of financing and capital delivery. We have looked carefully at this and are confident that the plan, whilst challenging, is deliverable and financeable.

Whilst innovation and efficiency will help to keep costs down, paying for this investment will have an inevitable impact on our customers, who have become used to flat or falling water bills in real terms over the last 10-15 years. We have consulted widely with customers on this, and the majority accept that increased investment is necessary, and do not wish to see this postponed.

> The typical household bill is to rise by 26% in real terms by 2030 compared to 2025.

Average bills for household customers will increase from a forecast £463 in 2024/25 to £581 in 2029/30 (in 2022-23 prices, that is, not accounting for the impact of inflation), an increase of 26%. While this is a significant shift, we believe the water and wastewater service we provide remains good value for money. Our Business Plan has been optimised to deliver a 'best value' package of benefits to customers and the environment over the long-term that are necessary and should not be deferred.

Affordability

In our research, before they were given details of the investment the proposed bill increase would make possible, 47% of customers said the proposed bills will be 'difficult to afford to pay' compared to 15% who said they would find it 'easy'. However, when asked whether the plan was acceptable after having been given information about the performance and investment in the plan, an overwhelming majority (84%) said it was. 80% of customers saying they were struggling financially also considered the plan to be acceptable. We consider this a strong endorsement of our plan overall.

To assist with the affordability concerns, we will be continuing and enhancing our sector-leading social tariffs, which provide a flat lower bill for eligible customers facing financial hardship. Our HelpU tariff is currently set at £277 - a 40% discount on a typical household bill of £463. We currently have 97,000 customers on HelpU, and a further 35,000 on Water Sure Wales.

Our generous approach to social tariffs is made possible by our not-for-shareholder model. In AMP8 we will contribute £13 million a year towards social tariffs, which combined with the cross-subsidy from the generality of customers. This will provide us with the capacity to accommodate the anticipated increase in unemployment over the next few years, which we expect will result in demand for our social tariffs rising to 190,000. We will also aim to insulate customers on HelpU from the general increase in bills as far as is possible within the available financial envelope.

We have recently launched a new 'Cymuned' (Community) scheme to support working customers who are struggling financially and need short-term help with their bill. This is the first scheme of its kind in the industry. This is just one example of how we are seeking to respond to customers' needs, depending on the economic environment, and we will continue to do so whatever happens in the next five years.

Balance

Overall, we believe our plan strikes the right balance between ambition and affordability. We must step up our response to the current and future challenges and make progress towards the ambitions for the water sector in Wales over the next 25 years. On the other hand, we must also recognise the financial pressures on customers, and limit bill increases as much as we can, while ensuring our service remains affordable for all over the long-term.

In reaching this decision we have been guided by the views of the Wales PR24 Forum, with whom we have discussed our proposal. The Forum has acknowledged the requirement to increase investment and hence raise bills, while managing the impact over time and providing support to those most sensitive to price rises. Our Independent Challenge Group has amplified the voice of customers in ensuring that we put forward a plan that is stretching and in line with the priorities of customers as well as those of regulators and other stakeholders.

List of acronyms

AMP	Asset Management Period
BRWQT	Better River Water Quality Taskforce
CCW	Consumer Council for Water
CRI	Compliance Risk Index
DCWW	Dwr Cymru - Welsh Water
DWI	Drinking Water Inspectorate
DWMP	Drainage and Wastewater Management Plan
EA	Environment Agency
EPA	Environmental Performance Assessment
ICG	Independent Challenge Group (formerly the Customer Challenge Group)
IEAP	Independent Environmental Advisory Panel
LTDS	Long Term Delivery Strategy
NRW	Natural Resources Wales
ODI	Outcome Delivery Incentive
PAYG	'Pay As You Go'
PC	Performance Commitment
PCC	Per capita consumption (i.e. average household water use, per person)
PCD	Price Control Deliverable
PR	Price Review
RCV	Regulatory Capital Value
RORE	Return on Regulatory Equity
SAC	Special Area of Conservation
SEMD	Security and Emergency Measures Directive
SO	Storm Overflow
SPS	(Welsh Government's) Strategic Priorities Statement (to Ofwat)
SSSI	Site of Special Scientific Interest
TUB	Temporary Use Ban (i.e. hosepipe ban)
UWWTD	Urban Wastewater Treatment Directive
WACC	Weighted Average Cost of Capital (i.e. allowance for company finance)
WASC	Water and Sewerage Company
WFD	Water Framework Directive
WRMP	Water Resources Management Plan

Our Plan at a Glance

Key points

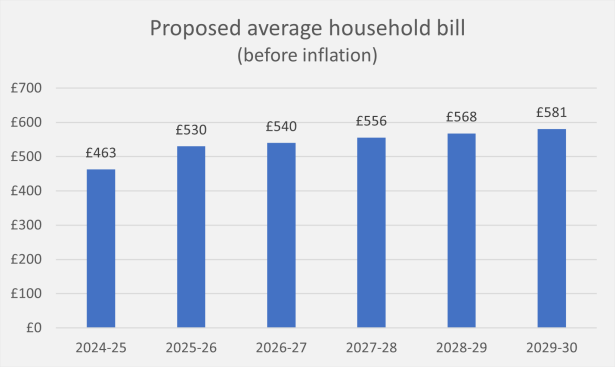
- Biggest ever investment plan to improve the environment, meet rising customer expectations, and secure long-term resilience in the face of climate change and other challenges.
- Aligns with Long Term Delivery Strategy and Welsh Water 2050, with outcomes and approach to prioritisation and delivery set collaboratively with Welsh stakeholders.
- Delivers against the PR24 Forum 'Strategic Steers' and thereby meets expectations of Welsh Government, regulators and customers.
- Based on clear understanding of customers' circumstances, needs and priorities through ongoing engagement and specific PR24 research projects.
- Strong package of risk/reward incentives, with Outcome Delivery Incentives derived using an amended version of Ofwat's 'top down' methodology.
- Subjected to rigorous challenge from the Board, stakeholders and customers, with £359 million efficiency cuts imposed on investment plan.
- Deliverability of capital plan assured, with procurement process for needed capacity well underway, and new capital delivery arrangements coming on stream in 2024.
- Plan is financeable, with strong financial fundamentals to build on, and A-grade credit ratings forecast throughout the period.

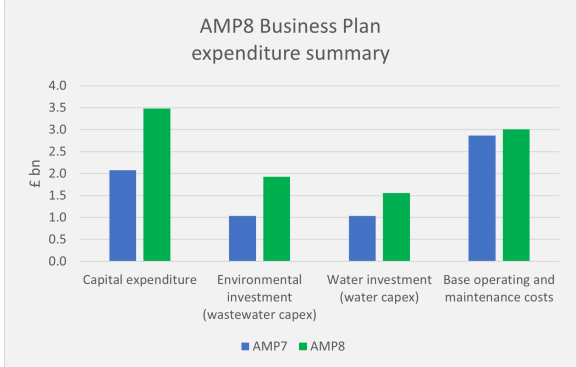
Bills

- Much increased investment leads to bill increases of around 26% 2025-2030 (before inflation) – around £118 on annual bill.
- 84% of household customers accept the plan as a whole, albeit that affordability remains a material concern given the cost-of-living crisis.
- Leading HelpU social tariff scheme maintained, with capacity to expand to support 135,000 customers on low incomes.
- Aim to freeze level of social tariff bill in real terms.

Outcome/ambition highlights

- Reduction of Phosphorous discharges to sensitive (SAC) rivers to levels consistent with good river health by 2032.
- Elimination of all ecological harm from operation of storm overflows by 2040.
- Return to 4-star Environmental Performance Assessment on ongoing basis.
- Net zero on total (operational and embedded) carbon emissions by 2040.
- Sustained upper quartile industry customer satisfaction scores.
- Upper quartile target on base costs. £42 million of savings on wholesale operating costs per year by 2029/30 through efficiencies and innovation.
- Stretching Performance Commitment targets, particularly where lagging industry.
- Maintain our engagement with academic partners and industry innovation initiatives : currently actively participating in 28 Ofwat Innovation Competition projects.





Investment Plan highlights

£945 million investment in the environment through NEP and WINEP[1], of which:

- £141 million to reduce Phosphorous discharges to improve river water quality.
- £366 million to improve performance and reduce harm at priority Storm Overflows.

£131 million to reduce risks of serious pollution risks.

£227 million for resilience improvements, of which:

- £66 million to accelerate replacement of asbestos cement water mains.
- £54 million for other water network resilience.
- £79 million for upgrades to dams and reservoirs.

£206 million for protecting and improving tap water quality, of which:

- £27 million for green solutions to prevent deterioration of raw water in catchments.
- £46 million to make improvements to processes at water treatment works.
- £15 million to replace 7,500 lead supply pipes.

£125 million to implement metering strategy.

£35 million for increasing security at critical sites and strengthening cybersecurity.

Performance Commitments

PC	Measure/Unit	2022-23 actual	2029-30	2050 (or other)
Supply interruptions	Average minutes lost	00:44:31	00:04:30	00:02:00
Tap water quality risk	Compliance Risk Index	5.4	0.0	0.0
Tap water 'acceptability'	Contacts per 1,000 population	2.35	1.00	0.50
Leakage	% reduction on 2019-20 (3YA)	-11.5%	18.4%	50%
Per capita consumption	% reduction on 2019-20 (3YA)	-6.2%	7.4%	25%
Business demand	% reduction on 2019-20 (3YA)	8.7%	5.1%	8.5%
Internal sewer flooding	Number of incidents	169	165	95
External sewer flooding	Number of incidents	3634	2700	1300
Total pollution incidents	Number of incidents	89	68	24
Serious pollutions	Number of incidents	5	0	0
GHG emissions (water)	Reduction against 2021/22	26%	73%	100% (2040)
GHG emissions (waste)	Reduction against 2021/22	15%	52%	100% (2040)
Permit compliance	% discharge compliance	98.5%	100%	100%
Bathing water quality	Weighted average	90.2%	88.9%	88.9%
River water quality	Reduction in P discharges to SAC rivers (to sustainable level) from 2020	-	90.0%	100% (2032)
Storm overflow impact	% SOs causing 'no harm'	52.3%	61.0%	100% (2040)

1 NB Wastewater only

1. Introduction

1.1 Who we are and what we do

Our purpose

"The purpose of the Company is to provide high quality and better value drinking water and environmental services so as to enhance the well-being of its customers and the communities it serves, both now and for generations to come." (Article 2A, Glas Cymru Holdings Cyfyngedig Articles of Association, December 2019).

Welsh Water (Dŵr Cymru) is the licensed provider of water and wastewater services for the majority of Wales and some neighbouring parts of England (see Figure 1). We are the sixth largest of the 11 water and sewerage companies (WASCs) in England and Wales. Welsh Water is owned by Glas Cymru, a single-purpose company with no shareholders. We are the only 'not for profit' utility company in England and Wales.

The core services we provide are essential for the daily lives of our customers, for their health and the health of the environment and its ecosystems, and for thriving businesses. We consider it both a privilege and a huge responsibility to be in the position of playing such a crucial role, and our job is to perform to a high standard and minimise problems, so that customers can rely on having a safe and high-quality supply of water, confident that their wastewater will be dealt with properly while minimising the impact on the environment. Our vision is "to earn the trust of our customers every day".

We generate our own energy from renewable sources such as wind, solar and hydro. We also recycle the organic material resulting from the sewage treatment process, generating further electricity and natural gas, and passing the by-product on to farmers to enhance the fertility of their land.

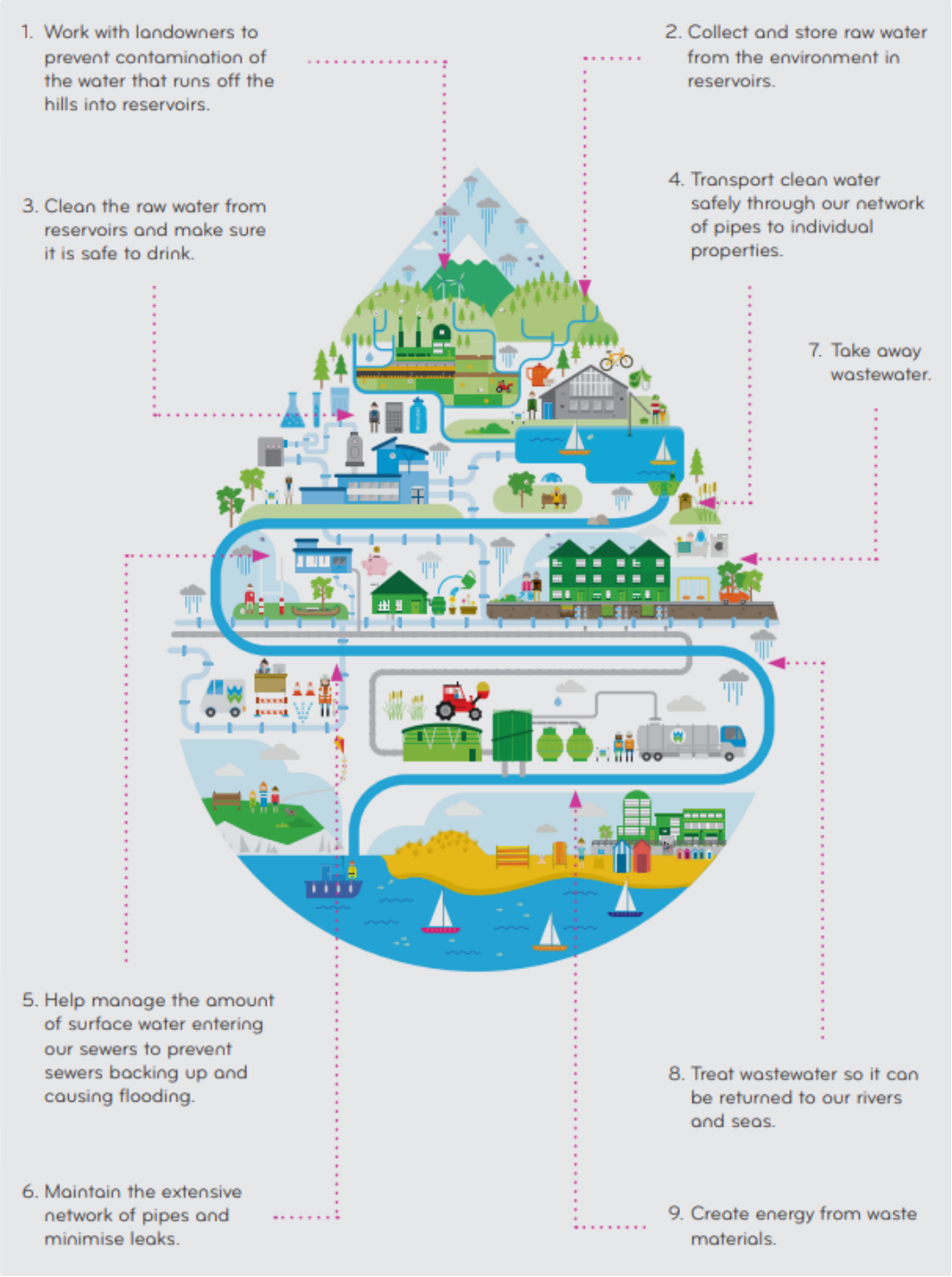
Figure 1 Welsh Water's operating area

We are embedded in communities across our area, working closely with partners to support vulnerable customers and help those who struggle to pay their bills. We inform the younger generation about the importance of water and the environment through our education programme. Over the past five years we have increased access and recreation at our reservoirs as well as adding to our visitor centres for the benefit of our customers' wellbeing. We work to enhance biodiversity on our sites and landholdings.

Our customers comprise around 1.4 million households, as well as non-household customers: businesses of all kinds, schools, hospitals, local councils and housing developers. We have sought input from many of our customers in putting together this Business Plan for 2025-30.

As one of the largest private companies based in Wales, our impact reaches beyond the provision of our core services of supplying safe, clean water and the treatment of wastewater. We contribute significantly to the Welsh economy, supporting more than 9,100 jobs.

Figure 2 What we do.



1.2 Our model

As Welsh Water does not have shareholders, we do not pay any dividends and can focus our resources and expertise fully on delivering our company purpose. Any surpluses we generate are available to be reinvested in the business to support our current and long-term objectives of providing the best-value outcomes, for the benefit of our customers, our communities and the environment. Since 2001, our non-shareholder model has enabled us to apply additional funds of over £570 million in the form of accelerated investment to help improve service delivery and social tariffs to support our most vulnerable customers.

Our model also enables us to focus more clearly on the long-term, and on delivering the right outcomes in the best way, avoiding 'quick fixes' and cheap but short-lived solutions. This requires the trust and co-operation of stakeholders, including the Welsh Government and our key regulators (see 1.5 Our regulators and stakeholders). Since our model is embedded in our company culture, it provides added motivation for our people to always 'do the right thing', and drive efficiency in the knowledge that all cost savings are retained in the business for the benefit of our customers.

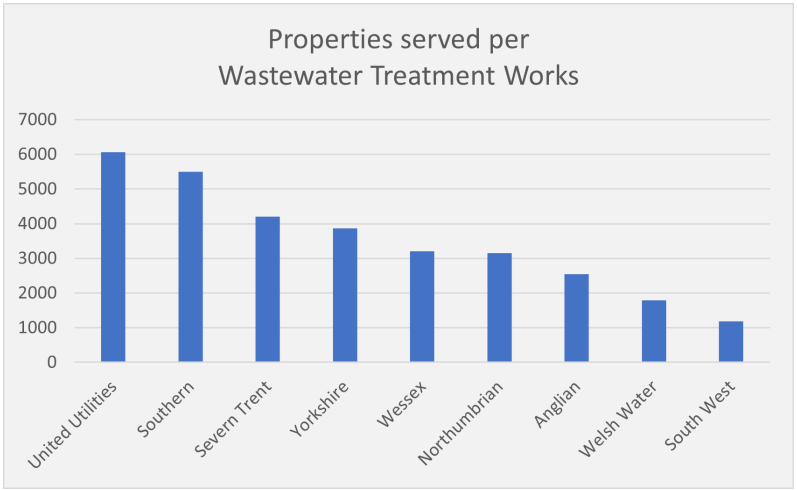
Finally, our model helps to reduce Welsh Water's financing costs and hence bills, by providing secure, long-term credit quality to investors, as acknowledged by the credit rating agencies.

1.3 Operating context

Our area is blessed with beautiful countryside, magnificent landscapes and spectacular coastlines. It also presents a unique set of challenges to us as a water company.

Many of our customers are concentrated in the south and south east of Wales, but our region is predominantly rural with widely dispersed populations in small towns and villages. This means an extensive network of pipes and treatment works, presenting challenges in terms of comparative efficiency.

Figure 3 Average properties served by WWTW.



The hilly topography of our region means that we can rely principally on reservoirs as a means of collecting water for storage and treatment, and many of our water distribution networks are then gravity fed under high pressure.

We have a high number of small and ecologically sensitive rivers, and nine river Special Areas of Conservation (SAC), including the River Wye.

Finally we have 2,700 kilometres of coastline - approximately 15% of the total for the United Kingdom but with a quarter of its Blue Flag beaches. There are 107 designated bathing waters in Wales of which 79% are classed as 'Excellent.'

Large numbers of tourists visit Wales, with high peak seasonal demand especially in the summer months, attracted by its nature and culture. These are in effect additional customers who need to be provided with water and wastewater services.

Against the background of these characteristics, the impacts of climate change on our operating area are becoming increasingly apparent. In Wales and other western parts of the UK the main concern is the increase in the frequency and intensity of rainfall, which has major implications for drainage in general and the operation of our wastewater network in particular. We will return to this theme throughout this document.

Wales is deeply affected by the legacy of early industrialisation and post-industrial decline, in a variety of ways. Operationally, it means that in our most populous area many of the trunk mains are oversized for current purposes, exacerbating issues with tap water quality. In terms of economics, our customer base suffers disproportionately from financial deprivation and indebtedness, so it is all the more important to keep bills low and support those who struggle to pay. Wales suffers from a higher poverty rate than Scotland, Wales or Northern Ireland (24%). [2]

We both support and are part of the Foundational Economy - the part of the economy that we rely on for everyday life - supporting jobs and local supply chains wherever possible.

Wales and the environment

Wales is one of the first countries in the world to have sustainability written in its government legislation.

Wales generates twice as much electricity as it uses, exporting the surplus.

Wales pioneered the 5p plastic bag charge to cut waste and pollution.

Wales was the first country to officially declare a climate emergency, on 1 May 2019.

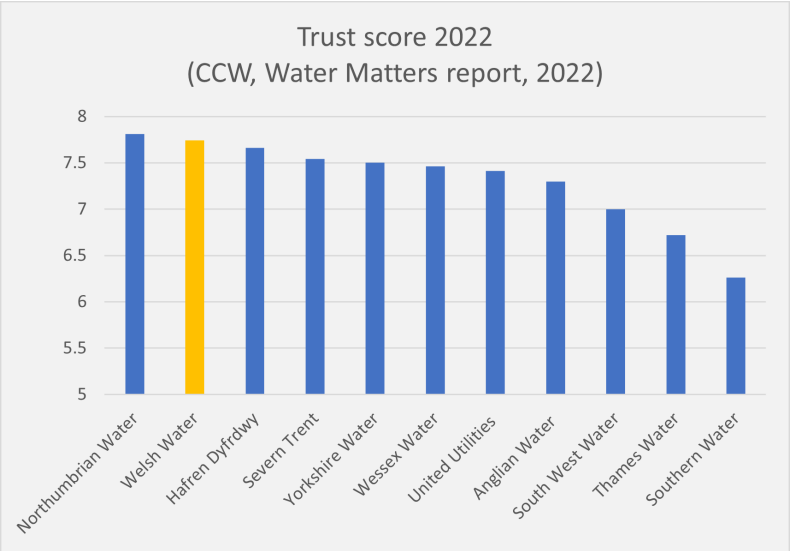
The Wales Coast Path runs through eleven national nature reserves and was the first dedicated coast path in the world to cover the entire length of a country's coastline.

1.4 Our record: building and maintaining trust

When Glas Cymru took over Welsh Water in 2001 there were doubts about whether the innovative model would be able to deliver the necessary performance and efficiency improvements. Over the last twenty years customers have seen broadly stable bills in real terms (as measured against RPI), while service standards have improved significantly and debt levels have come down to amongst the lowest in the industry. We have invested hugely in our assets and our networks, and we have a hard-won place at the top of the industry league table on customer trust. According to CCW's Water Matters report, trust is "significantly higher" in Wales than it is in England (7.74 vs 7.18).

[2] Source https://www.jrf.org.uk/data/uk-poverty-rates-region.

Figure 4



That said, trust levels have been declining in recent years, and we are acutely conscious of the levels of public concern around the performance of their water company and the issues around river water quality in particular. We are clear that there are other areas of performance where we need to improve, including drinking water quality incidents, supply interruptions and serious pollution incidents.

It is vital that we retain the trust of our customers, as they have the ability to materially contribute to solving some of the problems that we face. If we do our part, whether it is by tackling leakage or investing in the improving the sewerage infrastructure, it will encourage them to help by moderating their water usage and avoiding sewer misuse.

We are determined to demonstrate that, notwithstanding the problems and challenges ahead, we are continuing to do the right thing: developing well-informed plans for the long-term that will provide real environmental benefits - not short-term headlines - while managing affordability and ensuring deliverability. We fully recognise that there are things we need to do to improve things, and that is the thrust of this Business Plan. But we also want to encourage others to play their part, so that by working together we can deliver the biggest improvements for the lowest cost to customers.

1.5 Our regulators and stakeholders

In Wales we operate under a regulatory regime which differs in some important respects to companies in England. The Welsh Government has devolved responsibility for most matters relating to water in Wales (see Box below). We have a separate environmental regulator Natural Resources Wales (NRW) Since the last Price Review, Ofwat has appointed a Wales Director which has helped to ensure that decisions made by Ofwat appropriately reflect the policy landscape and operating circumstances in Wales

Devolved decision-making

The Welsh Government has powers to introduce new legislation to the Senedd in respect of devolved policy areas such as water, environmental regulation, and flood defence. The Senedd may also pass legislative consent orders in respect of UK parliament legislation which deals with such devolved areas. The Welsh Government has responsibility for executive powers, policy and legislation in most areas relevant to the activities of Welsh Water. This applies across the whole of our operating area, including those parts in England, because powers are devolved in legislation on a wholly or mainly in Wales' basis.

The Welsh Government also works closely with the UK Government (the Department for Environment, Food and Rural Affairs), which sets the relevant policy framework for Water and Sewerage Companies (WASCs) and Water Only Companies (WOCs) in England. Since the Government of Wales Act 2006, we have seen increasing divergence between the approaches of the Welsh Government and DEFRA in some key areas, including competition for non-household retail services, charging structures for new connections, and compulsory sustainable drainage systems on new properties.

The regulatory landscape means that all of the key organisations relevant to decision-making on the water sector in Wales, including both water companies, have the opportunity to work effectively in collaboration, in a way that is not possible in England. Ofwat's Final Methodology for PR24 recognised the importance of taking a collaborative approach in Wales to identifying the long-term outcomes to be achieved and the phasing of the delivery of those outcomes. This approach was mobilised through the Welsh Government's PR24 Forum, which has met regularly through the last two years to consider the key issues and issue 'Strategic Steers' to influence the companies' business plans (see Section 2.3 Collaborative Process in Wales: PR24 Forum).

We strongly support this approach, and have consistently made the case for a stronger 'Team Wales' approach to the way that we work together towards improved water sector outcomes in Wales. The various challenges that we face are complex, and a wide variety of players including agriculture, industry, the public sector and regulators all have a part to play. We believe that stronger mechanisms for coordination and collaboration, both at a catchment-level and at the national level, are needed to ensure these problems can be solved effectively and at the lowest cost to citizens in Wales. We are committed to playing our part. In the normal course of our business we work closely with a wide range of organisations. Our partners include consumer organisations, local authorities, environmental and campaigning organisations and others.

Regulation of water companies in Wales

Welsh Government	The Welsh Government has devolved authority over most matters pertaining to the regulation of the water industry in Wales.
Drinking Water Inspectorate (DWI)	The Drinking Water Inspectorate is a statutory body with duties and powers to develop and update drinking water quality regulations (which derive from EU legislation), monitor compliance with such regulations, and implement enforcement action where required. The Chief Inspector is appointed by the Secretary of State and by Welsh Ministers.
Natural Resources Wales (NRW) **Environment Agency (EA)**	Natural Resources Wales and the Environment Agency are the environmental regulators for Wales and England respectively, with important roles with respect to the regulation and planning of water companies. NRW has responsibility for conservation in addition. They set out water companies' environmental obligations in the National Environment Programme (NEP) in Wales, and the Water Industry National Environment Programme (WINEP) in England.
Consumer Council for Water (CCW)	The Consumer Council for Water (CCW) is a non-departmental public body of DEFRA and the Welsh Government established under the Water Industry Act 1991 (as amended) to represent the interests of consumers by handling complaints, acquiring and publishing information, providing advice, and investigating matters of interest to consumers. CCW is supported by regional committees established under the Act including a Wales Committee.
Ofwat	Ofwat is the economic regulator for the water industry. Its duties include protecting the interests of consumers, ensuring that water companies carry out their statutory functions, and furthering the resilience of water companies. Ofwat has a range of powers, including setting price limits and performance targets through the five-yearly Price Review process.
Department for environment, food and rural affairs (DEFRA)	Defra is a department of the UK Government that is responsible for improving and protecting the environment in England.
Welsh Language Commissioner	The Welsh Language Commissioner's main statutory aim is to promote and facilitate the use of the Welsh language, and also ensures standards are being met.

1.6 Delivering wider value

The nature of the services we provide means that Environmental, Social and Governance (ESG) issues are at the heart of everything we do. We have ten ESG objectives set out in our ESG Strategy, which since 2021 are overseen by a dedicated committee of the Board (see link).

We are committed to reducing our overall environmental footprint, and to enhancing the natural environment in which we work wherever possible, in order to benefit nature and the communities we serve. Since Glas Cymru acquired Welsh Water in 2001 we have followed the UK Corporate Governance Code and worked to ensure good governance and informed decision-making at all levels of the organisation. We recognise that good governance needs to underpin all of our decision-making as a key part of our commitment to 'Earn the trust of our customers, every day'.

Economic Impact Assessment

As one of the largest private companies based in Wales, our impact reaches beyond the provision of our core services of supplying safe, clean water and the treatment of wastewater. We make a significant contribution to the health of the Welsh economy and are a major employer. In March 2023, Cardiff University completed a report on our impact on the Welsh economy, following up a similar report published in 2013. The report estimated the economic impact on employment generated by our operations, the value added to the Welsh economy, and the amount of the company's expenditure retained in Wales.

The report shows:

- Welsh Water is responsible for more than £1 billion of output/expenditure in Wales each year.
- Welsh Water supports over 9,100 (including direct and indirect) jobs in Wales.
- Every £1 million of Welsh Water's direct gross value added (GVA) supports a further £1.27 million of GVA elsewhere in the economy.
- 62% of Welsh Water's supply chain expenditure is within Wales – a significant increase on the approximately 41% estimated in 2013.

The report concludes that "Welsh Water anchors other anchor companies in Wales".

2. How we prepared our plan

This section describes how we approached the task of preparing a plan that met the challenges and guidelines set by Ofwat, and the process that was followed. There is a particular focus on how we ensured that the investment plan represents good value for customers.

The plan has been developed over the past two years, through a complex process of multi-stakeholder engagement, customer research, internal analysis and option assessment, discussion and decision-making following a structured governance process. The Executive has been engaged through monthly PR24 strategy meetings, with PR24 being a regular agenda item at Board.

As a fundamentally long-term business, we started with our long-term strategy, Welsh Water 2050, and the ambitions and outcomes set out in the Long Term Delivery Strategy that was developed alongside this plan. The PR24 Business Plan should therefore be seen as the next step in a long-term process of evolution and improvement in the service we provide, to make sure we are providing a 'world-class, resilient and sustainable water service for the benefit of future generations' as per our Welsh Water 2050 mission statement.

2.1 Board leadership and assurance

This business plan is critical to the success of this company over the next five-years and beyond. Accordingly Welsh Water's Board has been fully engaged in its development throughout the process. Board members have attended customer research focus groups themselves, have visited assets that are the subject of key investment decisions, and received independent advice from experienced water industry regulatory professionals.

Robust internal and external assurance has been at the heart of the process of developing our plan, so that customers and stakeholders can trust the information contained therein and be assured of our ability to deliver.

The data submitted alongside this plan has been subject to a rigorous process of internal and external audit, following the same risk-based framework that we deploy for our Annual Performance Report, working closely with our external assurance provider, Jacobs.

The Board's Assurance Statement is provided alongside this plan as a supporting document (WSH04-Assurance Statement).

2.2 Customer research

Introduction

Our PR24 Business Plan was informed by a structured programme of customer engagement and research, to make sure that we have a good understanding of customer needs and priorities, and to ensure that the plan reflects their views and preferences. The research was overseen by our Board and the Independent Challenge Group (ICG), and undertaken by a coalition of research agencies following best-practice market research standards. Each piece of research was peer-reviewed.

This section summarises our approach to customer research for PR24, including the role of the ICG and the Board, the projects undertaken, how we ensured high standards, and the key conclusions. A full description of the customer research and results can be found in submission document (Customer Engagement Evidence)

Background

Our customer research programme for PR19 was the biggest we have ever conducted, with over 40,000 customers in a major research and consultation programme covering a wide range of areas.

Following the conclusion of PR19 we undertook a review of the customer research in discussion with the Customer Challenge Group (as was). We also carefully considered the findings from CCW's commissioned review of PR19 customer research ('Engaging water customers for better consumer and business outcomes' (link), CCW's 'Framework for water company research' (link) and the emerging policy from Ofwat on customer research for PR24 (link).

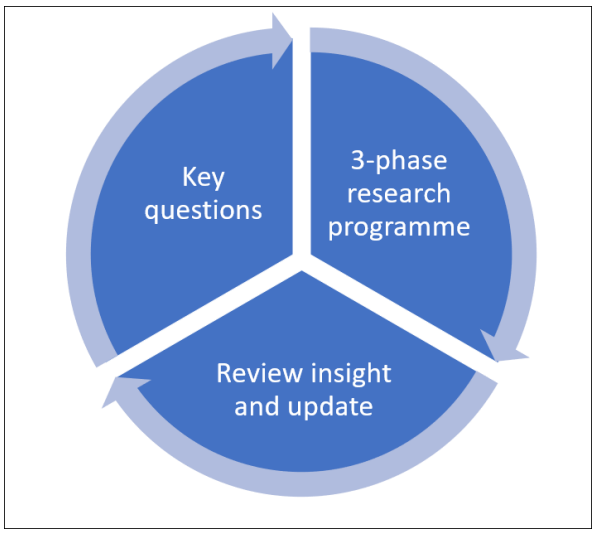
Some of the key themes from these reviews were that price review research should be part of an ongoing process, that research should be focused in areas that are most meaningful to the business planning process, and that customers should be engaged on topics and in ways that are clear and understandable to them, and on which they feel they have a valid contribution to make.

We therefore modified our approach to customer research for PR24, taking a more deliberate approach focused more closely on the key questions underpinning the price review, and talking to customers about issues that they could understand and to which they wanted to offer an opinion.

The choice of a more focused company programme of business planning research was facilitated by Ofwat and CCW's decision to undertake a programme of 'collaborative' research with companies to cover some of the key cross-cutting issues and themes for the price review. Some of this research was actually carried out centrally, and for other projects there was more standardised guidance and expectations, but the research itself was carried out by companies.

Insight Framework

Figure 5 PR24 Insight Framework



In light of the above, the PR24 insight framework was focused around four 'key questions', which were then addressed in a three-phase research programme. This brought together commissioned customer research alongside 'business as usual' data and external sources of information. The results of the research and engagement were brought together in a 'state of play' insight framework that was regularly updated, discussed with the Board and the ICG, and then fed back into the ongoing research.

This allowed us to provide recommendations for business planning purposes based on the insight generated.

The four 'key questions' underpinning the engagement programme are:

- **Outcomes**: What outcomes do customers expect us to deliver over the short and long-term?
- **Priorities**: What do customers think are their biggest priorities for investment over and above any statutory requirements?
- **Pace**: How quickly do customers want us to deliver outcomes?
- **Bills**: What would be an affordable and acceptable level for bills?

The research covered themes including bills and affordability, customer service and performance, the environment, and resilience and climate change adaptation.

The PR24 research programme was part of an ongoing programme of customer engagement and involvement. Every contact we have with a customer gives us an opportunity to understand customer needs and improve our services further. All telephone and online customer contacts are followed up by an automated survey to request feedback on the service. All of this information feeds into our ability to obtain a clear picture of what our customers want from their water service and helps us find ways to do better.

We also track customer views regularly across a range of areas, including a monthly 'Trust Tracker', a quarterly non-household customer satisfaction survey, three Developer Services customer surveys, plus surveys conducted by third parties such as CCW, Ofwat and the UK Institute of Customer Services.

Independent Challenge Group (ICG)

The ICG is an evolution of the Customer Challenge Group (CCG) put in place initially for PR14. It has been chaired since 2016 by Peter Davies, a former Future Generations Commissioner for Wales. Its members include representatives of CCW, Citizens Advice Bureau, National Farmers Union (NFU) Cymru, Business in the Community, and the housing charity, Pobl Group. Its website, including minutes of meetings, can be found here link.

The ICG provides scrutiny and challenge, ensuring that the needs of current and future customers and communities are at the heart of how Welsh Water operates. The diverse membership of the ICG reflects a range of customer perspectives and includes experts in customer research and engagement. Organisations represented within the group include those working on behalf of older people or people in vulnerable circumstances, and environmental organisations.

In October 2022 the name of the group was changed from the Customer Challenge Group to the Independent Challenge Group to reflect the change from an Ofwat-mandated body to a more flexible format. Whereas at PR19 the CCG had a formal role in the price review designated by Ofwat, the ICG is now part of the more general price review 'challenge arrangements' of the company. It no longer has the responsibility to ensure that the customer research programme meet's Ofwat's requirements for high quality and objective research. These are now covered by separate arrangements (see under 'Assurance' below) allowing the ICG to focus more effectively on its challenge and customer representation role.

The Well-being of Future Generations Act provides the strategic framework for the ICG's work. Independence and transparency are central to the ICG's role, with a focus on meaningful engagement with customers within Welsh Water's day-to-day business, to ensure that all commitments are based on evidence gathered from customers, citizens and communities.

The ICG has provided independent scrutiny and challenge of the company's research and engagement in preparing this plan, contributed to and approved the research framework and participated in the assurance process through regular discussion with the assurance agencies. It has prepared a report on the activity undertaken to inform the business plan which can be found at WSH33-Independent Challenge Group Report.

Results of all of the customer research projects were presented to and discussed with the ICG, which also received regular updates on the development of the business plan. The Chair of the ICG was invited to discuss its views directly with the Board and also sat on the PR24 Forum to represent customer views.

Board involvement

Our Board provided oversight and approval of the customer research process for PR24 from the outset, discussing and agreeing the overall approach, framework and the plan for the key projects, taking into account Ofwat's guidance and expectations, and the lessons learned from PR19.

The company presented regular updates to the Board on the results and draft conclusions produced by the research programme throughout the process, supported by direct engagement with the ICG Chair.

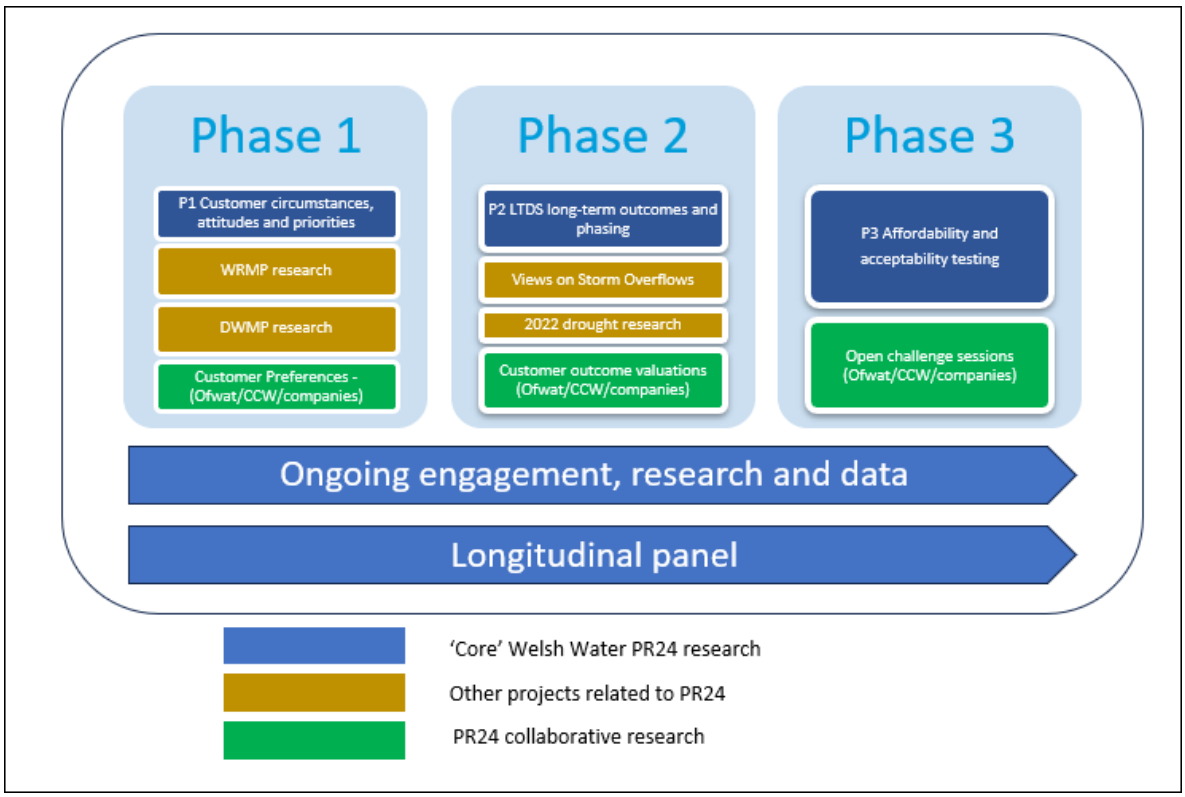
The Board was also keen to ensure that it heard directly from customers on their circumstances, their priorities, and their views of the services provided by Welsh Water. In June 2022 our Board held a 'customer immersion session' with members of the 'Longitudinal Panel' (see below), which was a structured conversation around a range of topics relevant to the business planning process. The session involved 15 customers and 19 members of the Board, senior executives and members of the ICG.

Research projects

The PR24 research programme was developed taking into account Ofwat's consultation document 'PR24 and beyond - creating tomorrow, together' which set out its vision and expectations for customer research at PR24, including making greater use of 'collaborative' industry research, and learning from the PR19 experience about what kinds of research were most meaningful to customers and helpful to the business planning process.

The programme was a combination of 'set piece' research in three phases aligning with the business planning process, and more specific research around more focused topics or associated strategies, such as the research on the WRMP and the DWMP.

Figure 6 Summary of PR24 research programme



The P1 research project on customer circumstances, attitudes and priorities was commissioned jointly by Welsh Water and Hafren Dyfrdwy, to provide an 'all Wales' view that informed early discussions of the PR24 Forum in Wales. Results were also disaggregated by company where relevant.

We also commissioned 'ad hoc' pieces of research to understand customer views on temporary issues or events, such as asking affected customers about their views of the hosepipe ban and drought issues in July 2022, or the research we commissioned on our customers' perceptions of river water quality and storm overflows.

We contracted five external research companies with differing experience and expertise to conduct the programme enabling us to draw on a range of skills. This also facilitated the 'peer review' process for each project which was part of our approach to the assurance of high quality research.

The results of each piece of research are publicly available online at our PR24 library (link).

The creation of a Longitudinal panel was suggested by ICG following the PR19 research programme as a way to track changing customer views over a longer period of time and to also capture the perspective of a more informed customer base. Relish Ltd were commissioned to run the group which was comprised of approximately 30 customers. The majority were recruited from those who took part in our Phase 1 research conducted in June/July 2021. Others were then sourced to ensure a rounded representation of customers. From Wave 3 onwards we recruited additional members from the Welsh Government's 'Future Generations Leadership Academy' to include a representation of future customers.

Figure 7 PR24 Longitudinal Panel research

Research methods

The research programme made use of a range of research methods appropriate to the objectives of each project. These are summarised in the table below. Usually a mix of methods was used for an individual project.

Method	Description
Qualitative Focus Groups (8-12 participants)	Exploratory research conducted in small groups between 8-12 people moderated by an independent researcher usually 3-4 hours long.
Quantitative surveys – usually online	Survey which gives the ability to gather data. Can be conducted at any scale needed but usually no longer than 15 minutes in length.
Cognitive interviews	Individual interviews with customers to check if the survey and stimulus material is understandable and logical.
One to One surveys	Surveys completed at a customer's home or preferred location by an independent researcher with or without the aid of a support assistant. This is usually with customers in vulnerable circumstances who may otherwise not be able to participate in the research.
Stakeholder & non-household customer interviews	Telephone or face to face interviews with representatives of a specific company/group of customers
Community Hubs	Research conducted in a community centre online using iPads with help from research field staff if needed. Conducted in more deprived areas to survey more customer who may be 'hard to reach' due to low mobility, poor transport links or no internet access.

Each project ensured appropriate representation of customers in terms of our operating area, socio-economic groupings, and other characteristics, ensuring that 'hard to reach' customers including those with health vulnerabilities were targeted through additional activities.

Assurance

In order to meet requirements around the quality of research and engagement by companies, an assurance framework was discussed and agreed with the ICG and we implemented two measures to increase the level of governance and assurance around the programme compared to PR19:

1. Peer review of all research undertaken by another research agency, looking at the quality of the methodology and survey design prior to research being undertaken. This was followed by a review of the research findings to ensure that the appropriate conclusions were made.
2. A separate agency was commissioned to work with Jacobs (who provide assurance on our wider performance metrics for our Annual Performance Report) to provide wider assurance of the programme. This included an overall assessment of the approach to research, the alignment with Ofwat's customer research principles, and the alignment between the research results and the decisions being proposed in the Business Plan.

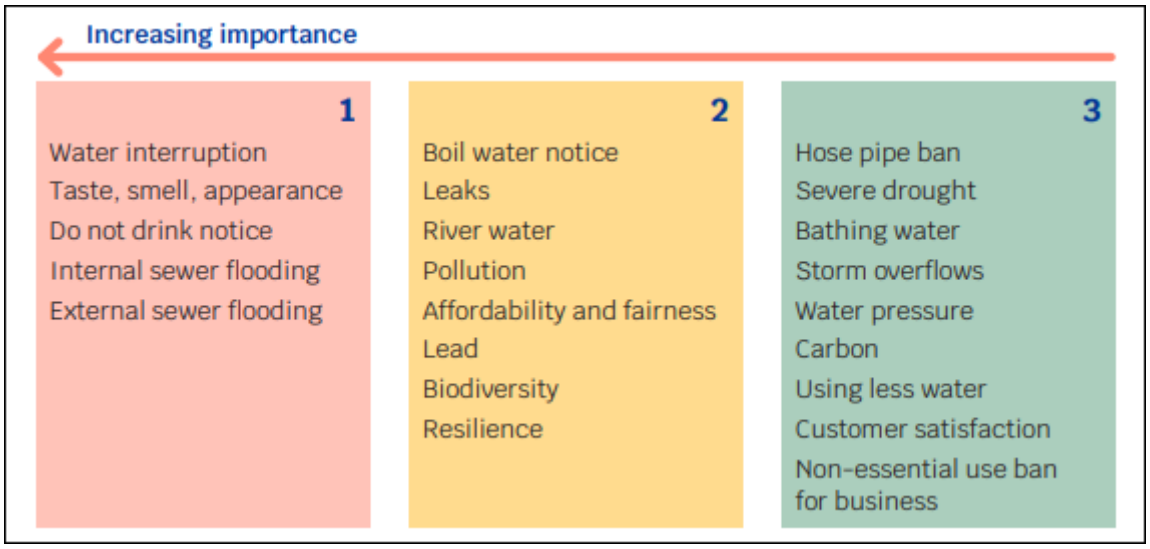
The findings from this assurance programme, along with a more detailed summary of our customer engagement programme are provided in supporting document (WSH30-Customer engagement and research)

Key questions - conclusions

Outcomes: What outcomes do customers expect us to deliver over the short and long-term?

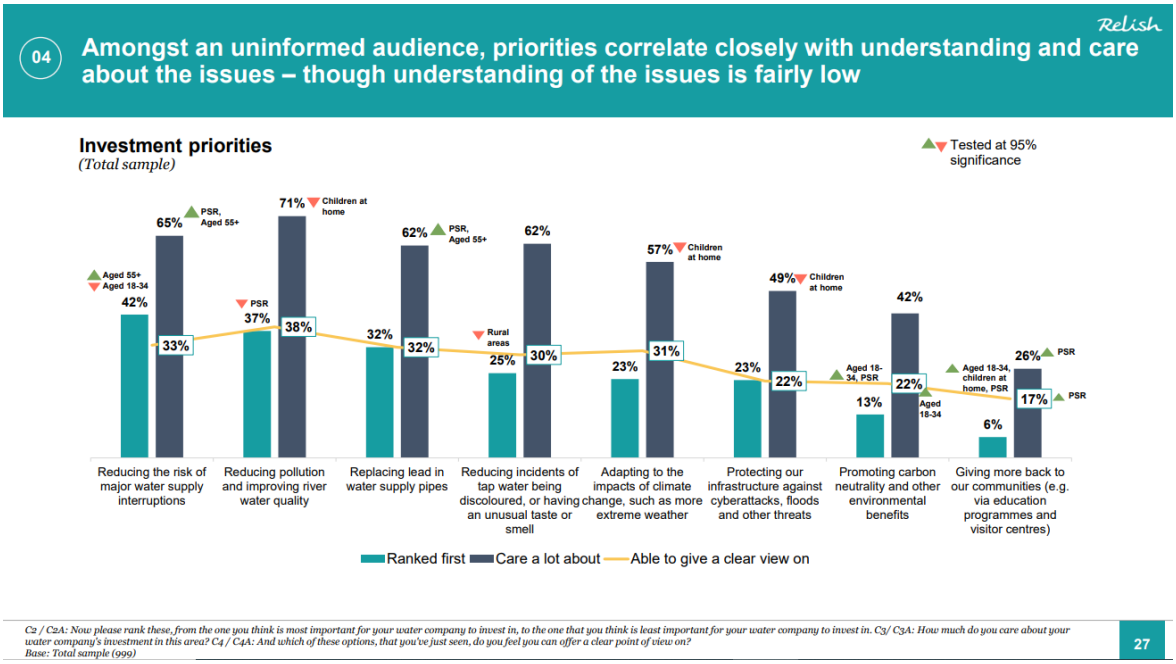
Ofwat and CCW's collaborative research on customer preferences found that all activities discussed with customers were considered to be important, but those that might affect individuals personally tended to be seen as the most important activities. The graphic below summarises the views of customers.

Figure 8 Collaborative research on customer preferences



Our P1 research found that 95% of customers were 'very satisfied' or 'satisfied' with Welsh Water 'taking everything into account'. We asked customers to rank a selection of service issues in terms of "most important for your water company to invest in", how much they care about each, and whether they felt they were able to provide a clear point of view. The results are shown below.

Figure 9 PR24: P1 research - Ranking of service issues



These results imply that customers will care a lot about service failures if they occur to them, but as only a minority have direct experience of these, the level of overall satisfaction remains high. The results go into greater depth on customer views on each area. Mostly customers had a low level of understanding and confidence, but said they would support further investment if needed.

The P2 research asked about the importance of objectives in relation to long-term investment, and the level of ambition of the company over the long-term, to inform the setting of outcomes in the LTDS.

Figure 10 PR24: P2 research - importance of outcomes for customers

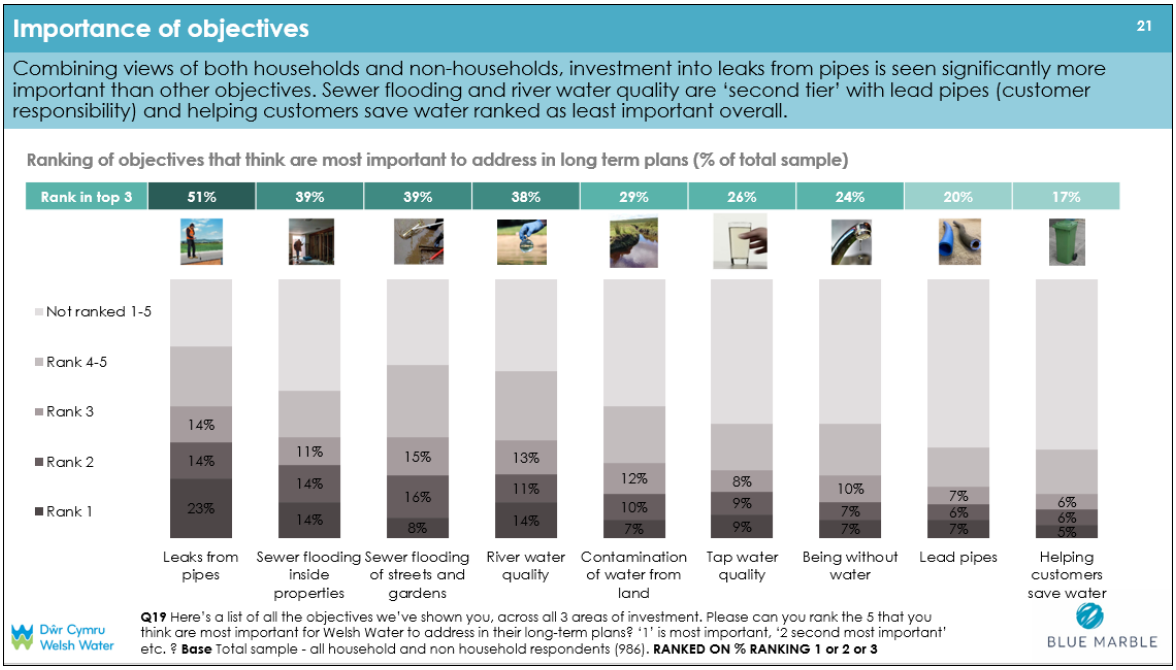
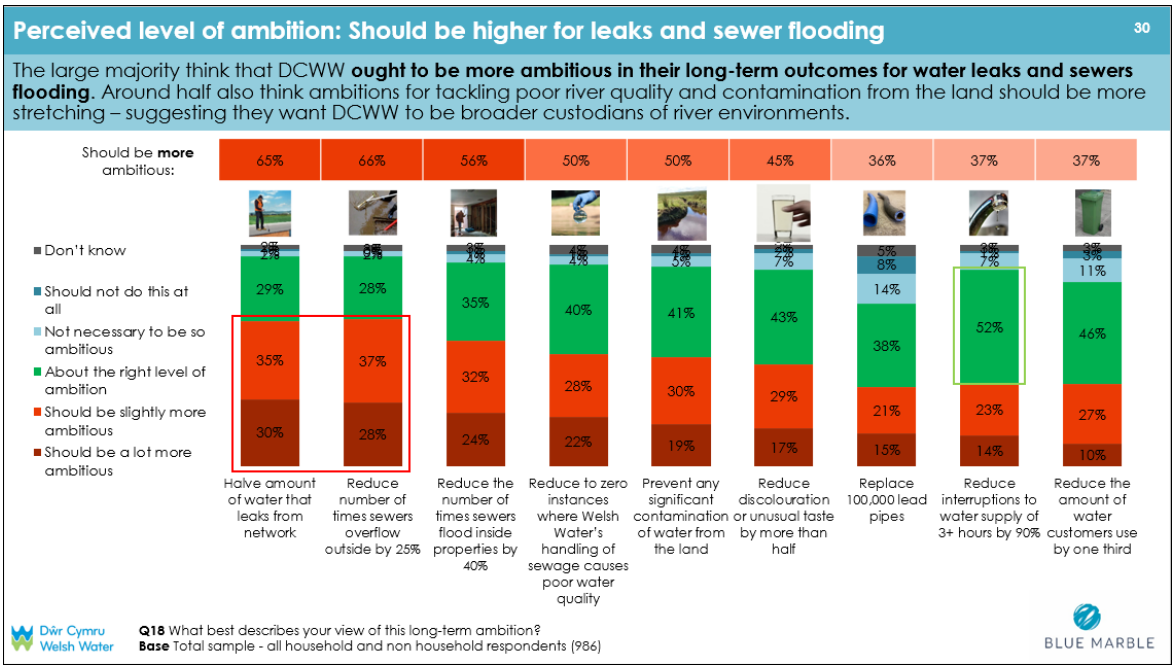


Figure 11 PR24: P2 research - customer views on long-term ambitions



These results were consistent with the general view that customers have stronger feelings on leakage and on issues that could affect them directly such as sewer flooding.

In the qualitative stage of the P3 Affordability and Acceptability research, a large majority of customers (though from a small sample) found the outcomes in the proposed plan to be acceptable, having been shown a set of proposed performance targets for 2030 and 2050. That said, the strongest challenge from customers remained around the leakage and pollution incidents. 84% of customers in the quantitative Affordability and Acceptability research found the plan, including a selection of the key outcomes, to be acceptable.

Customer views on specific Performance Commitments are summarised in Sections 6-10 of this document.

Priorities: What do customers think are the biggest priorities over and above any statutory requirements?

Our P1 research was undertaken when the Covid-19 pandemic was still a current issue. It revealed that customers were increasingly concerned about climate change, the impacts of extreme weather events, and environmental issues such as river water quality. Expectations appeared to have risen in terms of future preparedness for major shocks and 'black swan' events.

Two thirds of customers supported the view that "today's customers should be willing to pay more to invest now in order to prevent future problems". This view was confirmed by one result from the P2 research, in which, given a choice between prioritising investment in long-term service issues versus 'keeping bills low', a significant majority chose the former.

Figure 12 PR24: P1 research - paying to future-proof water infrastructure

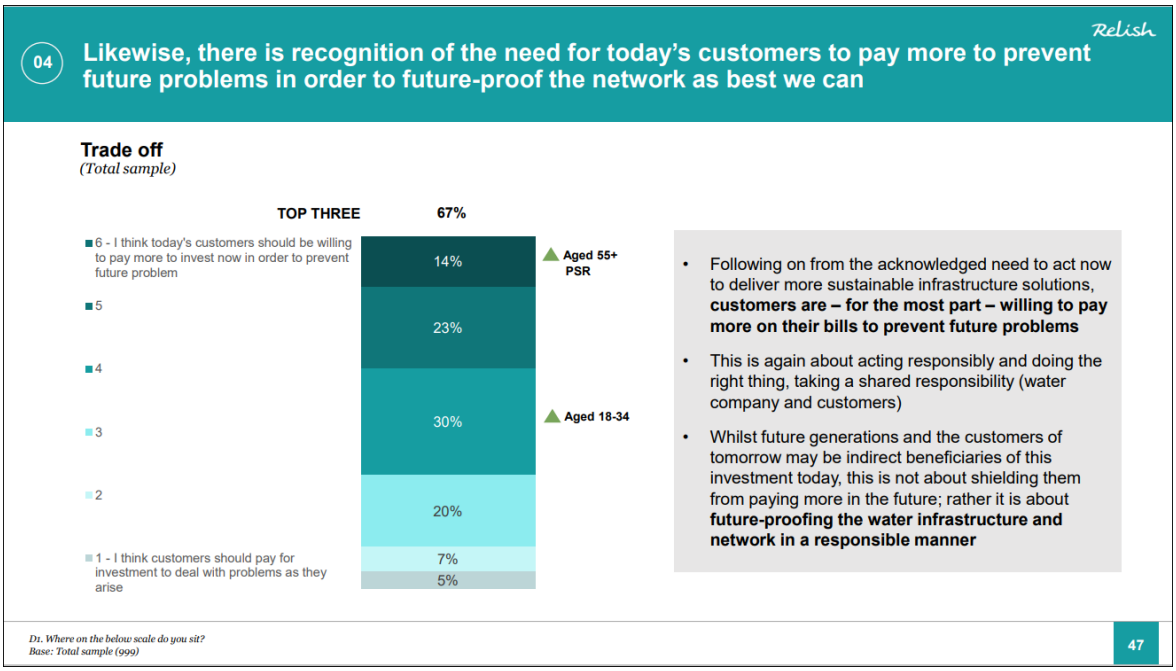
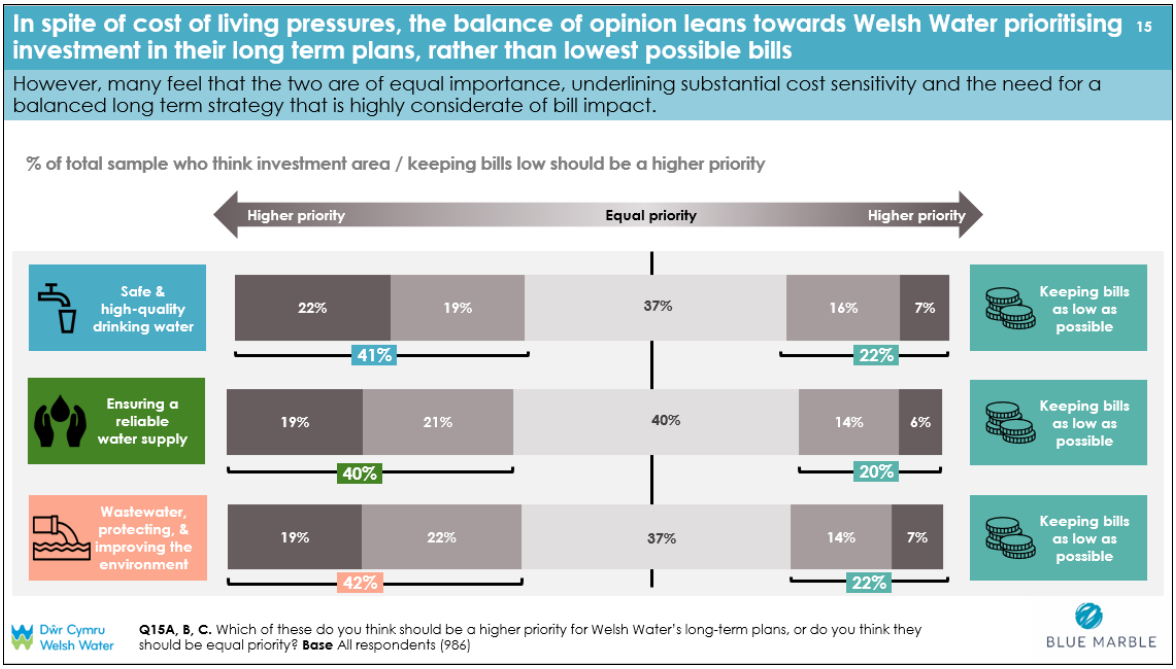


Figure 13 PR24: P2 research - investment versus low bills



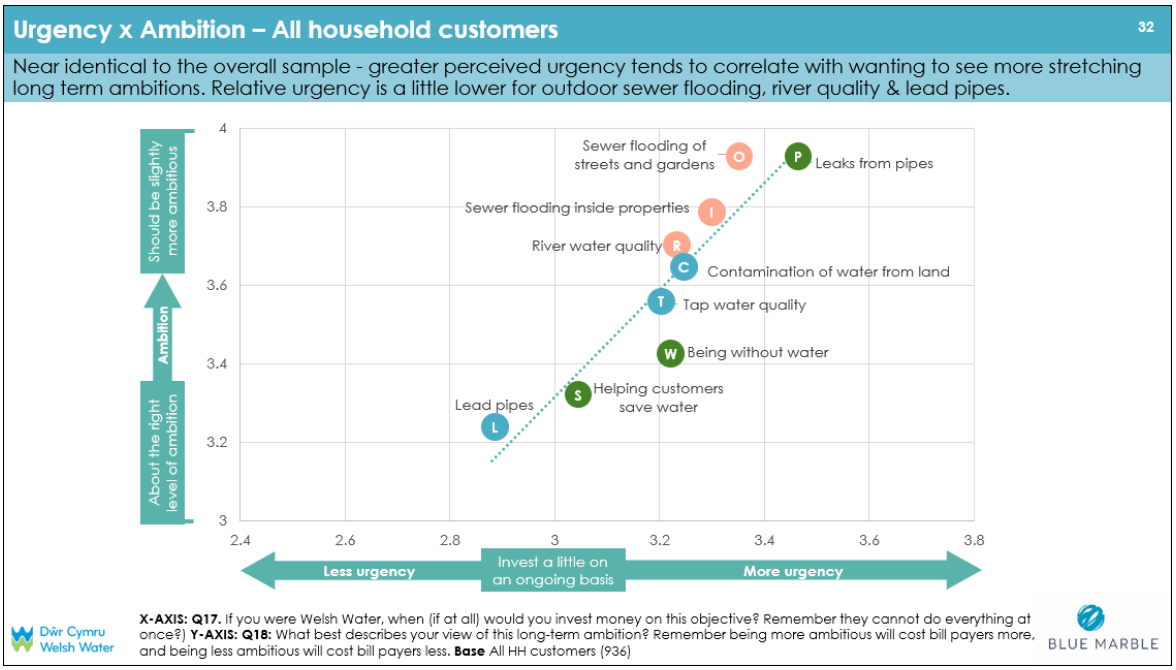
Overall we conclude that customers believe that it is a priority for water companies to invest to 'head off' growing challenges such as the impacts of climate change, and to do so on a sustainable basis. Customers naturally prioritise direct and more prominent service issues such as leakage and sewer flooding, but also understand and support the need for investment in the environment, however most such investment is driven by statutory requirements. In terms of non-statutory investment, there would appear to be support for investment in resilience in order to 'future proof' water infrastructure for the future.

Pace: How quickly do customers want the company to deliver their priorities?

There is to some degree a trade-off between the pace of delivery and bill increases, though this is mitigated by the fact that the cost of enhancement investment is 'paid back' by customers through bills over multiple AMPs. In reality the pace of delivery of outcomes is constrained also by the financeability and deliverability of the capital investment programme, as addressed elsewhere in this plan (see 13.1 Financing our plan and 13.8 Deliverability).

In our P2 research, it was revealed that the 'urgency' by which customers expect outcomes to be delivered matches closely with the degree to which they thought the level of ambition in our plans was satisfactory.

Figure 14 PR24: P2 research - urgency vs ambition



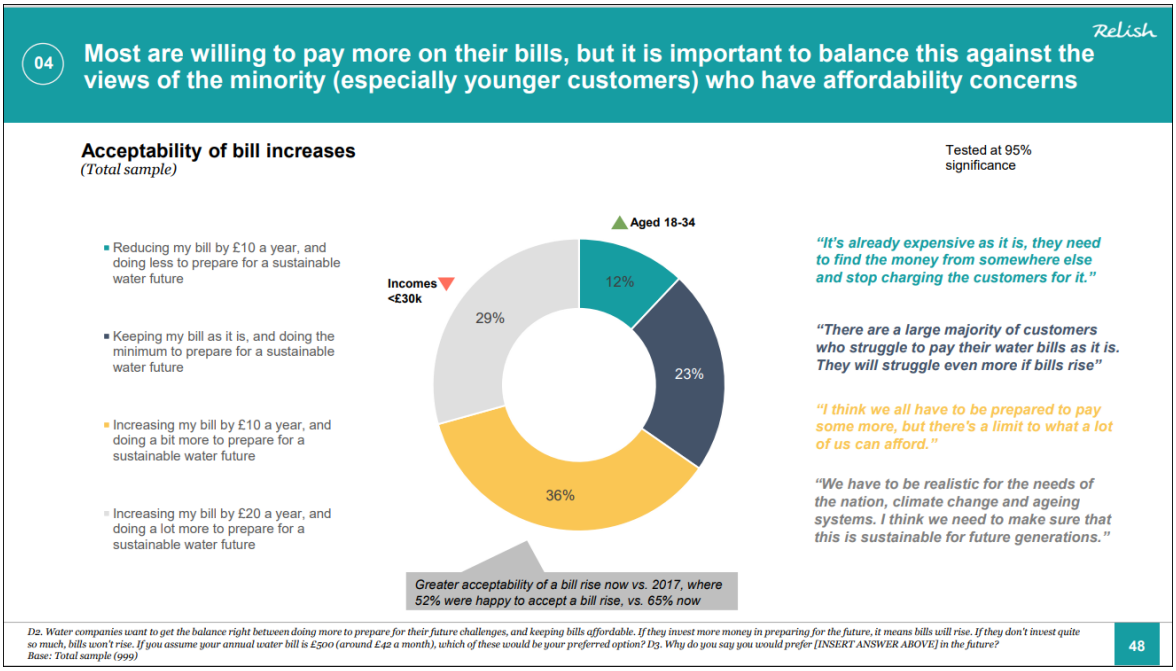
Overall we conclude that customers support the phased delivery of investment and outcomes over the long-term, so that bills increase gradually over time, as opposed to more investment 'up front', or delaying investment until future periods.

Bills: What do customers think would be an acceptable and tolerable level of bill increases over 2025-30 and the longer term?

Despite the immediate concerns of the cost of living crisis, it is striking that few advocate delaying investment. In the qualitative stage of the P3 research, given the choice between the 'proposed plan' and a 'must do' plan with slightly lower bills, customers exhibited a significant preference for the 'proposed plan'.

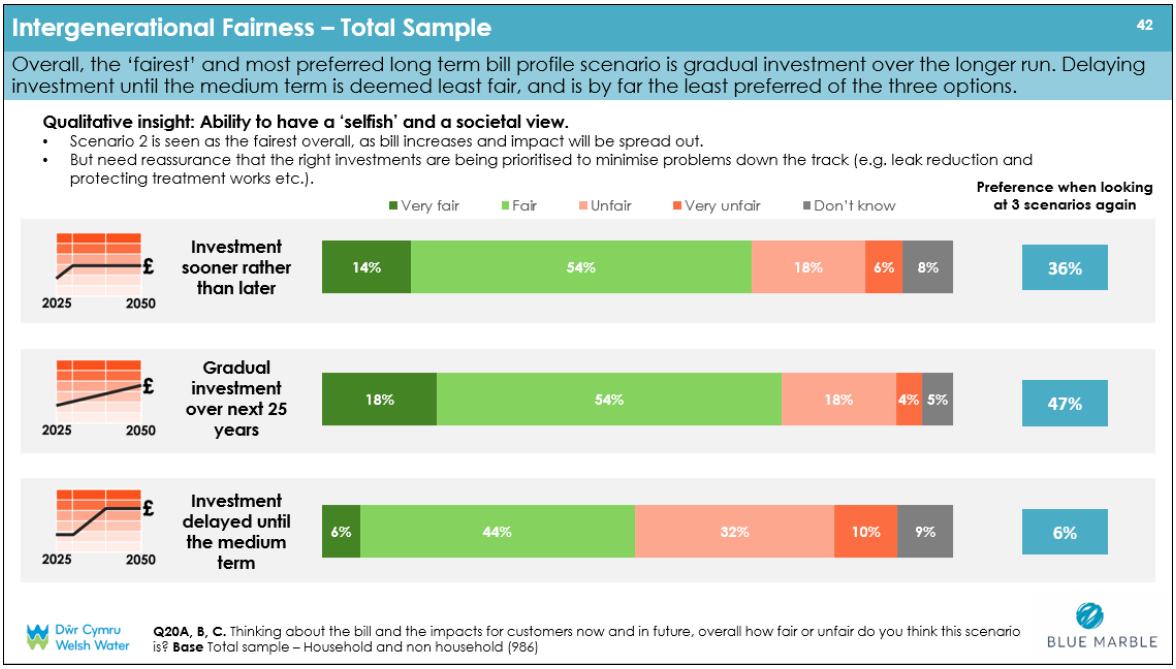
Our P1 research, which came early in the business planning process, gave customers a choice between £10 or £20 bill increases, flat bills, or a £10 reduction, with commensurate differences in our ability to 'prepare for a sustainable water future'. Almost two-thirds of customers chose a £10 or £20 bill increase if it meant doing more, an increased proportion over the result in our 2017 research on bills for PR19. That said, customers are clearly concerned about the impact of the 'cost of living' crisis and do not want to see bills rise any more than necessary in the short term. Those who are able to afford modest bill increases show concern for those who are less able to pay and say that they should be supported.

Figure 15 PR24: P1 research - bill preferences vs future sustainability trade-off



A gradual approach to investment, with bill impacts phased over time, is considered to be the fairest for current and future generations as shown in figure (see Figure 16). This appears to be a view shared both by younger and older customers.

Figure 16 PR24: P2 research - bills and fairness to current and future customers



In the P3 Affordability and Acceptability quantitative research customers were shown a profile of bills to 2030 based on our Business Plan, on the basis of their individual current bill. 47% of household customers said this would be 'fairly difficult' or 'very difficult' to afford to pay, with 15% saying it would be 'easy' or 'very easy'.

The result in terms of the proportion of customers saying the bills will be 'easy to pay' is unsurprising as a response to rising bills, particularly against the backdrop of the current cost of living crisis. 84% of household customers, however, said the plan was acceptable (82% for non-household customers). This result is only slightly lower for customers struggling financially, with 80% considering the plan to be acceptable. We discuss these results in more detail in 12.2 Customer and stakeholder views.

Longitudinal Panel results

A few of the insights from the Longitudinal Panel were the following:

- In Wave 1 (February 2022) customers were concerned about economic uncertainty post-pandemic, but in later waves (Wave 3, November 2022, onwards), the cost of living had risen to the top of customers' concerns.
- Attitudes changed as participants developed a better understanding of the issues and trade-offs over time. As customers become better informed they are more willing to recognise the need for investment - and suggest that we should do more to explain investment needs to customers in general in order to build support for bill increases.
- Climate change and river water quality were strong priorities for customers early in the process. By late 2022 we were starting to see more comments that greenhouse gas emissions should not be a high priority given pressures on investment and cost of living challenges.

Conclusions

These are just a few headlines from a wide range of customer research, the detailed results of which provide greater nuance and detail, including where there are results which vary for different categories of household customers, or for non-household versus household customers. A more comprehensive description of the research programme and findings is provided in (WSH30-Customer engagement and research and the full research reports are available online (link).

The results from the research fed into the deliberations on business plan decisions and priorities of the Board and the executive, with additional challenge provided by the ICG Chair. We have revisited these results repeatedly over the course of the process and have concluded that the plan that we are putting forward is consistent with the views of customers and is strongly supported by them.

2.3 Collaborative Process in Wales: PR24 Forum

We have always seen the process of building our Business Plan as the result of a collaborative effort involving our regulators, stakeholders, and customers. This feature of the process was enhanced and formalised at PR24 as a formal part of the Ofwat methodology.

The PR24 Forum is convened by the Welsh Government and is composed of the two water companies operating in Wales (Welsh Water and Hafren Dyfrdwy), the environmental regulator (NRW), the Drinking Water Inspectorate, the Consumer Council for Water and others. The Chair of our Independent Challenge Group is also a member representing the voice of customers.

While this Forum existed at the previous price review, PR19, for PR24 it also adopted the function of meeting the formal expectations from Ofwat for a 'collaborative approach in Wales' as set out in the PR24 Final Methodology. Wider stakeholders had also been calling from a more collaborative approach to the price review in Wales following PR19, in line with one of the 'ways of working' set out in the Well-being of Future Generations (Wales) Act 2015 (see Section 2.4), and in the Welsh Government's Strategic Priorities Statement for Ofwat (link).

The PR24 Forum allowed us to seek early feedback from our stakeholders as a group on our long-term vision for the water sector in Wales. The Forum also worked jointly to define the long-term outcomes that we will deliver over the next 25 years, and the pace of delivery of those outcomes, forming the core of our Long Term Delivery Strategy (see Section 2.6). This process facilitated discussion of the key trade-offs and constraints in terms of affordability and deliverability of our plans, and helped achieve alignment between stakeholders taking account of customer views.

We prepared a series of discussion papers which were taken to the PR24 Forum on key business planning topics and areas of investment during the course of 2022. The objective was to expose our early thinking in each area and invite challenge and input from members of the PR24 Forum. The feedback was incorporated into the different elements as they were then incorporated into the wider plan, which was then brought back to the Forum for discussion of the priorities and trade-offs in the round. The list of papers and topics is provided below.

While the process has faced some challenges, notably in the sequencing of activities and the interaction with other regulatory processes such as the NEP and DWMP, overall we believe that it has been beneficial and should be developed further for future price reviews.

The formal output of the PR24 Forum process is a set of written 'Strategic Steers' from the group issued to water companies and Ofwat. The document identifies the PR24 Forum's 'high level priorities', a set of 'strategic level steers', and company-specific 'steers' for Welsh Water.

As set out in the PR24 Forum's Terms of Reference companies and Ofwat are not obliged to comply with these 'steers', but are expected to set out where the decisions in the Business Plan (for companies) and the Draft and Final Determinations (for Ofwat) may not align fully with the steers, and the explanation for this.

Our Business Plan is fully consistent with the PR24 Forum's company-specific Strategic Steers, with the exception of those in the table below. The full set of Strategic Steers and our response is provided in WSH38-Response to PR24 Forum Strategic Steers.

PR24 Forum Strategic Steers for Welsh Water (DCWW)	Company response
"We expect DCWW to reduce leakage by 15% by 2025, a further 10% during PR24 and by 50% by 2050 (against a 2017/18 baseline)."	Our targeted leakage level for 2024-25 will constitute a 15% reduction over AMP7, against the 2019-20 result (not against the 2017/18 result, which was lower). Our 2029-30 leakage target will constitute a 24% reduction on the 2019-20 result, so just less than "a further 10%". Note that the PR24 Performance Commitment is defined in terms of three year averages, which produces different figures.
"We expect DCWW to seek a more stretching target for pollution incidents and do not want to see the biggest water company in Wales falling behind the rest of the industry. Forum members have concerns over declining performance and DCWW ambition to reduce pollution incidents over PR24."	We are proposing to reduce the total number of category 1, 2 and 3 pollution incidents from 89 in 2022 to 68 in 2030. We will continue to target zero serious pollution incidents. Our target is to return to a 4-star Environmental Performance Assessment as soon as possible. We have investment in our plan to materially reduce the risk of serious pollution incidents.
"We expect DCWW to work towards a 'lead free Wales'. DCWW should aim to replace an additional 10,000 lead pipes by 2030, and 100,000 by 2050, investing evenly over	Our investment plan includes expenditure to replace 7,500 pipes during 2025-30, not the 10,000 initially considered. This is due to affordability and financeability constraints in our plan. We plan to increase this over

PR24 Forum Strategic Steers for Welsh Water (DCWW)	Company response
the AMP periods to manage deliverability and maximise opportunities for innovation and efficiency to accelerate the programme where possible."	subsequent AMPs on an adaptive planning basis, as we seek to bring down the cost and find the most effective ways of communicating with customers on this issue to increase the acceptance rate. Our long-term target remains to replace 100,000 lead pipes by 2050.
"We expect DCWW to reduce total greenhouse gas emissions (operational and embedded) emissions by 90% by 2030 (against a 2010 baseline), and to zero by 2040."	A commitment to reduce total greenhouse gas emissions by 90% remains a key part of our Journey to Net Zero strategy. However, the size of our capital programme, and the constraints on affordability, financeability and deliverability in AMP8 put this target at risk. We will reassess the viability of this target following the Final Determination.

2.4 Wellbeing of Future Generations Act

The Wellbeing of Future Generations (Wales) Act 2015 requires public bodies in Wales to consider the impact of their actions on those who will be living in Wales long into the future, not just current generations. This requires them to take a long-term approach, even when short-term solutions appear more politically or economically attractive.

The Act also requires public bodies to work in a more joined up and integrated way in order to deliver more effective and lasting solutions to the problems we face.

Although Welsh Water is not a public body for the purposes of the Act, the principles and objectives contained within it are highly relevant to what we do, and we choose to adhere to it. The Welsh Government also expects the PR24 process to reflect the goals and ways of working.

The PR24 Business Plan and the linked Long Term Delivery Strategy have been developed in a way that aligns closely with the five Ways of Working set out in the act (see Figure 17 Source: Future Generations Commissioner for Wales: https://www.futuregenerations.wales/about-us/future-generations-act/ below).

Figure 17 Source: Future Generations Commissioner for Wales: https://www.futuregenerations.wales/about-us/future-generations-act/

Long-term: Our PR24 Business Plan is set in the context of our long-term strategy, Welsh Water 2050, and the Long Term Delivery Strategy. We will always do the right thing for the long-term, and will seek to achieve fairness between current and future customers in the way that we set bills and plan investment.

Integration: In our Wellbeing Report 2020 (link)we set out how we support each of the seven Wellbeing Goals. The Annual Report and Accounts reports on how we are progressing against our sustainability objectives and support the broader UN Sustainable Development Goals. We will continue with the same approach in AMP8.

Involvement: We have set out above how we have engaged with customers in the development of our Business Plan, and customer involvement is critical to achieving our objectives, including through using water wisely and reducing sewer blockages.

Collaboration: The long-term outcomes in this plan and the Long Term Delivery Strategy have been developed collaboratively with the PR24 Forum. We work with a wide range of partners in our day to day work, importantly in activities such as raw water catchment partnerships and surface water management. We will seek to work together more effectively as 'Team Wales' to achieve our common goals for the water environment in Wales to 2050 and beyond.

Prevention: A major theme of this plan is anticipating and responding to long-term trends and challenges, in order to prevent deterioration in service requiring a sharp increase in investment in the future. Wherever possible we seek to address problems at source, including by controlling the quality of raw water and conducting research to understand the dynamics of the water environment.

2.5 Long-term planning frameworks

We are and always have been a business with a long-term planning horizon, due to the long-lived nature of many of our assets, and the essential nature of the services that we provide. Most of the things we do are dependent on and have an impact on the environment, which implies a long timeframe for adaptation. Also the investment decisions we make today will be paid for by customers over the course of the next generation, so we always have to have an eye on balance and fairness well into the future.

We have prepared this five-year business plan in the context of our long-term strategy and plans for 2050 and beyond. These are set out in our strategy document Welsh Water 2050, originally published in 2018 and reviewed and updated in 2021-22. Further detail on this process and its conclusions is provided in 3.1 Welsh Water 2050 Review

This plan also integrates the findings of other long-term strategic planning frameworks.

Water Resources Management Plan (WRMP)

The WRMP follows a well-established methodology and takes a 25-year timeframe to balancing demand and supply of water to customers. The implications in terms of performance and investment for AMP8 are reflected in this plan, and the longer-term implications are integrated into the Long Term Delivery Strategy (see below).

Drainage and Wastewater Management Plan (DWMP)

DWMPs are a welcome new development in terms of long-term planning for the water industry. The framework was commissioned by Water UK working in collaboration with Defra, Welsh Government, Ofwat, EA, NRW and others, and published in 2018. It provides the basis for more collaborative and integrated long-term planning in relation to drainage, flooding and protection of the environment.

Our first DWMP follows specific guidance issued by the Welsh Government, who will sign-off the plan. As explained in 6.1 Introduction, the status of DWMPs and the link to PR24 is therefore different in Wales. While we have complied with Ofwat requirements to produce specific outputs from the DWMP, in terms of performance and investment requirements, these remain preliminary and indicative given the context in Wales.

The topography of our operating area presents a huge challenge in terms of in terms of understanding the modelling capacity needed to prepare detailed and comprehensive drainage plans, owing to the high number of small catchments. Our first DWMP is therefore best understood as a first step towards our objective for what the DWMP will become when we fully understand the drainage and treatment capacity of our operating area, and how that will be affected by climate change, growth and changing customer demand. We will build our modelling capabilities and improve the underlying data across all our catchments during AMP8 and work towards this goal.

These long-term planning frameworks, along with the NEP and WINEP have all been brought together within the LTDS. The LTDS sets out for the first time a comprehensive view of the enhancement investment requirements of Welsh Water over the next 25 years, under a range of plausible futures. This has helped provide greater confidence that this five-year business plan is truly part of a long-term plan that will deliver the right outcomes for customers and the environment both now and in the future.

2.6 Long Term Delivery Strategy

While Welsh Water 2050 is framed around the future threats and risks to be countered, the Long Term Delivery Strategy (LTDS), introduced by Ofwat in 2022 as a new requirement for PR24, starts by identifying a set of 'outcomes' to be delivered by 2050, representing a suitably ambitious improvement on today's performance by water companies. The LTDS then sets out how the company plans to deliver those outcomes in a range of plausible future scenarios, including through a 'low-regrets' core pathway investment using an 'adaptive planning' approach.

Adaptive planning

"The future is inherently uncertain, and it is important that the strategy is flexible enough to cope with changes in circumstances so it is robust over time. The adaptive planning approach enables strategies to be developed in the context of different future scenarios. It aims to optimise the profile of key interventions across time, ensuring that decisions are not avoided when they are needed – for example, to ensure resilience against adverse scenarios – while minimising the risk of stranded assets should more benign scenarios come to pass. Adaptive planning can therefore establish what enhancement investments are needed now, and where decision points can be delayed until later in the timeline, when there is likely to be greater certainty about what is needed, including possibly technology change." (Ofwat, 2022)

Welsh Water's LTDS is published alongside this Business Plan, as part of our PR24 submission to Ofwat. The core pathway of investment, which includes only investments required in all plausible future scenarios, shows a major step up in investment needs in AMP8, and then a peak in investment in AMP9. It suggests that there is likely to be a long-term upward trend in customer bills, increasing the average household bill by over 50% by 2050 in real terms.

Note that the core pathway reflects a relatively benign view of future investment needs - not, for example, reflecting more extreme levels of climate change. It does not account for any increase that may be needed in base maintenance expenditure. We can therefore expect the core pathway to understate the most likely levels of expenditure and hence bill increases required. See Section 12.3 Long-term bills pathway.

The biggest area of investment forecasted to be required over the long-term is the improvements to wastewater networks required to mitigate climate change and address the ecological harm caused by Storm Overflows (SO) (£4.05 billion by 2050 in the core pathway). But there are also key programmes of investment in other environmental improvements through the NEP/WINEP, water network resilience, tap water quality, and carbon emissions.

The LTDS also sets out the key conclusions from the consideration of a range of scenarios, and has set some of these out as 'alternative pathways'. These show that plausible legislative changes affecting regulatory standards for water quality will have significant implications for investment and bills. If climate change evolves more rapidly, the level of challenge and hence the cost of delivering our ambitions around river water quality and SO impacts would rise.

However, it highlights the potential savings associated with moving to an enhanced level of collaboration between various stakeholders and actors in relation to addressing the problems of pollution and river water quality. Whatever the future holds, innovation and collaboration to identify more cost effective and less carbon intensive solutions will be at the centre of our plans.

2.7 Challenging our plan

This plan has been subjected to rigorous challenge from a variety of quarters during the latter stages of plan development.

1. **The Board** has challenged the management team on the level of ambition in the plan, the alignment with customer and stakeholder views, the affordability and financeability of the plan, deliverability of the capital programme, and the way in which the plan ensures that we meet our legal obligations and deliver our statutory functions over the long-term.
2. **The ICG** has challenged the way in which the plan reflects and is consistent with the results of the customer research programme. The ICG developed a written set of 'Key Questions' that they believed the company need to answer for the benefit of providing challenge to the company and clarity to customers. The questions and answers are provided in full in the ICG report. (WSH33-Independent Challenge Group Report)
3. **Customers** had the opportunity to challenge the plan at our 'Your Water, Your Say' session, held on 6 April online. The session was widely promoted and was open to all customers and stakeholders.
4. We also discussed our draft plan with Glas Cymru **Members**, with Welsh Water's Independent Environmental Advisory Panel (IEAP), and with the PR24 Forum as described above.
5. We commissioned independent external reviews and challenge of various elements of our plan as part of the **assurance** process, including investment cases, deliverability, application of cost benefit analysis, customer research and the data tables.

Independent Environmental Advisory Panel

The Independent Environmental Advisory Panel (IEAP) was established to support Welsh Water to

(i) maximise the value of its investment programme for customers and the environment, and

(ii) to secure a safe and sustainable future for our environment; one that is able to support the economy and quality of life for generations to come.

Member organisations of the IEAP come from a number of front line environmental organisations in Wales and England. The IEAP members also include leading academics from England and Wales, to support the scientific capability of Welsh Water and thus ensure every pound of its customer's money is invested to deliver best value.

IEAP members represent the views of their organisations, and are entirely independent from Welsh Water.

Members include

- Coed Cymru
- Cardiff University
- Welsh Government
- Country Landowners Association
- Wye and Usk Foundation
- RSPB
- Natural Resources Wales
- Wildlife Trusts Wales
- Keep Wales Tidy
- National Trust
- Afonydd Cymru

On 6 April we held our first 'Open Challenge' session - "Your Water, Your Say". This was prepared in accordance with the detailed guidelines published by Ofwat and CC Water.

Following six weeks of promotion, 66 customers and representatives of stakeholder groups attended the online session, plus five of our senior Executive Directors. After a 15 minute presentation on our draft business plan from our Chief Executive, participants were able to ask questions and challenge the company on any aspect of its plan or its activities.

Most of the challenges arising in the session were concerned with current performance and specific investment schemes that are being opposed by campaign groups, and other wider topics, rather than the proposals set out in our business plans. Notably there were no concerns or challenges raised about the proposed bill increase. A full write-up of the discussion and responses to questions from customers was made available on our website (link).

In spring 2023 we held a series of focus groups with customers to discuss our draft plan and gauge the 'Affordability and Acceptability' of the proposals. These sessions involved a diverse mix of 160 household and non-household customers in four focus groups held in different locations across Wales. 84% of household customers found the draft plan to be 'acceptable', and 15% of customers said it would be 'very easy' or 'fairly easy' to afford.

There were challenges from customers on:

- the profile of improvements on internal sewage flooding and pollution incidents, and
- leakage performance and ambition.

Following consideration of the report from this research, and taking into account all of the feedback and challenge from customers and stakeholders, the Board made a number of changes to the plan, including making additional investments to accelerate the replacement of asbestos cement mains help tackle leakage and supply interruptions, and investment to reduce serious pollution risks including replacing parts of the South East Coastal rising mains to reduce the risk of serious pollution incidents (see Section 6.8 Pollution incidents).

3. Identifying the challenges

In its "Creating tomorrow, together" policy document for PR24, published in May 2021, Ofwat set out its view of the challenges facing the water sector (link). These were summarised as:

- The threat to resilience from climate change.
- The evolving expectations and interests of customers.
- Affordability, against the background of the Covid-19 pandemic and (later) the cost of living crisis.

Ofwat emphasised the need for fresh and ambitious thinking to address these challenges. We agreed with these challenges, which have only grown since then with the impacts of the war in Ukraine, the cost of living crisis, the drought of 2022 and the public outcry around storm overflows.

This section provides more detail on the background which has formed the context for this business plan and informed its development.

3.1 Welsh Water 2050 Review

In 2018 we published our long-term strategy, Welsh Water 2050, which started by identifying the key long-term trends, challenges and opportunities facing the business over the next 30 years, and then setting out the 18 'Strategic Responses' needed to address them and "become a truly world-class, resilient and sustainable water service for the benefit of future generations." (link).

Our first step in preparing the ground for the development of the business plan was to refresh our view of the long-term challenges and opportunities facing the business, to ensure that adequate responses to these were being factored into our plans. We commissioned a team of experts from Cardiff University's Water Research Institute to undertake a review of the key trends, taking account of those identified in our Welsh Water 2050 strategy (2018), but focusing on trends and risks that were evolving in ways that had not been anticipated. Its conclusions were reported in our Welsh Water 2050 Review and Update, published in April 2022 (link).

Taken as a whole, the period from 2018 to 2022 included some very significant unexpected shocks and challenges affecting UK society in general and water companies in particular. These included

- The Brexit process and the attendant political uncertainty, and the consequent questions about future environmental regulation and land use incentives.
- The Covid-19 pandemic with its impact on continuity of service provision and changes in societal expectations.
- Clear evidence of an acceleration of climate change impacts, particularly in terms of flooding events.
- The sharp increase in energy prices, and the knock-on effects on inflation, following Russia's invasion of Ukraine.
- Growing cybersecurity risks.
- Rapidly changing societal expectations around greenhouse gas emissions, storm overflows, and the environmental agenda in general.

Review of trends, threats and opportunities

In order to update our view of long-term trends, in 2021 we commissioned Cardiff University's Water Research Institute to undertake a review of the latest evidence and to gather the views of experts and stakeholders such as regulators, government representatives, academics and non-governmental organisations. We asked them to consider the following questions:

- What has the experience of the last three to five years told us about the challenges facing Welsh Water in the long-term and the likely opportunities?
- What does the relevant academic literature tell us about the key issues affecting the resilience of Welsh Water's business?
- What are the developments relating to each of the key trends identified in Welsh Water 2050?
- How do these changes relate to Welsh Water's vision of providing a world-class resilient water service for future generations?
- How might these various trends, risks and opportunities combine, overlap and reinforce each other?

Our key conclusions from the review were as follows:

1. The pandemic highlighted the importance of protecting our services against large and unknown risks that could strike at any time, while retaining flexibility to respond to unexpected opportunities for innovation and change.
2. Protecting our services against the impact of climate change is a top priority, now and in the longer term.
3. We need to work collaboratively to make the most of the opportunity for regulatory innovation, to enable cost-effective delivery of improvements for environment and society in general.

In addition, it was at this time becoming clear that societal expectations with regard to protecting the environment, particularly with regard to river water quality, were increasing, and the performance of water companies on this issue was not considered to be acceptable.

We carried these conclusions forward into the development of our Long Term Delivery Strategy and PR24 Business Plan, notably by ensuring we are investing in resilience as well as necessary performance improvements, and working collaboratively with regulators and government on the best approach to achieving environmental improvements.

The Review also underpinned the importance of our 18 Strategic Responses and in some areas we need to find ways to accelerate progress. It was clear as a result of this exercise that both investment and innovation needed to step up if we are to achieve our goals for 2050. We recognised the likely implications for customer bills, and committed to assess our investment plans rigorously for cost effectiveness, and maintain our drive to improve the ongoing efficiency of our operations. The full Welsh Water 2050 Review can be found here (link).

Figure 18 Welsh Water 2050 Review: Strategic Responses

		STRATEGIC RESPONSES	STATUS AND COMMENTARY	
DRINKING WATER	1	Safeguarding clean drinking water through catchment management	On track. Approach still needed to tackle emerging contaminants etc.	✓
	2	Enough water for all	On track. WRMP and dam maintenance form key future investments.	✓
	3	Improving the reliability of drinking water supply systems	On track. Growing need for measures to create greater resilience.	✓
	4	Protecting our critical water supply assets	On track. Risks growing. Long-term programme in development.	✓
	5	Achieving acceptable water quality for all customers	At risk. Acceleration of mains replacement and innovation needed.	⚠
	6	Towards a lead free Wales	At risk. Need increase in rate of replacement and new approaches.	⚠
CUSTOMERS & COMMUNITIES	7	Working with customers and communities	On track. Importance increased owing to impact of pandemic.	✓
	8	Ensuring affordability of services delivered to customers	At risk. Cost of living crisis. Prospect of future bill increases.	⚠
	9	Supporting customers in vulnerable circumstances	On track. Importance increased owing to impact of pandemic.	✓
	10	Addressing our 'worst served' customers	At risk. Climate change. Interventions disproportionately expensive.	⚠
	11	Employer of choice	On track. Challenging labour market. Changing work practices.	✓
	12	Leading edge customer service	On track. Rapidly moving picture, customer expectations rising.	✓
	13	Smart water system management	On track. Opportunities but also challenges of rapid OT change.	✓
ENVIRONMENT	14	Supporting ecosystems and biodiversity	On track. Opportunities to do more, with funding alongside partners.	✓
	15	Using nature to reduce flood risk and pollution	At risk. Water quality a key concern requiring sustainable solutions.	⚠
	16	Cleaner rivers and beaches	At risk. Need to work collaboratively. Increased investment needed.	⚠
	17	Protecting our critical wastewater assets	On track. Risks growing. Long-term programme in development.	✓
	18	Achieving net zero carbon emissions by 2040 and promoting a circular economy (REVISED)	On track. Ambitious net zero plan - will require investment.	✓

3.2 Customer views on the challenges ahead

Our key piece of customer research in Phase 1, conducted in the summer of 2021, aimed to provide insights into the general attitudes and priorities of customers in relation to the services we provide, while helping us to understand how their personal and financial circumstances were changing. This research, which used both qualitative and quantitative approaches, came on the back of the Covid-19 pandemic, but before the war in Ukraine and the emergence of the cost of living crisis (see below). While things have changed significantly since then, we believe there are some important conclusions that can be drawn that are relevant to our business planning for the medium and longer-term.

- 95% of customers were very satisfied or quite satisfied with their water company.
- There were already indications of a tightening of financial situations in many households.
- Customers were more worried about environmental issues such as climate change and extreme weather events, and had become more aware of the natural environment.
- Public expectations on preparedness for 'worst case scenarios' had shifted, suggesting an increased appetite for resilience generally, though customers lacked awareness of any specific threats to water as a resource in the medium to long-term.

- The highest investment priorities for customers were reducing the risk of major water supply interruptions and reducing pollution and improving river water quality.
- 67% of customers agreed with the statement that today's customers should be willing to pay more to invest now in order to prevent future problems, and 65% said that a £10 or £20 annual bill increase would be acceptable if needed to prepare for a "sustainable water future".

This research helped to set the scene for the business planning process, and to sharpen the focus on the challenges of river water quality, climate change adaptation and resilience. With high levels of satisfaction with the overall service, we believe customers would prefer us to focus on these as the primary issues, rather than prioritise further improvements to 'core' service performance indicators.

We recognised the need to track some of the core views of customers to see how they have changed over time. We therefore established a panel of customers with whom we held discussions on multiple occasions. A range of other customer research was conducted as part of the process of preparing this business plan, mostly designed to answer more specific questions about preferences and priorities. However we have continued to interrogate these results for additional information on customers views on the broader challenges that should be addressed in our plans.

3.3 Cost of living crisis

The period in which this business plan has been developed has coincided with the worst cost of living crisis in a generation, with a spike in energy prices and general inflation increasing to levels not seen since the early 1980s. With affordability being one of the key requirements of our business plan, this has required us to think very carefully about how to ensure fairness between current and future customers when considering how to plan investment needs over the long-term. Water bills have CPIH inflation rates 'built in', so the question is how much bills could justifiably and affordably be increased in relation to future CPIH in AMP8 and beyond.

According to a Public Health Wales survey from January 2023, 37% of people in Wales are 'only just managing' and a further 11% 'not managing' to make ends meet. The number of people who were 'not at all' worried about their finances more than halved between January 2022 and January 2023.

The impact of inflation naturally varies across socio-economic groups, with those already struggling suffering the most. Indeed there is evidence that the effective inflation rate is higher for the poorest households[3] (link). Wales includes some of the poorest areas in the UK, with over 20% of households living in relative poverty (that is, with less than 60% of the median UK household income). In customer research conducted in July 2022, 63% of customers said they could afford to pay their current water bill comfortably or fairly comfortably, which leaves around a third of customers in the 'struggling' category.

In developing our plan we have also to think about the longer term, not least as the impact on customers bills will not manifest until 2025. An expert group reported to a Welsh Government committee in March 2023 that "the cost of living crisis was not going away and the effects would be long-lasting" (link). This plan covers the period 2025-30, over which time there is a great deal of uncertainty concerning inflation rates and wage increases. In the qualitative stage of the Acceptability and Affordability research, customers expressed difficulty in making judgements about how easy or difficult it will be to pay their bills over this period (see 12.2 Customer and stakeholder views).

[3] Institute of Fiscal Studies, May 2022

Given the likely increase in expenditure driven by new legal obligations, particularly around environmental improvements, we formed the view, informed by discussions with the PR24 Forum, that in the business planning process a distinction should be made between affordability for average households, and for those who are financially struggling. We will seek to minimise bill increases for average households, in a way that does not postpone needed investment or load the burden onto future customers, but to focus affordability concerns on those who most need help. Affordability is discussed in more detail in 12. Customer bills and affordability, but our plans include a continuation of the sector-leading financial support we provide to customers in financial difficulty.

3.4 Legal and regulatory requirements

The regulatory and legislative framework in which we operate is an important element of the context for our PR24 Business Plan.

As explained in 1.5 Our regulators and stakeholders we are subject to a different legal regime to water companies in England, but the framework of economic regulation is the same. This means that Ofwat benchmarks our costs and performance against the best performing companies in England and Wales, and sets stretching common targets in a range of areas. Our plan therefore needs to ensure we challenge ourselves to maintain and enhance performance to align or outpace the rest of the industry, while taking into account our particular operating circumstances and challenges in certain areas.

The key of Wales-only legislation relating to our activities is the Environment (Wales) Act 2016, which established 'Sustainable Management of Natural Resources (SMNR) as the central principle to be adopted by NRW. We seek to align with this approach in the way that we fulfil our duties and carry out our functions. There are also important pieces of UK legislation which apply in England not in Wales. The Environment Act (2021) set a wide range of environmental targets for water companies in England, including targeted reductions in the average number of SO spills. Targets relating to Phosphorous discharges and 'nutrient neutrality' similarly do not apply in Wales.

Sustainable Management of Natural Resources

SMNR is defined in the Environment (Wales) Act 2016 as: "using natural resources to maintain and enhance the resilience of ecosystems and the benefits they provide and, in so doing—

- meet the needs of present generations of people without compromising the ability of future generations to meet their needs, and
- contribute to the achievement of the well-being goals in section 4 of the Wellbeing of Future Generations Act Link."

Our plan also takes account of the Well-being of Future Generations (Wales) Act 2015, which obliges public bodies in Wales to take account of the impact of their activities on the well-being of people in Wales over the long-term. Although Welsh Water is not a public body for the purpose of the Act, we are guided by the Wellbeing Goals as set out in the Act.

The legal obligations for environmental improvements in the water sector for PR24 are set out in NRW's National Environment (NEP) for Wales, and the EA's Water Industry National Environment Programme (WINEP).

We are confident that the NEP and the WINEP reflect the right environmental priorities. We have worked closely with the NRW throughout the process, providing additional data to help ensure requirements are prioritised according to environmental impact and urgency, and represent good

value for money for customers who are ultimately paying through their water bills. A similar process has been followed with the EA for the WINEP, which covers a relatively small but important part of our operating area, including much of the River Wye in Herefordshire.

There is a range of other legislation which impinges on our plans. These include the Reservoirs Act 1975 (as amended by Schedule 4 to the Flood and Water Management Act 2010) with implications for dam maintenance and safety standards; the Flood and Water Management Act 2010, the Security of Network & Information Systems Regulations (NIS Regulations), and the Security and Emergency Measures Direction 2022. We are also subject to requirements around Critical National Infrastructure (CNI).

The Drinking Water Inspectorate has powers to issue legal notices for improvements in relation to tap water quality standards, under the Water Supply (Water Quality) Regulations 2018 in Wales.

3.5 Welsh Government policies and priorities

The Programme for Government 2021-26 sets out the Welsh Government's commitments for its current term across a range of areas. These including "Embed our response to the climate and nature emergency in everything we do". We have carefully considered the Government's priorities and objectives in the development of our long-term ambitions and the plan for AMP8.

The Government's Strategic Priorities and Objectives Statement for Ofwat (SPS) was updated and republished in July 2022. The statement issued by the Minister for Climate Change said that "The SPS requires Ofwat to adopt an approach to the price review and regulation of water companies wholly or mainly in Wales firmly within the context of Welsh legislation and policy, supported by Welsh specific evidence to meet the needs of Welsh customers, citizens and the environment."

We consider that the SPS identifies many of the key challenges that we are seeking to address in this Business Plan. The five key priorities included in the SPS are

- Climate and Nature Emergencies - water companies as exemplars in pushing for net zero, tackling the impacts of climate change, and embedding biodiversity and ecosystem considerations across their activities.
- Environment - focusing on an integrated approach to natural resource management, with water companies meeting the requirements of all environmental legislation, and delivering wider environmental and social benefits while carrying out their functions.
- Resilience - seeking to address the current and future threats to the water sector that are likely to increase in frequency, severity and complexity.
- Asset Health - good management of companies' assets, with sound monitoring and sufficient maintenance to ensure long-term resilience and service.
- Customers and Communities - considering affordability for all customers and those who are struggling to pay, ensuring value for money, and working collaboratively with others to protect health and the environment.

The SPS also sets a number of specific expectations for water companies, in terms of the things Ofwat must challenge companies to do, and the way in which they do them. We have taken these expectations and challenges into consideration in the development of our Business Plan, and believe that we are closely aligned with the priorities and objectives issued to Ofwat.

The Welsh Government also chairs the PR24 Forum, the conclusions of which are set out in the Strategic Steers document (WSH38-Response to PR24 Forum Strategic Steers). In addition to the 'Strategic Steers' for companies and Ofwat, the document identifies a number of challenges and priorities for the water sector (see box below) including the importance of prioritising the reduction of ecological harm in our approach to tackling SOs.

Excerpts from PR24 Forum 'Priorities for the Water Sector in Wales'

"Our water sector and the ecosystem services they rely on must deliver for both people and nature. Issues of pollution, storm overflows, phosphates, temperature increases, and flow reductions are placing significant pressures on the water environment."

"The threats facing the water sector are complex and constantly evolving. In the PR24 cycle, water and wastewater services will need to be ready to grapple with a complex set of existing and emerging risks. The PR24 Forum members highlighted the risk of more extreme weather changes relating to frequency and intensity of flooding, prolonged dry weather and freeze/thaw incidents, plus cyber security, reservoir safety, energy and chemical resilience as key risks for PR24."

"The DWI highlights a need for investment in source to tap planning as a result of assets and ageing infrastructure that are no longer able to cope or effectively cater to changes in our environment, demographic and customer expectations."

"A key priority raised by PR24 Forum members is achieving a balance of long-term, investment requirements with customer affordability."

"The scale of investment needed for PR24 is one not seen since privatisation, with water companies assessing that, given the nature and extent of demands, the required investment needed is many times higher than in previous price reviews. It is therefore imperative that water companies prioritise and phase investment to ensure bills can be maintained at an affordable level while also enabling them to finance and sustain their operations and meet their environmental obligations. Recognising the investment required, it is also vital that companies can sustain social tariff support to protect financially vulnerable customers from bill rises."

"NRW highlights the imperative to act now in the face of the climate and nature emergencies. While it is recognised that bill increases to address these challenges may not be welcomed by customers, it is imperative that water companies address current challenges effectively to avoid significant financial and environmental burdens being placed on future generations."

3.6 Current performance challenges

The issues to be addressed in this plan include consideration of areas of performance where we are currently experiencing challenges in meeting our regulatory targets and in some cases performing poorly relative to other companies. It is important to note that we are taking immediate action to address those areas, not waiting until the new price control period starting in 2025. However, these issues have yielded some important lessons and insights into the challenges of meeting the expectations set at PR19, given the particular characteristics of our network, our operating area, and the extreme weather we have been experiencing. These lessons will be taken forward into AMP8, with proposals for additional investment to help address some of the underlying problems.

We know that customers place a great deal of emphasis on the importance of tackling leakage, particularly in times of water stress. This is why we were hugely disappointed to have to report that our historic leakage figures had to be restated following a review of the detailed estimation methodology in 2023. This restatement worsened our position on leakage relative to the rest of the industry. We are redoubling our efforts on leakage control and reduction, and are aiming to recover our position by 2025, ahead of a further ambitious reduction in AMP8.

On supply interruptions, the average number of 'customer minutes lost' in the last two years has been 16:17 minutes and 44:31 minutes, against targets of 6:08 and 5:45 respectively. In both cases a small number of major mains bursts contributed to the failure to meet the target, added to the impact of the major freeze-thaw event in December 2022 that saw a small number of customers off supply, following widespread pipe bursts on customer properties.

While we will continue to seek ways to mitigate the impact of major events, our primary focus is on addressing the underlying cause of the increase in mains bursts which is affecting performance. Our investigations have revealed that the problem lies with the prevalence of asbestos cement (AC) mains pipes, which are failing with increased frequency as climate change accelerates and the pipes are eroded by hard water.

Figure 19 Current performance summary on common PCs - extract from APR 2022-23

Table 1 - Performance Commitment – Common Measures *C – Calendar year		*	2022/23 Outturn	2021/22 Outturn	2022/23 FD Target (Final Determination)	2022/23 Vs FD Target
Wt1	Water Quality Compliance (CRI) (%)	c	5.40	9.77	0	X
Wt2	Water supply interruptions (mm:secs)		44:31	16:17	05:45	X
Wt4	Mains repairs		156.2	136.6	135.1	X
Wt5	Unplanned outage %		1.07	0.55	2.34	√
En1	Treatment works compliance %	c	98.50	98.32	100.00	X
En3	Pollution incidents (per 10,000km of Sewer)	c	24.55	22.90	23.00	X
En4	Leakage (% reduction) – 3 year average		-11.5	-7.3	7.3	X
En5	Per capita consumption (% reduction) – 3 year average		-6.2	-5.6	3.0	X
Ft1	Risk of severe restrictions in a drought %		4.4	4.5	4.5	√
Ft2	Risk of sewer flooding in a storm %		24.28	25.05	30.07	√
Rt1	Internal sewer flooding (per 10,000km sewer connections)		1.14	1.36	1.58	√
Rt3	Sewer collapses (per 1,000km sewer)		6.68	6.71	7.20	√
Sv1	C-MeX – Company Measure		82.92	82.93		
Sv2	D-MeX		84.68	83.94		
Sv5	Priority services for customers in vulnerable circumstances					
•	• Reach %		10.4	8.1	5.6	√
•	• Actual contact %		43.4	40.9	35.0	√
•	• Attempted contact %		96.2	93.2	90.0	√

We have also faced challenges on other key measures of water service performance, tap water quality compliance (CRI), and customer contacts due to discolouration, taste and odour (the latter not shown in table above as it is not a common measure). These will be discussed in further detail in Section 7. While we have a Drinking Water Recovery Plan in place to rectify the issues, again we are learning more about the impact of increasingly 'normal' extreme weather events, such as the hot and dry summer of 2022. In our plan for the long-term through to 2050 we have included investment to increase connectivity between water supply zones and improve the resilience of our water network to such events.

On the wastewater side our primary challenge for the long-term is the impact of SOs and nutrient discharges from wastewater treatment works on river ecology. While there are no regulatory performance measures on these issues in the current period, we have clearly taken full account of the expectations of regulators and stakeholders, including customers, in preparing the right long-term plan to address this issue in a way that is effective and affordable. Our ultimate intent is to remove all ecological harm caused by SOs by 2040, which is aligned with the direction we have been given in the strategic steer by the PR24 Forum. This is a major challenge given that we have more than 2,300 SOs across our network. We are second only to Severn Trent Water in having the largest number of storm overflows but with a much higher number per customer served.

In 2022 the Environmental Performance Assessment (EPA) for the company issued by NRW and the EA meant that we dropped to a 2-star rating, meaning that improvement is required. The summary table is shown below. Our aim is to routinely achieve a 4-star EPA rating in AMP8.

Figure 20 Welsh Water Environmental Performance Assessment 2022.

EPA metric	2022 result	Comparison to previous years' performance
Metric 1: Total pollution incidents (sewerage)	**25** (Amber)	Dropped back to amber after achieving green for 2 years
Metric 2: Serious pollution incidents (sewerage and water supply assets)	**5** (Red)	Dropped to red after being amber last year and green for 2 years prior
Metric 3: Self-reporting of pollution incidents (sewerage and water supply assets)	**69%** (Amber)	Remained amber
Metric 4: Discharge permit compliance (numeric)	**98.5%** (Amber)	Remained amber
Metric 5: Satisfactory sludge use and disposal	**100%** (Green)	Excluded metric 2018-2020, green shadow metric in 2021
Metric 6: Asset Management Plan National Environment Programme Delivery	**100%** (Green)	Remained green
Metric 7: Supply Demand Balance Index	**100** (Green)	Remained green
Overall company star status	**2-star**	Dropped to 2-star after achieving 3-star in 2021 and 4-star for the first time in 2020

Key: Metric status

Green	Performance better than target
Amber	Performance below target
Red	Performance significantly below target

Key: Overall company star rating

4-star	Industry leading company
3-star	Good company
2-star	Company requires improvement
1-star	Poor performing company

Source: Natural Resources Wales (link)

The most serious failing in 2022 was the five serious pollution incidents that we caused. The EPA target for serious pollution incidents is a challenging one and in the most recent review of EPA performance thresholds Welsh Water, along with the other smaller WASCs, were set a target of zero serious pollution incidents by the end of the AMP in order to meet the highest performance category. In order to meet our EPA ambition and follow the direction set out in the strategic steer from the PR24 Forum and the Welsh Government, we must target zero serious pollution incidents in future and build on the work we are already undertaking.

There are a number of changes in process or anticipated that will affect the EPA in the future. NRW is conducting a 'Review of Permits' for WWTWs discharging to SAC rivers. This will likely lead to a significant increase in the number of sites with numeric limits and add new numeric parameters to other existing sites including backstop phosphorus limits on small works that previously had descriptive limits only, a feature unique to Wales.

In addition, new measures are being introduced to the EPA measure. Along with the reintroduction of a sewage sludge metric, abstraction license compliance will be introduced in the 2023 assessment for the first time and is a particular challenge for water companies like DCWW that operate upland reservoirs. Compliance with descriptive conditions will also be introduced in AMP8. In preparation for these we introducing new management systems and auditing our sites to identify and correct as many of these issues as possible in this AMP.

Overall we expect achieving 4-star EPA performance will be a significant challenge but one that we can meet with the investment laid out in our PR24 Business Plan.

4. Maximising value in our plan

Having considered the challenges that our Business Plan needs to meet, and before describing the core areas of our business plan, this section outlines our investment planning methodology. Our approach is intended to ensure that

- Our assets are maintained, configured and upgraded to ensure sustainable, resilient and high-quality outcomes **over the long-term.**
- Our investment plan represents the best possible **value for money**, both in terms of the individual 'solutions' chosen and as an overall package.
- We seek to achieve the **lowest efficient costs** for the delivery of the chosen plan, using robust cost estimates and applying forward-looking efficiency assumptions that are challenging.

We cover each of these topics in turn, and then describe our wider approach to innovation, which dovetails closely with investment planning and efficiency. Finally we cover our cost efficiency estimates for each main part of the business. Further detail on our investment planning methodology can be found in (WSH50-Introduction: Our investment approach).

4.1 Asset management for the long-term

Building a high quality investment plan for the long-term starts with ensuring current assets are well maintained and managed. We are ISO 55000 certified and our Asset Planning and Local Asset Management teams are trained to Institute of Asset Management diploma standard. Our objective is to deliver best practice management capability, using high quality data, tools and processes. We meet frequently with investment planners from other regulated businesses to review and compare good practice.

We monitor our assets in a range of ways, including the three regulatory asset health Performance Commitments set out at PR19 - mains repairs, sewer collapses, and water treatment works outages. As these are indicators of asset health (for only some of our assets), rather than being measures of performance, our goal is to maintain stability of these over the long-term.

We welcome Ofwat's increased focus in recent years on asset health and the recognition of the need to gather additional data to assess whether cost allowances are sufficient to safeguard the health of assets over the long-term. Our approach to asset maintenance is based not on the age of the assets but on deterioration modelling to assess causes and risks of failure, and then prioritise interventions based on minimising the impact on service to customers. Data is critical to this effort, and we have embarked on an ambitious Data and Digitalisation Strategy.

Our analysis is showing that certain asset classes in particular are coming under greater pressure in response to wider environmental changes and long-term trends. An example is asbestos cement (AC) mains, where we are seeing accelerating deterioration due to asset condition, local operating conditions and the impacts of climate change.

Our approach looks not just at costs and service, but also risk. While we have been able to maintain our assets and in general deliver stable or improving service (albeit with challenges in certain areas) within the envelope of expenditure defined by Ofwat's cost models, there are signs that we are carrying increasing risks, which may not yet manifest in service performance. We have included investment in this plan to address some of these key risks which need to be addressed to secure asset health and levels of service over the long-term.

These growing risks and long-term trends such as climate change explain why we have not assumed improving service from base maintenance allowances over time as a general rule. We recognise Ofwat's expectations in this area, and have challenged ourselves to look for opportunities to achieve this. Our rationale on 'performance from base' is set out for each PC in WSH15-Outcomes OUT1-OUT10 and in the relevant enhancement cases.

4.2 Building the right investment plan

Introduction

Beyond the 'base' maintenance activities discussed above, we needed to determine what 'enhancement' investment to include in our plan for AMP8, as part of the long-term plan set out in the Long Term Delivery Strategy. The key considerations were:

- Our long-term ambitions (see 2.5 Long-term planning frameworks).
- Our legal and regulatory obligations (see 3.4 Legal and regulatory requirements).
- Customer views and priorities (see 2.2 Customer research).
- Stakeholder views and the PR24 Forum Strategic Steers (see 2.3 Collaborative Process in Wales: PR24 Forum).
- Choosing the best options (this section).
- Cost efficiency and value for money (this section).
- How to provide 'best value' overall (this section).
- Affordability, financeability and deliverability constraints (see 13. Financing, incentives and delivery).

This section summarises our approach to optioneering and ensuring efficiency and best value in preparing the 'enhancement' investment plan (henceforth 'investment plan'). Further detail is available in document (WSH50-IP00_-_Our_Approach_to_Investment_Planning)

Cost-benefit analysis (CBA) forms a core part of our asset planning approach. In evaluating and building our investment plan for AMP8 we have not just looked at the next five years but considered costs and benefits on a 30-year time horizon.

Working with such long timeframes means that inevitably we are dealing with a high degree of uncertainty. Adaptive planning has always been part of our approach. We only proceed with putting forward schemes when we have confidence that they are needed now and short-term delivery represents the optimum long-term solution, given future uncertainties. Schemes which are unsure or depend on untested innovation will tend to be postponed until the evidence base is stronger.

Thirdly, we look at a wide range of options to identify the most cost effective option over the long-term, from looking at preventative action 'at source' to capital investment.

Cost efficiency and value for money

The Welsh Government set an expectation in the SPS that Ofwat should challenge companies "to deliver value for money for customers, communities and the environment". We believe our plan does deliver great value, and one of the ways in which we have achieved this is by challenging ourselves hard on cost, and by identifying the investment solutions which offer the best value for money.

1. We ensured that the investment proposals in our plan deliver in areas that have not previously been funded by customers.
2. We applied an optioneering methodology at the scheme level which takes into account the full range of solution possibilities. It is informed by a combination of historic data and expert judgement on future innovation possibilities. See Figure 21 'Totex hierarchy' used in optimisation.

3. We conducted cost benefit analysis with a 30-year timeframe, using multi-capitals valuations, to guide the choice of options with a positive return over the long-term.
4. We applied a robust costing methodology based on:
   - Our unit cost database (UCD) which is benchmarked against the Water Research Centre's standard TR61 cost model and the standard tool used by the industry and Ofwat.
   - Applying a stretching cost efficiency challenge, based on judgement of future opportunities for innovation and efficiency.
   - Optimising delivery and procurement arrangements at the portfolio level.
5. We ran portfolio optimisation models in order to determine the overall package of schemes that delivers the maximum overall net benefit for customers and the environment, using costs and benefit valuations. [4]
6. Finally, we looked for opportunities to use the market to finance and deliver investment schemes more efficiently than could be achieved by an in-house route. However, our plan for AMP8 does not include any 'stand alone' schemes that are suitable for Direct Procurement for Customers (DPC).

The adaptive planning approach also helps ensure value for money over the long-term, by ensuring that schemes are only proposed when we have confidence that they are needed now and short-term delivery represents the optimum long-term solution, given future uncertainties. This approach is described further in the Long Term Delivery Strategy (WSH01-Long Term Delivery Strategy).

Figure 21 'Totex hierarchy' used in optimisation

Solution Category		Example	Certainty of Success
⊘	Eliminate	**Remove the root cause** of the Risk through modified behaviour or process/system changes.	L/M
⚠	Operate	**Operational or Maintenance Solution** require adherence to standards to ensure Outcomes aremet and system failures are eliminated.	M/H
□	Combine	**Similar Needs from the register** (Geographically or Technically) are considered: • Can similar Needs be solved by developing a standard design? • Can Needs be combined to minimise mobilisation costs?	M/H
↻	Invigorate	**Leverage Asset capabilities or unused headroom** by increasing the capability of existing or redundant assets through the implementation of latest thinking, best practice, proactive principles, advanced data analytics and control systems.	H
+	Fabricate	**Construction of new assets** to meet Customer Outcomes	H

Collaborative effort required

Increasing TOTEX

[4] This has had a limited impact on the investment plan, as around 88% (in terms of enhancement expenditure) of it is considered mandatory, meaning required in order to meet legal or regulatory obligations, or specific expectations of one or more of our regulators.

Best value

The Welsh Government's SPS highlighted that companies should be enabled "to deliver best value solutions." Ofwat placed a strong emphasis on 'best value' in its PR24 methodology, as part of its strategic goal for water companies "to provide greater social and environmental value, delivering more for customers, communities, and the environment."

Our plans to deliver 'wider environmental and social value' more generally are covered in Section 12, and we explain our approach to nature-based solutions below. Here we describe how we have sought to identify enhancement schemes which are best value. This means that we have not necessarily chosen the *lowest whole-life cost* investment solution to deliver the required outcome. We looked for opportunities to choose solutions that deliver wider benefits where this would represent good value for customers, taking into account the value of other environmental and social benefits, as well as costs, risks and affordability.

The primary means for achieving this was the use of multi-capital accounting at both the optioneering and portfolio optimisation levels (see above). The multi-capital accounting was based on our Service Measure Framework which has been assured by ICS Consulting, uses official sources such as the HM Treasury Green Book for values. Our application of multi-capital accounting in our PR24 plan was reviewed and assured by Economic Insight.

Having applied the constraints imposed by financeability, deliverability, and affordability/acceptability considerations, and the regulatory requirements to deliver certain outcomes, there were in fact few opportunities to add wider benefits by increasing costs beyond the minimum, for the vast majority of schemes. In all but a few cases we have therefore chosen solutions that represent the lowest financial cost to customers.

This outcome is unsurprising given the significant increase in expenditure required to meet the requirements of the NEP and WINEP. The aspiration to deliver 'best value' rather than 'lowest cost' is something we strongly support. Our plan will provide huge benefits for the environment and customers, and represents excellent value for money. In the delivery of the plan, and in our preparations for PR29, we will seek to go beyond this and work with partners to achieve wider benefits in delivery where we can do so within the funding allowances.

Partnerships

Ofwat has been clear that it expects companies to seek opportunities for co-funding of schemes with third parties in order to deliver better value to customers.

We have a strong track record of working with partners towards shared objectives and achieve more by acting in collaboration. In AMP7 we established a team with the purpose of working with local authorities and other stakeholders to look for opportunities to manage surface water together, sharing data and modelling tools. This approach was successfully applied in Grangetown in Cardiff. Schemes like this take time to develop but they provide opportunities to deliver much wider benefits for the communities we serve. In Grangetown the local community benefited not only from better surface water management but also from local regeneration and investment to improve parking and cycling facilities.

We are also undertaking catchment partnership projects through our SMNR pilot work in the Clwyd and Teifi catchments, exploring approaches to catchment permitting and developing nutrient trading pilots. In one part of the Clwyd catchment we have undertaken detailed studies with local farms to understand how much more phosphorus could be removed through combined improvements at our works and the farms upstream of our discharge. Whilst these approaches are becoming more commonplace in England, the different regulatory and policy framework in Wales means a suitable approach has yet to be agreed. We are working with NRW to use our pilot sites as a test bed for the application of Wales specific approaches to the regulation of catchment management

We are developing one major scheme for AMP9 with the Canals and Rivers Trust (CRT) that is likely to involve co-funding. Under new legislation, CRT's abstraction at Brecon has come into the licensing system, which will reduce the amount of water that can be taken from the river to support losses from the Monmouthshire and Brecon Canal. Working closely with CRT we have incorporated their needs for supply from Usk reservoir within our supply demand assessment. The scheme, if confirmed, will deliver increased supply of water to the Canal, helping to improve the ecosystem and protect it from the impacts of climate change.

Nature-based solutions

Nature-based solutions offer one way of delivering wider benefits of investment, and providing 'best value' taking into account factors such as community wellbeing, greenhouse gas emissions, and biodiversity. We welcome the importance placed on nature-based solutions in the Welsh Government's SPS and in Ofwat's PR24 Final Methodology. We want to scale up the use of nature-based solutions over the next AMP periods. The environmental investment programme that is planned will have a far bigger beneficial impact for Wales if delivered primarily through nature-based solutions rather than through traditional 'grey' or 'concrete' solutions.

We were early adopters of nature-based solutions in the water industry, notably in the case of the Rainscape approach which was designed to slow down and mitigate the flows of storm water into the sewers in the Llanelli area, that were then overflowing into the Loughour Estuary (link).

Our experience with Rainscape and elsewhere shows that nature-based solutions can deliver major benefits and greater overall value for our customers and the environment, but they do take considerable time to develop and implement. While they can deliver good value and resilience over the long-term, they may be more expensive initially. Furthermore, they are often more complex and, in some cases, involve greater uncertainty of outcome. The temptation for companies and for regulators alike is, therefore, to default to traditional grey solutions. This needs to be avoided if we are to deliver on our other commitments to meeting Net Zero, improving the resilience of our service, and delivering biodiversity net benefit across our area.

As described later in Section 6, in response to the current challenge around the use of storm overflows (SOs) we are planning a major capital investment programme over the long-term, across Wales. We want to use nature-based solutions wherever possible in delivering this programme, for example by using wetlands and reedbeds to supplement treatment processes, and using Rainscape-style approaches to slow down flows of rainwater run-off. This will provide wider benefits to communities and the environment, as well as minimising our embedded greenhouse gas emissions.

Given the urgency of making rapid progress in this area and the challenges with collaborative or nature-based solutions in the necessary timescales noted above, we anticipate that in AMP8 the opportunities to deliver nature-based solutions will be limited. Our multi-capital valuations on this part of the investment plan placed a high weighting on the financial costs of the schemes, owing to the constraints around the financeability and affordability of the plan. Consequently we have based our investment programming on conventional solutions on cost grounds at this stage of our planning but we expect to look for innovation opportunities that could deliver nature based solutions in AMP8 whilst building relationships and longer term plans to ensure that a greater proportion of our solutions will be delivered in this way in AMP9 and beyond.

Pont-y-Felin wetland proposal

We are in the final stages of the design of a nature-based treatment solution to address the impact of a storm overflow (SO) in Pont-y-felin, near Pontypool in south east Wales. The scheme represents a more nature friendly and low carbon alternative to a traditional 'grey' solution. The £8 million wetland treatment system is the first of its kind in the UK. It will deliver numerous wider benefits including industry knowledge, community benefits and biodiversity gain. Work commences on site in October 2023.

Background: The Pont-y-Felin storm overflow discharge is causing a 'severe' Water Framework Directive (WFD) assessment impact on the water quality and the local ecology of the Afon Lwyd. The location and topography of the Pont-y-Felin site was favourable for a NBS, with opportunities to improve transport links between surrounding green sites, footpaths and schools. The proposed layout allowed for a purely gravity system, with no power or mechanical elements other than the screening chamber.

Proposal: The scheme is a combination of an aerated reed bed to reduce pollution and reduce the risk of odour nuisance, and an Integrated Constructed Wetland designed to treat screened sewage and surface water run-off during rainfall events. It will deliver a 'no impact' classification against WFD 'good' status.

Figure 22 Flow schematic for Pont-y-felin

Research: There will be multiple research programmes running parallel to the scheme. One programme is examining how to optimise plant selection and plant density. The aim is to enhance biological processes at Pont-y-felin, attracting native wildlife, and supporting further scale-up of wetlands. Other research will look at how to design treatment processes to tackle different pollution concentrations, and how to optimise carbon sequestration in wetland systems. The scheme will be part of a national research project comparing wetlands with grey solutions for bioaccumulation of emerging substances such as pharmaceuticals. It will also form part of Welsh Water's multi-capital and biodiversity baseline research for 2025.

In order to pursue those opportunities that exist for nature-based and collaborative solutions we will continue pressing ahead with major trials (see box below), and pursuing discussions with regulators in order to allow them to develop regulatory guidance that will be compliant with Welsh policy and, in some cases, provides a counterpart to regulatory guidance that is already enabled in England. Over the longer term we expect nature-based solutions to represent a much bigger proportion of our investment plans, as the evidence as to the costs, resilience, benefits and risks of different approaches becomes stronger.

4.3 Innovation

Introduction

Delivering our Welsh Water 2050 mission "to become a truly world class, resilient and sustainable water service for the benefit of future generations" in the face of the many challenges and trends identified will require us to find further new ideas, technologies and ways of working. The pace of change is increasing and we are grasping the opportunities to innovative at a commensurate pace to deliver benefits for customer now and in the future.

Technology is advancing apace, and is providing opportunities for us to change the way we operate assets so as to reduce their impact. Allied to this, the opportunities to work more closely across the sector have been enhanced through Spring Innovation, the Ofwat Innovation Competition and the new Water Efficiency Fund. The rapid development of AI and 'big data' also present rapidly emerging solution to work differently with customers on behaviour change.

We work openly and collaboratively with regulators and partners to bring about change, as this so often relies not just on company action but the right regulatory and policy framework. This 'Team Wales' approach will be vital to meet our own objective and play our part in meeting society's wider goals.

The size and scope of the challenge we face from the challenges set out in Welsh Water 2050 means that we need to increase investment in the most effective research and technology in the next period, and accelerate the adoption of effective solutions, in order to make the necessary progress.

Background

Our long-term strategy, Welsh Water 2050, provides the framework we use to shape and prioritise our long-term innovation needs, and specifically our science and research agendas.

The work undertaken since 2020 to update this strategy underlined that significant efficiencies will be required over the course of the next 30 years if we are to meet the expectations of our customers and mitigate the challenges ahead, whilst keeping bills at an acceptable level (link).

In 2022, we refreshed and brought up to date both our Innovation Strategy and its innovation 'Journey Plans' (link). These have been developed to match each of the 18 Strategic Responses in Welsh Water 2050. Each plan identifies and addresses research and knowledge gaps, encourages the trial of near-market technologies, and promotes the development of new technologies and ways of working in each asset management period for the next 25 years.

The 18 innovation Journey Plans set out a detailed view of our innovation work and are updated annually and placed on our website to enable academics and other stakeholders to fully engage with us.

Customer and stakeholder views

Our customers and stakeholders expect us to innovate to keep costs and bills down whilst at the same time recognizing the need to invest further in research and development to achieve this and meet future challenges.

During AMP7 we have strengthened our relationships with other water company innovation and research professionals, universities and research companies. The new sector of excellence for innovation in the water industry - Spring Innovation - has provided additional opportunities for collaboration.

We recognise and welcome the opportunities to work closely with the Welsh Government, our regulators and local stakeholders to co-create and co-deliver innovative solutions, given the relatively small size of Wales.

Our Independent Environmental Advisory Panel (IEAP) is also helping to shape our science, catchment and research priorities.

Our approach to innovation

Our refreshed Innovation Strategy is focused on driving and delivering efficiencies and improved performance through an accelerated innovation cycle which rapidly appraises new ideas, focuses on operational needs, and has access to a wide range of external expertise and resources to leverage our own growing capability. In essence our innovation mantra remains to *'Think big, start small, and scale fast to drive value.... '*

Figure 23 Innovation Strategy

Our Innovation Laboratory (iLab) process leads and drives our innovation agenda. It is led by the Environment Director and includes other Directors and Heads of Service as needed to ensure that innovation is integral to every part of the business - not just operational services.
The activities and outcomes of the iLab process are reviewed annually by the Board, with selected projects shared with key stakeholders via our Independent Environmental Advisory Panel. Around a third of proposals presented via our innovation portal have progressed onto trials since the start of AMP7.

Partners in innovation

In the last 5 years, partnerships have been central to our innovation agenda. We took a leading role in the formation of Spring, with one of two founding Directors being from Welsh Water. Our Director of Environment also led for the UKWIR Board the development of the water industry's Innovation Strategy, now under review at Spring. We are represented on the Board of the Cardiff University Water Research Institute as well as a number of other institutions relevant to aquatic research, evidence gathering and knowledge development.

We also are the only water company to have a strategic Memorandum of Understanding with the Natural Environment Research Council (NERC). We also have a strategic Memorandum of Understanding with Cardiff University and are progressing a range of well leveraged initiatives with them. This partnership working has enabled a number of secondments into the business for catchment studies and ensures that NERC research calls are focused on our needs, and the wider needs of the water sector.

The iLab's responsibilities include encouraging and embedding a culture of innovation throughout the business, providing an environment in which colleagues are encouraged to innovate and take reasonable risks to test their ideas. Improving the capacity of our people is key to this. To that end we run a number of innovation related courses including an annual Innovation Leadership course with a local Welsh University, which equips colleagues with new tools and ways of thinking to assist them to innovate in their areas of the business. We also support and sponsor qualifications such as MSc's through local universities and have regular innovation days for all colleagues to celebrate and thereby encourage innovation.

Water and Wastewater Innovation Forums encourage colleagues to come together to discuss new ideas, technologies and products. Managed by our Heads of Service, they act as a catalyst to bring innovation into the business. We have an ongoing innovation communications plan, which aims to sustain the culture of purposeful innovation within the organisation, and to communicate our ideas and progress to customers and other stakeholders.

We hold a virtual bi-annual Innovation Conference, which brings the latest technologies, innovations and products into the business from across the globe. The last event in 2022 involved more than 400 delegates including senior government officials, experts, partner companies and stakeholders.

In our latest (2022) employee engagement survey, 77% said that different ideas and perspectives are valued at Welsh Water, and 82% said that their manager encourages them to come up with better ways of doing things.

Track record

By the end of AMP7 the total leveraged investment in innovation, including those projects we are involved with via the Ofwat Innovation Fund, those funded directly by customers, and those supported by UKRI and Innovate UK, may exceed £80 million (around 2% of turnover). The largest single element of this is accounted for by the Innovation Fund, and the National Environment Program which includes environmental monitoring and catchment innovations to support novel and nature-based solutions. Such evidence is also being used to support the definition and size of our AMP8 environmental quality programme, and our longer term strategic planning.

We have been engaged in Ofwat's Innovation Fund since its launch in 2020, leading on 4 and supporting 24 other projects as of August 2023. We are working directly and through Spring with over 100 partner organisations and have leveraged £95 million of Research and Development funding so far this AMP.

Plans for AMP8

The Ofwat Innovation Fund is doubling in size to £400 million during AMP8 (£300m for innovation and £100m for water efficiency specific innovations) and we will be seeking to exploit all available opportunities to find more effective ways of tackling the challenges that we face, sharing the learnings with the wider sector, and reducing costs to customers. Additional funding will be leveraged through UKWIR and Spring and partnerships with NERC and universities, as well as our various partners.

In AMP8 we will continue to work with partners, collaborators and stakeholders to develop our research priorities, and to develop and trial new technology, but focusing on doing so through Spring to leverage efficiently the expertise of the whole sector. Our challenge is to turn the research during AMP7 into innovative approaches to problems that will allow us to implement optimal solutions in subsequent AMPs.

4.4 Efficiency

Introduction

Value for money is a top priority for our customers, particularly in challenging economic times and with water bills set to rise. To the extent that customers are willing to accept bill increases, this is on the condition that we work hard to play our part by improving operational efficiency and making investments that represent great value for money. We have therefore been challenged hard by the Board to drive further efficiencies into our ongoing operations and maintenance activities, and to ensure that the investment plan delivers its objectives at an efficient cost.

In this section we provide an overview of our track record on efficiency, and our plans for further efficiency improvements in AMP8, first for wholesale base costs and then for retail costs. Our AMP8 plans are ambitious in terms of efficiency, with targets to deliver 11% efficiency on wholesale operating costs and 12% on retail costs.

Wholesale efficiency

Track record

We have had a strong track record of delivering efficiency improvements. At both PR14 and PR19 our planned levels of ongoing wholesale costs were at or close to the upper quartile level of industry modelled costs after applying a substantial ongoing productivity challenge. At PR19 we set ourselves the challenge of reducing annual base costs by around 12% by 2025 as compared to 2020.

During AMP7 so far our base expenditure levels have exceeded our PR19 allowances. This is due to some significant additional operating expenditures, including:

- Extreme weather, including Storm Dennis (2020 - £13 million), Freeze Thaw (2022 - £5 million).
- Leakage - requiring an additional £11 million per annum to bring performance in line with target following the restatement of leakage and PCC performance figures.
- Energy costs increases following start of war in Ukraine - and the knock-on impact on chemicals costs.
- Covid-19 pandemic - higher household consumption pushing up chemicals and energy costs.

Notwithstanding these additional costs, we have worked hard to deliver successfully the programme of efficiencies planned for PR19, through tough headcount reductions, adopting the latest innovations in operating techniques, improving energy efficiency, and driving savings through smart procurement policies. We have also delivered on the targeted savings in our capital investment programme, working through contracted 'Alliance' delivery arrangements for much of the programme.

Further savings are targeted for the remainder of AMP7, while at the same time delivering performance improvements.

AMP8 plans

The Board's ambition is that our cost base, taking into account the particular characteristics of our licence area and customer base, should be industry upper quartile in terms of relative efficiency.

For the wholesale businesses, we adopted a comparative efficiency approach, based on Ofwat's published models populated with available industry data, to determine an upper quartile wholesale Botex level for the company. Currently, the company's wholesale Botex costs are above this assessment of upper quartile.

Consequently, our Botex plans consist of two elements; an efficiency "catch-up" to upper quartile and an ongoing productivity improvement. This has led to a Botex plan with a 11% cost reduction by the end of AMP8. We plan to save £22 million per year in the water business, and £20 million per year in the wastewater business, on operating costs alone by 2030.

We believe this is challenging but achievable, taking into account:

- Expected productivity improvements.
- Performance levels to be delivered from base expenditure, against a background of a changing climate.
- Input price pressures beyond management control and an anticipated revaluation of business rates.

The efficiency target has been agreed with Board and the Executive is working up a comprehensive plan for delivery of these efficiencies. In broad terms we have identified significant opportunities in energy self-generation and consumption reduction along with a number of smaller 'spend to save', contract renegotiations and other reductions across various cost categories. We are preparing a programme of restructuring of our operating model, Org.25, led by our Human Resources Director and chaired by the Chief Executive. We anticipate this will generate significant reductions in overheads. The planning stage is expected to conclude in the first half of 2024.

Investment cost efficiency

To deliver a great value Business Plan overall, it is important not only that we challenge ourselves on the efficiency of our ongoing operating and maintenance activities, but also that the way we have selected and costed our enhancement investment plan provides great value for money.

As explained in 4.2 Building the right investment plan, we used a series of steps in the process of building our plan to ensure that our investment plan is a great deal for customers. These included:

- Cost benefit analysis to determine which investments provide value over the long-term.
- Optioneering to choose the best investment solution.
- Optimisation of the investment programme using multi-capital accounting.
- Using a robust industry-benchmarked cost database.
- Applying ongoing cost efficiency assumptions based on forecast innovations at the scheme level.
- Effective procurement and delivery arrangements.

The costs in the plan have been subject to external review and challenge by expert independent consultants and external assurance of our costing methodology by Jacobs.

As an indication of the level of efficiency challenge in our plan, the cost of our capital investment programme for AMP8 was cut by £359 million (9.3%) from initial costings by the company, following Executive and Board challenge.

Retail cost efficiency

Historically, the costs of our retail businesses are significantly higher than allowed at previous price controls and higher than most other companies. This is largely driven by our costs of debt management and doubtful debt, associated with serving some of the poorest communities in the UK and by having average bills that are relatively high. All the same, we have worked hard to improve the efficiency of our retail operation, reducing costs per household by more than 20% since 2013-14, from £47 to £37 per year.

In AMP7 we have seen significant variability in household retail operating costs, owing to:

- The impact of Covid-19 and associated lockdowns in the first three years, which affected doubtful debt through additional provisions for non-payment and then subsequent releases of the provision.
- Increases in manpower costs from year 3 following the increase in inflation in late 2022 (the pay settlement negotiated with the trade unions ahead of AMP7 linked annual pay rises to November CPIH).
- £6m of atypical costs in 2022/23 as described in our APR commentary (pension recovery costs and cost of living support payments to our employees) which are not expected to recur.

Nevertheless, by 2025 we expect to have reduced our household retail operating costs by 1.4% over AMP7.

Our AMP8 retail plan assumes that we see more stable economic conditions, which will reduce the cost of doubtful debt by some £3m per annum from the final year of AMP7, as well as seeing improved efficiency through greater use of our digital services.

Going forward into AMP8 our plan is to strive to make further efficiencies in retail, amounting to 12.2% across household and non-household retail, as shown in the table below. This will be achieved through innovation and digitalisation, the costs of which in effect we will need to absorb as additional efficiency.

	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30
Household Retail Costs (£m)	52.9	48.9	48.1	47.3	46.9	46.5
5-year cost saving						12.2%
Non-household Retail Costs (£m)	5.7	5.5	5.4	5.2	5.1	5.0
5-year cost saving						11.9%
TOTAL Retail Costs (£m)	58.7	54.4	53.5	52.5	52.0	51.5
5-year cost saving						12.2%

4.5 Performance from base expenditure

We have given extensive consideration to the degree to which we can commit to making improvements to Performance Commitments from base expenditure, without a need for enhancement expenditure. We note Ofwat's expectation that companies should be able to deliver improvements from base expenditure, and in some cases in AMP8 we think this expectation is justified.

However, this is not true of all outcomes, particularly where there are external factors and trends that are tending to worsen performance other things being equal. This is most commonly associated with factors related to climate change, including changing rainfall patterns, extreme weather events, rapid changes in temperature and ground conditions.

This means that in some cases, even when accounting for the effect, where applicable, of technological improvements, operational innovations, and routine replacement of older assets with newer, more efficient ones, overall performance may not see significant improvement.

A further factor which may drive deterioration in performance from base expenditure relates specifically to compliance measures, where there is an incremental tightening of legal and regulatory standards, or the interpretation and application of those standards, with which we have to comply.

We have considered what the net effect of these conflicting drivers is likely to be going forwards. We have examined historical trends, both for ourselves and for the rest of the sector. We note that some performance improvement over the AMP5 and AMP6 periods was achieved from base as performance commitments and ODIs became a central component of the regulatory regime, but that the rate of improvement appears to have tailed off since the beginning of AMP7. This accords with our experience on certain PCs where we have largely exhausted the available scope for incremental achievements without incurring additional (enhancement) expenditure.

We have set out in detail in our accompanying data tables and supporting enhancement cases the expected performance from base, and the impact of enhancement expenditure, on our performance forecasts. The table below summarises our position for the key PCs in our plan for the AMP8 period:

Performance Commitment	Performance from base	Rationale
Supply interruptions	Flat	Improvements required to achieve 'base' performance from PR19.
Tap water quality risk (CRI)	Declining	Raw water quality deterioration and tightening regulatory standards.
Leakage	Improving	Ongoing operational innovation and technological improvements.
Per capita consumption	Improving	Changing consumer attitudes (but uncertain).
Business demand	Flat	Background increase in demand due to economic growth.
Internal sewer flooding	Improving	'Smarter' networks, some residual benefit from wider investment, cancels out impact of climate change.
External sewer flooding	Improving	'Smarter' networks, some residual benefit from wider investment, cancels out impact of climate change.
Total pollution incidents	Flat	Base improvement counteracts deterioration from climate change.
Serious pollution incidents	Declining	Growing risks from asset failure.
GHG emissions	Improving	Minor improvements from distribution input reductions and grid emissions factor.
Permit compliance	Declining	New or tighter permit requirements.
Bathing water quality	Flat	Enhancement may required to prevent future deterioration due to factors beyond company control.
River water quality (phosphorous discharges)	Flat	No improvement without investment.
Storm overflows	Flat	No improvement without investment.
Asset health	Flat or improving	No direct performance impact. Stable or some small improvement.

5. Overview of our investment plan

2022/23 prices	Water	Wastewater	Total wholesale
Capital expenditure*	£1,559 million	£1,924 million	£3,482 million
Enhancement expenditure	£783 million	£1,195 million	£1,978 million
of which WINEP/NEP	-	-	£988 million

**includes Infrastructure Renewals Expenditure (IRE)*

The investment plan set out in this Business Plan for AMP8 should be set in the context of the LTDS and our targeted outcomes for 2040 and 2050. The figures in the table above represent a significant step up in the level of our ambition needed to meet the challenges ahead, set out elsewhere in this document. While our plans for AMP8 are ambitious, there are constraints on what can be achieved in a single period.

The overall size of the investment plan was constrained by the need to limit bill increases (see Section 12. Customer bills and affordability), protect our credit rating to ensure we can raise finance efficiently (see Section 13.1 Financing our plan), and ensure that the overall capital investment plan was deliverable (see Section 13.8 Deliverability).

We have therefore considered carefully, in consultation with the PR24 Forum and others, which areas of investment represent the highest priority, and where we can have the biggest impact. The result is a long-term 'adaptive' plan that is phased over multi-periods, and that meets customer and stakeholder expectations, achieves our vision for 2050, and ensures a resilient water service for future generations.

The single biggest component of the long-term plan is the programme to eliminate the impact of Storm Overflows on the environment. We have worked with the PR24 Forum, regulators and others to develop an approach which will deliver real benefits, and which is affordable and achievable. It allows us to take a prioritised approach based on achieving the biggest improvements to the environment first, particularly by targeting reduction in ecological harm from SOs rather than maximising the reduction in the number of spills.

The vast majority of the investment plan is required to meet mandatory legal requirements, much of which is covered by the NEP and WINEP, and other legal requirements such as dam safety. Other investment is obligatory to deliver the expectations of regulators and stakeholders and deliver agreed strategies, such as reducing greenhouse gas emissions, or replacing lead supply pipes. We estimate that some 88% of our proposed enhancement expenditure could be considered 'mandatory'. (See our commentary on table SUM4 (link) for more detail.)

The subsequent sections provide an explanation of the context, requirements and decisions underpinning our investment plan.

Structure of investment plan sections

As set out in our LTDS (section 1.3.2) we have chosen to express our long term ambition in the form of five high-level strategic objectives. These are the themes that have given structure to our long term planning and the adaptive core pathway we have presented. For the purposes of the AMP8 plan we have modified the five slightly by separating out one of the elements embedded within all of them and presenting it as a separate consolidated high level objective, namely `Resilience and Security'. For long term planning it naturally sits within each of the five themes, but such is its critical importance to the specific shorter term challenges we face at PR24 that we chose to give it a greater and distinct prominence. Hence, for the purposes of the AMP8 plan we have six high-level objectives, as shown in the table below.

Section	Commitments	Other themes
6. Protecting and improving the environment	Phosphorous reduction Storm overflows Bathing water quality Discharge permit compliance Pollution incidents Sewer flooding Odour control	NEP, WINEP DWMP
7. Safe and high-quality drinking water	Tap water compliance (CRI) Customer contacts (appearance, taste and odour) Lead supply pipes	Raw water quality in catchments Treatment works resilience
8. A secure and reliable water supply	Leakage, PCC, business demand Supply interruptions Mains bursts	WRMP Drought resilience Reservoir and dam safety
9. Wider environmental and social value	Greenhouse gas emissions Biodiversity	Bioresources Community, partnership and recreation
10. Excellent customer services	Household customer satisfaction (C-MeX) Non-household satisfaction (B-MeX) Developer customer satisfaction (D-MeX)	Customers with additional needs Debt management
11. Resilience and security	Cybersecurity SEMD requirements	Resilience Framework Resilience in the Round Operational Technology

Each section covers:

- The relevant context for our decision-making;
- Stakeholder views (including customers);
- Legal obligations (where relevant);
- Our track record and current performance;
- The long-term ambition;
- Our plans for AMP8, including any major investments and Performance Commitments.

6. Protecting and improving the environment

6.1 Introduction

Statement from Welsh Ministers on PR24

Ministers acknowledge the likely scale of investment needed to deliver the National Environment Programme and want to see investment ***prioritised based on delivering the maximum improvement to the environment*** *in terms of reducing harm taking account of customer and stakeholder expectations around harm and impact, delivering best value for customers.*

Water companies bear a huge responsibility in the role that they play in protecting the environment from the impacts of human society. Society in the nineteenth and early twentieth centuries made huge investments in infrastructure so as to prevent sewage and wastewater from households, and effluent from businesses, flowing untreated into the environment. In recent years, a combination of better data, more demanding societal expectations and a changing climate, mean that the performance delivered by our assets is no longer acceptable.

The health of Wales's rivers in particular is a major and legitimate concern. Although water companies are not the only sector that impacts on river water quality, we clearly have a major part to play in solving the problem. A significant step up in investment over an extended period will be required to address the issues and improve outcomes. This section will address our approach and our plans to tackle this important problem.

Note that this section is primarily concerned with our wastewater business, which is where the majority of our activity that impacts the environment and delivers NRW and EA requirements is situated. However, there are important elements pertaining to the environment elsewhere. We cover our activities in raw water catchments which deliver significant environmental benefits in Section 7, on tap water quality. And in Section 9 we cover our plans in relation to wider environmental issues including greenhouse gas emissions and biodiversity. There are significant NEP and WINEP drivers on each of those elements too, but a summary of the NEP and WINEP as a whole is provided in this section.

Our long-term ambitions in this area have been developed collaboratively with the PR24 Forum. In summary we will:

- Reduce phosphorous discharges from wastewater treatment works in SAC catchments to the level consistent with healthy rivers by 2032, and by 90% by 2030.
- Tackle first the SOs that are having the biggest environment impact, moving 100% of SOs into the 'low or no harm' category by 2040.
- Reduce pollution incidents (as classified by NRW) to 24 per year by 2050.
- Consistently achieve 4-star status on the Environmental Performance Assessment.
- Support the objectives for biodiversity and nature recovery developed by NRW, ensuring we are maintaining and enhancing biodiversity and in so doing promoting the resilience of ecosystems.

These objectives will achieve little if done by water companies alone. The health of rivers can be restored only through concerted and collaborative action by all those whose activities are having an impact, as exemplified by the collaboration forums for each of the vulnerable SAC rivers. Clearly government and regulators have a huge role to play as well.

Nine PR24 Performance Commitments related to our wastewater activities are covered in this section, as shown below, grouped into three thematic areas. These are all linked and share, to a degree, common causes and solutions.

Theme	Subsection	PR24 Performance Commitment measures
1. Water quality (NEP/WINEP) Other NEP requirements	6.3 River water quality (phosphorous) 6.4 Storm overflows 6.5 Bathing water quality and shellfish waters 6.6 Other NEP/WINEP	River water quality (phosphorous reduction) SO spills SO harm (bespoke) Bathing water quality
2. Permit compliance and pollution incidents (partial NEP/WINEP)	6.7 Permit compliance 6.8 Pollution incidents	Discharge permit compliance Serious pollution incidents Total pollution incidents
3. Protecting customers and communities	6.9 Sewer flooding 6.10 Odour control	Internal sewer flooding External sewer flooding

This document takes each of these in turn. First, however, we provide an overview of the context for this area of the plan and a description of the regulatory framework and the overall approach to environmental improvements being taken in Wales.

The challenge on environmental performance

A thriving environment is a fundamental priority for the Welsh Government, and for other stakeholders in Wales and across our operating area in England. The state of the natural environment, and rivers and seas in particular, has become a matter of intense public debate and scrutiny in recent years. We welcome this, despite the negative headlines, as it provides an opportunity to engage policy-makers, customers and wider organisations in how we can work together and contribute to delivering the outcomes that we as a water company work towards every day.

Customers too are increasingly concerned about the state of the natural environment and the health of rivers. In our Phase 1 customer research, 50% of customers agreed with the statement that "I have become more aware of the natural environment around me" than they were before the Covid-19 pandemic. Our research suggests that 71% of customers "care a lot" about reducing pollution and improving river water quality' (see Figure 9 PR24: P1 research - Ranking of service issues).

As explained in Section 1, the natural environment is a huge part of what makes Wales what it is. It is richly endowed with spectacular landscapes, beautiful coastlines, unspoilt rural areas and an intricate network of rivers. The natural features of our operating areas are a source of enjoyment and pride, but they also pose challenges when it comes to managing our wastewater network. Wales has:

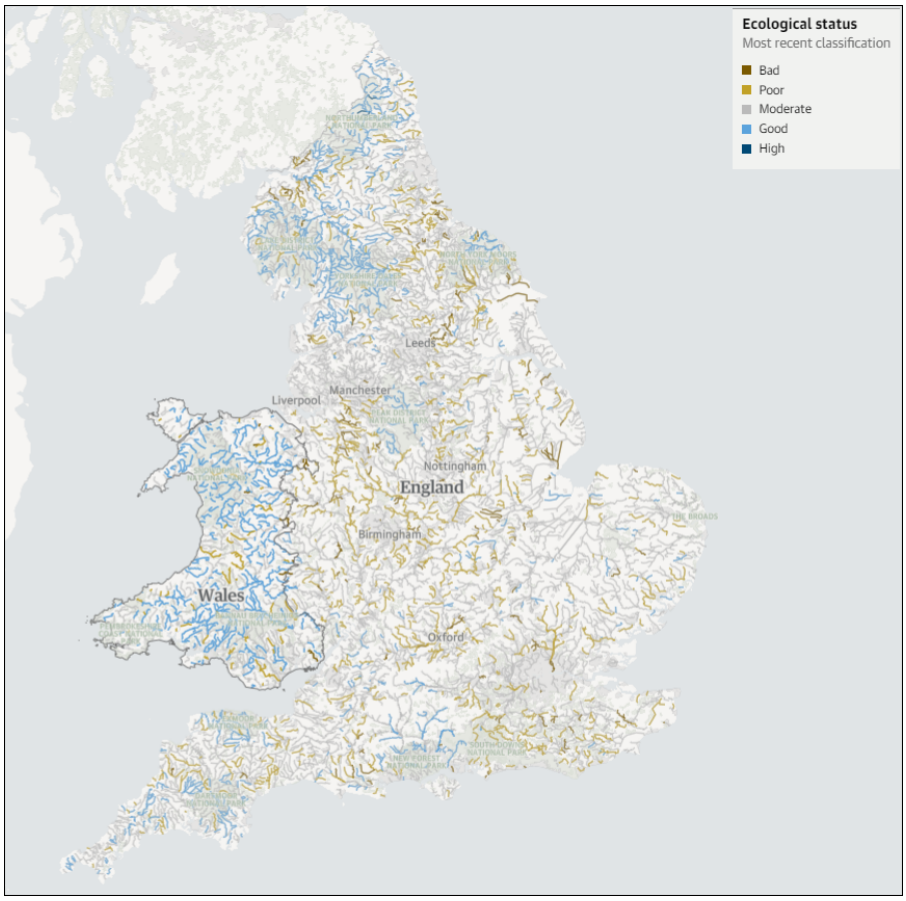
- 20 major river systems (in Wales alone) with 24,000 kilometres of rivers and streams [5]
- 2,700 kilometres of coastline (15% of the UK total).
- 85 out of 107 bathing waters classified as 'Excellent'. 25 Blue Flag beaches. [6]

[5] Source: NRW, SoNaRR 2020, Rivers p.26 (link).

[6] Source: link

The environmental quality of rivers and bathing waters in Wales are relatively high, with 40% of waterbodies in Wales meeting 'good' Water Framework Directive (WFD) ecological status, compared to 16% of waterbodies in England.[7] See map below. 85% of designated bathing waters in Wales are classified as 'excellent'.

Figure 24 Map showing ecological status of rivers in England and Wales



Source: www.guardian.com/environment

Nevertheless there is much more to do, particularly on rivers, where some rivers in SAC areas in particular are in desperate need of improvement.

The high number of small rivers and streams means we have to operate within tight limits on what is permitted to be discharged from wastewater treatment works. We also have a disproportionate number of small wastewater treatment works serving small communities across our area, and more wastewater assets per head in general than the average, including pumping stations, kilometres of sewer and treatment works.

Being on the western side of Britain our operating area bears the brunt of the rainfall and storms that come in from the Atlantic. Wales receives around 70% more rainfall than England [8]. However, this understates the impact of the additional rainfall, which is increasingly coming in heavy and intense storms, creating more of a problem for the capacity of sewer networks, particularly in areas with narrow, steep-sided valleys.

7 Source: https://jncc.gov.uk/our-work/ukbi-b7-surface-water-status/

8 Source: Statista

Climate change and rainfall patterns

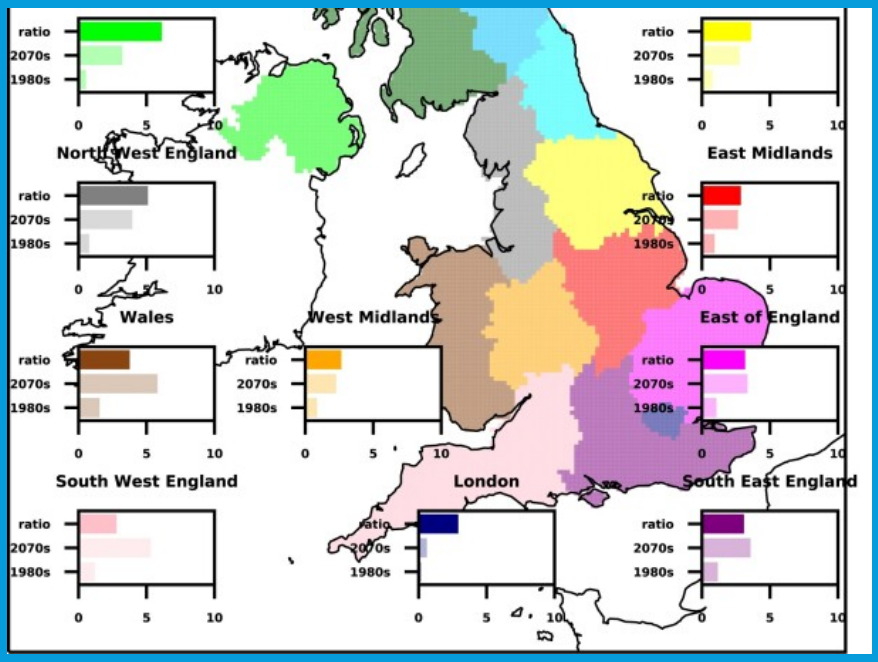
Climate change is expected to increase the frequency of extreme weather events such as heatwaves and storms. On a smaller scale, intense rainfall is also expected to become more common, and this is highly relevant to the planning of our drainage and wastewater systems, as our sewers were not designed with the capacity to cope with atypical rainfall over short periods.

Examples of extreme wet weather in recent years include:

- In 2020 we saw the wettest February on record, which brought Storms Ciara and Dennis, and the wettest day on record in the UK overall, on 3 October.
- 6 of the wettest years on record have been since 1998.

While we cannot say for certain that these events were caused by climate change, it is making such events more likely to occur in the future. The Met Office expects that by 2070 rainfall intensity will increase by up to 20% in summer, and 25% in winter, on average across the UK. Hourly rainfall exceeding 30mm per hour is a threshold used by the Met Office and the Environment Agency Flood Forecasting Centre to issue flash flood alerts. By 2070, we will meet this threshold twice as often as we did in 1990. (Source: metoffice.gov.uk. link)

Figure 25



Our DWMP highlights where these increases may be locally higher. For example runoff from a 'once in a year', 60-minute summer storm in our Dee sewerage catchments is forecast to increase by around 40% between 2020 and 2050 when all the effects of climate change, and growth are taken into account. The runoff from a similar storm in the south east Valleys area is forecast to increase by 21%.

There is a strengthening body of evidence as to the impact of climate change on rainfall intensity. Earlier this year academics published the results of detailed modelling which found that under a high emissions scenario downpours in the UK exceeding 20mm per hour could be four times as frequent by the year 2080 compared with the 1980s (link.) The figure below shows projected future changes in the occurrence of extreme hourly precipitation regionally. It shows the expected frequency by the 2070s to be substantially higher on the western side of the UK compared to the eastern side, and a bigger proportional increase compared to the 1980s as well.

Source: nature.com (link)

We have, on the whole, a highly disparate population with large numbers of small towns and villages. Nevertheless many of our more populous communities are in the South Wales Valleys, an area typified by housing and infrastructure (including sewers) with much of it dating back more than 120 years, constrained in the bottom of steep narrow valleys adjacent to rivers.

Climate change is exacerbating these difficulties. The sewer network and our treatment works were not designed with the capacity to cope with the kinds of intense rainfall events that we are seeing more frequently, in which surface water runs into drains and into combined sewers. Surface water

flows are also being affected by the increase in paved areas relative to natural green spaces in populated areas. Storm overflows (SOs) are there to prevent this 'hydraulic overload' from causing sewer flooding in homes and businesses, sending a mixture of rainfall and sewage into waterways or into the sea.

Climate change also impacts our environmental performance in terms of the more frequently occurring extended periods of dry weather. Low water levels in our wastewater network increase the likelihood of blockages. Sewage is less diluted and, therefore, is more difficult to treat. It also means we see increased production of wastewater sludge, which places additional risk on maintaining compliance at our sewage work. Very low river flows, such as those in the drought of 2022, mean incidents at treatment works or in the network can have a greater impact.

Understood in this context, our own environmental performance in this AMP has remained positive overall. Treatment works compliance and the number of pollution incidents remained broadly the same, and compares well to the rest of the industry. Sewer flooding also remained stable. We were however disappointed that in 2022 we dropped to a 'two star' rating, on NRW's Environmental Performance Assessment in 2022, the principal factor being the number of pollution incidents categorised as 'serious'.

EPA rating	2016	2017	2018	2019	2020	2021	2022
Rating	3	2	3	3	4	3	2

We have faced understandably strong criticism for our environmental performance based on the EPA rating, the frequency and duration of SO spills, and for our role in poor river water quality. We take all of these issues very seriously and are determined to put them right. In May 2023 our Chief Executive issued an apology for any environmental harm that we cause linked to delivering our wastewater services. We published a Manifesto for Rivers in Wales to explain our plans to customers. By 2025 we will have spent an additional £140 million on accelerating investment to address problems, £100 million of which we have committed to by virtue of our 'shareholder dividend', something we are able to do due to our model.

This all amounts to a major challenge, for water companies and for Wales as a whole, to improve the state of the water environment. The next section describes the overall approach that we plan to take, following guidance from government and regulators. We then move on to our specific plans for investment and performance in AMP8 and beyond, as part of our long-term strategy.

Customer views on environment

As with all aspects of our plan we have asked customers for their views on river water quality and taken this into account, despite the fact that investment in this area is mainly driven by regulatory obligations.

Many customers are very concerned about the issues they are reading about in the media around bathing water quality, river health, and the operation of SOs. There are also many campaigning individuals and organisations who are making their voices heard and calling for action.

In terms of importance and concern, reducing pollution and improving river water quality came second in customers' investment priorities in our Phase 1 research (2021). See Figure 9 PR24: P1 research - Ranking of service issues

In our Phase 2 research 'River water quality' was ranked fourth out of the nine areas to address in our long-term plans. See Figure 11 PR24: P2 research - customer views on long-term ambitions

It is also clear from our conversations with business and developer customers that the issue of river pollution has major implications in terms of the moratorium on housing development in SAC catchments. We also have many business customers in the tourism sector that are concerned about the potential impact of the condition of rivers on visitors to Wales.

Stakeholder views on the environment

We work closely with environmental organisations and campaigners in an atmosphere of healthy debate, challenge and collaboration. Our primary forum for this engagement is our **Independent Environmental Advisory Panel (IEAP)**, which meets monthly. Members come from a number of front line environmental organisations and academic institutions, including RSPB, Wildlife Trusts Wales, National Trust, Afonydd Cymru, and Cardiff University. Further details can be found . The IEAP has shaped and endorsed our approach to environmental investment in the short and longer-term.

The Wales Environment Link (WEL) brings together a wider range of environmental organisations in Wales. WEL published a 'Blueprint' for the actions that Welsh Government, regulators and water companies should take in the context of PR24. The document states that water companies must:

- put the environment at the heart of decision-making as part of a sustainable development approach and invest in catchment and nature-based solutions.
- continue to develop a multi-capital approach to cost benefit assessments;
- reduce the amount of water taken from the environment, through adopting a long-term target of 100 Litres per person per day or less by 2050;
- ensure that Drainage and Wastewater Management Plans include a 2030 target for zero pollution incidents and plans to end discharges from the most environmentally harmful CSOs; and
- invest in engagement with local communities, developing catchment and nature-based solutions in partnership.

The IEAP reviewed the Blueprint and fully supported its aspirations, while acknowledging that its objectives must be pursued within the limits of what could be delivered with an acceptable impact on customer bills. The full document can be found here (link).

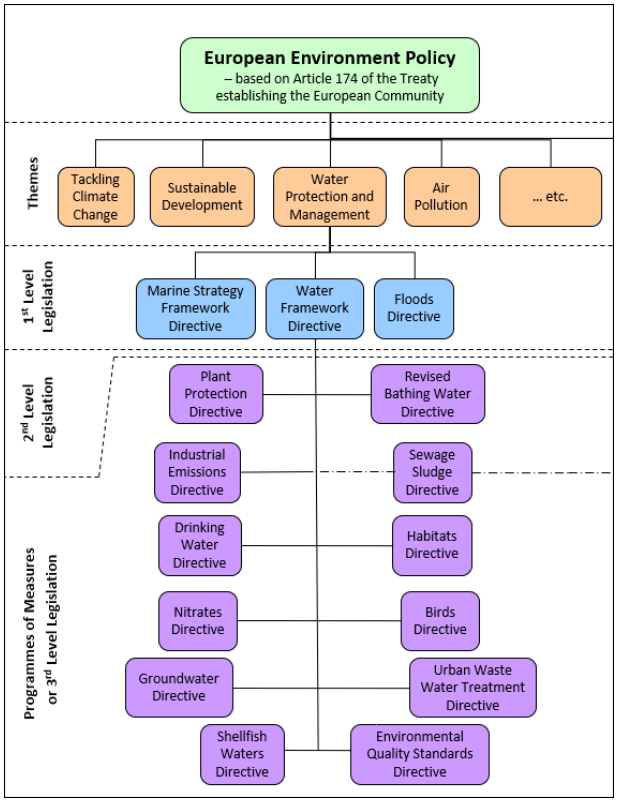
We have heard from a wide range of other environmental groups and campaigners in public meetings, through social media and in our 'Your Water, Your Say' session. We hope that this plan will give them a degree of confidence that we are taking the issues very seriously, and are seeking to 'do the right thing' in the measured approach we are taking.

6.2 Environmental regulation and planning frameworks

The two key pieces of legislation on which the environmental regulation of water companies is based are the Water Framework Directive (WFD) and the Urban Wastewater Treatment Directive (UWWTD).

The WFD is based on the aim of achieving 'good status' for groundwater and surface waters, with that status being based on a range of factors including biological, physical or chemical quality, and other qualities such as the physical features of the river. The UWWTD is based on the ability of the treatment facilities to adequately treat sewage, focusing on the qualities of the discharge, and the conditions under which capacity may be exceeded.

Figure 26 Environmental legislation originating from EU pre-Brexit.



Though originating in the European Union, this legislation was transposed into UK regulations before Brexit. In England it has been partially superseded by the Environment Act (2021), which introduce storm overflow spills as a proxy for environmental harm. This does not apply in Wales, which continues to follow WFD and UWWTD as the basis for protecting and improving the environment.

The implications of the WFD and UWWTD for water companies are set out by the environmental regulators, NRW (for Wales) and EA (for England) in the National Environment Plan (NEP) and the Water Industry National Environment Plan (WINEP) respectively. Delivering the NEP/WINEP drivers are therefore legal requirements, which can be enforced through permits issued through Permitting Regulations.

In Wales therefore the objectives of government and the environmental regulators are aligned around legal objectives focused on the actual state of the environment. The environmental investment in our plan is driven by the requirements of the NEP and WINEP, with the aim of achieving the objectives of WFD and UWWTD, and ultimately improving the environment. This is true also of our DWMP (see below).

Drainage and Wastewater Management Plan (DWMP)

DWMPs were originally commissioned by Water UK in 2018 as a basis for more collaborative and integrated long-term planning and management for drainage, wastewater and environmental protection. Although the DWMP framework will become a statutory obligation for water companies under the Environment Act, the first cycle is non-statutory. The DWMP will become a far more sophisticated and comprehensive drainage plan than we have been able to produce in the past, requiring a big increase in our capacity to run hydraulic models across our area.

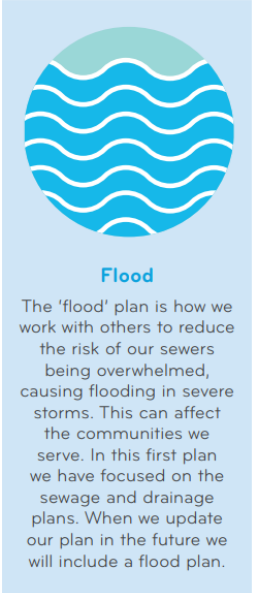
The DWMP will eventually provide detailed plans in three key areas as summarised below.

Sewage

The 'sewage' plan is about how we protect customers and the environment under normal rainfall conditions. We particularly want to make sure that we can prevent sewage spills in dry weather when they are most likely to have the greatest impact on the environment.

Drainage

The 'drainage' plan is how/where we need to work with others to manage drainage, not just in our sewers, but also in other urban drainage systems (such as highway drains) to reduce their impact during heavy rainfall.



Flood

The 'flood' plan is how we work with others to reduce the risk of our sewers being overwhelmed, causing flooding in severe storms. This can affect the communities we serve. In this first plan we have focused on the sewage and drainage plans. When we update our plan in the future we will include a flood plan.

Whilst we recognise Ofwat's direction to develop a plan which would directly inform our PR24 programme for SOs, this is not aligned with the approach to DWMPs in Wales. For English companies the focus is on limiting high spilling storm overflows. This means understanding, and then tackling, flows that can be derived from the DWMP's hydraulic modelling, hence providing a direct link between the DWMP and the AMP8 enhancement plan.

In line with Welsh Government's aspirations, we set out to develop a long-term planning framework and methodology which could be utilised to determine what ourselves, local authorities and other stakeholders needed to provide to support the wastewater and drainage infrastructure required over a 25-year horizon.

In Wales, the SO investment programme is prioritised on the basis of ecological harm caused by SOs to receiving watercourses, rather than flows through treatment works. This is based on the SO assessment framework (SOAF) and the NEP, rather than on the DWMP's hydraulic modelling.

As part of the development of our next DWMP by 2028 we are planning to incorporate the results of the completed SO harm assessments into the DWMP catchment models, thereby creating a more direct link between the DWMP and the PR29 investment plan.

Our first DWMP provides a strategic overview, suitable as a platform for driving collaborative working on drainage matters moving forward. It offers a strategic view of the impacts of climate change, growth and urban creep in each of our 106 planning zones. It will also support wider national infrastructure planning around drainage and surface water management as intended by the Welsh Government.

All water and sewerage companies are required by Ofwat to provide estimates of outcomes and investment requirements derived from the DWMP process for the LTDS and the PR24 Business Plan. We have complied with this requirement but the figures should be seen as preliminary and indicative given the context in Wales.

For further detail please see our DWMP website here (link)

National Environment Plan (NEP - Wales/WINEP - England)

The new legal obligations on water companies in Wales in relation to the environment are covered by the National Environment Programme (NEP) which is developed by the NRW and, for a relatively small area in England, the EA's Water Industry National Environment Programme (WINEP).

The NEP and the WINEP have been developed through an iterative process of engagement between us and the environmental regulators, working also with the Welsh Government and others, including through the Better River Water Quality Taskforce (see below). It is important to all parties that the resulting environmental programme delivers on the priorities for the environment, reflects societal expectations, and delivers good value for customers. As such the requirements in the NEP and WINEP should be based on a robust base of evidence as to the benefits for the environment, and agreement that the associated costs are reasonably proportionate to those benefits.

The NEP resulting from this process represents a very significant proportion of our overall investment plan and is a major increase on the levels of investment in previous AMP periods. This investment programme has been agreed with NRW and it all responds to requirements in the latest version of the NEP. There are ongoing discussions between the company and NRW on a small number of outstanding items in the NEP on which there is not yet agreement as to the evidence base and the question of proportionate costs.

The WINEP has been fully agreed with the EA.

A collaborative and long-term approach for Wales

PR24 Forum: Strategic Steers (general)

- ✓ We expect DCWW to prioritise environmental interventions that provide the **maximum environmental benefit**, in accordance with the approach agreed in the Better River Water Quality Taskforce and the First Ministers' River Pollution Summits.
- ✓ We expect the company to pursue the adoption of **nature-based solutions** and **partnership working**. The company should also seek innovative solutions and identify and implement (where appropriate) alternative ways of managing nutrients.

The Welsh Government is leading a multi-stakeholder Better River Quality Taskforce (BRQTF) with the aim of facilitating collaboration to address with urgency the challenges to river water quality in Wales. It is chaired by NRW and includes representatives from Welsh Government, Ofwat, Afonydd Cymru, CCW, Welsh Water and Hafren Dyfrdwy. The Taskforce has been clear that the causes of poor river water quality are multi-faceted, but that water companies must play their part in reaching a solution, something that we fully accept.

The PR24 Forum Strategic Steers (see above) are very clear about the approach that the Welsh Government and others expect us to take to issues with our environmental performance. This guidance means that making improving 'output' metrics, without improving environmental outcomes, is not and cannot be the objective. Our plans must target actual improvement in the environment, even at the expense of appearing to make less progress on measures such as spill numbers which are not directly tied to environmental benefit.

Ecological impact is not straightforward to measure and the dataset is not yet complete, but thanks to our early start on EDM installation and storm overflows assessments we do have sufficient data on the impact of overflows to have a robust basis for our plans and targets. Maximising environmental benefit also means working together, not driving ahead alone, and seeking the maximum improvements for the long-term, rather than prioritising short-term 'easy wins'.

Sustainable Management of Natural Resources (SMNR), as enshrined in legislation in Wales through the Environment (Wales) Act, also underpins the approach in Wales. SMNR prescribes effective collaboration, taking preventative action, and pursuing a long-term approach. This is aligned also with the 'ways of working' set out in the Wellbeing of Future Generations (Wales) Act. Our approach is fully aligned with these principles, which are vital if we are to achieve the outcomes we want for the environment at an acceptable cost now and for future generations.

We want to maximise environmental benefits of our investment, which may require further research to assess the actual impact and understand what approaches work best. And we want to take into account longer term objectives such as carbon, biodiversity, and affordability, not just pouring concrete to solve one problem while contributing to another.

All of this means moving rapidly and investing at pace to address known problems on the basis of minimising environmental harm, but taking the time necessary to develop the right solutions for the long-term.

By the end of AMP7 we have assessed the ecological impact of around 800 of our SOs in order to inform the plan for AMP8, using the Storm Overflow Assessment Framework (SOAF) agreed with our regulators, and partly funded through PR19. The results have allowed us to develop an SO 'impact' measure to NRW and the Taskforce as the basis for our long-term plan (see 6.4 Storm Overflows below for details).

All of the above has informed our plan for AMP8, which is a continuation of the agreed long-term, collaborative approach. The plan tackles high priority SOs, but also invests heavily in reducing phosphorous discharges, which is the stated priority of the Welsh Government. Meanwhile we will be laying the groundwork for a nature-friendly SO programme for AMP9 (2030-35) and beyond.

In summary, our approach to meeting the challenge on the environment can be summed up by the following commitments:

- Follow the guidance and recommendations of the Welsh Government, the PR24 Forum and the Better River Water Quality Taskforce.
- Increase investment as required, but tackle the priority issues first based on sound evidence of environmental impact.
- Phase investment over multiple periods to ensure it is affordable, based on good evidence, is 'low regrets', and can be delivered efficiently maximising wider benefits.
- Pursue monitoring, research and data science, and share widely to improve the evidence base for maximising the environmental benefit of interventions. Make all 'source apportionment' research publicly available, detailing all the factors that contribute to Special Area of Conservation (SAC) rivers failing to reach good ecological status.
- Develop catchment permitting and nature-based solution approaches, particularly in smaller, more rural sites where conventional processes are likely to be sub-optimal.
- Continue to support and work with the Nutrient Management Boards on SAC rivers. Support the development of nutrient trading systems and contribute our resources to the necessary modelling and evidence gathering.

The remainder of this section sets out our plans in further detail, starting with the two biggest issues on river water quality: phosphorous discharges and SOs. In following the above approach, based on maximising environmental benefit, it has been agreed that reducing levels of phosphorous discharged into sensitive (SAC) rivers provides the biggest proven impact in the next five years, based on current evidence. We are therefore investing a total of £141 million in AMP8 on phosphorous removal and investigations, much of which will contribute to meeting our commitments in relation to SAC rivers, in line with a plan agreed with the Taskforce. We cover this in Section 6.3.

Our SO plan for AMP8 amounts to £366 million, targeted at those SOs causing the most harm, plus £111 million for increasing treatment capacity at WWTWs, which will also improve SO performance. This is the first part of a multi-AMP programme to eliminate virtually all ecological harm by 2040. All of this investment is needed to meet NEP and WINEP obligations. We will continue to prepare the groundwork for the longer term investment plan on SOs. Further detail is provided below.

6.3 Phosphorous discharges - protecting SAC rivers

PR24 Forum Strategic Steers: Phosphorous

- ✓ We expect DCWW to reduce its discharges from wastewater treatment works in Special Areas of Conservation (SAC) sensitive areas to the levels deemed consistent with healthy river water quality, alongside other contributors on an agreed 'fair share' basis.
- ✓ We expect the company to achieve 90% of the phosphorus reduction required on a 'fair share' basis by 2030, and 100% by 2032.
- ✓ We expect DCWW to deliver improvements where identified as contributing to reasons for not achieving good ecological status (RNAGs) – following the prioritisation approach to addressing environmental harm.

Background

Phosphorus is an element essential for plant growth and it is in lots of the food we eat and is a key part of fertiliser. [9] When too much reaches the river, along with other nutrients, it can cause algal growth and eutrophication which is harmful to the ecology of the river. There are many sources of phosphorous entering rivers, of which our wastewater treatment works and SOs are just two, with agriculture being another major contributor. Phosphorous is also naturally occurring and is released slowly from natural sources.

Phosphorous levels in many of Wales's rivers are too high, seriously damaging their ecological health. This is a particular problem for Special Areas of Conservation (SAC) rivers, of which there are nine in Wales - Cleddau, Eden, Gwyrfai, Teifi, Tywi, Glaslyn, Dee, Usk and Wye. These rivers are particularly valuable in terms of their biodiversity, including special species such as Atlantic salmon and freshwater pearl mussels.

In 2021 the Joint Nature Conservation Committee (JNCC) recommended that tighter phosphate targets be adopted after reviewing new evidence about the impact of phosphates and the effects of climate change on the ecology of rivers. A subsequent evidence review by NRW showed that 60% of SAC river waterbodies were failing against the new targets.

Phosphate constraints are also impacting economic and community development, with planning rules blocking house building in a number of catchments due to the impact on phosphates. Solving this problem is a major priority for the Welsh Government, which has a target to build 20,000 new low carbon homes to address the housing shortage.

The Welsh Government has said that phosphorous pollution in SAC rivers is "a serious issue which defies easy solutions". It has taken the lead in bringing together the relevant sectors, scientists and campaigners in two Phosphorous Pollution Summits chaired by the First Minister (link). The Better

[9] Phosphorus can come in many different forms and is often referred to as 'phosphates' – this is the most easily measurable form and is what is prescribed in our wastewater permits. When referring to our wastewater treatment works and processes, we use the term 'phosphorus' as this encompasses all the different types.

River Water Quality Taskforce is also tackling phosphorous as a key issue in improving river health. Welsh Water is fully involved in this effort and is contributing our expertise and resources, and taking a leadership position in committing to tackling our share of the problem.

In AMP7 we are investing an additional £100 million from our 'not for profit' dividend to accelerate investment in phosphorous reduction at treatment works in SAC areas.

A collaborative approach in Wales

Our plan for phosphorous reduction should be understood as part of the multi-stakeholder effort to tackle this issue, and also in the context of the NEP and the regulatory landscape in Wales.

The approach and regulatory context around phosphorous differs between Wales and England in important respects. The Environmental Targets (Water) Regulations 2023 requiring an 80% reduction in Phosphorous from WWTWs do not apply in Wales. The proposed requirement in the current Levelling Up and Regeneration Bill to meet technically achievable Phosphorous levels (TAL) will also apply to England only. The common Ofwat Performance Commitment for PR24 for River Water Quality, which measures total Phosphorous discharge reductions from WWTWs, is aligned with these legislative targets and requirements for England.

The relevant targets in Wales for water companies and other sectors that contribute to phosphorous levels in rivers are those that have been reached through the collaborative work of the Taskforce.

> "There is no single measure which will solve this crisis and there is no quick fix: the 'legacy effect' means that it may take many years before we see any change. The Welsh Government's Programme for Government commits us to improving water quality, which can only be done if we have full engagement and a Team Wales approach, where government, regulators, and all relevant sectors – work together, over the immediate and medium-term to realise long-term results to improve the water quality in our rivers." Welsh Government, *Relieving pressures on Special Areas of Conservation (SAC) river catchments to support delivery of affordable housing: action plan*, March 2023 (link).

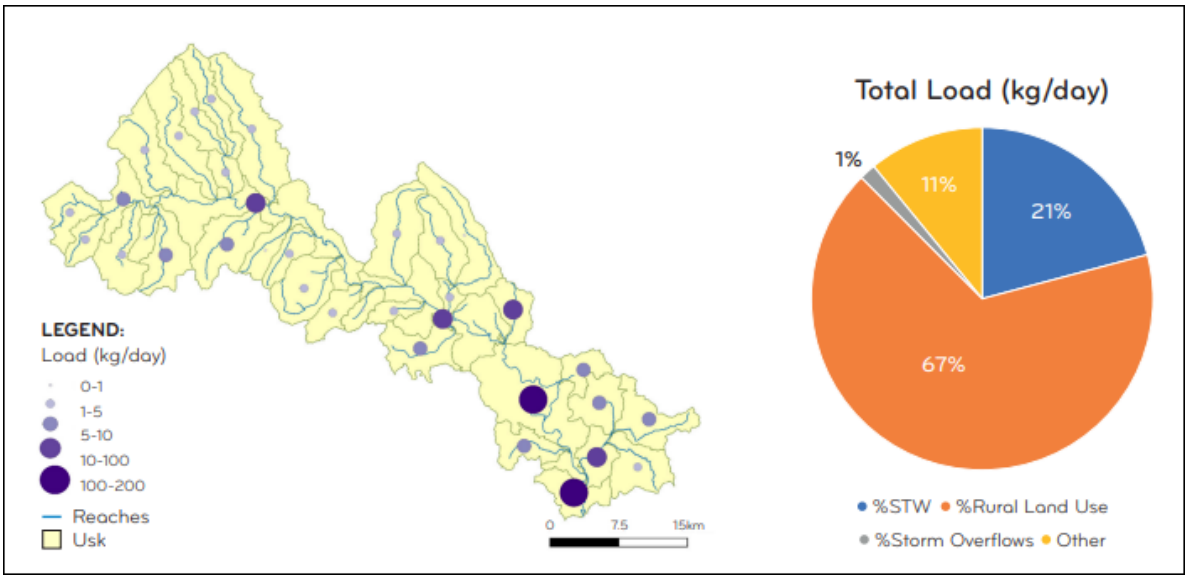
Going forward NRW has determined the phosphorous levels for SAC river waterbodies that need to be achieved to be consistent with good river health. The question then is how the required reduction is apportioned to different sectors that can make a difference. The approach taken is that the reduction should be apportioned on a 'fair share' basis, with the biggest reductions required to be achieved by those that are contributing most to the problem for each water body.

There is a challenge here in terms of reliable data on the 'source apportionment' of each sector for each water body, and this is where the Source Apportionment Graphical Information System (SAGIS) framework comes in (link). Welsh Water has led on SAGIS modelling for sensitive river catchments in Wales, allowing us to build a virtual representation of the river bodies and better understand the impact of our assets on SAC rivers, with all results shared openly.

By way of example, the results show that rural land use is contributing 84% of the phosphorous load for the Eastern Cleddau and 65% for the Western Cleddau. WWTWs are contributing 11% and 22% respectively. SOs are contributing relatively little to the phosphorus loads: 2% and 5% respectively. On the Wye the modelling suggests that our WWTWs contribute 23% of the phosphorous in the SAC waterbody, with SOs accounting for 2%. Further details of the findings can be found in our Rivers Manifesto (May 2022) - (link) - and full results are on our website - (link).

The SAGIS models also allow us to test proposed improvements in WWTW discharges to establish their impact on water quality in the river. This has helped us and NRW to identify where our investment can most effectively be directed to have the biggest impact.

Figure 27



https://corporate.dwrcymru.com/en/community/environment/river-water-quality/sac-rivers

As a result of this work, we agreed with NRW and the Taskforce that we will commit to reducing phosphorous discharges from our WWTWs to SAC rivers by 2032 down to the levels needed to fully comply with our 'fair share' of the overall required reduction, subject to Ofwat approval of the required funding. This will involve tighter phosphorus limits at 159 of our 233 wastewater treatment plants on the five failing SAC rivers, and the removal of 98.3 kg of phosphorus per day from works discharges. [10]

The Welsh Government has committed to the establishment of Nutrient Management Boards (NMBs) in each SAC catchment to find the optimal means to achieve the overall targets for nutrients. We are participating fully in this effort.

It is important to note the above approach will not only apply to SAC rivers, but to other (mostly smaller) rivers where there are also challenges around nutrient levels. These are not being ignored but the SAC rivers have been identified as the highest priority for action in the short to medium term.

Long-term ambition and AMP8 plan

Welsh Water 2050: Strategic Response 16

Cleaner rivers and beaches

With increasing pressure on the natural environment from increased population, changing land use, climate change and new sources of pollution, we will improve our wastewater assets to do our part to help achieve 'good' environmental status for our rivers, lakes and coastal waters.

As early as 2018 we committed in our Welsh Water 2050 strategy to help achieve better river water quality by playing our part to reach 'good' ecological status. We set out that we would do this by working collaboratively, and by using sound science and investigations to target our investment and help identify partnering opportunities with contributing sectors.

As noted above, we have now committed to eliminating the problem of phosphorous discharges from our WWTWs to SAC rivers by 2032. This will involve tighter phosphorus limits at 159 of our 233 wastewater treatment plants on the five failing SAC rivers, and the removal of 98.3 kg of

[10] Source: https://afonyddcymru.org/welsh-water-phosphorus-reduction-plan/.

phosphorus per day from works discharges. 90% of this reduction will be achieved by 2030. The final 10% cannot be achieved within the timeframe of the next AMP as it will take longer to develop cost effective solutions for these WWTWs which are more problematic.

The ambition to reduce nutrient levels and improve river water quality is not limited to SAC rivers. Out to 2050 we are aiming to reduce the total level of our Phosphorous discharges by 43% against a 2020 baseline. Much of this will need to be achieved at hundreds of small treatment works discharging into small rivers all across Wales and Herefordshire. We therefore want to take time to develop an affordable and deliverable strategy for achieving this, with considerable effort and cost being expended in research, monitoring and innovation in AMP8.

Although the approach and ambition is not designed primarily to drive reductions in the River Water Quality PC defined by Ofwat, we have calculated the likely impact of our approach on this PC. Our proposed 'performance' against this PC is shown in the table below.

AMP 7

Performance Commitment	Measure	Unit	2020	2024-25
Baseline	Total load of phosphorus from all of the company's wastewater treatment works in 2020	kg	368,109	
River water quality	Reduction in phosphorus from 2020	kg	-	38,206
River water quality	Reduction in phosphorus as a percentage of load discharged from treatment works in 2020	%	-	10%

AMP 8

		PR24 PC targets					
Performance Commitment	Measure	2025-26	2026-27	2027-28	2028-29	2029-30	2035
River water quality	Reduction in phosphorus from 2020	41,394	86,328	86,540	99,202	99,202	108,971
River water quality	Reduction in phosphorus as a percentage of load discharged from treatment works in 2020	11%	23%	24%	27%	27%	31%

6.4 Storm Overflows

Background

Like most of the UK, our drainage and sewerage infrastructure dates back to the Victorian era, and was designed both to manage surface water runoff from rainfall and sewage from rapidly growing populations. Responsibility for different parts of the system has evolved and divided, such that responsibility for wastewater and the sewerage network falls under water companies, while highway drainage and surface water management is managed separately. However, fundamentally the systems are overlapping, with rainfall and surface water runoff having a major impact on the management of sewerage and wastewater.

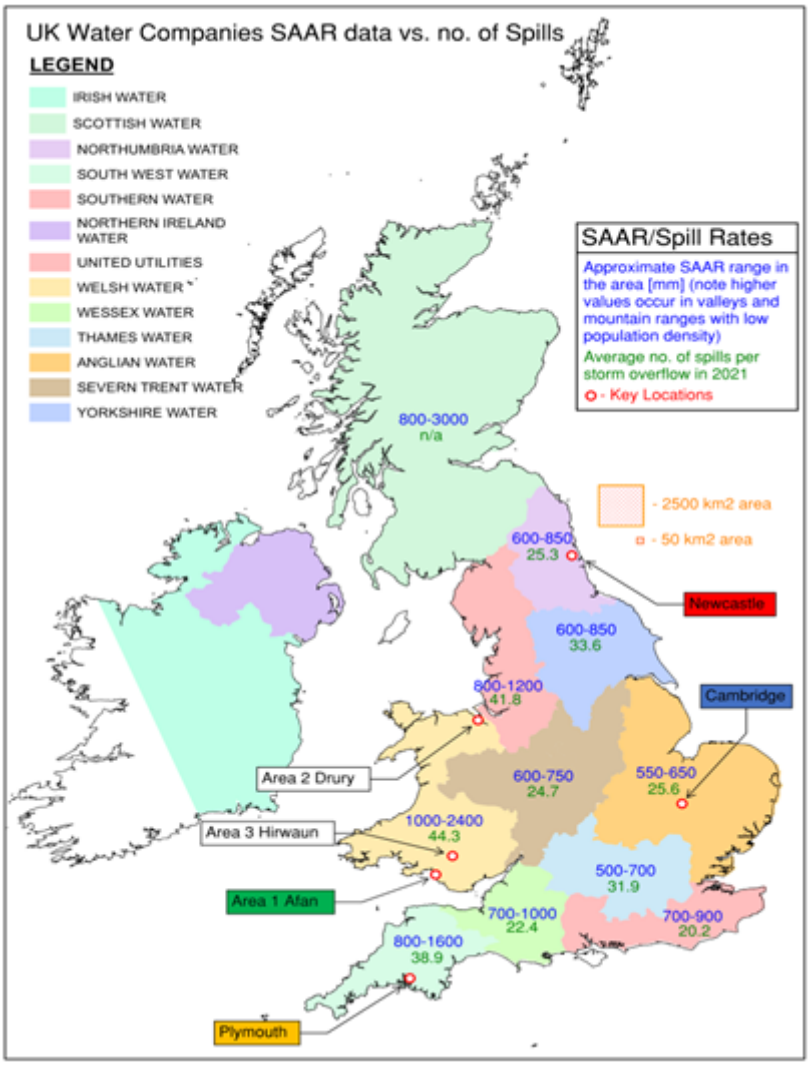
Given the combined nature of the system, it was designed with storm overflows (SOs) to ensure that the limited capacity in the network is not overwhelmed during and following heavy rainfall, to mitigate the risk of flooding from the system into homes and external areas. Normally SOs release highly diluted sewage and rainfall at times when the flows in rivers and streams are high and the impact on the environment should therefore normally be low.

Following heavy rainfall flow levels in our network increase 20 fold or more, and some catchments take many days to drain down through the infrastructure. Because of the levels and intensity of rainfall experienced in Wales, and our topography, we rely on SOs to protect our customers from flooding more than is the case in many other water company areas.

We have significantly more SOs per customer than other water companies, particularly those in eastern parts of England. We also have the highest standard average annual rainfall (SAAR) of all the English and Welsh water and sewerage companies as shown in Figure 28 below.

The impact of differences in weather on the system can be illustrated by running hydraulic models and varying the inputs from rainfall. We estimated the spill frequency of our Afan sewerage catchment if it were to receive the same rainfall as Newcastle, Cambridge or Plymouth ,to understand the underlying comparative performance of our system. In all three cases spill frequency per SO would be significantly reduced at Afan compared to the current figure if the rainfall experienced was comparable with these cities in England. This is illustrated in Figure 31 below.

Figure 28 Rainfall variation across the UK



The combined effects of climate change, population growth and urban creep are having the effect of increasing the frequency and volume of discharges from storm overflows, which in some cases is having a detrimental impact on overall river health.

For many years the operation of the some 2,300 SOs in our area was not well understood. This was because the focus of legislation (principally UWWTD) and our regulators was ensuring that the appropriate capacity was in place to treat minimum flows at treatment works, that the ecological status of rivers, shellfish waters and bathing waters was being improved as required, and that wastewater was being treated to minimum levels of quality before being discharged back to the environment.

The regulations recognise the need for SOs to protect customers and communities from sewage flooding that would otherwise occur in the absence of such relief points in combined sewerage systems. SOs can be classified as satisfactory, substandard or unsatisfactory, taking into account a range of factors set out in guidance from NRW.

We have rolled out monitoring of SOs (Event and Duration Monitors - EDMs) over the last 10 years and over 99% of our SOs now have spill event duration monitors (EDM) installed. EDM data allows us to report to the regulator on the frequency and duration of the operation of these assets. This is particularly important for SOs discharging into shellfish and bathing waters where there is often a legal limit on average spill frequency.

All of our EDM data is now available on our website (link). Early next year we will provide real time information (within one hour) on our website showing SOs that are operating - for bathing waters and high amenity sites initially.

Data from EDMs once available showed that SOs were operating more frequently, and for longer, than was considered acceptable. Further investigation and data was needed, however, to 1) establish which SOs were breaching their permits, and 2) to assess which SOs were having the highest ecological impact.

The primary means of determining a SO's compliance with its permit under the current guidance is to ensure it is passing forward the flow specified in the permit and, where specified, storage is fully utilized before a discharge occurs. In addition, storage should not be used before the minimum pass forward flow is met. The minimum flow to be retained for treatment varies depending on the type of SO and the environmental quality objective to be achieved in the receiving waters, and is normally specified in the permit for the site.

In terms of the impact on the environment of an SO, this requires an ecological impact assessment. At PR19 we developed with NRW an industry-leading Storm Overflow Assessment Framework (SOAF) programme to assess the impact of over 600 frequently spilling SOs on water quality in rivers. (Note that SOAF is not applicable at this point for transitional and coastal waters). Funding for this programme was agreed by Ofwat at PR19 and implementation is still in progress. By December 2025 we will have completed assessments of 605 riverine SOs as agreed at PR19, plus an additional 200 funded by the company from our 'not for profit' dividend.

The SOAF methodology provides the basis for our proposed SO 'harm' measure to monitor and incentivise progress on reducing the impact of SOs in our area (see below).

The challenge on Storm Overflows

Storm overflow assessments categorise their impact based on the worst scoring of either ecological (invertebrates) or water quality (UPM/FIS) assessments. It is then classified into one of the following categories: severe, high/very high, moderate, low or very low/no impact.

We have an ongoing programme of these assessments - with around 2300 SOs across our area this will not be complete until later in AMP8. The assessment programme has started with the SOs spilling most frequently. As of May 2023 we had completed assessments on 253 of circa 800 frequently spilling SOs. The results are shown in the table below.

SO impact by spill frequency

Impact	Sites	Percentage	Average Spills
Severe +	77	30%	83.1
High / Very High	42	17%	96.7
Moderate	51	20%	74.3
Low	23	9%	94.3
No / Very Low	60	24%	83.6
Total	253	100%	86.4

In order to estimate the impact of all SOs, since the assessments are not yet complete, we extrapolate from the available data.

For SOs spilling most frequently we extrapolate from the results shown above. As we have completed assessments of around 30% of these SOs this is a robust assumption, and will become stronger as more assessments are completed. We expect to have completed more than 500 assessments by October 2024.

We assume a smaller proportion of SOs spilling less than 40 times a year are causing harm, and similarly for SOs spilling less than 10 times a year.

This provides a reasonable basis of estimation, and we will update the figures as necessary as the assessment programme moves forwards.

On the above basis the ecological impact of all 2304 of our SOs has been estimated and is shown below. We estimate that, of all of our SOs, 18% are currently causing severe ecological harm. Of this number, most will be frequently spilling SOs, but some will be relatively low spilling SOs.

Estimated SO ecological impact as of 2023

Impact	% of total	No of Sites
Severe +	18%	422
High / Very High	10%	240
Moderate	12%	282
Low	6%	127
No / Very Low	54%	1233
Total		2304

Based on the above we estimate that our long-term programme will need to improve the operation of 1,070 SOs such that all have no or very low impact. The programme will prioritise those that we know are having the biggest impact.

It is clear therefore that with so many SOs in our network, and almost half of them requiring improvement, tackling this problem will be expensive and will take a considerable period of time to deliver. The question is then how to prepare a plan that would be affordable and deliverable, while generating the maximum benefits to the environment as quickly as possible.

PR24 Forum Strategic Steers: Storm Overflows

- We expect DCWW to reduce the use of Storm Overflows (SOs) **prioritised on the basis of delivering the maximum improvement to the environment** in terms of reducing harm. This also applies to currently unpermitted SOs.
- We expect DCWW to work together with NRW to implement an approach to permitting all SOs by 2030 with completed ecological assessments and **a plan for reducing ecological harm in line with the wider investment approach**.
- **Reductions in the numbers of spills are welcome but are not in themselves the priority for action, which should be focused on identifying and addressing SOs causing the greatest impact on the environment.**
- We **recognise the significant investment estimated to be required** to address the problem of SOs causing ecological harm and recognise the need to take a phased approach in order to manage the impact on customer bills, financing and deliverability.
- We expect all DCWW **assets to be classified** against criteria set out in NRW's Storm Overflow classification guidance by 2030.
- We expect DCWW to invest to increase the proportion of SOs causing no harm (or 'very low' harm) to the environment to **100% by 2040** at the latest including all currently unpermitted SOs. We expect the company to achieve 60% by 2030, and 80% by 2035.
- We expect DCWW to work with local authorities to maximise opportunities from the flood risk management programme where projects can directly or indirectly support the SO programme. We expect the company to be an **exemplar on surface water management in Wales**.

A collaborative and long-term approach in Wales

The Taskforce has recognised that tackling SOs is one of several issues that need to be addressed collaboratively to improve river quality in Wales. Alongside phosphorous reduction the Taskforce aims to "evaluate the current approach to the management and regulation of overflows in Wales", "set out detailed plans to drive rapid change and improvement" and "develop a Storm Overflow Action Plan".

As with the approach to phosphorous reduction, we will seek to address the problem through collaborative work and nature-based solutions where possible in order to deliver the most effective and best value solutions over the long-run. In the case of SOs this is most likely either through schemes to reduce run-off in catchments, or through wetlands to mitigate the impact of SO discharges. In relation to the former Welsh Water led the industry with its pioneering Rainscape scheme in Llanelli in AMP6. In terms of wetlands and other nature-based solutions, our approach is described further in section 4.2 Building the right investment plan.

The overall goal endorsed by the Taskforce is to maximise the reductions in *ecological harm* caused by SO spills. This is reflected also in the Strategic Steers from the Welsh Government and the PR24 Forum (see Box above). While this will also produce a reduction in the number of spills, this is not the principal objective. Achieving satisfactory status for all our SOs as defined by NRW is the ultimate objective for 2050. Owing to our well advanced SOAF programme we are in a position to target *reducing ecological harm* as the *principal objective* and tackle the highest priority SOs on this basis.

Again there are significant differences in the legislative and regulatory context between England and Wales. In England SO spill frequency has been adopted as a surrogate for impact. Defra's Storm Overflows Discharge Reduction Plan, published in August 2022, introduced long term spill frequency targets for water companies in England. The headline targets in England are:

- By 2035, English water companies will have: improved all overflows discharging into or near every designated bathing water; and improved 75% of overflows discharging to high priority sites.
- By 2050, no storm overflows will be permitted to operate outside of unusually heavy rainfall or to cause any adverse ecological harm. This means that storm overflows will not be permitted to discharge above an average of 10 rainfall events per year (or less if impact is modelled to occur at that frequency).

The common industry Performance Commitment on SOs prescribed by Ofwat is aligned with this approach in England. If our investment plan were developed and incentivised on the basis of targeting the SO spills measure, we would tackle first those SOs that are spilling most frequently but not necessarily causing significant harm (perhaps because of the nature and topography of the catchment, the size of the SO pipe, and the flows in the river). This would clearly not maximise the improvements to the environmental benefits in terms of minimising impact.

The common industry PC also suffers from the problem that the 'performance' is likely to vary by year to year considerably with variations in rainfall patterns, which are likely to dwarf any improvements resulting from our investment plan, at least in the short-term.

Instead we are following the approach agreed with the Taskforce and the PR24 Forum. The SO spills measure is not aligned with this approach, so we are proposing a 'bespoke' Performance Commitment which is aligned with the PR24 Forum Strategic Steers and government policy, as the basis of our long-term plan on SOs.

The measure shows progress on reducing the environmental harm from SOs, based on assessments using the SOAF framework (see box below). Adoption of this measure is possible owing to the minimum number of SOAF assessments that have been completed in order to provide a robust basis for assessing harm overall from SOs, and setting targets for its reduction.

Performance Commitment: Storm Overflow environmental impact

The definition is the percentage of SOs that produce "no" or "very low" ecological impact which will be calculated as a percentage to two decimal places as follows:

$$= \frac{\text{Total number of storm overflows with } no \text{ or } very\ low \text{ ecological impact}}{\text{Total number SOs}} \times 100$$

The ecological impact of each SO will be assessed using the methodology set out in the 2018 Storm Overflow Assessment Framework (link). SOs will be given an impact classification ranging from "No impact" to "Severe" as shown below, and this will be used to provide the baseline against which improvements are measured.

Impact classifications:

- No / very low impact
- Low impact
- Moderate impact
- High/very high impact
- Severe impact (including the "very severe" and "extremely severe" classifications that could be attributed when consider the invertebrate impact in stage 2b of the methodology.)

As interventions are completed, SOs will be assessed and reported as having 'no' or 'low' impact using the current SOAF methodology, and will achieve 'satisfactory' status that will be signed off by NRW.

The assessment of 'harm' underpinning the measure is based on the outcome of a robust and established assessment methodology. As explained above, at this stage there are some assumptions and extrapolations in the calculation of the overall figure, but the 'harm' measure remains the best basis for planning and monitoring of our SO programme. Any weaknesses in the underlying data will diminish over time as more assessments are completed. Full details of this measure can be found in (WSH40-Storm Overflows strategy).

Targets for the measure proposed in this document for 2025-2030 will be set on the basis of assessments completed up to 1 July 2023. An updated set of targets based on all assessments completed up to 1 April 2024, will be shared with Ofwat ahead of the PR24 Draft Determination (date to be agreed with Ofwat).

We are also setting out the expected number of 'spills per SO' as per the common industry Performance Commitment required by Ofwat, though this is a secondary outcome of our programme and not the primary driver as this is not what we will be targeting. It will not therefore be appropriate to compare Welsh Water's results on this 'spills' measure with companies in England in any assessment of company performance.

The approach we are taking to SOs therefore follows the commitments set out in Section 6.1, notably:

- Follow the guidance and recommendations of the Welsh Government, the PR24 Forum and the Better River Water Quality Taskforce.
- Increase investment as required, but tackling the priority issues first based on sound evidence of environmental impact.
- Phase investment over multiple periods, to ensure it is affordable, is based on good evidence, is on a 'low regrets' basis, and can be delivered efficiently maximising wider benefits.
- Pursue monitoring, research and data science, and share widely to improve the evidence base for maximising the environmental benefit of interventions. Make all 'source apportionment' research publicly available, detailing all the factors that contribute to Special Area of Conservation (SAC) rivers failing to reach good ecological status. We will also make our SO impact assessments public.

Importantly in this area of the environment programme, how we deliver it will have a major impact on the wider environment. Spills could be tackled relatively quickly and easily at many SOs by building vast storage tanks for storm water. This would increase embedded greenhouse gas emissions and also have significant implications for the landscape.

As noted in 4.2 Building the right investment plan, nature-based solutions will always be our preference, but these are more experimental, they often involve partnerships which take time to develop, they may take longer to design and construct, and the results are less certain and may take longer to manifest. In AMP8 there will be few opportunities as we address the high impacting SOs. NRW do not yet have an agreed approach for permitting nature-based solutions, but we are working with them on this and our Pont-y-Felin scheme will help with strengthening the evidence base. See Pont-y-Felin wetland proposal.

Over the medium and long-term our approach should allow us to deliver more of the SO programme using nature-based solutions, building on strong research and development foundations and regulatory developments in AMP8.

Long-term ambition and AMP8 plan

Welsh Water 2050: Strategic Response 15

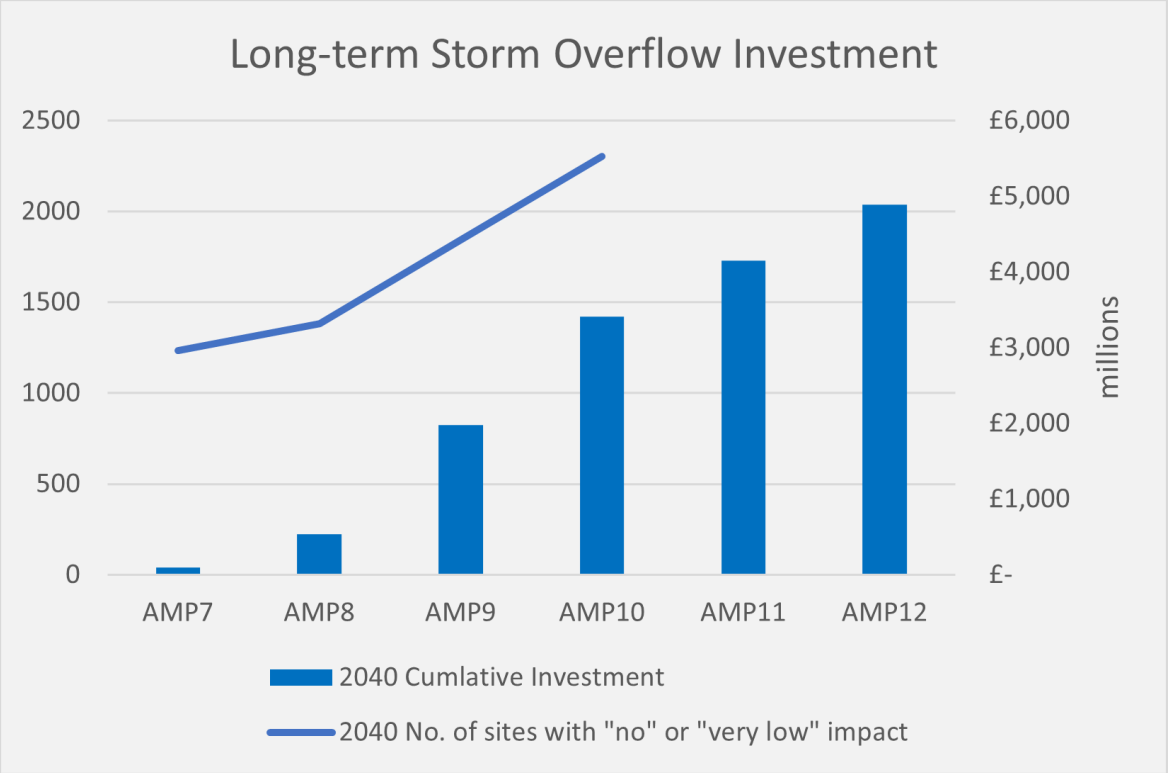
Using nature to reduce flood risk and pollution

"RainScaping our communities: confronted with urban creep due to demographic change and increased intensity of rainfall due to climate change, Welsh Water is proposing to reduce the risk of sewer flooding and pollution through sustainable urban drainage systems."

Our long-term ambition on SOs, aligned with the PR24 Forum Strategic Steers, is to eliminate all significant ecological harm caused by the operation of SOs in the combined sewer and drainage network. This will require a huge programme of maintenance and new capital investment in the sewer network and at treatment works, not just to tackle current issues but address the impact of climate change and other pressures over the long-term, as set out in our Drainage and Wastewater Management Plan.

Because of the scale of investment required, this programme will need to be ramped up over successive AMP periods in order to ensure it can be financed, delivered and afforded by customers. Initially targeted for 2050, following challenge from our Board and regulators, we are now committed to deliver the objective of eliminating harm from SOs by 2040. Additional investment will be required between 2040 and 2050 to address other SOs that are considered 'substandard' (but not causing significant harm) and move them to 'satisfactory' status as per the NEP driver.

Figure 29 Plan for Storm Overflow improvement



The total SO enhancement investment on SOs to be delivered in AMP8 is £477 million in enhancement. This will be as large in real terms as any historic investment plan, and at least four times larger than in AMP7 supported by an increased number of regulatory drivers in the NEP. However, it will be led by far stronger evidence than has been available in the past to guide efficient and well-targeted interventions.

The NEP drivers align with the Taskforce action plan and the timescales for delivery of improvements are to be agreed in that forum. There is good alignment between the objectives of delivering SOs classified as satisfactory and eliminating ecological harm over time with priority given to SOs having the greatest impact in the most sensitive receiving waters. This will leave a number of sites that would be considered as 'substandard' but not having ecological impact which will be the subject of investment much later in the long term programme.

The largest component of the NEP programme is £366 million for addressing high-impacting SOs. This will improve performance at 109 SOs.

Further investment of £92 million to increase Flow Passed Forwards (FPF) and £18 million to increase storm tank capacity at WWTWs is required to meet increased permit requirements. This will improve performance at around 31 and 45 SOs respectively.

Other investment drivers will also lead to impact reductions at SOs but the improvements delivered at these sites will not necessarily lead to the elimination of impact in a single step.

The order in which SOs are improved will be such that SOs having the biggest impact, and discharging to the most sensitive areas are scheduled for investment as early in the programme as possible. The highest priority waters will be those locations where the water body is designated under the Habitats Directive regulations or similar designation, within 1 kilometre of a bathing water or shellfish water, or where it is the confirmed or probable reason for a water body not achieving good ecological status (RNAG).

Delivery of this huge multi-AMP programme will be one of the biggest challenges we have ever faced as a company. Alongside delivering a major step up in our investment, AMP8 will be used to develop and refine our DWMP and build plans to maximise the long-term benefits of the programme, for example by minimising the carbon impact and maximising opportunities for nature-based solutions.

AMP 7			Actual	Forecast	
Performance Commitment	Measure	Units	2022-23	2023-24	2024-25
CSO spills	Total number of spills divided by number of SOs (see Ofwat PC definition for details of adjustments made)	no.	43.5*	50.5	49.2
CSO harm	Proportion of SOs classified as causing 'no' or 'no significant' harm	%	52.3%	52.3%	52.9%

* This was lower than forecast for 2023-24 owing to it being a relatively dry year.

AMP 8		PR24 PC targets					
Performance Commitment	Measure	2025-26	2026-27	2027-28	2028-29	2029-30	2040
SO spills	Total number of spills divided by number of SOs (see Ofwat PC definition for details of adjustments made).	48.5	47.5	44.5	41.5	38.7	27.8
SO harm	Proportion of SOs classified as causing 'no' or 'no significant' harm.	52.9%	53.3%	55.9%	58.4%	61.0%	100%

6.5 Bathing water quality and shellfish waters

PR24 Forum Strategic Steers: Bathing waters

- We recognise the overall excellent quality of bathing waters in Wales and do not wish to see any deterioration.
- We expect DCWW to operate and maintain their infrastructure to help ensure the current overall level of bathing water quality in Wales is sustained over the long-term.
- We expect DCWW to develop evidence to ensure investments are targeted to meet new bathing water designations and to address risks to deterioration of assets; to work in partnerships to achieve good/excellent water quality; to always consider and prioritise catchment based and nature-based solutions where appropriate.

Background

Coastal waters in Wales are overwhelmingly of high-quality. This is essential to the tourism sector in particular, as well as contributing to wider societal goals such as health and wellbeing.

The Wales Marine Evidence Report link estimated that over 60% of the population of Wales live and work on the coast. The Wales Coast Path runs for 870 miles and is estimated to be worth £23.6 million to the Welsh economy. Several of Wales's beaches such as Barafundle Bay and Rhossili are regularly voted among Britain's best.

There are 107 designated Bathing Waters around the coast of Wales, include two new designations in southern areas. In 2022 79% of the 107 designated bathing waters were classed as Excellent. The position is relatively stable and only one designated Bathing Water failed to reach the regulatory standard in 2022 (with the failure attributed primarily to an asset not owned by Welsh Water) and none in recent preceding years.

Bathing water designations

Bathing water classifications are based on four years' worth of data. New or recently designated bathing waters may be classified on less than four years data, but with a minimum number of 16 samples. Once designated for more than one year bathing waters will have a minimum of 10 samples per year. Samples are classified according to four categories: Excellent, Good, Sufficient and Poor. At the end of the bathing season certain samples may be discounted and replaced because of short term pollution incidents, usually caused by events lasting no more that 72 hours, provided advice was made available to bathers that water quality was temporarily reduced. In 2022 six bathing waters had samples discounted.

Newly designated bathing waters, as in the case for Ogmore in 2023, classed or found to be at risk of being classed as Poor will be a priority for investigation and investment. We will investigate the sources of bacteria and if the source of the failure is found to be from our assets we will undertake investment to reduce our contribution in subsequent investment periods.

This strong position is largely attributable to investments in wastewater treatment works and networks in coastal areas in previous AMP periods, particularly from 1995 to 2010. Improvements to protect bathing waters focus on measures to reduce concentrations of e. coli and intestinal enterococci in discharges reaching the designated bathing water area.

The WFD also requires specification of protected areas designated for the protection of economically significant shellfish species, and there are a number of designated Shellfish Water Protected Areas in Wales. There has already been significant investment in investigations and improvements including in the Loughor estuary, with extensive modelling in AMP6 to understand the remaining sources of

faecal bacteria preventing shellfish from meeting at least Class B. Based on this evidence we are investing to protect the Menai Straits shellfish waters in AMP7 and 8. Other improvements and investigations are planned for other shellfish waters.

We are therefore in a strong position on the quality of coastal and bathing waters in Wales, but we are not complacent. There are bathing and shellfish waters that are at risk of deterioration from wider trends such as impermeable area creep and climate change, on which we are working closely with NRW. The main example of this in AMP8 is Jackson's Bay near Barry which we have found to be affected by the growth in the local sewerage catchments. We plan to reduce the impact of our assets on the Barry bathing waters through implementing a multi AMP sustainable RainScape programme as we did in Llanelli over AMP5 and 6.

We want to support the Welsh Government's aspiration to move towards designation of some inland water bodies as bathing waters, an aspiration which is shared with the Wales Environment Link and a number of other stakeholder organisations (link).

Inland bathing waters

The Welsh Government have set an ambition to begin a process to designate new inland bathing waters. We are a key partner in the working group set up for this purpose and are currently supporting a trial in support of inland designations. However, the detailed requirements for inland bathing waters are not yet sufficiently advanced for inclusion as a basis for investment in our PR24 Business Plan. Investment in the NEP is targeted at a number of key trial sites and Welsh Water visitor centres along with an obligation to develop suitable models and guidance for riverine designations in future.

We also recognise the growth in wild swimming and recreational use of our inland and coastal waters more generally, whether they are designated or not. To support such use we have consulted with a number of stakeholder and swimming groups to understand locations where swimming is popular. We are planning to provide near real time storm overflow information at all these sites in 2024 and we will seek to do more to support water quality at these sites in the future.

A long-term collaborative approach in Wales

The PR24 Forum has been clear that it does not wish to see any deterioration in bathing water quality in Wales. Our actions on bathing and shellfish waters are guided by the data and the requirements set out in the NEP. Given the strong position on bathing water quality in Wales the emphasis is on preventing deterioration over the long-term rather than further improving the overall excellent quality of bathing waters. We work with regulators to monitor areas of concern and develop models so that we can understand the causes and take early action to prevent deterioration in bathing water quality.

NRW is responsible for monitoring bathing waters in Wales and communicating the results to the public. Bathing water classifications are based on four years' worth of data. New or recently designated bathing waters may be classified on less than four years data, but with a minimum number of 16 samples. Samples are classified according to four categories: Excellent, Good, Sufficient and Poor.

We also work with local authorities to reduce misconnections which are thought to be a major cause of some bathing waters achieving 'sufficient' or 'good' status rather than 'excellent'.

Long-term ambition and AMP8 plan

The new common Bathing Waters PC for PR24 takes a weighted average of the 'quality' score of bathing waters in the water company's area, to give an overall percentage, as shown below.

Bathing Waters PC

The Bathing Waters PC is calculated as a single overall average 'score' for bathing water quality, by multiplying the appropriate classification weighting by the number of bathing waters that meet the classification, summing this for each of the classifications, and dividing by the total number of designated bathing waters.

The weightings are 100% for 'excellent', 66% for 'good', 33% for 'sufficient' and 0% for 'poor'.

It is important to note that there will be differences between the official classifications and those used for the PC. The most important difference results from the fact that the PC will include samples taken during short-term pollution incidents, irrespective of whether these have been disregarded in the official classification. Another difference is that newly designated bathing waters during the 2025-30 period will not be included in the PC and de-designated bathing waters will continue to be given a weighting based on the latest classification it received.

As explained above, designated bathing waters in Wales are already at a high standard. This is due in part to major programmes of investment in previous AMP periods that focused on water quality in marine areas. As of August 2023 our estimated 'score' on the Bathing Water Quality PC is 90.2%. (Note this score is likely to alter once NRW have identified bathing waters that are not affected by Welsh Water assets as these will be discounted for the PC).

Given that there are other sectors that may be the source of bacterial pollution in coastal areas and that, in 2022, 94% of Bathing Waters in Wales were classed as Good or Excellent, evidence to date suggests it is doubtful that investment to raise standards further (as opposed to preventing deterioration) would be in customers' interests - unless our investigations show a clear link to the impact from our assets.

However we will continue to investigate approaches to help bathing waters classed as 'Sufficient' or 'Good' to improve. Where we can work in partnership with other organisations to promote and protect bathing water quality we will do so especially where our modelling shows that bacterial loading at bathing waters originates from diffuse sources in the catchment. In particular we will continue working with local authorities to reduce misconnections which are thought to be a major cause of some bathing waters achieving 'Sufficient' or 'Good' status rather than 'Excellent'.

The ambition over the short and long-term therefore is to maintain this high score, which means preventing deterioration caused by effects of climate change and growth on our discharges from our assets. However increasingly intense rainfall patterns resulting from climate change means that other sectors will also need to undertake measures, which we are ready to collaborate on, to prevent deterioration. This makes it more likely that we will be unable to maintain this score on our own, particularly as the measure disregards any samples that are discounted during short term pollution events.

Any new designations of 'below average' scoring Bathing Waters in AMP8 will also affect our results beyond 2030 and may require additional investment in our Long Term Delivery Strategy to maintain the 88.9% target over the long-term, or, if the source of the poor water quality is beyond the scope of water company influence, a restatement of the long-term target.

In AMP8 we plan to invest £29 million of enhancement in bathing and shellfish waters. This will cover improvements at the Barry bathing waters, investigations into potential measures for improving bathing waters from 'Sufficient' to 'Good' or 'Excellent' , supporting the designation of inland bathing waters, and measures to improve shellfish waters in the Menai Straits and Swansea.

AMP 7			Actual	Forecast	
Performance Commitment	Measure	Units	2022-23	2023-24	2024-25
Bathing water quality	Number of 'excellent' bathing waters	no.	85	85	85
Bathing water quality	Weighted average 'score' of designated bathing water quality classification (see Ofwat definition for full details).	%	90.2%	88.9%	88.9%

AMP 8		PR24 PC targets					LTDS
Performance Commitment	Measure	2025-26	2026-27	2027-28	2028-29	2029-30	2050
Bathing water quality	Number of 'excellent' bathing waters	85	85	85	85	85	85
Bathing water quality	Weighted average 'score' of designated bathing water quality classification (see Ofwat definition for full details).	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%

6.6 Other NEP investment

In addition to the investment areas driven by the NEP and WINEP already described (phosphorous reductions, storm overflows, bathing waters and shellfish waters) we will be investing in a number of other areas which, whilst smaller in scale, will produce additional benefits for the environment. These are also covered by NEP and/or WINEP drivers.

Fish passage

We will continue our AMP7 work to remove barriers to migratory fish, allowing them to reach spawning grounds higher up rivers that are inaccessible to them. This is a common reason for rivers failing to meet 'good' ecological status under the WFD. We not only remove barriers that we are responsible for, but work with partners to coordinate joint investment where possible in order to restore the maximum length of river possible. We expect our investment in this area to improve over 400 kilometres of river in AMP8 at a cost of £6 million.

Chemicals and microplastics

Persistent chemicals and other hazardous substances can have an impact at very low concentrations on surface and ground waters. We plan to continue our Chemicals Investigation Programme in AMP8 as a part of a long-term collaborative project across all water companies and regulators. NRW will work with us to identify the specific investigations we need to undertake for AMP8. This will allow us to understand how our assets are contributing to environmental levels of existing and emerging chemicals and associated issues, such as anti-microbial resistance, the extent and effects of microplastics, and the potential for new treatment and risk management processes that may be needed if these substances cannot be controlled at source.

Nitrogen technically achievable limits (TAL)

We work with regulators and other water companies to establish best practice and approaches to meeting environmental quality objectives. In the past we have contributed to the development of new, even lower, technically achievable limits (TAL) for phosphorus. In AMP8 we will be part of a programme to look at new TAL for total nitrogen limits.

Groundwater

Finally we have included improvements to protect groundwater. Some of our WWTWs discharge to underground water bodies rather than surface waters and their impact on these can be hard to assess. Groundwaters can be vulnerable to pollution particularly in the vicinity of drinking water protected areas or nitrate vulnerable zones. Our investment plan includes work at two sites to remove their discharges to surface waters and at a third to investigate any potential impacts.

6.7 Discharge permit compliance

PR24 Forum Strategic Steers

We expect the company to target ...100% compliance on wastewater treatment works discharge permits and abstraction licences.

Background and track record

Our water and wastewater treatment works have to operate within limits on the concentrations of different nutrients and other potential pollutants that they can discharge to receiving waters, as set out in their discharge permits. The permits are set by the NRW (in Wales) and the EA (in England). We have a relatively high number of very tightly prescribed permits due to the number of small and ecologically sensitive rivers in our operating area.

The NRW is conducting a Review of Permits (RoP) for WWTWs discharging to SAC river catchments. This process will lead to a significant increase in the number of sites with numeric limits and add new numeric parameters to other existing sites including backstop phosphorus limits on small works that previously had descriptive limits only, a feature unique to Wales.

The RoP is a critical enabler allowing development to restart in many parts of Wales the ability of our WWTWs to accept new housing while remaining compliant with their conditions will sit at the heart of this process. Consequently it is important for our customers and the Welsh economy that we continue to support the RoP as much as possible. To that end we have brought forward investment in water quality modelling and improvements at the largest affected treatment sites from AMP8 into AMP7. We have also undertaken to accept new permit limits immediately at sites that have been shown to be able to meet the new limits without investment. The management of treatment works compliance to maintain green status under EPA will remain an important focus for us if we are to achieve a consistent 4-star EPA performance.

Ofwat sets a Performance Commitment for all water companies to measure compliance with discharge permits, and to incentivise appropriate maintenance and operation of works to prevent pollution of receiving water bodies. The target for the measure is 100% compliance.

Like most companies though we target full compliance in reality a small number of failures in each year are inevitable (not least as sewerage systems are open and we cannot fully control what is discharged into them). In 2022 we achieved 98.5% compliance, which meant that 9 out of 602 permitted water and wastewater treatment works were non compliant. This was in the context of a severe drought in the summer of 2022 and very low river levels, requiring significant intervention at treatment works.

Our environmental regulators expect full compliance with our permits, and so do customers. Ofwat imposes a penalty in AMP7 if performance on this measure drops below 99%.

Long-term ambition and AMP8 plan

We will continue to target 100% compliance and strive to minimise failures over the short and long-term. This requires that we maintain the health of our assets and replace ageing assets when they are no longer performing as they should. We have set ourselves the challenge of achieving this from base cost allowances in AMP8, without additional enhancement investment.

AMP 7			Actual	Forecast		PR19 FD
Performance Commitment	Measure	Units	2022-23	2023-24	2024-25	2024-25
Discharge permit compliance	Discharge permit compliance (see Ofwat definition for full details)	%	98.93%	99.11%	99.11%	100%

AMP 8		PR24 PC targets					LTDS
Performance Commitment	Measure	2025-26	2026-27	2027-28	2028-29	2029-30	2050
Discharge permit compliance	Discharge permit compliance (see Ofwat definition for full details)	100%	100%	100%	100%	100%	100%

6.8 Pollution incidents

PR24 Forum Strategic Steers: Pollution incidents

- We expect companies to improve their asset health to ensure assets do not pose a risk to the environment.

We expect DCWW to target:

- ✓ A 4-star EPA assessment
- ✓ Zero category 1 and 2 pollution incidents
- ✓ A reduction in category 3 pollution incidents

Background and track record

Pollution incidents are categorised by NRW in Wales and EA in England from 1 (serious) to 4 (minor). Most pollution incidents relating to our operations are self-reported (65% in 2022). They are generally caused by the failure of a piece of equipment or a sewer, and/or a blockage caused by sewer abuse.

Our recent performance on pollutions has been positive overall against the backdrop of challenging conditions. We outperformed our regulatory targets in 2020 and 2021, setting best-ever performance in 2020. Performance was outside the target in 2022 (89 incidents against target 83), against a backdrop of prolonged dry weather, low watercourses and higher than usual numbers of incidents of sewer abuse.

There were five pollution incidents categorised as 'serious' in 2022 caused by our assets which is a significant failing. We discuss our plans for tackling this in AMP8 below.

We have a significant number of sewers adjacent to, crossing, or in watercourses, especially in the South Wales valleys. We are increasingly seeing these being damaged by fluvial debris during storm events. Most recently this caused a serious pollution incident on the River Taff near Pontypridd in March 2023.

Stakeholder and customer views

Over the past two years since the Covid-19 pandemic there has been heightened interest and focus of the general public on pollution of rivers and coastal areas. Customers do not distinguish between regulatory pollution incidents and wider issues around river water quality, which are clearly a priority for customers.

Regulators have shifted to a more hard-line approach in the last two years, particularly in relation to the classification of incidents where the impact is visible (e.g. wet wipes) or related to public amenity, rather than strictly on the basis of environmental impact.

As noted above, NRW downgraded Welsh Water to a 2-star rating on its EPA for 2022, and has set us a target of zero serious pollution incidents by 2025 in order to achieve the highest EPA category. The PR24 Forum strategic steers expressed concern about deteriorating performance in this area and there is a clear expectation that the company should reduce serious pollution risks.

Welsh Water's Independent Environmental Advisory Panel (IEAP) has unanimously supported our work to address river water pollution at source, such as on microplastics.

Long-term ambition and AMP8 plan

At the time of preparing our long-term strategy, Welsh Water 2050, we aimed to reduce pollution incidents gradually to around 47 incidents by 2050. Given the importance now placed on river water quality by customers and regulators, we believe a faster improvement is required. We have now accepted the challenge to reduce pollution to 24 incidents per year by 2050.

This represents an ambitious improvement on our current and historic performance. While we would like to be able to reduce pollution incidents to zero, it is not realistic to prevent all failures from the thousands of assets in our wastewater network, each of which represent a risk, and totally eliminate pollution incidents caused by blockages generated by wet wipes. Achieving a reduction to this level will require significant investment in predictive monitoring and further operational improvements.

Over the long-term, if pollution more generally is to be improved, we will need not only to improve asset performance but to better control what enters sewers. This is why we are pressing ahead with research and innovation with partners to provide evidence on which future legislative change could be built, in order to reduce pollution risks at source. Examples could be a ban on wet wipes or measures to reduce the use and disposal of microplastics.

Smart sewer networks

Ageing sewers increase the risk of sewers blocking and collapsing, and potentially polluting the environment. We deal with nearly 2000 sewer blockages a month, at a cost of over £7 million a year. But at the current rate of replacement it would take us over 700 years to replace our entire sewer network.

Through the innovative use and analysis of data, we can now more accurately predict where blockages are likely to occur, and so reduce costs and the impact of flooding on our customers. We can also use this information to shape our programme of planned maintenance works – deciding which sewers are most in need of work and when we need to do it.

We are now able to predict where problems are likely to occur in the future. This allows us to carefully target investment, reduce costs and get to blockages before our customers are affected.

We plan to make progress in this journey during AMP8, reaching 68 incidents per year by 2030, a 24% reduction on our current five-year average.

However, our priority in the next AMP is reducing the risk of pollution incidents classified as 'serious'. We will continue to target zero such incidents as is required by our regulators. To achieve this in practice we have to tackle assets known to be at elevated risk of failure. Our analysis has shown that our highest serious pollution risks are associated with rising mains. Historically we have been able to manage these assets successfully. However environmental regulators and stakeholders in both Wales and England expect Welsh water companies to reduce the risk of pollution. This means we expect to see our regulators make increased use of enforcement notices, sanctions and more serious categorisation of incidents if they do occur.

In order to respond to the evolving regulatory context and a lower customer and regulatory appetite for pollution risk, we will replace the highest risk assets instead of managing them through maintenance alone as we do at present. This aligns with the PR24 Forum's direction that companies should provide their assessment of where replacement rather than maintenance provides the best value for customers in the short, medium and long term.

The highest risk assets here are the 'rising mains' (pumped sewers), particularly those constructed of glass reinforced plastic (GRP). Rising mains are the biggest cause of higher category pollutions in our network, due in large part to the difficulty in managing flows during and whilst repairing bursts. GRP in particular are of great concern due to their likelihood of repeat failures, significant concerns now exist relating to the continued use of this material in pressurised pumping mains.

The South East Coastal Sewer (SECS) rising main runs between Chepstow and Newport through a highly sensitive environmental area, including the Severn Estuary RAMSAR site and several SSSIs including the Gwent Levels. Reducing the risk of pollution incidents in the Gwent Levels is a requirement of the NEP, obliging us to implement "actions to secure no deterioration of and/or contribute to maintenance of a SSSI and its features to meet/sustain Favourable Condition".

When the pipeline was laid in 2000 the value of the Gwent Levels habitat was not fully understood. The consequences of failures on the pipeline system are now assessed to be much more significant. Any untreated sewage which escapes from the pipeline is drained into the ditches which are the most sensitive and valued area of the SSSI. The pipeline has already failed on nine occasions, including two Category 2 pollution incidents. We are committed to intervening to reduce the likelihood of mains failure along the pipeline to protect these sensitive environments in line with the NEP requirement. We have therefore included £78 million for this investment in the Gwent Levels SSSI.

We will also invest £58 million to replace a number of other high risk rising mains across our network in response to the direction from the PR24 Forum as part of a long-term programme. Many of these are likely to be tackle assets located within rivers, which are costly to implement, and can therefore not be accommodated within wider maintenance budgets. This investment will substantially reduce the risk of serious pollution events occurring in the future.

AMP 7			Actual	Forecast		PR19 FD
Performance Commitment	Measure	Units	2022-23	2023-24	2024-25	2024-25
Serious pollution incidents	Number of category 1 and 2 pollution incidents	%	5	0	0	-*
Total pollution incidents	Number of category 1, 2, 3 pollution incidents	no.	89	81	78	71
Total pollution incidents per 10,000km of sewer	Total pollution incidents per 10,000km of sewer	no.	24.6	22.3	21.5	19.5

* Not a Performance Commitment at PR19.

AMP 8		PR24 PC targets					LTDS
Performance Commitment	Measure	2025-26	2026-27	2027-28	2028-29	2029-30	2050
Serious pollution incidents	Number of category 1 and 2 pollution incidents	0	0	0	0	0	0
Total pollution incidents	Number of category 1, 2, 3 pollution incidents	70	70	69	69	68	24
Total pollution incidents per 10,000km of sewer	Total pollution incidents per 10,000km of sewer	19.3	19.3	19.0	19.0	18.8	5.8

6.9 Sewer flooding

PR24 Forum Strategic Steers

We expect DCWW to make significant improvements to performance levels between now and 2050, phased across AMPs to minimise impact on customer bills to achieve:

- ✓ Internal sewer flooding - 120 events
- ✓ External sewer flooding - 1300 events

Background and track record

Our sewer network is largely a combined system, which combined with relatively high rainfall makes the network vulnerable to the impact of climate change and severe weather events. In addition, a significant portion of the households we serve are in the South Wales Valleys, typified by infrastructure constrained in the bottom of steep and narrow valleys, and terraced housing served by small-diameter sewers which are prone to blockages. On the other hand, there are large areas with small, isolated sewerage catchments which poses challenges in terms of detecting and attending to problems.

We have particularly focused on properties at risk of repeat flooding, as well as reducing the total number of sewer flooding incidents. Historically the priority has been to reduce incidents of internal sewer flooding, though external flooding incidents, which are far less severe but also more common, have been reportable since 2017-18. We have delivered sustained investment of around £40 million per AMP to reduce internal flooding due to hydraulic overload since 2000. From 2000-2005 the average number of internal flooding incidents caused by hydraulic overload was 351. This has been reduced to 38 incidents per annum on average between 2018 and 2023.

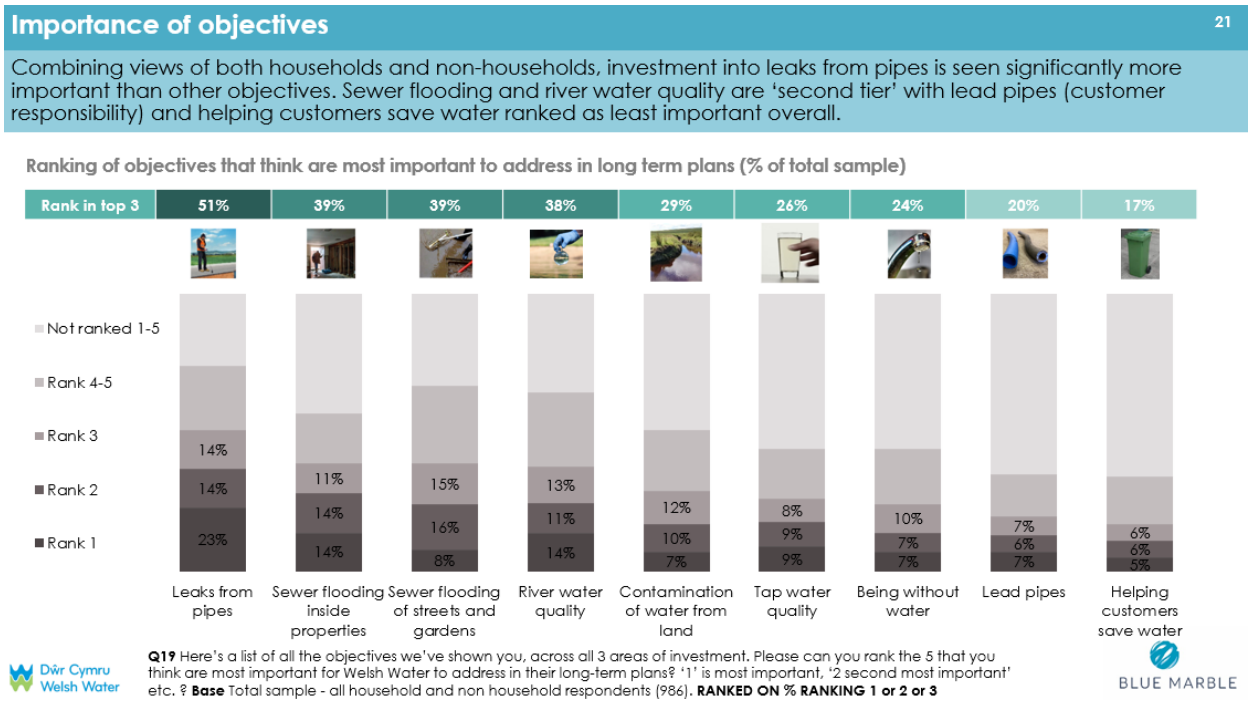
Ofwat sets targets for these performance measures on a comparative basis across the industry, and has consistently challenged companies to improve. These targets do not take into account differences in operating conditions, only the relative total sewer length.

We have been successful in bringing down the numbers of both internal and external sewer flooding in the last few years. This is largely thanks to improved remote network monitoring. We outperformed our target on internal sewer flooding in 2021-22 and 2022-23, though this was in part thanks to relatively low average rainfall, and no named storms affecting Wales in 2022-2023. On external flooding we have slightly underperformed against our target in recent years.

Stakeholder and customer views

Customer research has consistently rated internal sewer flooding as the worst service failure that is experienced by customers. In our PR24 'Phase 2' research, internal and external sewer flooding came second and third overall, just behind leakage, in terms of the importance customers placed on them out of nine issues that Welsh Water should address in our long-term plans. A majority of customers surveyed thought that we should be more ambitious in our long-term targets for improving on these measures. They did recognise, however, that other organisations and customers themselves played a role in terms of reducing blockages.

Figure 30



Long-term ambition and AMP8 plan

We recognise the importance customers place on making further improvements in this area. For internal sewer flooding, we are down to small numbers - around 150 out of 1.2 million households served in a year. Our aim is to reduce this by a further third, to 95 incidents by 2050. For external flooding, which has received less focus historically, there is a greater scope to improve relative to the current position, and the ambition is to reduce incidents by around two thirds, to 1,300 incidents by 2050, compared to 3,470 in 2022-23. However, this will be a huge challenge, and relies on our smart networks programme being successful in reducing blockages causing external flooding.

Below 1300 incidents the marginal costs of tackling the root causes are likely to be far beyond the environmental benefits, especially given that our investment will prioritise the issues that are causing the more impactful external flooding risks, such as those affecting customer properties.

These long-term targets were developed in the context of the 'benign' climate change scenario set out by Ofwat in its Long Term Delivery Strategy guidance. Should a more 'adverse' climate change scenario materialise the target may need to be reconsidered. It could also be affected by other changes beyond company control, such as legislation to ban wet wipes and other sewer misuse.

In our 'core pathway', going further would require the total elimination of sewer misuse, and a disproportionate level of spend on reducing hydraulic overload. Climate change will be tending to push up the number of incidents over time, as severe rainfall events become more and more frequent. That said, we will stretch our ambition further should legislative, technological or other changes facilitate this.

AMP8

In the context of the long-term targets and trends, the table below shows our proposed targets for internal and external sewer flooding incidents for the end of AMP7 and AMP8.

Owing to the effects of more frequent heavy rain events and the expansion of impermeable surfaces in built-up areas, the number of properties at risk of sewer flooding is growing, other things being equal. We will therefore invest £36 million in AMP8 to deliver schemes that target internal sewer flooding incidents from lack of hydraulic capacity. These schemes will also benefit performance on external sewer flooding and will allow us to meet the targets below.

AMP 7			Actual	Forecast		PR19 FD
Performance Commitment	Measure	Units	2022-23	2023-24	2024-25	2024-25
Internal sewer flooding	Total number of internal sewer flooding incidents	no.	169	210	200	202
Internal sewer flooding per 1,000 properties	Internal sewer flooding incidents per 10,000 properties	no.	1.1	1.4	1.3	1.3
External sewer flooding	Total number of external sewer flooding incidents	no.	3634	3600	3400	3,166
External sewer flooding per 1,000 properties	External sewer flooding incidents per 10,000 properties	no.	24.4	24.1	22.6	21.1

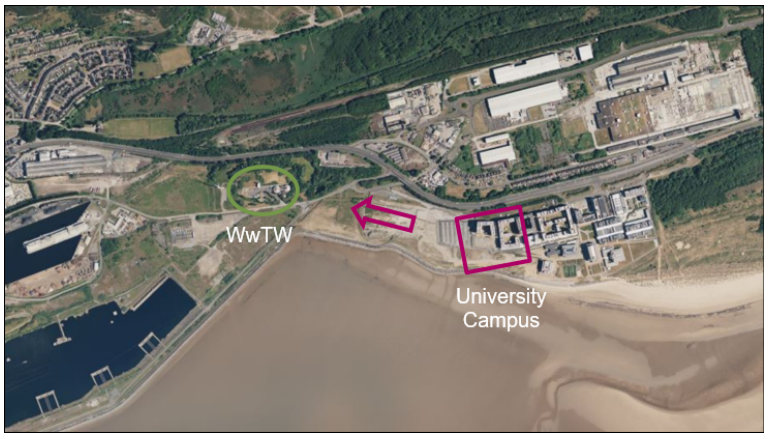
AMP 8		PR24 PC targets					LTDS
Performance Commitment	Measure	2025-26	2026-27	2027-28	2028-29	2029-30	2050
Internal sewer flooding	Total number of internal sewer flooding incidents	193	186	179	172	165	95
Internal sewer flooding per 1,000 properties	Internal sewer flooding incidents per 10,000 properties	1.3	1.2	1.2	1.1	1.1	
External sewer flooding	Total number of external sewer flooding incidents	3090	2993	2896	2797	2700	1300
External sewer flooding per 1,000 properties	External sewer flooding incidents per 10,000 properties	20.4	19.7	18.9	18.2	17.5	

6.10 Odour control

Swansea Council have issued an Environmental Management Plan (EMP) which dictates a requirement to significantly reduce odour emissions from Swansea WWTW. The reduction required by the EMP is beyond the level that the existing odour control unit can achieve.

Since the construction of the works in 1997 there has been a growth in residential development, a new university campus, and other recreational amenities added to the area. As a result, the number of customer complaints in relation to odour have increased significantly.

Swansea WWTW location



We have therefore included investment in our plan to upgrade the odour control unit, which will provide an efficient and sustainable solution to this problem for customers. The new unit will be above ground (allowing easier access), with increase capacity, an odour neutralisation tower, and monitoring equipment.

This investment of £22 million will improve the environment around this important asset in a built up area, significantly benefit customers, and achieve regulatory compliance with the EMP.

7. Safe and high-quality drinking water

PR24 Forum Strategic Steers: Drinking water quality (general)

Companies should provide assurance on how they are assessing and managing risks associated with their assets, from network to natural assets (such as the catchments that support raw water supply).

We expect companies to improve their asset health to address the risks to drinking water quality and compliance.

We expect DCWW to improve its performance on key service measures in the short-term where it is performing poorly on a comparative basis

7.1 Introduction

Providing clean water that is safe and high quality for drinking, for household use and for non-household customers, is a critical duty for all water companies. Customers can take it for granted that their tap water is safe to drink. Incidents of contamination by bacteria or hazardous substances are rare and there is a strict regulatory regime to control drinking water safety risks. Over the course of a year some 300,000 water samples are taken and analysed. Around 99.9% meet drinking water quality standards at customer taps.

High quality water means more than just ensuring its safety, however. Sometimes due to the nature of raw water supplies and issues in the network, there can be usually temporary incidents of tap water being discoloured, or having an abnormal taste or odour. We seek to minimise such incidents and reduce them further over time, as they can be worrying, unpleasant, or cause real inconvenience for customers.

Finally, we are part of a collective effort in Wales to improve the quality of water at the tap by replacing lead pipes owned by customers connecting homes to the water network.

Each of these issues is covered in turn in this section, in which we set out the background, our long-term ambition, and our plans for AMP8 in terms of performance and investment.

The challenge on tap water quality

The quality of water that comes out of customer taps depends principally on three factors:

- the quality of 'raw' water entering our reservoirs
- the type of treatments that the water is subject to at our water treatment works
- what happens to the water in the network of pipes, our own and then on the customer's property, between the treatment works and the tap.

In terms of both the first and last of these, our operating conditions pose a particular challenge in terms of ensuring that every glass of water at the customer tap meets the very highest standards.

We take 95% of our raw water from more than 100 topographically discrete catchments covering a combined area of almost 11,000 km^2. The remaining 5% comes from groundwater, mostly shallow boreholes and springs.

Water that runs off upland areas and into reservoirs, remaining there for long durations, can pick up contaminants which cause issues with taste and odour at the tap (notably Manganese and other compounds). This is not the case for water extracted from rivers or groundwater sources. Raw water can also contain other naturally-occurring suspended solids, dissolved minerals, nutrients, pathogens and chemical pollutants. These impurities have an impact on the compliance of tap water.

Climate change is having a significant impact on the quality of raw water, as extended periods of drought and heavy rainfall affect the quality of run-off into reservoirs. Warm weather can also create ideal conditions for the growth of algae which creates taste and odour issues, particularly when reservoir levels are low. Third party activities can also have negative impact on raw water quality, notably pollution and misuse of chemicals in agriculture.

When raw water quality deteriorates additional processes may be required to remove these contaminants and compounds at treatment works, requiring significant investment.

Treated water can then pick up impurities from water pipes, depending on the material composition of the pipes, and also whether the pipes are oversized compared to average flow. Cast iron mains are particularly susceptible to this kind of problem. We still have some 11,000 km of cast iron mains, around 40% of the total. Iron impurities are a particular challenge for us in our compliance scores (CRI) and causing discolouration problems.

Discolouration and cast iron pipes

The inside of cast iron mains corrode over time as a result of oxidation of the pipe following contact with water. In our area this corrosion is exacerbated by the fact the water is much more aggressive and doesn't have a natural conditioning effect, contrasting with water in eastern parts of the UK where discolouration is much less prevalent. In addition to the corroded iron layer, a layer of manganese, organic matter and biofilms also builds up over time. Our analysis shows that manganese and organic matter is increasing in raw water as a result of climate change, further adding to the treatment challenge at treatment works and increasing the build up of impurities on the inside of pipes. When there are transient events in the network following changes in demand or a burst pipe, such as when a fire hydrant is deployed, this results in discoloured (brown, black and orange) water at customer taps.

Due to the history of industrialisation in our most populous region, south east Wales, we have a disproportionate number of oversized pipes for modern purposes. This exacerbates problems that can occur when there are sudden changes in flows that release built up deposits into the water supply causing discolouration. Flushing of mains can help address this problem but does not resolve the issue.

Incidents of unsafe drinking water are now rare, and while we maintain the same rigorous standards on water monitoring and safety, our focus for this business plan is on ensuring consistently great quality drinking water, and reducing compliance risks as reflected in the CRI measure.

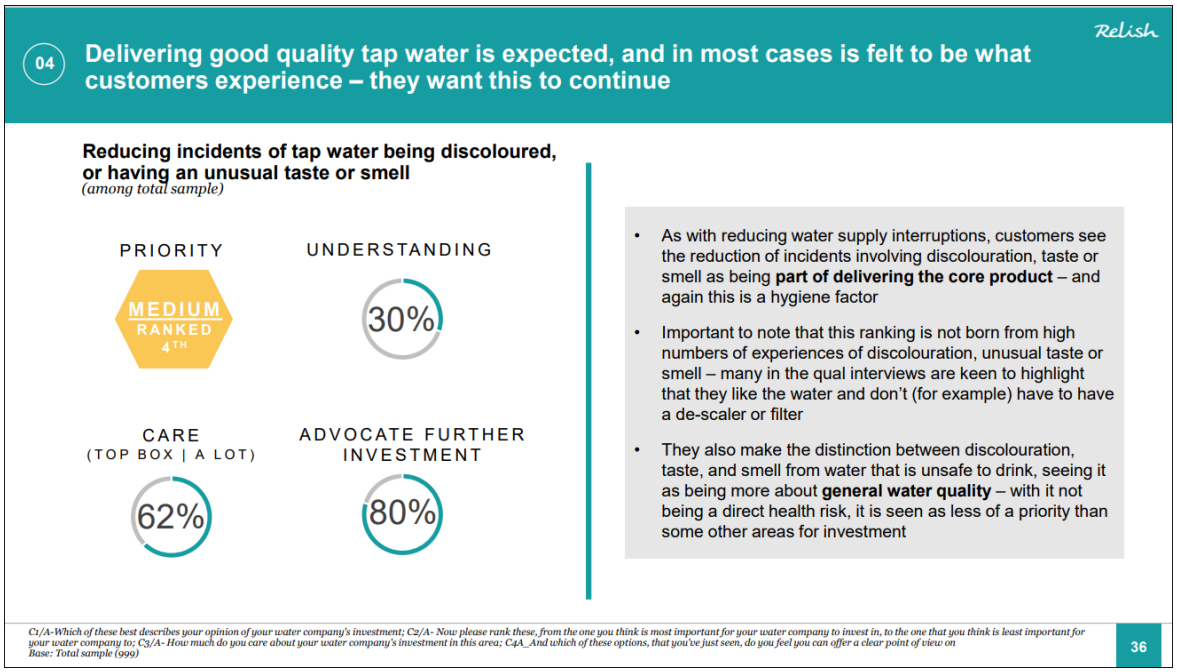
Our recent regulatory performance against the two key measures of drinking water quality - customer contacts and CRI - has been poor both in comparison to the rest of the industry and as against our PR19 targets. This is therefore a priority area for the company and we are focused on recovering our position by the beginning of the next AMP.

A Drinking Water Recovery Plan (DWRP) is in place to address the under-performance on our water quality compliance score (CRI) and 'acceptability of water' score, with the aim of achieving upper quartile industry performance. We set out the details for each related PC in the relevant sub-section below.

This section explains how we intend to address the underlying deterioration in raw water quality, and reduce the number of customer contacts due to tap water quality issues, as well as achieve and maintain a good record on tap water quality compliance.

Customer views on drinking water quality

Customers consider tap water quality to be a 'hygiene factor' - meaning that a high quality service, and safe drinking water, is a base expectation of the water company. See slide below from our Phase 1 research.



Given the choice between investing in safe and high quality drinking water for the long-term and prioritising keeping bills low, 41% of customers chose the former, as against 22% for the latter (see Figure 13 PR24: P2 research - investment versus low bills). 80% advocate further investment - without consideration of any trade-offs. There therefore appears to be a willingness to pay for investment in this area where it is well justified.

However, the views expressed by customers suggest that as long as water is safe to drink and incidents of discolouration are at a low level, improving tap water quality is is not a major priority for customers.

Our plans for investment in this area are therefore primarily driven by the requirements of our regulators, including DWI (meeting regulatory standards) and Ofwat (benchmarking against other companies on a common basis), rather than by demands from customers for improvements.

Regulation of drinking water quality in Wales

The regulator responsible for standards and guidance in this area is principally the Drinking Water Inspectorate (DWI). We work closely with the DWI on ongoing performance issues and their resolution, and the investment required in AMP8 and beyond.

We have carefully considered DWI's published PR24 guidance on long-term planning for the water industry on drinking water quality (link). Among other things, the guidance emphasises the importance of:

- Adaptation to the impacts of climate change, including impacts on raw water impurities and water temperatures.
- Strengthening resilience of services as extreme weather becomes more common.
- Improving asset resilience.
- Risk assessment of water supply systems, taking a source to tap approach, and drinking water safety plan approaches.

- Action in catchments to assess risks and tackle emerging issues 'at source'.
- Driving towards net zero carbon emissions (as a secondary objective) including reducing energy use.

DWI have expressed their support for the plans outlined below in the form of support letters pending the formal issuing of Section 28 notices as summarised below.

DWI Scheme Reference	Project Description	Legal Instrument Required	Timescale
DWR1: supporting the delivery of this scheme to secure or maintain drinking water quality.	Cefn Dryscoed WTW and other sites with manganese, turbidity, customer acceptability and discolouration	Regulation 28(4) notice	Expected within AMP8
DWR2: supporting the delivery of works of regulation 26 compliance.	Bretton, Broomy Hill, Mayhill and Whitbourne Regulation 26 compliance. UV installation	Regulation 28(4) notice	Expected within AMP8
DWR3: Critical Tanks Extended Maintenance Strategy Bacteriological Parameters and Resilience of Supply.	Bolton Hill, Glascoed, Llwynon, Whitbourne, Cwellyn, Elan, Preseli, Mayhill, Gwastadgoed, Penybont and Builth	Regulation 28(4) notice	Expected within AMP8
DWR4: supporting the delivery of works to reduce the concentration of disinfection by-products.	Capel Curig-Disinfection by-products	Regulation 28(4) notice	Expected within AMP8
DWR5: supporting the delivery of works for Mayhill organics removal.	Mayhill - organics	Regulation 28(4) notice	Expected within AMP8
DWR6: discolouration and consumer acceptability.		Regulation 28(4) notice	Expected within AMP8

Long-term ambition on tap water quality

Maintaining excellent tap water quality is a key element in our long-term strategy, Welsh Water 2050. It includes three Strategic Responses intended to address the key long-term trends and challenges we are facing in this area.

With the development of the Long Term Delivery Strategy we have now set out in greater detail what these mean in terms of the ambition around the key PCs, and the interventions and expenditure required to achieve them. These are described in the relevant sections below.

With the development of the LTDS we have built on and refined our commitments and ambitions for 2050. Specifically we will:

- Target an upper quartile position in the industry on tap water quality compliance risk (CRI), with a regulatory target of zero.

- Halve customer contacts from tap water quality incidents of discolouration, taste and odour, from 1 to 0.5 contacts per 1,000 population between 2030 and 2050.
- Replace (at no extra charge) 100,000 customer lead supply pipes with modern pipe materials.

7.2 Tap water compliance (CRI)

PR24 Forum Strategic Steers: CRI

✓ We expect DCWW to improve its performance on CRI to bring it back to at least the average of other water companies by 2025 and maintain this over the long-term, while seeking to make further improvements.

Context and track record

As CRI is a compliance measure the target for the measure is zero, though this is almost impossible to achieve in practice. Ofwat set a 'deadband' of 2.0 at PR19, above which companies pay penalties in the current AMP7 period.

CRI is a potentially volatile measure (see Box below). Our most common issue is failures caused by iron in the network, which each have a small impact on the CRI score but that have a big cumulative impact. On the other end of the scale, a single bacteriological failure at one of our largest treatment works can have add around 3 points to CRI on its own.

We have produced results that are significantly worse than the 'deadband' level in each year of AMP7. 2022 saw a result of 5.4, though this was an improvement on 9.8 in the previous year.

We have been fully transparent about the problems underpinning the poor performance on CRI and are cooperating fully with the DWI. The main focus of the Drinking Water Recovery Plan in this area is on installation of bypasses on tanks that have not been cleaned within the last 10 years, and moving all other tanks onto cleaning cycles not exceeding 5 years. We are also undertaking targeted flushing based on a more intensive sampling programme to reduce iron failures, which is a legacy risk from our long lengths of cast iron pipes.

Performance Commitment measure: CRI

The Compliance Risk Index (CRI) aligns with the risk-based approach to water supply regulation used by the Drinking Water Inspectorate (DWI) and is based on the provisions of the Water Industry Act 1991.) A contributing score is calculated for every individual compliance failure at water supply zones, supply points and treatment works, and service reservoirs.

The CRI score considers three main factors

- Parameter Score: This reflects the significance of the parameter failing to meet the standards outlined in the Regulations.
- Assessment Score: This considers the cause of the failure, how the company investigates the failure and any mitigation measures implemented by the company.
- Impact Score: This considers the location of the failure within the supply system and the proportion of the company's consumers affected.

The annual CRI for a company, for any given calendar year, is the sum of the individual CRI scores for every compliance failure reported during the year.

Where DWI initiate enforcement action as a result of a failure, the calculation of the CRI score for that failure will include a multiplier of 5, and of 4 where a regulatory notice is in force.

We currently have DWI enforcement notices on over half of our Water Quality Zones, primarily on account of discolouration. We are undertaking root cause analysis on all of these areas to confirm the improvements required on a 'source to tap' basis.

Customer and stakeholder views

Tap water safety is such a critical and highly regulated aspect of the service that it would not be meaningful to ask customers for their views on this specifically. Customers understand that it is the duty of the company, with the oversight of a dedicated regulator, to protect them from risks from poor tap water quality.

We have worked closely with the DWI in the development of our plans for AMP8, and the DWI has also been full members of the PR24 Forum.

Long-term ambition and AMP8 plan

Our long-term aspiration on CRI is to be an upper-quartile performer in the industry on a regular basis. In order to move towards this ambition we need to take steps in AMP8 to address rising risks that would otherwise be likely to cause a deterioration in our CRI score.

There are a number of schemes in our investment plan that will support CRI. Replacement of cast iron mains (see Section 7.3) will have an impact by reducing iron failures. Water quality schemes at treatment works including Cefn Driscoed (with a new Dissolved Air Flotation unit to remove rising levels of organic matter), and Capel Curig (disinfection by-products) will also help address these risks. DWI have issued us with a formal letter to support the water quality programme at PR24.

7.3 Customer contacts (appearance, taste and odour)

PR24 Forum Strategic Steers: Customer contacts on tap water quality

✓ We expect DCWW to improve its performance on discolouration, taste and odour contacts. It should target an improvement to 1.0 customer contacts per 1,000 by 2030, and a further 50% improvement to 0.5 by 2050, spread evenly across AMP periods.

Context and track record

This is an area where we fully recognise that improvements are needed. We are not meeting our current regulatory target and compare poorly relative to other water companies on discolouration incidents.

Incidents of discoloured tap water, or abnormal taste and odour, have a wide range of causes. This is a complex area where the industry is still building its knowledge and understanding through research and innovation. There are impacts and dependencies 'from source to tap', including:

- the quality of raw water and activities in catchments
- the compounds and impurities that can be removed at the treatment stage (particularly manganese),
- the materials and condition of the pipes in the distribution network,
- variations in flows of water, caused by peaks and troughs in demand, and
- third party use of the network (e.g. the fire service).

The regulatory PC measure is the number of contacts from customers (whether a complaint or otherwise) concerned with tap water quality, per 1,000 population. During 2022 we received 7,408 contacts, out of 1.4 million households served. This yielded a PC score of 2.35, compared to a regulatory target of 1.91. This was an improvement compared to 2.44 in the previous year.

Our performance in 2022 was affected by the unusually warm summer, causing algal blooms in reservoirs and higher water usage, both of which exacerbate the challenges. We have a strategy in place to recover our position by 2025. The strategy includes:

- using data analytics to improve our forecasts of raw water quality,
- improved monitoring at water treatment works to reduce the levels of manganese going into supply,
- deploying a mains conditioning approach to help us better control flows in the network, and
- progressive locking down of vulnerable parts of our network from third party use (3,000 locking caps have been installed in the year).

We have also been progressively making improvements to treatment works to reduce levels of manganese, in line with commitments made at PR19. We are now close to achieving our goal of an average level of manganese in drinking water of 2 microgrammes per litre, and have revised our strategy to aim for 1 microgramme per litre.

While there are a variety of factors which help explain poor performance in this area, including water softness and manganese levels in raw water, one factor merits particular consideration - the prevalence and age of cast iron mains in our network.

40% of our water mains are cast iron, which was the preferred pipe material in the early part of the twentieth century, or unlined ferrous. That's around 11,000 km out of the 27,500km of water mains in our network. Biofilm and manganese builds up on the rough surface inside these mains which is then released when there are significant changes in flow, causing discolouration events.

Three quarters of these cast iron mains are now over 70 years old, and a quarter are older than 110 years. While we have continued to replace cast iron mains (some 500km were replaced over AMPs 5, 6 and 7) up until now flushing has been a more cost effective solution to tackling discolouration. However flushing will only provide short term improvements. Over the long-term replacement of these mains is necessary and is more cost effective, but significant up-front investment is required.

The Long Term Delivery Strategy has highlighted the change that is needed to protect the level of service and ensure we have a water network that is fit for the future. To prevent significant deterioration in performance as the pipes continue to degrade and achieve our 2050 ambition we will need to move to a higher rate of replacement, while continuing with our operational strategies. Our approach is described further below.

Customer and stakeholder views

In our Phase 1 research, tap water quality arrived roughly in the middle of customers' list of concerns. See Figure 9 PR24: P1 research - Ranking of service issues.

In the Phase 2 research on Long Term Delivery Strategy, 'Tap Water Quality' came 6th out of 9 areas on priorities for investment, with only 26% of customers ranking it in the top 3. See Figure 10 PR24: P2 research - importance of outcomes for customers.

Our current performance is the subject of regular engagement with the Drinking Water Inspectorate. DWI have set a target of 0.7 for 'black, brown and orange' (BBO) discolouration contacts for 2030 (and 0.4 by 2035). This translates to around 1.38 for the PC measure, assuming no change in taste and odour and other appearance contacts.

Long-term ambition and AMP8 plan

Welsh Water 2050: Strategic Response 1

Safeguarding clean drinking water through catchment management

"Catchments as a first line of defence: we will face increased levels of pesticides, fertilisers, nutrients and pathogens in raw water, and increased turbidity of water reaching our water treatment works due to the intensification of agriculture and greater intensity of storms. We will co-create an extensive, innovative programme of catchment management with landowners and partners."

Welsh Water 2050: Strategic Response 5

Achieving acceptable water quality for all customers

"Ageing water mains and more extreme weather events increase the risk of supplying water which is discoloured or has a poor taste. This will be addressed through a targeted replacement of iron mains."

Our ambition over AMP8 is to improve our performance such that we move from a poor performer to the average for the industry on this measure, with a score of 1 contact per 1,000 customers. This will be a challenging goal given the characteristics of our operating area described above. We must also meet the DWI's minimum expectations on BBO discolouration incidents.

Over the long-term to 2050, we expect to halve this number further, to reach a score of 0.5. This is an ambitious goal, given the adverse characteristics of our operating area described above.

The proposed enhancement investment in this area are as follows:

Catchment management	£27 million	This will deliver: 1) Actions plans to progress the removal of 5 safeguard zones, 2) a new suite of partnership projects within the Brecon Beacons Mega Catchment, 3) preventative catchment management actions to avoid the designation of new safeguard zones.
Enhancement of water treatment	£42 million	Enhanced treatment processes to reduce manganese concentrations and to address deterioration in raw water quality. This will contribute to the reduction in the 'customer contacts' PC.
Distribution network enhancement	£118 million	Replacement, cleaning and conditioning focused on cast iron mains.

This package of investments is the result of careful analysis to select the most efficient combination of interventions to achieve the level of service that customers should be able to expect. The above table is a simplification as each intervention will have multiple benefits and will work together as a package, hence it is only possible to estimate the impact of specific interventions on the PC. Further details can be found in Supporting Document (WSH51-Safe & high quality drinking water)

Beacons Water Group

The Beacons Water Group is a group of farmers who have come together and set up a unique Community Interest Company from the Brecon Beacons. The Group work together to pilot new ways of working and innovative agricultural practices which provide benefits to farms and protect drinking water sources.

Established under Welsh Water's Brecon Beacons Mega Catchment initiative, Beacons Water Group is modelled on the internationally renowned Watershed Agricultural Council, New York State.

The group is an outcome-focussed partnership between Welsh Water and the agricultural community which takes a bottom-up approach to influencing proactive farmland management.

The activities of the group are recognised by key stakeholders as delivering best practice and are influencing policy ie. pilot projects undertaken by BWG have been incorporated into Welsh Government's future Sustainable Farming Scheme proposal document and BWG have been included as a case study in Bannau Brycheiniog National Park Authority's Sêr Y Bannau Management Plan. See for more detail.

This investment is designed to deliver the following PC targets for AMP8.

			Actual	Forecast		PR19 FD
Performance Commitment	Measure	Unit	2022-23	2023-24	2024-25	2024-25
Customer contacts from discolouration, taste and odour incidents	Number of contacts per 1,000 population	no.	2.35	2.02	1.75	

		PR24 PC targets					LTDS
Performance Commitment	Measure	2025-26	2026-27	2027-28	2028-29	2029-30	2050
Customer contacts from discolouration, taste and odour incidents	Number of contacts per 1,000 population	1.48	1.38	1.27	1.16	1.00	0.50

Examples of water treatment enhancement

Mayhill WTW (£2.9 million)

A scheme to upgrade the water treatment works to improve resilience to raw water events having an impact on taste and odour. A taste and odour event in 2021 resulted in significant customer contacts over a short period of time and revealed that the current treatment process at this major works is insufficiently effective in removing compounds that cause taste & odour problems in all operating conditions.

Cefn Dryscoed (£13.7 million)

A scheme to upgrade the treatment process in response to raw water deterioration. The scheme will bring the treatment works in line with current Welsh Water design standards as well as industry best practice to not only be able to treat declining raw water quality but also reduce manganese concentrations.

7.4 Lead supply pipe replacement

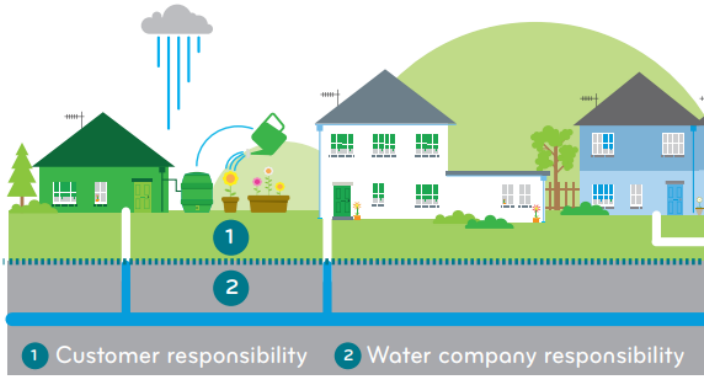
PR24 Forum Strategic Steers

- ✓ We expect DCWW to work towards a 'lead free Wales'. DCWW should aim to replace an additional 10,000 lead pipes by 2030, and 100,000 by 2050, investing evenly over the AMP periods to manage deliverability and maximise opportunities for innovation and efficiency to accelerate the programme where possible.
- ✓ We expect DCWW to revisit its ambition as more information becomes available on the most effective strategies for securing customer approval, and on how to maximise cost efficiency.
- ✓ We expect DCWW to work with partners such as local authorities and social housing providers on retrofitting programmes.

Context and track record

Whereas the rest of this chapter is concerned with things that affect drinking water quality originating in raw water or in the network, this section is concerned with just the final part of the delivery of water to customers, where lead pipes can cause dissolved lead to enter drinking water. Virtually the only lead pipes left in water companies' networks are on the portion of some pipes connecting a property to a water main that lies outside the property boundary. The portion on the customer's property belongs to the customer. There may also be lead water pipes within the home.

Where dissolved lead is consumed in drinking water it is known to be harmful to health at high levels of ingestion. Pregnant women and young children are more sensitive to lead than adults. For further details see the Water Health Partnership fact sheet (link).



The existing limit for lead in drinking water in the UK is 10 microgrammes per litre (that is 10 parts per billion). Water leaving water treatment works will contain little or no lead.

Since the Water Strategy for Wales was published in 2015, the Welsh Government has had an ambition to bring about a 'lead free Wales'. Water companies currently dose treated water with phosphates which reduce plumbosolvency, and therefore significantly reduce the levels of lead in drinking water. However this may not be a sustainable solution as supplies of phosphates are uncertain over the long-term.

During the current AMP period we have committed to remove 7,000 lead pipes as part of our PR19 business plan. In practice this means that where lead is found we will offer to replace the 'communication pipe' (the company's responsibility) and the 'supply pipe' (customer's responsibility). The supply pipe is replaced at no charge to the customer, but if the customer declines the offer we will still replace the communication pipe.

The programme was delayed early in the AMP due to the effects of the Covid-19 pandemic, but we have largely recovered our position and expect to meet our commitment to replace 7,000 pipes by the end of the AMP.

Customer and stakeholder views

This is a complex and sensitive issue, and views from customers have varied depending on the context and the information given.

In our Phase 1 research, 'replacing lead in water supply pipes' was customers' third priority for investment out of 8 areas in the survey, with 62% saying they 'cared a lot' about it. See Figure 9 PR24: P1 research - Ranking of service issues. In the Phase 2 research on the Long Term Delivery Strategy, lead pipes were given a relatively low importance in long term plans, with only 20% of customers rating it as 1-3 out of 9. See Figure 10 PR24: P2 research - importance of outcomes for customers.

In both pieces of research, qualitative discussions revealed that when it was explained that supply pipes are owned by the homeowner and not the company, they significantly downgraded the importance of this area.

The main driver of investment in this area is therefore not customer views but the Government and DWI's objectives. We want to support the Government's ambition of achieving a 'lead free Wales' (though this cannot be fully realised without wider intervention due to the presence of lead in some homes).

The DWI is strongly supportive of water companies' efforts to replace lead pipes, and wants us to make progress as fast as we can.

Long-term ambition and AMP8 plan

Welsh Water 2050: Strategic Response 6

Towards a lead free Wales

"We have the opportunity to help improve public health, and propose a targeted replacement of lead communication and supply pipes, as part of a wider societal effort to address lead in drinking water."

Our long-term ambition as agreed with the PR24 Forum is to replace 100,000 lead supply pipes by 2050. The exact number of lead pipes that exist in our supply area is unknown, but our current best estimate is 200,000. The goal of replacing all lead pipes will therefore not be achieved until well after 2050.

While we would like to make faster progress in this area, there are a number of challenges:

- we are finding that a significant proportion of customers decline the offer to replace their lead pipe due to the disruption involved
- the water company does not own the supply pipe, so the customer's consent is required
- replacing the supply pipe is costly, particularly for certain properties with longer lengths, and where reinstatement of paving or gardens is not straightforward
- the total size of our investment plan is constrained by affordability and financeability concerns, so we have to weigh up this priority against other issues, notably the need for environmental improvements.

In AMP8 we plan to replace 7,500 lead pipes. The rate of replacement will need to increase beyond AMP8, by around two or three times the rate of replacement in AMPs 7 and 8. We are conducting research and trials to enable increased take up in the future. We anticipate that this will produce valuable information on how to communicate most effectively with customers about the issue, and how to work best with government and regulators to achieve our joint objectives. We also hope that future technological advances or regulatory developments may assist with reducing the cost of pipe replacement.

8. A secure and reliable water supply

PR24 Forum Strategic Steers: Reliable and secure water supply (general)

✓ We expect companies to demonstrate how their business plans take account of learnings from weather events, cyber threats, and supply chain challenges, in particular how they have adapted their approach to mitigate against future events.

8.1 Introduction

Our most fundamental duty is to provide a dependable supply of water to our customers. This service is essential to daily life, and we believe our customers should be able to take it for granted, while playing their part in moderating water use for the benefit of the environment. This section covers our track record of performance improvement on water supply, explains the particular challenges we face in this area, and sets out our ambition to meet the challenges and improve outcomes on water supply.

Water supply issues can be divided into two broad areas - the short-term reliability of water supplies, and the security of water supplies over the long-term. The former is about minimising supply interruptions from mains bursts and other failures and ensuring we effectively manage the risks from extreme weather and other extreme events. The latter is concerned with ensuring we have planned ahead to ensure sufficient supplies of water needed to meet demand over the long-term. However the two are closely related - for example, tackling mains bursts can help reduce short-term supply interruptions but also helps to ensure sufficient long-term water resources by minimising leakage.

In this section we also cover the part that we are playing in helping to plan for sufficient water resources for the United Kingdom through our participation in regional water resource planning.

This section covers the following PR24 Performance Commitments:

- Leakage
- Per capita consumption (household demand)
- Business demand (non-household demand)
- Supply interruptions
- Mains repairs

Water supply: background

Wales experiences more rainfall than eastern parts of the UK. We estimate that our infrastructure only captures some 3% of effective rainfall, leaving some 97% for agriculture and the environment, compared to the southeast of England where up to 50% of rainfall is used for public water supply. Most water is supplied from impounding reservoirs although we also abstract significant volumes from lowland river sources. Groundwater accounts for less than 5% of supplies at a company level, but at a local level it may be the whole supply.

The majority of our customers are supplied by a network of reservoirs in the upland areas to the north of the heavily populated South Wales valleys and urban areas. Further west we have Llys y Fran reservoir, and in the north most customers are supplied by a number of smaller reservoirs. Our reliance on impounding reservoirs has some advantages in that we are less constrained by the need to abstract from rivers. However it also imposes a major safety responsibility and the cost of maintaining these major pieces of infrastructure, some of which are classed as Critical National

Infrastructure (CNI), is significant. The dams are typically a hundred years old or more, and were built with little regard for modern standards such as the need for access to pipes and valves for maintenance and replacement.

These reservoirs feed a network of 64 treatment works, and the treated water then flows mostly through gravity down into service reservoirs and into local supply networks. We have 23 Water Resource Zones with limited interconnectivity owing to the topography of our area. Our largest supply zone is the South East Wales Conjunctive Use Systems (SEWCUS) that covers Cardiff, Newport and most of the heavily populated Valleys areas.

The process of maintaining and replacing assets, particularly dams and pipes, needs to strike a careful balance between proactive replacement of ageing assets while ensuring fairness between current and future customers. Our approach to asset maintenance is set out in detail in 4.1 Asset management for the long-term.

Water supply: track record

Our overall record on providing a reliable and secure water supply is a good one. Before the Temporary Use Ban implemented in Pembrokeshire in 2022, the last one was in 1989. The target for implementing Temporary Use Bans (formerly hosepipe bans) is once in twenty years on average, and for non-essential use bans it is no more than once every forty years.

The ban in 2022 affected 60,000 households served by the Llys-y-Fran reservoir, around 5% of our customer base. It was the driest year since 1976 and saw just 60% of the expected rainfall across Pembrokeshire between March and July, combined with a 20% increase in the usual levels of demand.

On short-term supply interruptions, bursts and leakage, our record is more mixed. Mains bursts have come down over the last 20 years, but in recent years this trend has stabilised and been partially reversed. This highlights the importance of ensuring the long-term integrity of our mains network, and we have been working hard to improve our understanding of mains deterioration rates and the factors at play. This analysis has revealed a particular concern around asbestos cement mains which is affecting our supply interruptions and leakage performance, and which we are seeking to address in this plan.

Our track record on the specific Performance Commitments related to the water supply is covered in the relevant sub-sections below.

Water supply: customer and stakeholder views

In our Phase 1 customer research project that looked at general customer priorities and attitudes, "reducing the risk of major water supply interruptions" came out as the issue that was most often ranked top of customers' concerns. Interestingly, this is a significantly higher priority for older customers over 55, compared to younger customers in the 18-34 bracket. This concern does not appear to be driven by experiences of supply interruptions, but a feeling that this is simply the first responsibility of water companies. See Figure 9 PR24: P1 research - Ranking of service issues.

Figure 31 Customer views from 'Phase 1' qualitative research.

In our Phase 2 customer research, 40% of customers expressed a preference for "ensuring a reliable water supply" over 20% that preferred 'keeping bills as low as possible". See Figure 13 PR24: P2 research - investment versus low bills. This preference was slightly higher (46% vs 20%) for non-household customers. 'Being without water' ranked fairly low on customers ranking of objectives for companies to address in long-term plans, but comments from focus groups suggest customer consider performance on supply interruptions to be satisfactory, and short-term interruptions of a few hours not to be a major inconvenience.

What we take away from this range of research is that our primary focus should be on preventing *major* supply interruptions in the future by focusing on resilience over the long-term, ensuring our network assets remain fit for purpose, and ensuring security of water resources. As our supply interruptions performance has been significantly affected by the incidents of extreme weather, managing and mitigating these risks remains a key priority.

The Welsh Government, CCW, our Independent Challenge Group and other stakeholders closely monitor our performance in this fundamental area of service. The Welsh Government's SPS includes 'Resilience' and 'Asset Health' among its priorities, making clear that "customers expect reliable water and wastewater services now and in the future." The Welsh Government also has responsibility for approving our statutory Water Resources Management Plan.

Water supply: long-term ambitions

Our overall ambition in this area is to provide a reliable and resilient supply of water that customers can depend on over the long-term.

Our long-term strategy Welsh Water 2050 examined the long-term trends and opportunities affecting water supplies, focusing in particular on the impacts of climate change. The Strategic Responses explain how, in light of these trends, we will ensure Enough Water for All (SR2), Improve the reliability of drinking water supply systems (SR3) and protect our critical water supply assets (SR4).

With the development of the LTDS we have built on and refined our commitments and ambitions for 2050. Specifically we will:

- Ensure our dams and reservoirs are well-maintained and meet new regulatory standards, in the context of the changing climate.
- Increase drought resilience across all water supply zones to 1 in 500 year droughts by 2030.
- Reduce leakage by 50% by 2050 against a 2017-18 baseline in line with our 25-year WRMP.
- Increase the level of metering to 79% by 2030 and to 96% by 2050.

- Reduce household Per Capita Consumption to 110 litres per head per day by 2050, from 154 in 2021-22 (3-year rolling average).
- Reduce non-household (business) demand by 8.5% by 2050, against a 2019-20 baseline.
- Reduce average 'customer minutes lost' from supply interruptions to 2 minutes per customer by 2050.

The specific outcomes in relation to water supply performance over the next 25 years are set out in our Long Term Delivery Strategy. It shows substantial investment over the long-term in leakage reduction and meter installation in order to meet stakeholder expectations on leakage and per capita consumption, and to maintain supply-demand balance. The subsequent subsections will explain how investments and outcomes in AMP8 will make progress towards these longer-term objectives.

Water supply resilience

While there is rightly a focus on improving performance on short-term supply interruptions, it is important that this does not come at the expense of ignoring the background risk of supply interruptions of a more catastrophic nature. We are improving our understanding of such risks, including possible causes and the areas of greatest vulnerability. This is an area of significant interest to government as part of national critical infrastructure arrangements and resilience and emergency planning. Such concerns were given greater impetus by the Brexit preparations, the Covid-19 pandemic and incidents such as the Toddbrook dam failure.

We are increasing the sophistication of our risk and resilience metrics and of our abilities to analyse and measure systems resilience. Where the level of risk is found to be at levels we and our regulators consider to be unacceptable we will develop proposals to intervene. As an example we have developed a long-term programme to reduce the population vulnerable to a sustained supply failure (i.e. served by a WTW with no alternative source of supply) from 439,000 today to zero by 2050, by investing to link supply areas. This is a significant area of expenditure in the Long Term Delivery Strategy.

8.2 A secure water supply for the long-term

PR24 Forum Strategic Steers

- ✓ We expect DCWW to move all water supply zones to a 1 in 500-year level of resilience to drought.
- ✓ We expect DCWW plan for investment for water resources, and drought resilience at PR24 should be consistent with its final Water Resources Management Plan.
- ✓ We expect DCWW to demonstrate how it has learned from the experiences of prolonged dry weather, peak demand, heatwaves, and droughts of 2018, 2020 and 2022.

Context and track record

From a water resources perspective, our region benefits from an ample supply of rainfall. No new reservoirs have been needed in Wales for generations thanks to reductions in overall demand and leakage. We continue to expect to be able to meet the needs of society in the same way. While our water supply systems have come under pressure in the extended hot and dry periods experienced in the last few years (notably 2018, 2020 and 2022), only a small minority of customers have been directly affected. Nevertheless, we continue to take the challenges of ensuring a secure supply of water over the long-term extremely seriously, especially in the face of climate change, the future evolution of which remains uncertain.

Our region also plays an important role in the wider UK picture on water resources. The historical supply from Elan Valley to Birmingham is a critical part of the national infrastructure, and we continue to play our part in conversations about how we can contribute to resolving long-term supply shortages in other parts of the UK, subject to ensuring no detriment to customers and the environment in our region.

Our assets and procedures have held up well against testing circumstances in recent dry periods. In 2018 we saw an extended dry period, particularly in North Wales. No Temporary Use Bans were required, but our systems were stretched and this led to work to improve our drought plans and models so as to be able to reduce amounts taken from the most stressed areas. 2020 was dry for an extended period relatively early in the year, but was not a critical drought, and our plans worked as expected. However it did increase costs as we had to use more expensive (i.e. pumped) sources of water to protect those areas at first risk of entering drought status.

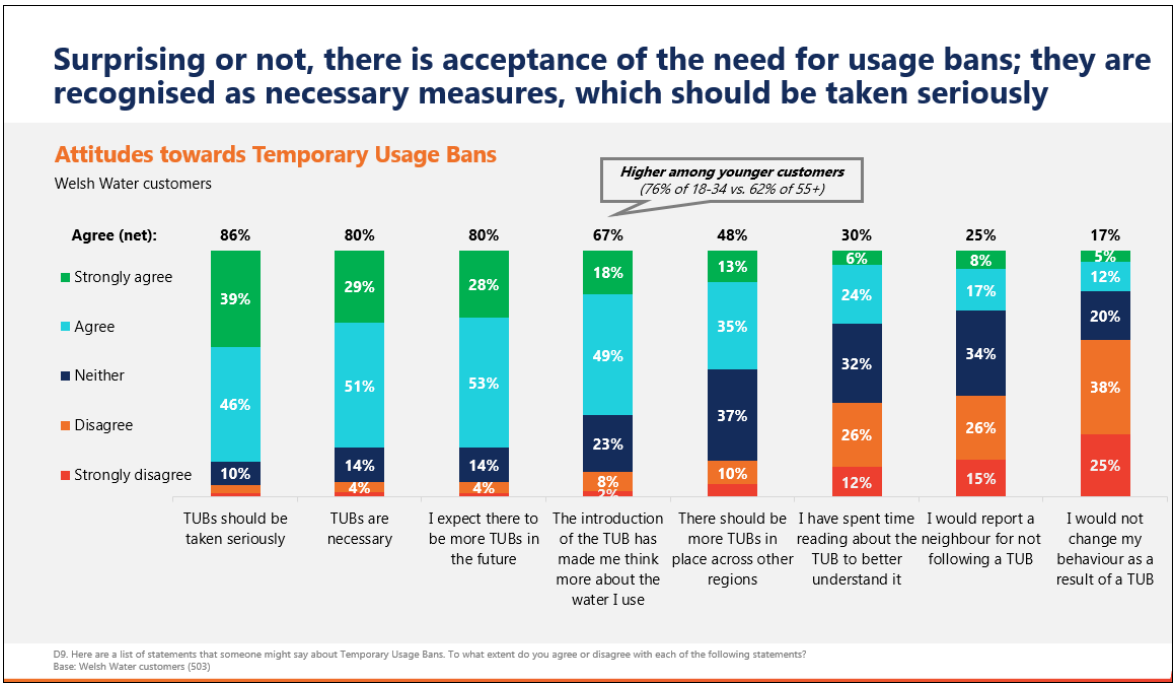
We have progressed the schemes to address the supply-demand balance deficits in the three zones identified in WRMP19. The 2022 drought underlined the need for the Pembrokeshire scheme in particular. As noted above, the summer of 2022 saw a severe drought, and a Temporary Use Ban was necessary in one part of our supply area, affecting around 5% of customers. Analysis showed that an investment scheme that was in progress at that time, and is now completed, would likely have prevented the need for the ban in Pembrokeshire.

As a '1 in 100 year' drought event, which is expected to require a TUB, the drought tested our models, procedures and forecasts. The governance process worked as expected and our forecasts proved reliable. We are very conscious of the inconvenience to customers affected, but customer research showed that most customers understood and accepted the need for it (see below).

Stakeholder and customer views

We have statutory duties on water resources planning, regardless of customer views, though we do take into account their views on how we ensure security of supply. Customers clearly expect companies to plan to secure sufficient water resources over the long-term. The feedback from customers who experienced temporary use restrictions in Pembrokeshire in the summer of 2022 was revealing, with 68% of customers agreeing with the statement that "drought is not treated seriously enough" but the majority accepting the need for restrictions, with a minimal impact on the reputation of Welsh Water.

Figure 32 Customer attitudes to temporary use bans, October 2022.



Source: Customer research on drought and TUBs, Welsh Water and Relish Research, October 2022.

Our Water Resources Management Plan (WRMP) reflected the results of research conducted with customers on the different ways in which we can ensure secure future water supplies, including water efficiency, tariffs and metering. Notably, customers see water demand management as a 'social contract', with Welsh Water's efforts on reducing leakage tied to customer willingness to reduce consumption. See WRMP (link).

Long-term ambition and AMP8 plan

WRMP and drought resilience

Welsh Water 2050 Strategic Response 2

Enough water for all

"Confronted with an increasing water supply demand gap due to population growth and drier summers due to climate change, we will use our Water Resource Management Plan to ensure the water supply demand balance to 2050. We propose to implement water transfers, demand management measures and leakage reduction programmes to address any deficits, whilst recognising the possible need to support other parts of the UK."

Welsh Water's WRMP was submitted to the Welsh Government for approval on 23 June 2023. The planning exercise followed guidance from NRW and the EA, taking into account the results of customer research on such issues as charging, alternative approaches to securing future supplies, and leakage. It harnessed climate change models and scenario planning to ensure that key future uncertainties were carefully considered and planned for.

Defra and NRW's joint water resource planning guidance (link) states that companies companies must be resilient to a 1 in 500 year drought by 2040. Assuming we are able to deliver our leakage and metering programmes as planned, then we expect to achieve this by 2030.

The WRMP shows that we can meet demand for water resources over the long-term with an investment in AMP8 of £51 million in zone interconnections on the supply side, plus £185 million for our metering strategy and £20 million for Project Cartref to reduce demand.

The key outputs of the WRMP are as follows:

- Our leakage, PCC and Business Demand PC targets will be sufficient to achieve supply-demand balance over the long-term in all zones. They will also achieve the targeted 1 in 500 year level of drought resilience by 2030.
- The reductions will be delivered principally through a combination of metering installation, 'Project Cartref' which supports customers to reduce water use and minimise leakage in the home, and ongoing leakage reduction on our network. We will also need to take a more proactive approach to engaging business customers in supporting them to reduce water usage where they are able to do so.
- We will embark on an accelerated metering programme, moving from a largely reactive approach to installing 'Smart' meters on unmeasured properties by geographical area. This will increase the level of metering from 46% as of March 2021 to 79% by 2030 and 96% by 2050.
- The improved evidence generated through our planning process identified zones that require greater network connectivity to resolve constraints that are apparent under extreme drought conditions. This investment has been included in our PR24 Business Plan for AMP8 (see below) and in the LTDS beyond that to 2050.
- We are mindful that the sustainability of our raw water sources is an area of significant uncertainty particularly under a changing climate. We have therefore included in our PR24 Business Plan investment to fund our largest ever programme of water resource environmental investigations during AMP8.

Water Resources Management Plan

The objective of the WRMP is to ensure that Welsh Water will always be able to provide sufficient water supply to meet our customers' demand for water over the next 25 years by making our water supply systems resilient to drought, particularly in view of a changing climate. It also ensures that we can meet the environmental obligations set out in abstraction licences in accordance with the NEP. The plan uses best available evidence to formulate a set of actions through analysing future risks and identifying how we might need to adapt to different future circumstances. We have been guided by our regulators, interested parties and our customers in selecting the most appropriate solutions to the challenges we face. The WRMP is fully integrated into our Long Term Delivery Strategy.

The WRMP uses UKCP18 climate impact data, and we agreed with NRW the use of a 'medium emissions' scenario (RCP 6.0) as the central basis for an assessment of whether we may need to adjust our long-term investment plan. The climate change assessment showed a higher impact in all zones compared to the WRMP19 version. For example, in WRMP24 climate change is forecast to reduce supply in our largest 'SEWCUS' zone by 6.3%, compared to the 4.3% assessed in WRMP19. Overall however the analysis of climate change scenarios does not require us to consider any significant new capital investment in water resources.

Regional water resource planning

Our region also plays an important role in the wider UK picture on water resources. The historical supply from Elan Valley to Birmingham is a critical part of the national infrastructure, and we continue to play our part in conversations about how we can contribute to resolving long-term supply shortages in other parts of the UK, subject to ensuring no detriment to customers and the environment in our region.

The UK Government, through the Environment Agency and Ofwat, set up a National Framework for Water Resources in England in 2020 to explore the long-term needs of all sectors that depend on a secure supply of water. The water industry was tasked to set up five regional water resource groups and to consider the availability and use of water resources to support long-term resource resilience for companies and the environment in England. Welsh Water is a core member of the Water Resources West (WRW) planning group due to border interests and shared water resources (see box below).

Water Resources West

Water Resources West is a group of stakeholders, including Welsh Water, with a role in ensuring a secure long-term water supply for the western side of England & Wales. The region covers the Dee, Severn and Wye catchments. The group is part of a national water resources framework for England, led by the Environment Agency, but in which the Welsh Government and Natural Resources Wales represent Welsh interests due to the cross-border interdependencies involved in water resource planning. It is one of a number of such regional groups which aim to allow water companies to look beyond their operating areas to enable more collaborative working to meet long-term objectives and bring wider benefits.

Only water resource zones that border other water companies are included within the WRW regional plan. The information provided within our WRMP24 is consistent with that provided to the non-statutory WRW regional plan.

Various options have been set out by water companies in England for water transfer schemes over the long-term, and some of those involve transfers from Wales. We have provided the requested information to support options assessment but have made no commitments. Welsh Government policy is that no new water transfers to England will be developed unless there is a clear benefit to water customers in Wales, and that there is no detriment to customers or the environment in Wales.

8.3 Reservoir and dam safety

PR24 Forum Strategic Steers

- We expect DCWW to continue with its multi-AMP programme of upgrading reservoirs to meet new regulatory standards and adapt to climate change, in accordance with risks identified in the rolling programme of Section 10 inspections.
- We expect DCWW to ensure that any dams identified and classified as 'high-risk' are prioritised for safety and resilience improvements to address this as an immediate priority.

A secure long-term supply of water relies fundamentally on safe and well-maintained dams and reservoirs, resilient against climate change. Dam safety is also critical to protect against the risk of loss of life should a dam fail. We are therefore fully committed to maintaining compliance and meeting required safety standards. But this will require continual vigilance and and an ongoing programme of regulatory inspections and upgrades, against the background of climate change and evolving regulations.

Climate change is producing more intense storm events which creates a requirement to re-engineer spillways to cope with bigger volumes. More variable rainfall means that dams will draw down more often and this creates changes around dam structures that require careful monitoring. Drier, hotter summers have also impacted dams by, for example, exposing pier supports which has exacerbated corrosion, leading to early cracking.

Regulation and good practice guidance relating to reservoir safety have evolved significantly since 2017. New regulations were introduced in Wales by the Welsh Government in 2016 driven by the Floods and Water Management Act 2010, bringing all reservoirs of 10 megalitre capacity within the 1975 Reservoirs Act. New guidance relating to the management of flood risk at reservoirs and relating to drawdown in an emergency was also introduced. This led to the need to upsize spillways, raise dam crests and upgrade pipes and valves at our reservoir sites, due to the increases in expected storm intensities driven by climate change.

These requirements led us to embark on a major long-term programme of upgrades to our dams, starting with AMPs 6 and 7 for which funding was approved at PR14 and PR19. We have a statutory duty to ensure our bulk storage of water complies the Reservoir Act 1975, with a requirement to carry out detailed (Section 10) inspections every 10 years supported by annual reports (Section 12 reports). The timing of these inspections is known and agreed with NRW, and they act as the trigger for moving to compliance with the latest guidelines.

Regulations and guidance continue to evolve, particular with the publication of the Balmforth Review following the incident at Toddbrook Reservoir in 2019 (see box below).

Our specific commitment is to ensure any dams found to be in the highest risk category when inspections take place are dealt with as an immediate priority such that no dams remain in this category except in the short-term. We will continue in AMP8 to upgrade our dams in accordance with a long-term programme of Section 10 inspections for assets that impound more than 10,000 m3 of water.

Toddbrook Review

The failure of concrete panels at the dam at Toddbrook Reservoir in Derbyshire in 2019, and other dam failures in the US in 2020, shone a spotlight on the risks to dam structures posed by heavy rain and the changing climate. We have 140 reservoirs holding over 10,000 m3 of water. We are required to maintain compliance with the Reservoirs Act 1975, as amended by the Flood and Water Management (Wales) Act 2010, which introduced changes applying in Wales. The provisions were enacted in Wales on 1 April 2016. The most significant change was the reduction in the thresholds for reservoirs falling under the Act from 25,000 m3 to 10,000 m3. This had a significant impact on the maintenance and enhancement requirements for our dams estate.

Following the Toddbrook incident a review was carried out and a number of initial recommendations were made. We were able to meet this guidance without significant additional investment, but anticipate changes to legislation in the future which are likely to mandate significant new investment in dam safety. In the meantime we are are actively engaged in the Defra-led Reservoir Safety Reform Programme.

We have a robust programme of surveillance, monitoring and inspections, with visits typically two to three times a week by our trained dam safety inspection team. All reservoirs falling under the Act are inspected at no more than 10 year intervals by an independent qualified civil engineer. The resulting report may include statutory intervention measures in the interests of safety. We hold regular compliance meetings with NRW who act as the enforcement authority.

Our dam safety investment plan is constantly evolving in line with the risk prioritisation revealed by the ongoing programme of Section 10 inspections. During AMP7 the list of schemes has changed since the original PR19 Business Plan submissions, but by the end of the AMP7 we will have delivered more than the committed benefit in terms of safety issues addressed, completed around 40 schemes compared to the PR19 commitment of 26, and spent £153 million (against a planned £117 million in the original submission).

We will continue with this approach in AMP8, keeping pace with a rapidly changing regulatory environment while minimising the risk to water supplies. We expect to complete upgrades on a further 29 reservoirs during AMP8 at a cost of £79 million above the maintenance allowance. The investment will include the following:

- Increasing spillway capacity (in order to meet 'Probable Maximum Flooding' requirements).
- Upsizing pipes and valves (in order to meet drawdown requirements).
- Upgrading pipes and valves.

8.4 Reducing demand: leakage and consumption

PR24 Forum Strategic Steers

- ✓ We expect DCWW to reduce leakage by 15% by 2025, a further 10% during PR24 and by 50% by 2050 (against a 2017/18 baseline).
- ✓ We expect DCWW to encourage customers to reduce consumption, to achieve a 6% reduction during PR24 and to 110 litres per capita consumption by 2050 and set out a comprehensive water efficiency plan to meet these targets.
- ✓ We expect DCWW to collaboratively lead on behaviour change campaigns on respecting water resources especially during periods of prolonged dry weather and the recovery from such periods.
- ✓ We expect DCWW to encourage non-household customers to reduce their usage, recognising the wide variety of types and sizes of business customer. The target should be set in accordance with the WRMP, making an appropriate assumption about background increase in demand from economic growth, and adjusting for new large industrial water users.
- ✓ We expect DCWW to seek further reductions in leakage where possible as tackling leakage is a priority for customers.

Background and track record

Over the last 25 years, the quantity of water we supply to our customers has reduced from an average of over 1000 million litres per day (Ml/d) to about 850 Ml/d today. About half of this is down to reduced leakage, the rest is due to reduced demand from heavy industry and our customers increasing appreciation of the value of their water supply and subsequent reduction in their usage. Around 80% of this demand for water is from the major cities and towns of south Wales around Cardiff, Swansea, Newport, Bridgend, Carmarthen and the surrounding Valleys.

As noted above in the context of our WRMP, our region is not expected to suffer from any significant water supply-demand shortages over the 25-year planning period.

With nearly 28,000 kilometres of underground water mains across our area, leakage will always be a challenge due to the difficulties in finding leaks and maintaining pipes. At PR19 we accepted the challenge of reducing leaks by 15%. In 2022-23 we identified issues with the way that leakage and household water use was being estimated and undertook a full review and restatement of our leakage and water use levels. This revealed that in fact our leakage performance has been worse than reported.

We have recommitted to reaching the targeted percentage reduction by 2025 against the restated baseline, though this will not be achievable on the 3-year rolling average on which the PC definition is based. We have provided an extra £54 million of expenditure to reduce leakage in AMP7 and have returned £10 to every customer by way of apology for having incorrectly stated our performance on these measures.

The picture on PCC reductions in this AMP has been complicated by the Covid-19 pandemic which affected water usage, and also by the leakage restatement. We reported an increase in PCC of 6.2% in 2022-23 compared to 2019-20 baseline, against a target reduction of 3.0% in the PR19 Final Determination. The restatement did have the positive effect of bringing down average PCC for Welsh Water, although it remains significantly above the average for the industry.

At PR19 we secured funding to develop and roll out our innovative Project Cartref programme which is about working with customers to reduce wastage of water, either through leakage or inefficient use, and to save them money. We will build on this success in AMP8.

Project Cartref

Because of the high levels of trust we have established with customers over recent years, we identified an opportunity to work more closely with customers to reduce leakage, waste and consumption in the home, and save customers money. The programme involves home visits to fix 'leaky loos', provide water efficiency equipment and conduct water efficiency audits. We can also signpost customers to wider Welsh Water offerings such as social tariffs.

The programme has been welcomed by customers, and though affected by Covid at the start of the AMP it is now showing strong results. By 2025 we expect to have 94,000 customers signed up to '"Get Water Fit", and arranged 12,500 free plumber appointments for customers. We will grow this programme further during AMP8, and extend it also to non-household customers under the same banner.

Stakeholder and customer views

Leakage is consistently cited as a priority issue for customers, and we know that reports of leakage undermine our efforts to persuade customers to use less water themselves.

In our Phase 2 research on priorities for long-term plans, leakage came top in the ranking of customers' priorities, with 23% of customers putting it at the top of the list. See Figure 10 PR24: P2 research - importance of outcomes for customersThe qualitative stage of the Affordability and Acceptability research also confirmed that leakage is a key customer priority. Customers thought that both that the current level of leakage was too high, and though there were mixed views, a general conclusions was that customers felt the targets for leakage reduction both to 2030 and 2050 could be more ambitious.

Note that we did not engage with customers on PCC reduction targets, as customers themselves have to make usage reductions in order to achieve those targets, so the conversation can quickly become unhelpful.

Long-term ambition and AMP8 plan

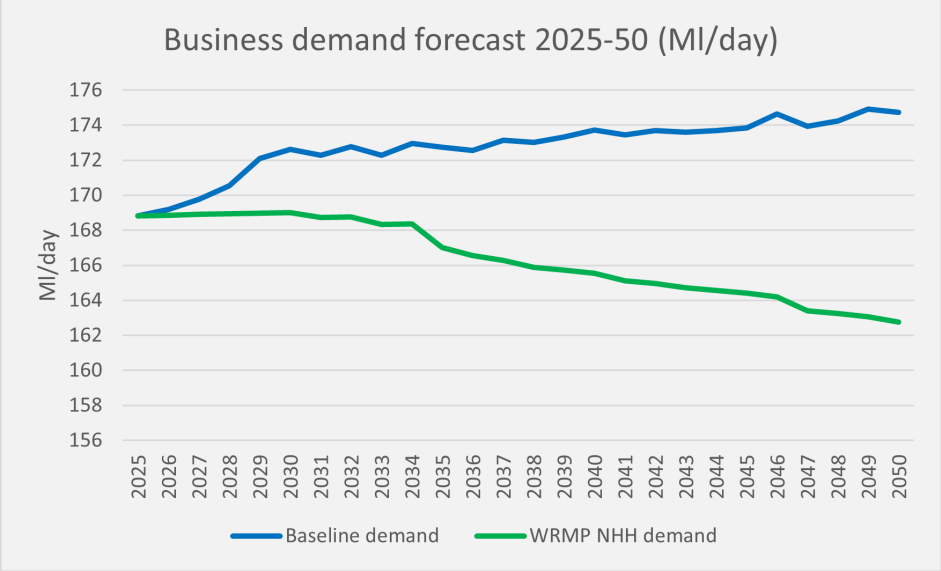
In the long-term we will:

- Reduce leakage by 50% by 2050 against a 2017-18 baseline. This is in line with the needs of the WRMP. Water companies in England have set a target of halving leakage from 2020 levels by 2050. Our plan is to follow a profile in line with this commitment. This is also closely aligned to our long-term metering strategy.
- Increase the level of metering to 79% by 2030 and to 96% by 2050. This will be done on a voluntary basis, with no compulsory metering in line with Welsh Government policy. It will support both the identification of leakage in customers' properties and a reduction in customer consumption (PCC) by providing customers with accessible data on their own water usage. See box below for more detail.
- Reduce household PCC to 110 litres per head per day by 2050, from 154 in 2021-22. This is the level of demand modelled on the basis of the progressive metering strategy.
- Reduce non-household (business) demand by 8.5% by 2050 against a 2019-20 baseline.

We have not previously targeted any reduction in business demand, as it is variable and dependent on economic growth and wider conditions. Non household customers are highly diverse in the way that they use water, so not all will have significant scope to reduce demand. We have developed a preliminary strategy for reducing usage by targeting customers who can benefit most in terms of reducing their water bills and who have the greatest scope for reductions. We will achieve this through water efficiency audits, advice and tools as part of the service that we offer to help maintain high business customer satisfaction scores. We will undertake 'deep dive' water efficiency audits for 350 customers per year, and run water efficiency mini audits for 650 businesses per year.

This approach will reduce NHH demand by around 3.6 Megalitres per day from the baseline forecast for 2029-30, or around 2%. However, the forecast NHH demand is rising so there will be minimal observed reduction overall in this period. As shown in Figure 33 (below) the reduction will be greater in future AMP periods.

Figure 33 Business demand



In AMP8 we will continue to bear down on leakage levels through trunk mains repairs and network detection and fix. We will help household customers to reduce water usage and step up activity to support reductions in business demand. This will be facilitated by two key programmes that will support each other:

1. We will continue and expand Project Cartref, undertaking 2,000 'leaky loo' customer appointments per year and fixing internal leaks at 3,000 properties per year following smart meter installation. The associated enhancement investment is £20 million.
2. We will implement our new Metering Strategy as outlined below. The metering strategy is forecast to reduce overall demand by 37 Ml per day by the end of AMP8 and 96 Ml per day by 2050. The associated enhancement investment is £125 million.

Our AMP8 targets against the three PCs in this area are shown in the table below:

AMP7			Actual	Forecast		PR19 FD
Performance Commitment	Measure	Units	2022-23	2023-24	2024-25	2024-25
Leakage	Leakage (megalitres per day)	Ml/d	253.2	225.3	191.3	N/A*
Leakage	Leakage (% reduction on 2019-20, 3 year rolling average)	%	-11.5%	-10.4%	-2.8%	13.3%
Per capita consumption	PCC (litres per person per day)	l/d	148.7	143.4	142.8	N/A*
Per capita consumption	PCC (% reduction on 2019-20, 3 year rolling average)	%	-6.2%	-2.2%	0.5%	6.3%
Business demand	Business demand	Ml/d	172.8	172.7	168.8	-
Business demand	Business demand (% reduction on 2019-20, 3 year rolling average)	%	8.7%	4.6%	3.7%	-

* The PR19 Performance Commitment was set in terms of percentage reduction.

AMP8		PR24 PC targets					LTDS
Performance Commitment	Measure	2025-26	2026-27	2027-28	2028-29	2029-30	2050
Leakage	Leakage (megalitres per day)	187.8	183.9	180.8	178.0	172.7	85.0
Leakage	Leakage (% reduction on 2019-20, 3 year rolling average)	7.2%	13.6%	15.2%	16.7%	18.4%	50%
Per capita consumption	PCC (litres per person per day)	141.0	139.0	136.9	134.9	133.0	110
Per capita consumption	PCC (% reduction on 2019-20, 3 year rolling average)	2.3%	3.3%	4.6%	6.0%	7.4%	25.1%
Business demand	Business demand	168.9	168.9	169.0	169.0	169.0	-
Business demand	Business demand (% reduction on 2019-20, 3 year rolling average)	4.5%	5.2%	5.2%	5.1%	5.1%	8.5%

Metering strategy

Following a detailed review since 2020 we have finalised a new metering strategy that will be implemented from AMP8 onwards.

Our approach to customer metering in AMP7 is largely reactive, responding to customers' demand to switch to a meter (meter 'optants'), installing in newly built properties, and replacing faulty/damaged meters (reactive replacements). Metering is promoted as an option to reduce bills for low-occupancy households, particularly those on low incomes. Approximately 46% of our customer base is metered (March 2021) compared to an industry average of 63%.

Our meters are mostly manually read, as are the meters that will be installed over the course of AMP7. However, the advance of smart metering in other sectors, and the control it gives consumers over usage, is driving customer expectation of this functionality for their water service. It is unlikely that customers in 2050 will consider our current approach to be acceptable and therefore change is required.

From 2025 we propose to move to a strategy of installing 'Smart' meters on unmeasured properties by geographical area. In the first instance these will be unbilled meters and will remain so until there is a change of occupier; this approach is known as 'progressive metering'. We have used a bespoke investment model to examine the cost benefit ratios for a number of delivery options for both Automatic Meter Reading (AMR) type meters and Advanced Metering Infrastructure (AMI) meters.

Based on evidence, AMR solutions are currently most cost effective, but this is largely dependent on the cost of data network infrastructure used in integrating AMI type meters. We are investigating the implementation of AMI ready meters and the pathway between AMR and AMI in AMP8 through discussions with meter manufacturers.

Through our strategy we will increase the level of metering to 79% by the end of AMP8 and 96% by 2050 (no water company has yet to achieve 100%) and the demand forecasts include savings achieved from both better data and communication with customers and the identification of leakage on customer properties. The metering strategy is forecast to reduce overall demand by 37 Megalitres per day by the end of AMP8 and 96 Megalitres per day by 2050. Source: Draft WRMP24 (link).

8.5 Supply interruptions

Welsh Water 2050: Strategic Response 3

Improving the reliability of drinking water supply systems

"Faced with an increased risk of outages due to agricultural run-off, extreme weather events, terrorism, and cyber attacks, we will build more flexibility and integration into our water treatment and supply systems."

PR24 Forum Strategic Steers

We expect DCWW to make significant improvements to performance levels between now and 2050, phased across AMPs to minimise impact on customer bills to achieve:

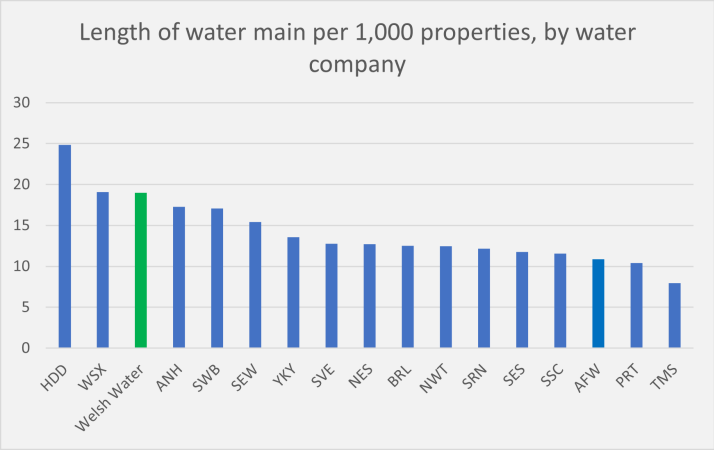
✓ Water supply interruptions: 2 minutes

Background and track record

Much of our supply network was built during the period of heavy industrialisation of South Wales, and is therefore not optimally designed for today's needs. For example, oversized pipes create problems with regulating flows associated with sediment build up and incidents of discoloured tap water.

Because of our dispersed population across rural areas we have a proportionately larger network of water mains (see Figure 34). We operate our network under high pressure, largely due to the fact that our most populous areas are gravity fed from upland reservoirs. High pressure makes mains bursts more frequent and more difficult to fix safely.

Figure 34



We operate more than 3,700 kilometres of Asbestos Cement (AC) distribution mains (see Figure 35), around 13% of the total, but concentrated in western and northern areas. These mains are failing more frequently than other materials, leading to higher levels of bursts and leaks which often cause interruptions to supply. This is increasingly the case partly due to climate change: we observe higher failure rates in summer as high temperatures and dry conditions increase loading, and climate change is exacerbating this problem. Burst rates are also related to ground conditions, with wetter areas seeing higher numbers of bursts.

Figure 35

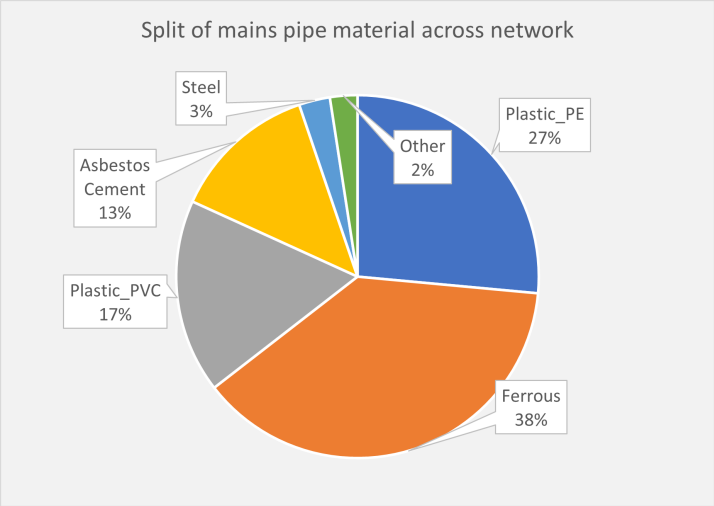
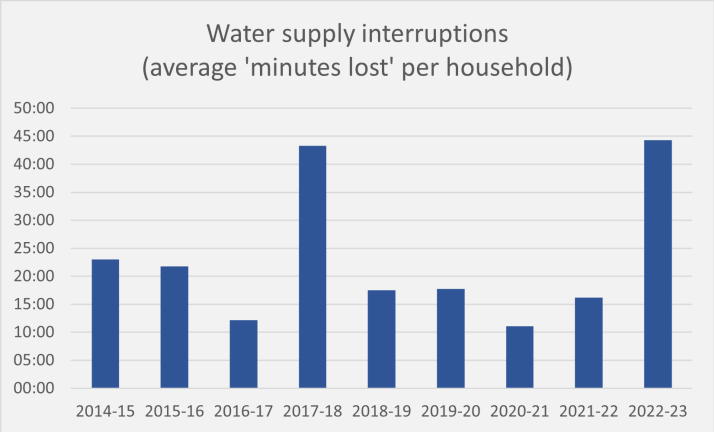


Figure 36 Welsh Water record on supply interruptions



The primary measure of water supply interruptions is 'customer minutes lost'. Our performance since 2014, when this measure was established, has varied from year to year, largely driven either by severe weather events or other major incidents (see Figure 36). Prior to 2014 we made significant improvements in performance, though reporting on supply interruptions was then on a different basis, with companies reporting the number of properties affected by different outage durations.

In our PR19 Business Plan we proposed a Supply Interruptions PC target of 8 minutes for 2025. At the Final Determination a target of 5 minutes for all companies was set by Ofwat. While we accepted the Final Determination in the round and agreed to strive towards this target, our original goal of achieving 8 minutes remains challenging.

PR24 Performance Commitment: Supply interruptions

The Supply Interruptions PC is the sum of all supply interruptions lasting more than three hours in the year (sum of duration multiplied by households affected) divided by a company's total number of household customers. This gives a measure of the 'average interruptions per customer', sometimes known as 'customer minutes lost'. The PC does not exclude extreme weather events from the contributing incidents. This means that despite all of the mitigations we put in place when extreme weather occurs there is in any given year a significant risk of failing the target owing to events beyond the company's control.

Our short-term Supply Interruptions performance during AMP7 has been disappointing. While we are doing everything we can to learn from our experience to respond more effectively, performance has been repeatedly affected by major incidents and extreme weather. The result in 2022-23 was particularly disappointed at 44:31 against a target of 5:45.

Extreme weather and supply interruptions 2022

2022 was the driest year since 1976 and July's severe heatwave saw temperatures in Wales soar to a record high of 37.1°C. The dry soil increased the number of bursts on our pipes, particularly our cement pipelines in West and mid Wales, exacerbated by ground movement.

The impact on our supply interruptions PC was then compounded by the 'freeze/thaw' event in December. Temperatures in Wales dipped to the lowest levels since 2010 and were well below freezing for around a week before returning to mild levels virtually overnight. In the west a temperature swing of 6.7°C saw the fastest rise in winter temperature in a single day since the record-breaking winter of 1947. This significantly impacted our supply interruptions target due to the number of pipe bursts caused by the rapid change in temperature, with AC mains particularly susceptible. A small number of customers across very rural parts of Ceredigion, Mid Wales and Herefordshire lost supply for an unacceptably long period.

We carried out a thorough lessons-learned review following the freeze-thaw with the results reported to the Welsh Government and Ofwat. To help improve our response times to interruptions we are delivering organisational changes to centralise our response to bursts out of hours and where we locate our response teams locally. This move to a more responsive 24/7 operation aims to reduce the time taken to mobilise our tankers, for our repair teams to respond, and to allow water to be brought in from other pipelines where possible. Our longer term plans are to move a more predictive capability based on our SMART Networks programme.

We have also struggled to improve underlying performance in supply interruptions from bursts, despite making all possible refinements to factors such as pressure management, availability of equipment and optimising mains repairs practices. This is due to an increasing rate of failure of asbestos cement (AC) mains that are over 50 years old. We have undertaken extensive modelling of the current rate of deterioration in performance of AC mains and forecast that into the future under differing climate and investment scenarios.

Stakeholder and customer views

In Ofwat and CC Water's 'Priorities' research, water supply interruptions were placed in the most important category of performance measures. Supply interruptions can affect customers directly, although the impact depends on whether customers are forewarned, and the timing and duration of the interruption.

In our own research, customers considered the issue of 'reducing the risk of major supply interruptions' to be a high priority, particularly for older customers, and part of the core remit of water companies, with 65% of customers saying they 'care a lot' about it. Figure 9 PR24: P1 research - Ranking of service issues. But in our Phase 2 research only 24% of customers ranked 'being without water' as one of the top 3 priorities (out of 9) for investment over the long-term. See Figure 10 PR24: P2 research - importance of outcomes for customers.

In our 'Affordability and Acceptability' research customers reacted positively to the levels of supply interruptions currently achieved and our forward-looking targets.

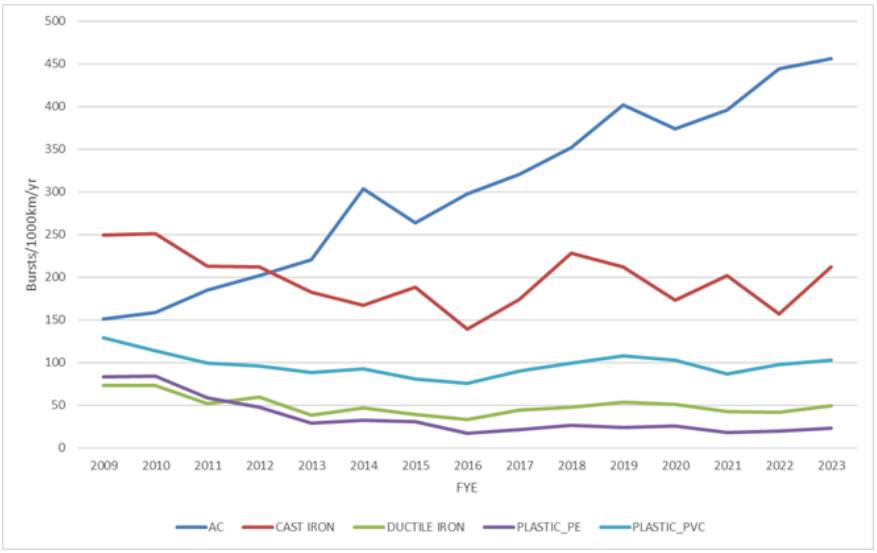
Long-term ambition and AMP8 plan

We will continue to seek operational solutions to drive improvements on this measure, but this cannot be achieved without additional investment to step up the replacement of AC mains. This is because we are finding that AC mains are now experiencing bursts with increasing frequency, and without addressing this our underlying performance on supply interruptions will deteriorate significantly. They are more vulnerable to the impacts of climate change, being subject to a higher burst rate in the summers when conditions are hotter and drier.

Across Welsh Water, AC mains now have the highest mains repair rate of any pipeline material, over double that observed on cast iron mains (the next highest), see Figure 37 (below). This rate of failure is also increasing rapidly whereas for other materials it is staying broadly constant.

Unless we take action to address this growing problem, in the future we will likely see significant declines in performance on supply interruptions with more repeat failures for certain customers and communities, as well as significant increases in operating costs.

Figure 37 Comparison of mains repairs rates for different pipe materials since 2009



Over the next 25 years we plan to replace sufficient AC mains to be able to hold burst rates constant. The related expenditure is included in our Long Term Delivery Strategy.

In AMP8 we are proposing to invest £66 million to replace a targeted 174 kilometres of AC mains with modern pipe materials. This will generate an improvement of 0:30 in our supply interruptions PC by 2030.

AMP7			Actual	Forecast		PR19 FD
Performance Commitment	Measure	Units	2022-23	2023-24	2024-25	2024-25
Supply interruptions	Supply interruptions (minutes lost per customer)	Mins	44:31	08:48	08:00	05:00
Mains repairs	Number of repairs per 1000 km of mains	No.	156	131	128	131

AMP8		PR24 PC targets					LTDS
Performance Commitment	Measure	2025-26	2026-27	2027-28	2028-29	2029-30	2050
Supply interruptions	Supply interruptions (minutes lost per customer)	04:54	04:48	04:42	04:36	04:30	02:00
Mains repairs	Number of repairs per 1000 km of mains	127	126	125	124	122	99

9. Wider environmental and social value

9.1 Introduction

While our core duties to the environment through our wastewater and abstraction activities are covered in previous chapters , we also have the explicit objective of contributing to wider environmental goals, particularly addressing the Climate Emergency and the Nature Emergency declared in Wales. Many of the former core activities also contribute to the latter wider objectives - for example, improving river water quality, and in many cases transforming the quality of local rivers, estuaries and coastal waters, we have also improved aquatic biodiversity and the ecology of these waters.

> "The water companies in Wales contribute to the foundational economy in Wales and deliver essential services that play a vital role in our everyday lives. As major employers they are vital for our local economy as they are key providers of skills training and employment, they also have the resources and expertise to play a leading role in working collaboratively with local authorities, landowners, businesses and communities to protect our health and environment." (Source: Welsh Government Strategic Priorities Statement to Ofwat)

Ofwat has introduced two new industry Performance Commitments for AMP8 to track company's progress in this area:

- Greenhouse Gas Emissions
- Biodiversity.

We have been making contributions in these areas for some time. We launched our Net Zero Carbon Strategy in 2021 (link), and published our first Biodiversity Plan in 2017 (link). These commitments are part of being a sustainable business, and formed an important part of our Welsh Water 2050 strategy published in 2018 (link).

We also cover the benefits that we offer in terms of societal mental health, wellbeing and education, through our visitor centres and education programme.

Customer and stakeholder views

In our Phase 1 customer research, "Promoting carbon neutrality and other environmental benefits" came out fairly low in the list of customers' priorities for investment (see Figure 9 PR24: P1 research - Ranking of service issues). This is perhaps to be expected given that achievement of these objectives is not a core part of what we do, and so is unlikely to be a top priority. The research also suggested that customers have a low level of understanding as to how water companies can contribute in these areas through their activities.

Wales has strengthened its legislative framework to reduce greenhouse gas (GHG) emissions through The Environment (Wales) Act 2016, and has set out its legal commitment to achieve net zero emissions by 2050, with an aspiration to achieve that sooner. In 2021 the Senedd put the Welsh Government's commitment to achieve Carbon Net Zero by 2050 into legislation (link).

The Welsh Government's SPS to Ofwat stated that water companies should "adopt practices and behaviour which act as an exemplar and positively enable change to achieve a net zero carbon society in Wales." The SPS makes clear that the Welsh Government expects companies to develop plans to achieve net zero on the basis of both operational and embedded carbon emissions. This is why we have committed to achieve net zero on total carbon emissions by 2040.

We have consulted with the IEAP on our approach to and plans for GHG emissions reductions and on our new biodiversity strategy. These discussions are now finalised and we have published revised targets and plans in accordance with the advice we have received.

The National Environment Plan issued to Welsh Water for PR24 includes specific drivers on carbon emissions and biodiversity for the first time.

9.2 Greenhouse gas emissions

PR24 Forum Strategic Steers

- We expect DCWW to reduce total greenhouse gas emissions (operational and embedded) emissions by 90% by 2030 (against a 2010 baseline), and to zero by 2040.

Context and track record

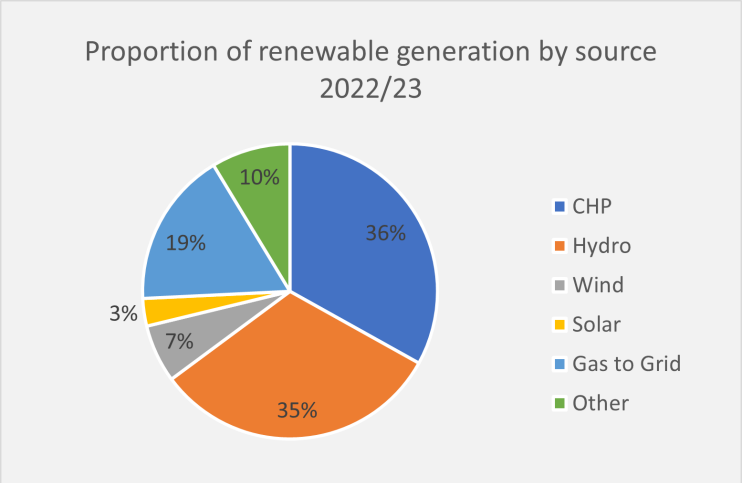
Welsh Water is one of the largest energy users in Wales, with an annual energy bill of over £66 million. We are also an energy producer, generating enough to power 25,000-35,000 homes.

Many of our processes are energy intensive, particularly operating treatment works and pumping water and wastewater. This can easily be measured and is well understood in terms of effective carbon emissions.

The other major source of GHG emissions is fugitive emissions, mainly nitrous oxide and methane, associated with wastewater treatment. This area is less well understood but is the subject of ongoing research across the industry. Welsh Water is undertaking sector leading research into process emissions in readiness for AMP8 with a number of monitoring projects assessing actual emissions arising from all types of wastewater treatment works. The most recent figures suggest that the level of fugitive emissions of Welsh Water may be more than twice as high as the reported level, with a similar picture emerging for other water and sewerage companies.

Fugitive emissions are likely now to be the single largest remaining source of GHG emissions in Welsh Water, though these are still estimates. This would have a significant impact on our Scope 1 and Scope 2 greenhouse gas emissions, meaning it will be vital to allow the baseline for any forward-looking PC to be adjusted accordingly. Clearly this will also significantly increase the challenge of meeting net zero carbon.

Figure 38



We have been on a journey to reduce our energy use and hence tackle greenhouse gas emissions for some time, having achieved an 80% reduction in operational GHG emissions since 2010. In 2022-23 we generated 22% of our own energy needs. This is behind the target (33%) on the current PC, which is measured as the electricity generated and gas injected to grid as a percentage of all electricity and gas consumed by the company. This is due to comparatively low rainfall and an extensive reservoir investment programme affecting hydro-electric generation. Hydro-electric generation makes up almost 50% of our renewable electricity generation.

We still expect to achieve the target of generating a third of our own energy needs by 2025. The remainder of our energy needs are procured from 100% renewable energy sources.

The figure below shows the estimated total carbon footprint of the company, with a breakdown of the main carbon emission sources (i.e. net emitters, and net carbon sinks) and illustrates the progress we have made to date on reducing our total carbon footprint over the last decade, resulting in a 65% reduction compared to a baseline footprint of 335kton (+/- 15kton) in 2010-11.

Figure 39

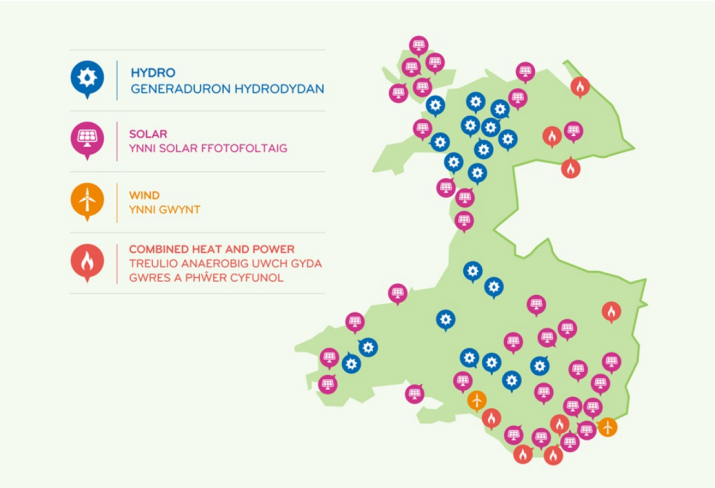
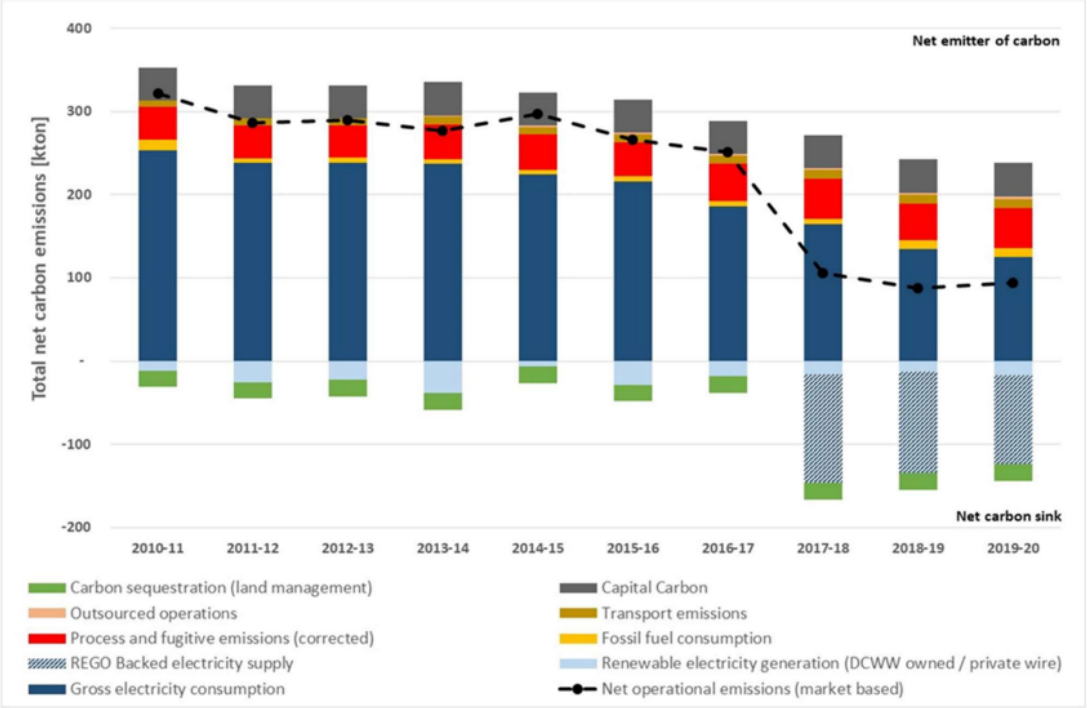


Figure 40 Welsh Water's historical net carbon emissions



It should be noted that the field of measuring carbon emissions is constantly evolving and we remain committed to openly declaring any changes resulting from improvements in measurement, even if it adversely affects our reported performance.

Moving forward we recognise that transitioning to a low carbon society is vital to improve the social, economic, environmental , and cultural well-being of Wales and meeting international obligations, and we are committed to playing our part.

Stakeholder views and NEP requirements

Our plans on achieving net zero are in large part driven by the Welsh Government's ambitions and its direction that water companies should be leading the way in moving towards net zero for Wales. Wales strengthened its legislative framework to reduce greenhouse gas emissions through The Environment (Wales) Act 2016, and has set out its legal commitment to achieve net zero

emissions by 2050, whilst pushing to get there sooner. To meet the declared climate emergency the Welsh Government is championing Race to Zero pledges for Wales public sector organisations. Welsh Water signed up to the UNFCCC Race to Zero in February 2021 (link).

The Welsh Government stated in its SPS to Ofwat that water companies should "adopt practices and behaviour which act as an exemplar and positively enable change to achieve a net zero carbon society in Wales." The SPS also makes clear that the Welsh Government expects companies to develop plans to achieve net zero on the basis of both operational and embedded carbon emissions.

The NEP includes a driver relating to the planning and delivery of mitigation measures to deliver the decarbonisation outcomes, including ultimately net zero emissions by 2040.

Ofwat has introduced a new common industry PC for AMP8 which will report operational, location-based, GHG emissions for water and wastewater separately, normalised across companies by water volumes (see box below).

PR24 Performance Commitments: Operation Greenhouse Gas emissions (water/wastewater)

There are two PCs for PR24, one for water emissions and one for wastewater emissions. Companies will report in terms of tonnes of carbon dioxide equivalent, and the percentage change since 2021-22. It will also be reported as kilogrammes of carbon dioxide equivalent per megalitre of distribution input as an indicator of 'carbon intensity'.

The measure will include Scope 1 (direct emissions), Scope 2 (indirect emissions on a location basis rather than market basis) and selected Scope 3 emissions (emissions that occur in the value chain). It does not include embedded carbon from capital investment, reflecting the lower level of maturity in achieving consistent and robust reporting of embedded carbon. The PC only allows a very limited reduction from the use of credible offsets. The industry will be reporting embedded carbon in companies' Annual Performance Reports, with a view to potentially widening the scope of the PC in the future.

The common industry PC does not align with our Net Zero Carbon strategy targets, our commitments to the Welsh Government, and the Welsh Government's guidance as set out in the SPS. The 'intensity' measure will be subject to significant swings year-on-year resulting from variances in rainfall which significantly impact on wastewater energy consumption from pumping, for example.

We will therefore continue to target reductions in absolute total carbon emissions as per our Net Zero strategy, while at the same time meeting Ofwat's requirements for reporting. Our 2040 net zero commitment is clear that it includes embedded carbon emissions from construction. We will continue to make every effort to reduce all aspects of our carbon footprint to achieve this outcome.

Long-term ambition and AMP8 plans

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Achieving Net Zero carbon emissions by 2040 and promoting a circular economy

"Faced with a changing climate and increased energy costs we aim to reduce our total carbon emissions by 90% by 2030 and achieve carbon neutrality by 2040. We will also maximise opportunities to reuse treated water and other potentially valuable natural materials, contributing to the circular economy in our local region."

Our long-term ambitions for energy self-sufficiency are set out in our *Journey to Net Zero* strategy, published in 2021. It sets out how we aim to become carbon neutral (on total carbon emissions) by 2040, and an energy neutral business by 2050. As it includes *total* emissions, our strategy goes further than the target set by the English water companies of net zero *operational* emissions by 2030. Our target takes into account the total carbon emissions throughout the lifecycle of our assets, including construction and operation, as well as fugitive emissions.

Offsets will likely form a key part of ongoing carbon reductions, as other reductions will simply be inadequate to counteract increases in embedded emissions in capital investment required to meet other environmental outcomes such as reducing phosphorous levels in rivers, especially where conventional solutions are necessitated due to catchment sensitivity. Any offsets that we do use will be credible and permanent, and where possible we will seek to align interventions to support wider objectives such as biodiversity.

We are making significant progress on GHG emissions in AMP7. Owing to the increase in energy prices we have brought forward some investment originally planned for AMP8. These will increase energy efficiency and increase our capacity to generate biomethane to sell as 'gas to grid'.

In order to meet continue progress to our Net Zero commitments we are proposing an enhancement investment of £42 million (capex) for schemes specifically or primarily intended to reduce operational GHG emissions. It will deliver an advanced process control system to reduce nitrous oxide emissions and reduce energy consumption, as well as a network control system to further reduce energy consumption and GHG emissions. It will achieve a reduction of more than 20,000 Tonnes of emissions, mostly on the wastewater side through reductions in process emissions.

Acting against this will be the increase in Scope 2 and 3 emissions resulting from new schemes, such as enhanced processes at water treatment works that will increase energy and chemicals use, and a significant increase in embedded emissions resulting from the major step up in capital investment, mostly needed to deliver on our environmental obligations under the NEP and WINEP (see 6. Protecting and improving the environment). Over the longer term much will depend on the extend to which we are able to use nature based 'green' solutions rather than 'grey' solutions. This is subject to considerable uncertainty and is dependent on the outcome of trials, and discussions with our regulators which are ongoing - see Section 4.2 Building the right investment planfor further details.

The overall result in terms of the common Performance Commitment will be the change in the GHG emissions PC figures shown below. As noted above, most of the progress made towards the 2030 reductions will be achieved through investment in AMP7, with a smaller reduction in AMP8 reflecting an anticipated upwards restatement of wastewater process emissions, and constraints on the overall size of the plan. To reiterate, while we will report against the common PC, we will continue to target a different measure which is the maximum reduction in *total* carbon emissions as per our Net Zero strategy, aiming for net zero by 2040.

AMP7			Actual	Forecast	
Performance Commitment	Measure	Units	2022-23	2023-24	2024-25
Greenhouse Gas Emissions	Greenhouse gas emissions (water)	Tonnes	49,087	35,248	21,408
Greenhouse Gas Emissions	Greenhouse gas emissions (wastewater)	Tonnes	97,101	77,323	57,544
Total emissions	Greenhouse gas emissions (water and waste water)	Tonnes	146,188	112,570	78,952
Reduction from 2021-22 baseline	Greenhouse gas emissions (water)	%	26%	47%	68%
Reduction from 2021-22 baseline	Greenhouse gas emissions (wastewater)	%	15%	32%	50%

AMP8		PR24 PC targets					LTDS
Performance Commitment	Measure	2025-26	2026-27	2027-28	2028-29	2029-30	2050
Greenhouse Gas Emissions	Greenhouse gas emissions (water)	20,730	20,052	19,374	18,696	18,020	0
Greenhouse Gas Emissions	Greenhouse gas emissions (wastewater)	57,001	56,457	55,914	55,370	54,827	0
Total emissions	Greenhouse gas emissions (water and waste water)	77,731	76,509	75,288	74,066	72,847	0
Reduction from 2021-22 baseline	Greenhouse gas emissions (water)	69%	70%	71%	72%	73%	100% (2040)
Reduction from 2021-22 baseline	Greenhouse gas emissions (wastewater)	50%	51%	51%	52%	52%	100% (2040)

9.3 Biodiversity

PR24 Forum Strategic Steers

- ✓ We expect DCWW to be ambitious in its proposals to improve biodiversity given its extensive landholdings and the nature of the business. It is in a position to make a significant contribution to achieving national targets set by NRW.
- ✓ We expect DCWW to support national targets for at least 30% improvement of protected sites and habitats by 2030, 30% improvement of condition of SSSI, SAC and RAMSAR sites, and 10% improvement of woodland from unfavourable to favourable condition by 2030.

Context and track record

Our biodiversity mission is to maintain and enhance biodiversity within the fulfilment of our functions for the wellbeing of current and future generations.

Our Biodiversity Strategy sets out our ambitions, objectives, and action plans to maintain and enhance biodiversity and ecological resilience across our operational assets and landholdings, within the fulfilment of our core duties (link). Our approach is to support NRW and the Welsh Government to address the biodiversity crisis we face in a way that is aligned with delivery of our functions.

Our strategic objectives focus on the following areas:

1. Restore habitats and look after the protected sites in our ownership
2. Work in partnership with our regulators and stakeholders and promote research opportunities
3. Improve the management of invasive non-native species (INNS)
4. Develop and engage our colleagues as ambassadors and work better to understand our customers' expectations
5. Maintain and enhance biodiversity at our operational assets and landholdings

We are required under the Environment (Wales) Act to prepare and publish a report every three years to demonstrate that we have achieved our biodiversity duty. Our most recent report is entitled 'Doing the Right Thing for Nature 2022' , which sets out progress against the plans contained in the original 2020 'Making Time for Nature' plan (link).

Much of what we do, particularly on the wastewater side of the business, helps to improve ecosystems and biodiversity in our rivers and marine areas as part of our day-to-day functions. However we seek to go further than this wherever possible and where it represents good value for money.

To-date we have leveraged over £15 million of available funding from third parties, including the European Union's 'LIFE' Programme which supported by the Welsh Government, to improve river habitats and water quality on multiple SAC rivers. £13.8 million is being invested into urgent conservation challenges over the period 2022-27. See our Biodiversity Strategy 2022 for details (link).

A key challenge is the current lack of robust data on the state of biodiversity on our land holdings, particularly in relation to specific sites and species, something which we are seeking to address. We are working with NRW to clarify requirements on landowners in relation to Habitats Directive designated sites to move them into favourable condition from 2025.

Stakeholder views and legislative requirements

Section 6 of the Environment (Wales) Act 2016 states as follows: "A public authority must seek to maintain and enhance biodiversity in the exercise of functions in relation to Wales, and in so doing promote the resilience of ecosystems, so far as consistent with the proper exercise of those functions." (NB Welsh Water is a public authority for the purposes of the Act, as a statutory undertaker). This is seen as a key driver to maximise the contribution from the public sector towards achieving the objectives of the Nature Recovery Action Plan (NRAP).

NRW expect us to contribute to the "30 by 30" commitment and other national goals which include:

- At least 30% improvement of protected sites and habitats by 2030 (including SSSI, SAC and RAMSAR sites)
- 10% improvement of woodland from unfavourable to favourable condition by 2030
- 5% increase in total area of woodland on Welsh Water owned land (around 200,000 trees)

We have confirmed that we will support these objectives. NRW have also set out targets for water companies as shown below:

- By 2040: maintain and enhance biodiversity and ecosystem resilience across Water Company land (and relevant third party land).
- By 2050: All water company assets, processes, services, activities, and land are managed in a sustainable way to maintain and enhance biodiversity and in so doing promote the resilience of ecosystems.
- By 2050: Achieve biodiversity net benefit in all water companies' activities so maintaining and enhancing biodiversity on water companies' land.

In its PR24 methodology and its *PR24 and beyond: Creating tomorrow, together* (2021) document Ofwat acknowledged public concerns about the environment and biodiversity loss. It wants to see companies making contributions to biodiversity, including through the increased use of nature-based solutions where appropriate.

As noted above, customer views on the level of priority water companies should give to biodiversity enhancement are difficult to discern. The levels of investment required to achieve the targets set by NRW are likely to be small in comparison to the more material investment in assets described in other sections, so the impact on customer bills will be minimal. In general we believe that customers would support us making a modest contribution to the nation's aspirations to address the Nature Emergency in line with the environmental regulator's expectations.

Long-term ambition and AMP8 plans

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Supporting ecosystems and biodiversity

"Biodiversity faces threats including habitat loss, fragmentation and over-exploitation. In the longer term, temperature and changed rainfall patterns will also impact biodiversity. We will look for ways to help nature, enhance biodiversity and promote ecosystem resilience while we carry out our water and sewerage activities. Welsh Water has a duty under the Environment (Wales) Act (2016) to enhance biodiversity and promote the resilience of ecosystems in the exercise of our functions."

Our revised Biodiversity Action Plan, published in 2020, set out 30 commitments in pursuit of achieving our mission for biodiversity cited above. Many of the steps require multi-stakeholder involvement and we will continue to look for opportunities to work in partnership with public authorities, environmental groups and others in pursuit of the objectives.

As part of our Biodiversity Strategy 2022, £9 million will be invested into bringing four Welsh rivers into good condition – the Teifi, Cleddau, Tywi and Usk with an estimated 500 kilometres of river improved. In addition to this over £4.5 million will be invested to conserve quaking bogs. Areas targeted will include Crymlyn Bog on the outskirts of Swansea as well as St David's in Pembrokeshire and on the Llŷn Peninsula. Not only will this project restore the peat land but also help preserve very rare species – including Britain's largest spider, the great fen raft spider at Crymlyn and the marsh fritillary butterfly in Pembrokeshire and Gwynedd.

Dee River 'LIFE' Project

LIFE Dee River is a £6.8m project funded through multiple stakeholders, including Welsh Water, to transform the River Dee and its catchment by restoring the river and its surroundings back to their natural state. The Dee is the largest river in North Wales and is a highly regulated river as well as being designated as a Special Area of Conservation (SAC).

The project which started in 2019 and is due to complete in December 2024 will look to remove the constraints to fish migration and improve wider ecological connectivity, restore or improve physical features along river banks, improve agricultural and forestry land management practices to reduce the input of nutrients and sediment entering the SAC, as well as establish and build long-term positive relationships with key stakeholders during and beyond the life of the project. The project will also initiate conservation management for the critically-endangered freshwater pearl mussel.

For more details see ( ).

Almost all our biodiversity work over the last 10 years has been in partnership with a public body such as NRW, or an environmental trust like RSPB. We will build on these partnerships to progress improvements to both aquatic and terrestrial environments in the fulfilment of our functions, and to leveraging funding from elsewhere such as we have done in AMP7 with the two 'LIFE' bids.

We will also work to support the actions of others to progress initiatives, such as nutrient trading, that will have biodiversity benefits on land not belonging to Welsh Water. Such systems should enable us to increase the overall value of investments during AMP8. We will measure and report leveraged value as part of our three-yearly biodiversity reports.

Biodiversity Performance Commitment for PR24

Ofwat is introducing a Biodiversity PC for PR24. The PC records the increase in the number of 'biodiversity units' on land 'nominated' for the purpose of the measure. The measure of units of biodiversity is based on a tool which looks at a combination of factors (including condition and distinctiveness) which serve as a relatively crude proxy for biodiversity value on land area, hedgerows, and water bodies (henceforth 'land', for simplicity). The tool is used to survey the land every three years to establish the number of units, which is compared with the previous year to capture the increase.

Before targets can be set for the Biodiversity PC, the relevant land needs to be specified. Following NRW guidance we intend to nominate land that has 'protected' status under Habitats Regulations. We are in the process of defining this land area, working closely with NRW. We expect the process to be complete by the end of October 2023.

We will then need to survey this land in detail to a) establish its current condition, and b) assess the potential for interventions to meaningfully increase biodiversity. This will enable us to estimate the potential for increasing the number of 'biodiversity units' according to the PC.

This will be an intensive and costly process. Since the surveys will continue on a rolling basis, the introduction of the PC will require a step change in our capacity to undertake or fund this kind of biodiversity evaluation activity, in addition to the resources required to implement measures to maintain and enhance biodiversity.

Our primary focus will be to meet the multiple objectives agreed with NRW as set out above. In doing so we expect to be able to make significant increases against the Biodiversity PC. For the reasons set out above, we are not yet in a position to forecast our medium or long-term ambition in terms of the PC at this time. We will work with NRW, Ofwat and Welsh Government to work towards setting out our commitments and the related incentives to a practical timescale.

The main improvements that we make to biodiversity in AMP8 in real terms will be in aquatic environments, related to the capital programme and delivery of the NEP. We will also be conducting a major programme of monitoring of the chemistry and ecology of our rivers in support of the WFD classification work undertaken by the Welsh Government and NRW. We will therefore be delivering benefits that go substantially beyond the scope of the Biodiversity PC.

9.4 Bioresources and the circular economy

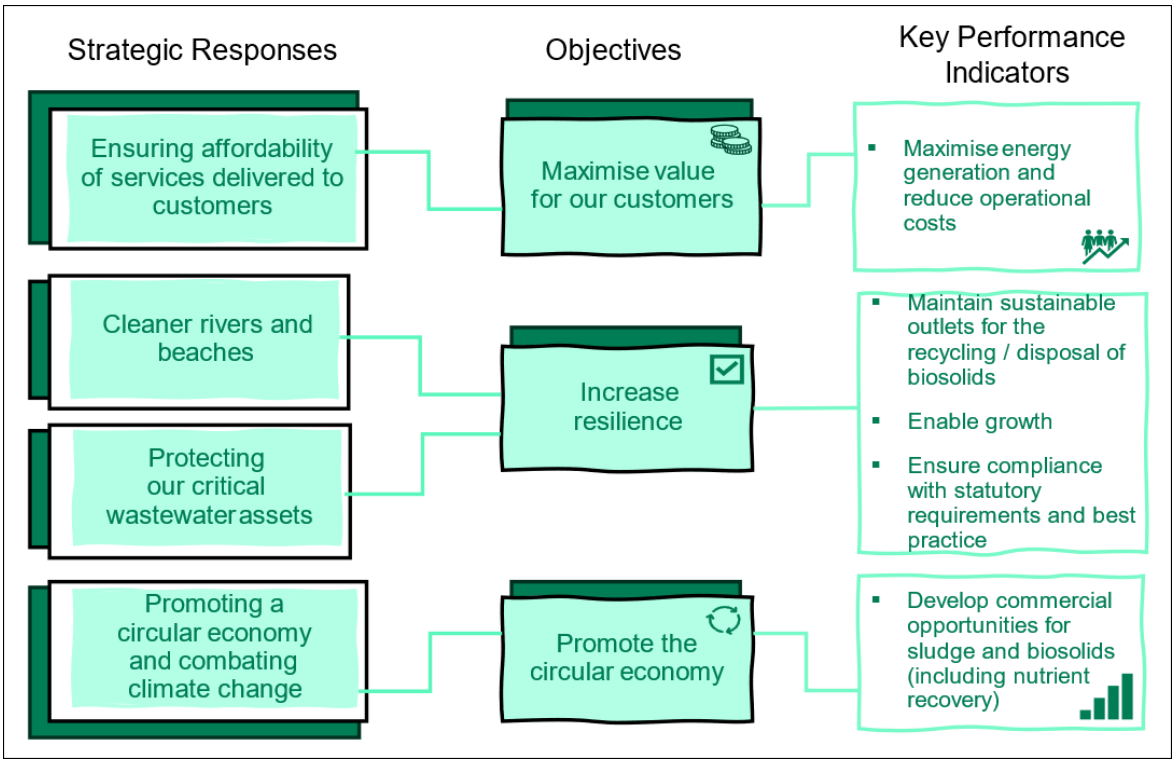
Background and track record

The effective treatment and removal of sludge that is the by-product of the wastewater treatment process is both crucial to our own activities and the wider environment. Without effective sludge removal, wastewater treatment works soon fail to operate properly with harmful consequences to rivers or coastal waters. We generate energy from Advanced Anaerobic Digestion processes which reduces our carbon footprint and supports the circular economy. The final product, biosolids, is recycled to agricultural land, adding value to farmers by increasing fertility and improving soil quality.

Our Bioresources Strategy for AMP8 is published alongside this Business Plan as document (WSH37-Welsh Water PR24 Bioresources Strategy). It is designed to support our responses to the strategic risks identified in Welsh Water 2050, notably landbank availability and decarbonisation. Two of the three strategic objectives focus on how we will use the market to address these and related risks in AMPs 8 and 9. Our third strategic objective is concerned with how we will support the circular economy and create greater value for our customers. (See Figure 41)

Figure 41 Our Bioresources business in 2025

Figure 42 Welsh Water 2050 Strategic Responses and Bioresources Strategy Objectives



Engaging with the bioresources market

Since PR19 we have bid for and won the tender to provide sludge treatment services for Hafren Dyfrdwy. Through this contract we provide out-of-region sludge treatment for 95,000 customers. By using existing headroom capacity in Welsh Water assets, Hafren Dyfrdwy has avoided the need for costly capital investment on its own sites and saved money for its customers.

We have also actively sought to provide sludge treatment services to others. We entered into contract to provide access to our treatment capacity for Mayglothling, a waste management company. Through our annual market information publication and regular informal conversations, we share capacity information with our neighbouring water companies to provide cover for planned and unplanned downtime.

Over the current AMP 7 we expect to recycle 600,000 wet tonnes of biosolids to land. This improves soil quality and structure and provides nutrients such as nitrogen, phosphorus, sulphur, magnesium, potassium and other trace elements. It is a sustainable product which helps farmers to avoid the need for manufactured fertilisers, reducing the carbon footprint of food production.

We have continued to protect the Wye and Usk catchments through lighter spreading of biosolids and 'closed windows', which has enabled us to continue creating circular economy benefits for the region while complying with tighter regulations around nutrient spreading. We are also actively supporting the 'Nutrinet' planning and monitoring work in SAC catchments which is guiding the development of Welsh Government policy.

We have moved away from liming as a routine treatment, replacing it with advanced digestion. This has reduced the natural resources that we use. The volume of biosolids has reduced as a greater proportion of volatile solids has been converted to energy, and a larger amount of water is being removed and returned to the environment. The biosolids we produce are also more beneficial to our customers through being easier to handle and spread.

Our 100% enhanced biosolids product is industry-leading - 100% of our product has been BAS compliant since 2018. We will continue to maintain the quality of our product.

Customer and stakeholder views

The Welsh Government published its 'Beyond Recycling' strategy for the circular economy in 2021, and has made the circular economy a major plank of its programme for government. This contributes to its net zero strategy for Wales, reducing waste and reclaiming resources.

Plans for AMP8

We aim to do more in AMPs 8 and 9 to improve resilience of our bioresources activities in the face of climate change, evolving regulations, and customer and stakeholder expectations. This will include:

- **Increased storage:** To protect rivers and streams, it is sometimes necessary to avoid spreading sludge during certain periods. To further increase our ability to temporarily halt biosolids recycling operations, during AMP 8 we will invest in further strategic storage to raise our capacity from two to six months.
- **Nutrient recovery:** Nutrient recovery is a potential alternative to temporarily halting recycling operations to avoid the risk of excessive nutrients harming the environment. During AMP 8 we will investigate how nutrient recovery could enhance the viability of landspreading in nitrogen and phosphorus sensitive areas, aiming to shift into delivery in AMP 9.
- **New digestion capacity:** During AMP 8 we will obtain capacity in our northern region to supplement our existing capacity. We will explore the options for obtaining this, including through joint capacity with neighbouring water companies.

- **Market Buffers:** Despite our best endeavours, there may be short periods of time when we don't have enough capacity. Instead of being reactive in this area, we aim to continue to maintain our routes to market to provide buffers for any capacity shortfalls, including third-party liming. We will continue to offer support to our neighbouring water companies, and will consider opportunities to co-fund new capacity with our neighbours.
- **Biosolids to land alternatives:** During AMP 8 we will continue to engage with providers of alternative outlets for sludge and to develop readiness for this, for example through investing in drying research. We aim to be ready in AMP 9 to switch to alternative treatment if necessary, and will prepare options for this.

We have included in our plan the costs of providing sludge dewatering facilities at two of our water treatment works, Alaw and Velindre. This investment of £13.5 million is driven by legislation which puts restrictions on the spreading of sludge to land. It will prevent cost increases, provide greater resilience, improve the environment, and reduce carbon emissions associated with transportation.

In AMP8, we will add further value by hiring an addition three full-time equivalent agricultural advisors to support farmers in effective and compliant biosolids application.

The greatest opportunity we see in the market for AMP8 is in creating new products, and there are a range of areas we are exploring including carbon dioxide capture and reuse, hydrogen production, and fertiliser production. We will also use the potential that exists for suppliers and third parties to create solutions to the issues we will face, such as the need for more strategic storage, the need for low-cost drying, and the need to develop alternative outlets for biosolids.

There is exciting potential for alternative treatment providers including options for co-incineration of sludge with wastes, and use of innovative thickening and dewatering technologies. We will develop this further in AMP8.

9.5 Community, partnerships and recreation

Welsh Water 2050: Strategic Response 7

Working with customers and communities

"We will work with customers and communities to co-create solutions, share knowledge, and support initiatives which reduce water use, prevent sewer abuse, and provide wider benefits for communities and the environment."

Background and track record

We are not just a company like any other. Because of the nature of the service we provide, its reach, and our presence in local areas, we are embedded into the communities we serve. The vast majority of our 3,500 employees live in the communities we serve, as do a further 5,500 who support our work through our contract and supply chain. Partnerships with local communities and relationships with a wide range of organisations are very important to us. This helps us to deliver our responsibilities more effectively and find ways to offer wider benefits for communities and the environment.

Much of the work that we undertake requires support from local stakeholders and customers - from capital investment to maintain and upgrade our networks through capital investment , to our work with landowners in catchments; from the continued work with groups supporting vulnerable customers to our behaviour change activity on water efficiency and blockage reduction. Our partnerships with community groups, trusted individuals and organisations, have never been as important.

We have five visitor centres: at Llyn Brenig in north Wales, Elan Valley in mid Wales, Llandegfedd in south east Wales, Llys y Fran in the west, our new centre at Lisvane and Llanishen Reservoirs in Cardiff as well as two sites which provide recreational access at Lliw and Swiss Valley Reservoirs also in the west. In 2022-23 we received 739,000 visitors to these sites, surpassing our regulatory target of 720,000. This is a substantial increase on 450,000 five years ago.

New Visitor Centre Opened 2023

In July 2023 Lisvane and Llanishen Reservoirs in north Cardiff reopened as a visitor attraction, after seven years of work by Welsh Water, partners and the local community to bring them back into use. Once a popular recreational spot, the area was fenced off in 2001 and drained by owner Western Power Distribution with a view to developing the area for new housing. Local residents formed the Reservoir Action Group to fight for its future.

Welsh Water acquired a 999 year lease of the site in 2016 and embarked on a project to restore the reservoirs and their surroundings for public use. At a special event on 20 July 2023, chair of the RAG Richard Cowie said: "To be able to sit here today and see it all – it's absolutely fantastic. We've waited 22 years for this moment. One of our aims was to have the site become a recreational resource that the people of Cardiff could enjoy. We are very happy to see that this is what Welsh Water has basically created."

The site now includes a visitor centre with cafe and restaurant, and a recreational facility offering a wide range of water activities including open water swimming. The woodlands and local habitats have also been restored, offering valuable ecological benefits in a mainly urban area.

We are continuing with our longstanding education and customer engagement programmes to raise awareness of the services we provide and the role that customers themselves can play in ensuring a sustainable and cost efficient service. This programme has also seen an increase in numbers, from 62,000 in 2017-18 to over 80,000 in 2022-23.

We have also continued to have a strong presence at some of the key festivals in Wales such as the Royal Welsh Agricultural Show and the National Eisteddfod for Wales. Such events give us the opportunity to discuss issues directly with customers whist also educating them on behaviour change that can benefit both customers and the company alike.

In 2017 we launched our Community Fund, by which projects to support environmental improvements, health and wellbeing can apply for between £250 and £1000 to help make a difference in their local communities. The Fund has now provided over £450,000 to charities and community organisations across our operating area.

Following a successful pilot in AMP6, we have expanded our Water Resilient Communities projects, targeting communities that score poorly on the Welsh Index for Multiple Deprivation and have below average take-up of social tariffs. The projects have allowed us to target activity on a smaller geographic area, working with community groups and individuals to inform them about social tariffs, provide support for job seekers, enhance our education activity, and provide targeted debt and water efficiency advice. In AMP7 we have targeted Rhyl in North Wales, the northern part of the Rhymney Valley, and western areas of Newport.

Stakeholder views

While customers appreciate our role in communities and the recreation and visitor centres we provide, they do not consider it a priority for further investment. 'Giving more back to our communities (e.g. via education programmes and visitor centre) came bottom of the priorities list in terms of investment priorities in our Phase 1 customer research, though 26% of customers said that they "cared a lot" about it (see Figure 9 PR24: P1 research - Ranking of service issues). This is

understandable given the other more pressing priorities in our plan. We are therefore not expanding our visitor centres further in AMP8, though we will look for opportunities to do more in the longer term.

Our stakeholders and wider partners similarly support our role in communities and our wider activities in recreation and education, and would not wish to see a reduction in this activity going forward.

Long-term ambition and AMP8 plans

Having completed a major investment in a new visitor centre in Cardiff in 2023 (see box above) as part of our PR19 plans, we are not including any significant new schemes in this area in our PR24 Business Plan. We are committed to maintaining and, where we can, improving and extending what we already do without the need for enhancement expenditure. We are exploring opportunities for joint funding with third parties for new projects during AMP8.

Partnerships and collaborative working will become increasingly important as we step up the level of investment in the environment in AMP8, in order to achieve the maximum benefits for communities and wildlife.

10. Excellent customer services

Welsh Water 2050: Strategic Response 12

Leading edge customer service

"Changing customer expectations, the digital revolution and demographic and lifestyle change are all leading Welsh Water to further develop our customer service culture. We will harness technological change to provide a personalised service for customers through their preferred contact channel."

As a company without shareholders, we pride ourselves on focusing entirely on maximising value for customers and the environment. Our Vision since 2015 has been 'Earning the trust of customers, every day'.

While everything we do is in the pursuit of that Vision, this section is concerned specifically with retail services, and with the regulatory measures of customer satisfaction for each of the three principal classes of customers: households (C-MeX), non-household customers (B-MeX) and developers (D-MeX).

Water Fair

We have a small number of customers who suffer repeated or longstanding issues with their level of service. We are committed to tackling these issues over the long term, though there is likely to be a hard core of issues where no cost-effective solution currently exists. In the meantime, we have a Water Fair scheme to ensure that customers who fall into the 'worst-served' category for water or for wastewater are not charged for that service.

C-MeX and D-MeX differ from most of the other Performance Commitments in that companies are incentivised relative to performance across the industry. There are therefore no definitive targets in this Business Plan against these measures, although we target a top-3 industry position on each in line with the PR24 Forum's expectations. We can, however, examine our track record, provide relevant context, and explain what we are doing to ensure we remain strong performers on these measures over the long-term.

B-MeX is a common measure for business customer satisfaction for the two water companies operating 'wholly or mainly' in Wales, as the market in Wales for retail services for business customers is only partially subject to competition for these companies. We therefore continue to provide retail services directly to the vast majority of our non-household customers. Regulatory targets will be set for this measure as part of the PR24 process, and we set out our proposals below.

Track My Job

During AMP7, in response to feedback from customers as part of the PR19 process, we introduced the capability for customers to track the progress of an issue that requires an engineer to visit the customer's property – for example, responding to a sewer blockage or to fix a leak. Similar to the ability to 'track' a parcel delivery, customers are automatically sent updates and can track exactly where the engineer is on their way to the property. It was piloted in summer 2019 and has now being rolled out across most business areas that require visits to customers' properties.

This is an example of how we are adapting to keep up with customer service developments in other sectors and meet customers' changing expectations whilst bringing wider efficiencies for the business including a reduction in chase calls and abandoned visits.

Our retail teams play an important role in supporting customers with queries they have in relation to their account or our water and wastewater services generally. They are the main point of contact for our 1.4 million household customers and 100,000 non-household customers on matters as wide-ranging as an individual's credit file, or a manufacturing company's request for an increase in its metered supply.

It is vital that, regardless of how a customer chooses to contact us, they can be confident in the advice they receive and that promises will be kept. Our approach is to ensure that all customers find our services accessible and that, when they need to contact us, we are responsive to their needs and flexible in the solutions that we offer.

We are committed to retaining our Wales-based contact centre so that our customers can always call and speak to a real person in English or Welsh who can help them.

This section will explain in brief how our retail teams provide great value for money and ensure customers receive the standards of service they expect.

This section covers the following PR24 Performance Commitments.

- Household customer satisfaction (C-Mex)
- Business customer satisfaction (B-Mex)
- Developer customer satisfaction (D-Mex)

It will also cover services to customers who need extra support, and our debt management. Note that social tariffs, which are managed by our household retail business, are covered in Section 12.

10.1 Customer satisfaction: C-Mex

PR24 Forum Strategic Steers

✓ Target a top-3 position in the industry on overall customer satisfaction (C-Mex).

Context and track record

The environment in which we operate has changed considerably since the start of AMP7. This is particularly evident in technology, which has driven significant innovation in the retail, telecommunication, and energy sectors. Of equal significance, however, are the societal changes since 2020, including the impacts of climate change, a growing awareness of the water industry's role in the environment, the effects of lockdown and the Covid-19 pandemic, and more recently the cost of living crisis. Unsurprisingly these changes have impacted on customer expectations of the service we provide and we expect these changes to persist into AMP8.

We have a strong track record on C-MeX since it was introduced for AMP7 in 2020. In 2021-22 we were fifth of 17 companies, and in 2022-23 were placed fourth. This most recent year's performance was against the background of very difficult economic circumstances for our customers, and a higher-than-usual number of major service issues such as the impacts of the 2022 drought (which required hosepipe bans for a small proportion of customers) and supply interruptions caused by the freeze-thaw of December 2022.

Average combined household bills for Welsh Water customers are relatively high for England and Wales, owing to the high wastewater bill, for reasons to do with historic investment and the characteristics in our operating area. However, this does exert negative pressure on our C-MeX

score, particularly against the backdrop of the cost of living crisis. Wider perceptions of water companies, influenced by negative media reports and perceived performance, are also starting to affect survey scores.

C-MeX

C-MeX is a customer measure of experience and customer satisfaction. Ofwat is currently consulting on the details of the measure for AMP8. Historically it has comprised of two survey elements:

- Customer Experience Survey – a customer satisfaction survey amongst a random sample of the water company's customers; and
- Customer Service Survey – a customer satisfaction survey amongst a random sample of those customers who have contacted their water company.

It generates a score out of 100 which is the average of the results from four quarterly surveys, and allows performance to be compared across companies.

A consultation on changes to the definition of C-MeX for AMP8 is currently underway.

Customer and stakeholder views

In terms of customer service levels, in our 'Phase 1' research over half of customers said that their water company should offer the latest customer service technology (even at the expense of higher bills), but 70% of customers said they thought that providing a 'sustainable water future' was more important than 'high performing' customer service. In the same piece of research 53% of customers said they were 'Very satisfied' with their water company, and a further 42% said they were 'Satisfied'.

Figure 43 PR24 Phase 1 customer research - preferences on customer service.

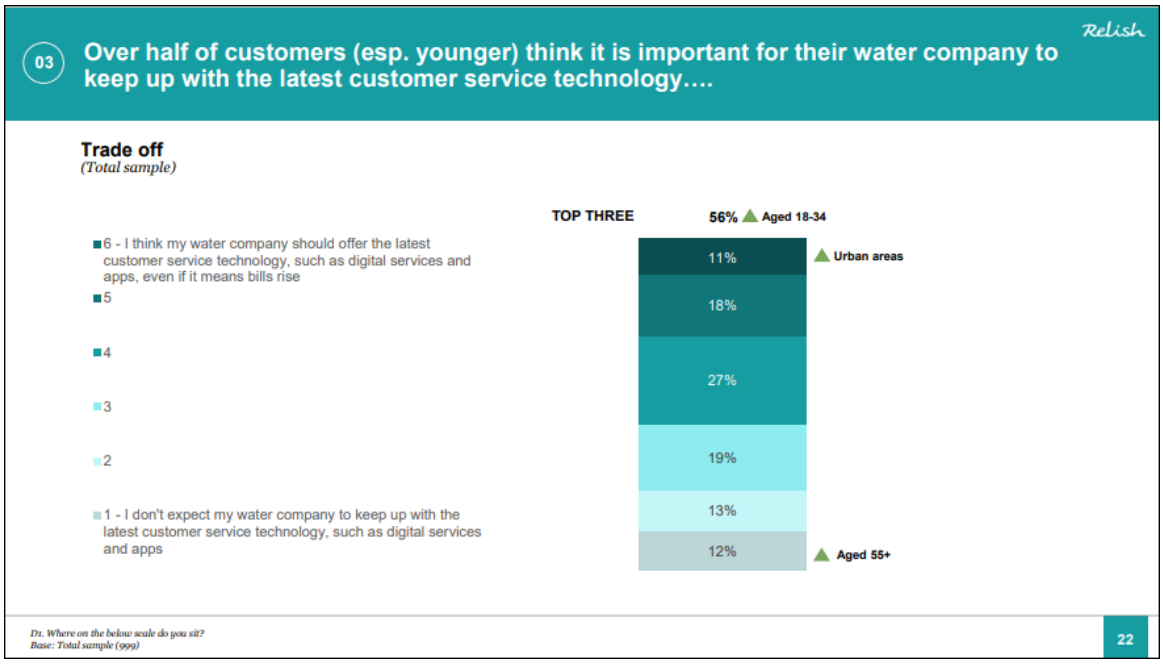
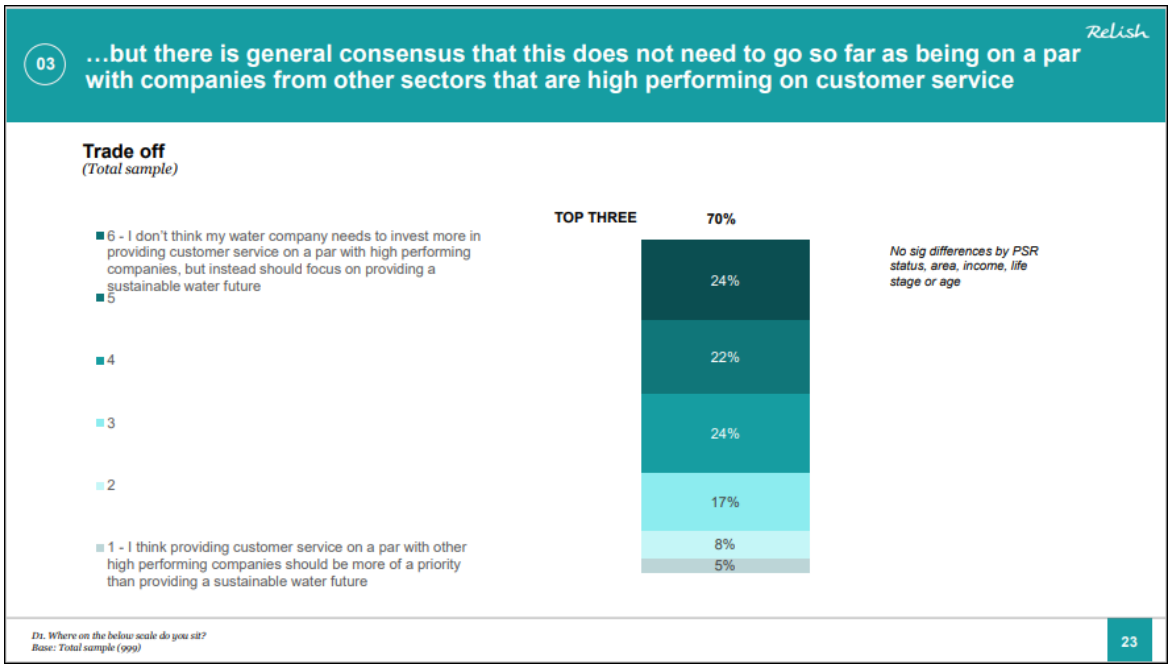


Figure 44 PR24 Phase 1 customer research - preferences on customer service (2).



The research concluded that good customer service and communication is entirely expected from a water company, so there is little room to 'surprise and delight' customers here. It is easier for the company to exceed expectations by finding ways to give back to the community than by excelling in customer service itself.

Good customer service is about keeping up with digitisation, not least because our customers have become more digitally focused by necessity through the pandemic. But ultimately, customers do not see a need for large increases in investment in customer service and just want the basics done well. Customers in general would rather their water company focuses in on area of core expertise and future focus, such as delivering a sustainable water future

Long-term ambition and AMP8 plan

Our ambition is always to be one of the top three companies on C-MeX, and to maintain this over the long-term (based on the current definition).

In order to achieve this we will build upon the work we are doing in AMP7 to enhance the customer experience. Our current objective is to build on our digital services offering and expand the use of these services, while ensuring that we continue to provide high quality services through traditional contact channels for those customers who need them. We have

- established an online My Account service, allowing customers to self-serve at a time of their choosing;
- expanded our payment and debt recovery processes to include digital channels;
- introduced job tracking functionality, providing customers with up-to-date information on the status of their jobs

Excellent customer services require the right culture as much as digital technology. It is important that teams have a passion for delivering high standards of service, understand their role, and are empowered to take ownership for resolving customer issues.

This is the focus of our Customer Led Success programme, established in 2018. Its principles are incorporated into our Code of Conduct and performance management framework. We use our annual employee engagement survey and the Institute of Customer Services (ICS) Service Mark assessment to monitor our customer-focused culture. In November 2022 95% of our people told us that there is a strong emphasis on our customers in the company .In January 2021, the ICS Service Mark assessor stated: 'The customer centred ethos and focus on service delivery have always been strong at Welsh Water and continue to inform the business strategy.'

In AMP 8 we will:

- Maintain our Customer Led Success culture programme, ensuring that our people have the skills and confidence to meet customers' growing expectations.
- Focus on how we use new technology to provide customers with more choice and control over their services, while making our digital customer service offering simple and easy to use for customers.
- Expand the use of the My Account service with the target of having 80% of customers 'self-serving' by 2028. We will also grow the scope of My Account to include early-stage arrears activity and water efficiency.
- Support implementation of the progressive metering strategy (see 8.4 Reducing demand: leakage and consumption) including the introduction of dual billing and use of AMR technology which will help customers understand their usage and identify leaks earlier.
- Expand the use of automation for transactional contacts, so that customers get an immediate response to their query.
- Introduce new billing and payment technologies (such as dual billing capability, Open Banking, mobile app).

10.2 Household customer services: customers with vulnerabilities

Strategic Response 9: Supporting customers in vulnerable circumstances

"We need to use data effectively, provide personalised customer service and work in partnership with other service providers to give appropriate and effective support to customers in vulnerable circumstances."

Background and track record

Our vision of 'earning the trust of our customers, every day' means meeting the needs of *all* of our customers. We know that some of our customers will struggle to access our services and that we will need to tailor our support to meet their needs. We want to ensure our services are affordable and accessible to all, that our people recognise and respond to the signs of vulnerability and that when things go wrong, extra help reaches those that need it.

We have been providing this kind of support for many years.At the start of AMP7 we established our Specialist Support Team, bringing together Affordability and Priority Services teams into one place tasked to fully understand a customer's circumstances and provide them with a case managed service and a package of support that meets all of their requirements.

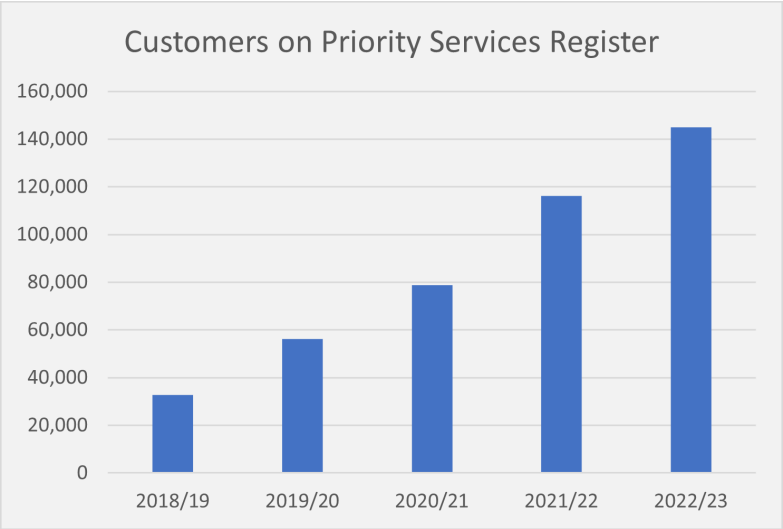
Our Priority Services Register (PSR) offers additional services to customers who may for example be disabled, chronically ill, of pensionable age, on dialysis, or have a sight or hearing impairment.

There are almost 145,000 household customers on our Priority Services Register (PSR) as of 31 March 2023, an increase of 25% on the previous year's figure. This is about 10% of households in our operating area (see Figure 45 Expansion of Priority Services Register).

A summary of services provided is:

- 2,150 household receive support with tailored communication;
- 1,332 households received support with mobility and access restrictions;
- 144,905 households receive support in the event of supply interruptions;
- 4,774 households receive support with security; and
- 5,972 households receive support with other needs.

Figure 45 Expansion of Priority Services Register



The Covid-19 pandemic placed a number of new limitations on our customers, particularly those who were instructed to shield by the Chief Medical Officers of Wales and England. We recognised very quickly that this meant that these customers would need extra help if they lost their water supply. Therefore, after putting in place appropriate data sharing arrangements with Welsh Government, we set up a temporary PSR to hold the details of circa 400,000 households with one or more members who were shielding.

Since 2018 we have grown our network of partners to around 300 with whom we work to increase awareness and expand the reach of the extra help that is available. The aim is to minimise the effort that any customer has to go to get the help to which they are entitled. In 2022 we launched our mobile Community Hub, where we join up with organisations such as local authorities and debt advice charities, and base our teams jointly in towns across our area. Over a 6-month period in 2022 this allowed us to speak to over 4,000 customers who would have been unlikely to make contact with us otherwise.

This community-based work is resource intensive so we share data with other utilities and organisations. We became the first utility company to participate in Project JIGSO, a Welsh Government platform to improve planning and response to major incidents, with the aim of protecting people who are disproportionately impacted. This is in addition to long-established arrangements with National Grid and Wales and West Utilities, and more recently Scottish Power. We also share information with two renal units in Cardiff and Swansea and have commenced a pilot with Kidney Care UK.

Financial data sharing has an important role to play in supporting customers that struggle to pay their bills. In 2022 we started sharing benefit data with the Department of Work and Pensions and we are using this information to sign people onto our WaterSure Wales tariff. We are now investigating expanding this agreement to support applications for our HelpU tariff, and opportunities for sharing information with HMRC and social landlords.

Long-term ambition and AMP8 plans

Welsh Water 2050 recognised the need to respond to demographic changes by making sure we are resourced to support customers in vulnerable circumstances appropriately over the long-term. In 2018 we launched our strategy to meet this objective - 'Supporting our customers: Working at the heart of our community' (link). This outlined five priority areas - data, financial assistance, non-financial assistance, partnerships and employee training and support. We have made good progress against the targets, including achieving the Inclusive Service Standard (BSI 18477) earlier this year.

These will continue to be priorities for us over AMP8 and beyond as we expect that the demand for this support will continue to grow. We will publish an updated strategy in June 2024, which will respond as appropriate to the requirements set out in Ofwat's recent consultation on vulnerability guidance.

10.3 Household customer services: debt management

Background and track record

Our operating area includes some of the most financially deprived areas in the UK. We have the third highest poverty rate of all water companies as measured by the Index of Multiple Deprivation (IMD), a measure of the proportion of income deprived households (link). This makes our customers more susceptible to the cost of living crisis, which has had a bigger impact on the lowest income households. At the same time we know that a small minority of customers may simply choose not to pay for our services. This means that our debt management activities have to strike a careful balance between supporting customers who need it, and ensuring fairness for all by pursuing those who choose not to pay.

We have developed collection strategies that allow us to identify and distinguish between customers that need help and those cases where swift recovery action is needed. This involves making full use of the information we capture as customers move into properties, and supplementing it with data from third parties such as credit reference agencies and local authorities.

We offer a wide range of ways to pay, and have many options available for customers who are struggling or are in debt. This includes: social tariffs, debt rehabilitation schemes, free metering, payment holidays, and short term low value payment plans. We are expanding digital services into our recovery processes, and plan to launch digital wallets and variable payment facilities by 2025.

Despite the economic uncertainties of recent years, our collection rates remain high. We saw a small drop (0.5%) in collection rates in the first year of Covid-19, but this was a reflection of higher usage as a result of customers working from home. Underlying indicators, such as customers paying by direct debit and payments in advance have steadily improved in the five years to March 2023. However, the uncertainties around future customer ability to pay and the need for prudence in provisioning has meant that this has not resulted in a lower bad debt charge in the first three years of AMP7.

	2018/19	2019/20	2020/21	2021/22	2022/23
Collection rate (%)	96.4	97.0	96.8	97.0	97.1
Debt/Revenue (%)	3.86	3.48	3.76	5.16	2.99
Debt/Revenue WASC average (%)	3.01	2.69	4.12	3.90	2.96

Plans for AMP8

With the unforeseen energy price shock and the sharp increase in inflation, AMP7 has so far demonstrated that it is difficult to forecast the economic conditions that our more vulnerable customers will face in the 2025-30. We therefore believe it more important to retain flexibility to respond to changing circumstances and continue to innovate in the area of payments, charges and collections, rather than tying ourselves into fixed plans.

We have established a mature data sharing capability and we will look for opportunities to expand the organisations with whom we share data for financial and non-financial purposes. Having more timely data on customer circumstances will allow us to make more targeted recovery action where it is appropriate.

We will continue to take advantage of emerging technologies that make it easier for customers to receive bills and make payments, which will support our early stage recovery activities. However, some customers will still require contact via traditional channels, including in person meetings in some circumstances. Although this is more expensive and time consuming it may be what the customer needs in order to reach a positive resolution.

Our progressive AMR metering strategy (see Metering strategy) will also help customers reduce bills, receive more frequent billing and payment periods, and identify consumption changes promptly thereby reducing the accumulation of unnecessary arrears.

10.4 Non-household customer services (B-Mex)

Background and context

Non-household customers include not just business customers, comprising a wide range of business types, from small high street enterprises to major industrial sites, but also local authorities, charities, farms, universities and many others.

In England the non-household retail services market for water was fully opened in 2017. This was not the case in Wales, which means that we continue to be able to provide an 'end to end' service offering to most non-household customers. In so doing we are committed to ensuring that the levels of service provided are at least equivalent to those available in England.

We have dedicated teams providing tailored services to large business customers. The largest sites, consuming over 50 megalitres per year, are eligible for the competitive market and so are serviced either by other retail service providers or by a Welsh Water retail team operating at 'arms length' from the wholesale business.

Track record

It is important that we closely monitor business customer satisfaction to ensure we are delivering the highest standards, regardless of the competitive landscape.

In AMP7 our business customer satisfaction measure is a regulatory Performance Commitment, based on a survey which is run four times a year with a random sample of 250 customers, and on which we are scored out of 5. The target is 4.5, where a score of 4 represents "fairly satisfied" and 5 represents a maximum of "very satisfied".

So far in AMP7 we have achieved a score of 4.4 in each year which is equivalent to 88% customer satisfaction. We believe this is a strong result, though slightly lower than the target. The CCW 'Testing the Waters' report which is published every two years continues to evidence that satisfaction levels of business customers in Wales is materially higher than those in England. The latest report published in January 2023 confirmed that customer satisfaction is higher in Wales – at 92% for water and 88% for sewerage services (versus 87% and 81% in England) - while retailer satisfaction in Wales is also higher at 85% (versus 66%) (link).

Plans for AMP8

Ofwat is currently consulting on a common measure of business customer satisfaction for the two companies operating 'wholly or mainly' in Wales. The intention is for the measure to combine responses from customers who have and those who have not contacted the company, and to change

from the 1-5 range used for our current PR19 measure to 1-10. These proposed changes are a welcome refinement, but it makes setting an appropriately stretching target difficult to determine in the absence of comparable historical information.

Regardless of the measure and the target we will strive to improve standards of service for our non-household customers. Our plans include:

- launching a 'My Account' service for non-household customers to allow them to manage their accounts online
- generating better data and insight into business customers' needs, including their appetite for water efficiency services
- Refining our account management services and dedicated support that we offer business customers and continuing to evaluate the value-adding services and products that we offer to business customers.

As the B-MeX measure has not yet been finalised we have not put forward proposed targets at this point, but will work with Ofwat on this as appropriate ahead of the Draft Determinations.

10.5 Developer customer services (D-MeX)

PR24 Forum Strategic Steers

✓ Target a top-3 position in the industry on developer customer service rankings table (D-MeX).

Background and context

The services we provide in relation to all forms of new development - from house extensions to new housing and large scale infrastructure projects - often go unrecognised. Nevertheless they perform a vital function in the ability of such schemes to go forward.

As well as meeting the needs of these 'developer' customers we see our role assupporting economic development in our region while protecting the interests of existing customers and the environment. We are a statutory consultee on planning applications, dealing with around 7,000 planning applications each year.

We provide new water and sewerage connections, and support large scale strategic development sites which often require complex provision of significant new water and wastewater infrastructure. We also work with 'self lay' providers in accordance with the standards and legislation applicable in our operating area.

New Appointments and Variations (NAVs)

We also deal with applications for 'New Appointments and Variations' (NAVs) by which a 'new entrant' water company can apply for a licence to provide water and sewerage services to sites meeting certain criteria, most often significant new housing developments. These applications are dealt with by our Wholesale Service Centre, which operates at arms length from our Developer Services business to help manage any potential conflict of interest

The legislative and regulatory requirements that apply to new development within Wales and our operating area significantly differ from those applicable in England. Whereas in the past engagement between developer customers and water companies was a matter of choice (as is still the case for water companies in England), our customers are legally obliged to engage these services and if they fail to do so they commit a criminal offence. We are legally obliged to enforce requirements on customers who fail to use these services and must prosecute in line with these requirements. The basis of our relationship with customers is therefore fundamentally different to that in England.

This, combined with the more onerous obligations on developers in Wales, which are often reflected in customer satisfaction responses, mean that it is not possible to fairly compare service performance in Wales and England on a consistent basis with a single assessment measure.

Track record

The regulatory measure of service for developer customers is known as D-MeX, and is applied across all water companies in England and Wales.

D-MeX

This measure of developer customer satisfaction is calculated from two components that currently contribute equally to the final score:

- 'qualitative' ratings provided in a satisfaction survey by developer services customers who transacted with the company during the year
- 'quantitative' scores based on the company's performance against a set of performance metrics define by Water UK during the year

The Water UK performance metrics are slightly different between companies in England and companies in Wales, while the satisfaction survey results are affected by the differences in legislation and regulations. These factors serve to materially adversely impact the comparability of the D-Mex scores for companies in Wales on a like for like basis.

Companies are ranked according to their D-Mex score, and those towards the top of the table can earn a financial reward, while those who score towards the bottom incur a financial penalty. Ofwat is currently consulting on changes to this measure, to increase the weight given to competitors and large customers, and reduce the weight of the quantitative component.

In the last two reporting years we have placed 12th and 13th in the D-MeX table. In 2022 we were in third position on the quantitative scores (first among water and sewerage companies) and generally perform strongly on this sub-measure. We tend to do relatively poorly on the 'qualitative' customer satisfaction survey results. While our score has improved, other companies have improved at a faster rate. Many of the negative written responses we receive as part of the survey relate to the different regulatory and legislative context for developers in Wales, including requirements for developers around mandatory sewer adoption, sustainable drainage and fire sprinklers, which are often incorrectly blamed on the water company.

An example of this relates to the requirement in Wales for the Local Authority to approve the surface water management solution proposed by the developer. If this proposal does not involve a connection to our sewerage system we are obliged by the Water Industry Act 1991 to refuse any subsequent request by the developer to connect to the sewer. This often leads to a negative response in the customer satisfaction survey. All the same, we use feedback from the quarterly survey wherever we can to identify areas for improvement based on customer comments, and have ongoing actions in place to improve performance.

We also have concerns over the comparability of the quantitative scores across companies and have evidence that companies are interpreting the Water UK 'Levels of Service' in materially different ways, thereby undermining the robustness of the D-MeX measure. We have flagged these concerns to Ofwat via Water UK.

We also track our own measures of customer service, including the number of complaints. We have succeeded in reducing the number of written complaints received, and the volume of incoming calls as shown below.

	2019/20	2020/21	2021/22	2022/23
Written complaints	168	122	130	100
Calls received	78957	49807	56836	44517

Plans for AMP8

Our ambition for customer satisfaction for developer customers is to target a top-3 position on the level of service received, compared with other companies in England and Wales on a like for like basis. However achieving 'top 3' on the current D-MeX measure, is not practically achievable, given the impact on developer customer satisfaction of the legislative and regulatory requirements in Wales. We have strong evidence that these requirements on developers reflect negatively on their perception of Welsh Water and the service we provide, despite our efforts to explain to customers that we have no role in setting those requirements.

Ofwat is currently consulting on changes to the D-Mex definition for AMP8, and we will take the final definition into account in our plans and targets once confirmed. We will continue to push for changes to the mechanism to allow fair comparison of performance levels across England and Wales as we believe this can help drive innovation and service improvements by all companies.

We estimate that our ambition to be one of the best performers on developer customer satisfaction is consistent with achieving ninth position overall on the current D-MeX measure. The 'quantitative' Water UK 'levels of service' component of D-MeX is more comparable and we will target an upper quartile position on this element.

More generally, we have seen significant growth in our customers' use of Accredited Self-Lay Providers which requires support from us, as well as an increase in NAV applications. We are committed to responding to the needs of our customers and providing the required support wherever it may arise between now and 2030.

We will also challenge ourselves to further reduce complaint numbers, seeking a 25% reduction in avoidable complaints between 2023-24 and 2029-30.

11. Resilience and security

PR24 Forum Strategic Steers: Resilience

- ✓ We expect companies to demonstrate how their business plans take account of learnings from weather events, cyber threats, and supply chain challenges, in particular how they have adapted their approach to mitigate against future events.
- ✓ We expect companies to prepare business plans which demonstrate the current and future resilience of water and wastewater services is understood and managed through a robust, adaptive, and evidence-based approach.
- ✓ We expect companies to enhance the resilience of their assets and operations to flood and coastal risk and to meet the requirements of their role as a Risk Management Authority (RMA) under the Flood and Water Management Act 2010.
- ✓ We expect companies to meet obligations under the relevant regulations and legal obligations, including SEMD, Critical National Infrastructure and cybersecurity.
- ✓ We expect companies to invest in their water supply infrastructure in particular reservoirs in response to the Balmforth Review.

11.1 Introduction

What is resilience?

Resilience is our ability to continue to provide our services no matter what kinds of chronic stresses and acute shocks we experience. Ofwat defines operational resilience as "the ability of an organisation's infrastructure, and the skills which run that infrastructure, to avoid, cope with and recover from, disruption in its performance".

Resilience goes beyond our own activities and assets to encompass the supply chain on which we depend. The importance of supply chain resilience was highlighted during the twin crises of the possible 'no deal' exit from the European Union and the Covid-19 pandemic in 2019-20. Welsh Water played a leading role in co-operative industry efforts to preserve the reliability of the supply chain, particularly for chemicals needed in water treatment that come from Europe.

Because of the nature of the services that we provide, most of what we do is concerned with resilience in one way or another. We strive to prevent service failures whatever the cause, and plan for the future to ensure we have assets that can deliver stable or improving services over the long-term in the face of any adverse trends.

In this section we provide a cross-cutting summary of what we do on an ongoing basis to ensure our services are resilient. This can be found in the next sub-section on 'Resilience in the Round', following the framework set out by Ofwat at PR19. This section briefly touches on asset health, although our approach to the management of our assets is covered in 4.1 Asset management for the long-term.

We then summarise our long-term plans to manage and enhance resilience as covered in the LTDS, incorporating the DWMP and the WRMP. The first part of the long-term resilience plan involves selected enhancements required in AMP8. This section also covers cybersecurity and the requirements of the Security and Emergency Measures Directive (SEMD).

Background

Our long-term Welsh Water 2050 mission is "to become a truly world class, resilient and sustainable water service for the benefit of future generations". Resilience and sustainability are clearly linked. The Wellbeing of Future Generations (Wales) Act provides an additional impulse to ensure the decisions of today are in the best interests of future generations of customers.

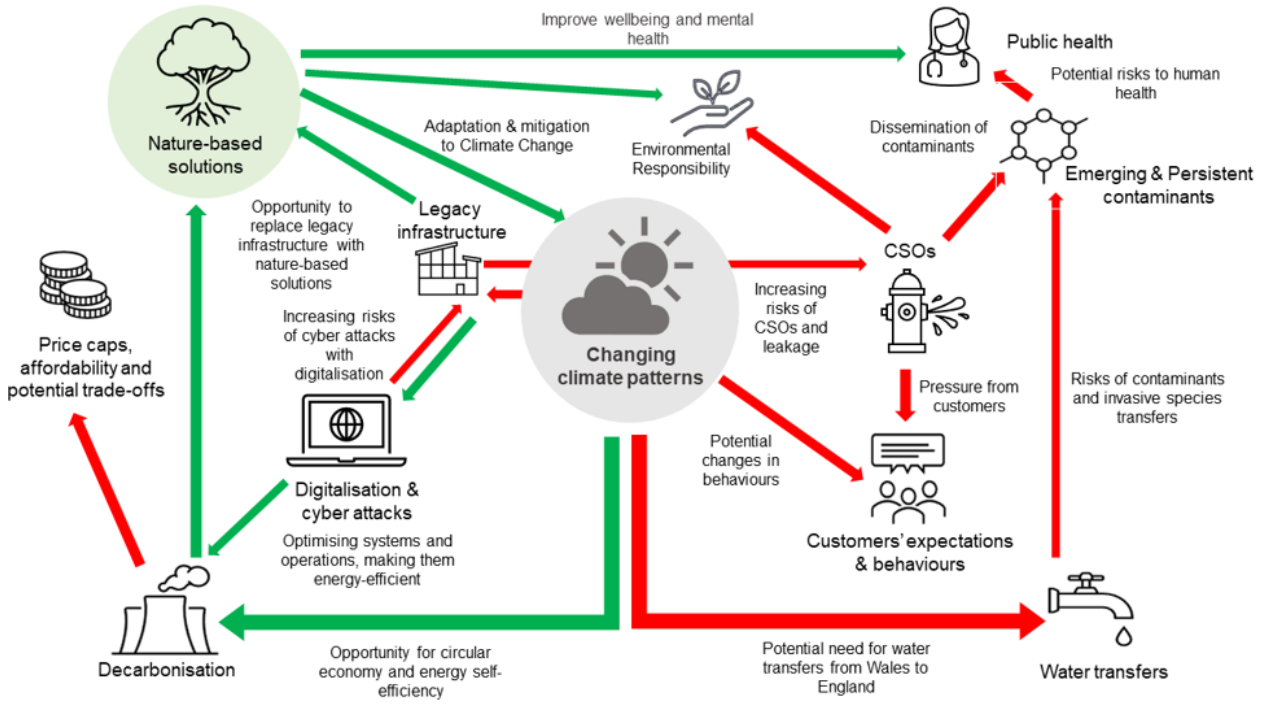
Welsh Water 2050 examined the long-term trends affecting the business (both risks and opportunities), and set out strategies to respond to and address each of those trends in order to achieve our Mission. A similar approach to ensuring long-term resilience of services is the basis of the two key strategic planning frameworks, the WRMP (for water resources) and the DWMP (for drainage and wastewater), though with a more focused and technical scope.

The Review of Welsh Water 2050 (link), and our work in preparing the LTDS, confirmed that climate change represents the central challenge that we face in terms of resilience over the long-term. This is not to ignore the multi-faceted nature of resilience and the multiple risks, trends and opportunities identified. But climate change connects to many other factors and is affecting almost every area of activity. Climate change adaptation is also likely to drive a bigger increase in expenditure than any other long-term trend.

Impacts of climate change on our activities include (but are not limited to):

- effects of rainfall patterns on the quality of raw water running into our reservoirs.
- impact of higher peak temperatures observed in reservoirs on the quality of stored raw water.
- impact of extreme hot or wet weather on ground conditions affecting mains pipes.
- impact of prolonged hot and dry weather on peak water demand and pumping costs.
- increased frequency of very heavy rain on capacity and adequacy of sewer network.

Figure 46 Centrality of climate change in future risks and opportunities (Cardiff University).



Source: Cardiff University Water Research Institute: https://www.dwrcymru.com/-/media/Files/WW2050/D2050R.pdf

Manifestations of climate change in AMP7 so far include the major floods and storms of 2020 and 2022, the extended dry periods or droughts of 2020 and 2022, and the general increase in the volatility and intensity of rainfall. Pinning these events directly onto climate change is difficult, but the Met Office and others are gathering growing evidence that these extremes are becoming increasingly likely and therefore we need to plan for this over the long-term.

Met office evidence on climate change

Rainfall/flooding:

"... an attribution analysis of the wettest February on record for the UK (which occurred in 2020) showed that the extreme rainfall experienced could become nine times more likely by the end of the century than in pre-industrial times. Wet weather events such as these are expected to increase over the coming decades in the UK."

"Particularly high levels of precipitation can occur due to slow-moving storms, with the potential for high rainfall accumulations projected to be fourteen times more frequent across Europe by 2100 (for 4.3°C of global warming – a high emissions scenario)."

Hot/dry weather:

"In the UK we can expect to see hotter, drier summers in the future, with temperatures similar to the 2018 joint-hottest summer on record around 50% more likely by 2050 even in a low emissions scenario."

"Research published last year using UKCP18 data indicated higher frequency and more severe long-term droughts in the UK, with droughts at least as severe as the one experienced in 2010 increasing by 86% at a 2.0°C level of global warming and by 146% at 4.0°C."

Source:

Our aim is to ensure that our strategies to mitigate the risks caused by climate change represent good value for customers, are subject to adaptive planning principles, and are fair to current and future customers. Given that the future of climate change is uncertain we have to consider all plausible scenarios but avoid unnecessary expenditure.

11.2 Resilience in the Round

Introduction

As part of Welsh Water 2050 we set out a resilience framework as a basis for assessing the maturity of our resilience and as a summary of how we think about resilience. This was updated to reflect Ofwat's 'Resilience in the Round' guidance at PR19.

An initial assessment of Welsh Water's resilience maturity was conducted against this framework by Arup in 2019, and this was repeated in 2022 as part of the PR24 business planning process.

Figure 47 Welsh Water's Resilience Framework

Arup highlighted key areas of progress since the last review in 2018 including:

- Ensure effective business continuity: Arup noted our appointment of a business continuity manager in 2022 and the creation of a more comprehensive business continuity plan.
- Develop our workforce for the future: It was acknowledged that we have developed a clear 5 year plan across a variety of key risk areas.
- Establish integrated and clear risk management processes: Arup commented on the company wide approach taken on risk management.
- Taking a value driven approach: Our development of a capitals-led approach with a Service Measure Framework being in place was noted.

This reflects some of the actions that were taken as part of the Resilience Action Plan developed in 2019 at Ofwat's request following their assessment of the resilience element of companies' business plans at PR19.

The remainder of this section provides a summary of each of the three 'Resilience in the Round' components which capture our ongoing approach to resilience. It also covers our resilience enhancement proposals for AMP8, and our proposals on security (including SEMD and cybersecurity).

Corporate resilience

It is critical that corporate governance, accountability and assurance processes support delivery of financial and operational resilience. They do this through robust risk management and sound decision making to help anticipate, avoid, cope with and recover from disruption of all types. The identification and management of risk must be allied with robust processes to prioritise the mitigation of risks.

We manage enterprise-level risks through procedures set out in the risk management policy and framework approved by the Board, which has a clear set of roles in relation to risk. The risk management framework includes a company-wide management process, a well-established governance structure and a Board-led approach to risk appetite.

Risks are identified, evaluated and reported using defined processes. More details on our approach to mitigating our principal and emerging risks can be found in our Annual Report and Accounts 2023. Decisions on which risks are put forward for mitigation are taken in accordance with our Asset Management Policy (link)and the Strategic Asset Management Plan.

Aside from the integrated and clear risk management processes, effective corporate resilience also means having effective leadership, governance and strategy more broadly. We act as if we were a listed company, so meet the highest standards of corporate governance. We comply with UK Corporate Governance Code, Ofwat's Board Leadership, Transparency and Governance Principles, and all other regulatory requirements. Further details can be found in our Annual Report and Accounts 2023 (link).

Our Board is accountable to the Glas Cymru Members, currently 60 in number, who are independently drawn from across our supply area (with no financial stake in the business). Members are not appointed to represent any particular group or stakeholder interest, and do not receive a fee. They are appointed by the Board under Glas Cymru's published Membership Policy on the advice of an independent selection panel. They play a vital corporate governance role in holding the Board to account, as well as acting as a sounding board for the Board and the Executive and providing a conduit to and from the communities we serve.

It is also vital that we retain an integrated, resilient, diverse and flexible workforce, with the right culture to support long-term success. There are particular challenges around attracting and retaining those in Science, Technology, Engineering and Mathematics (STEM) related roles owing to the nationwide shortages. We have refreshed our plans and have a new five-year strategy to become the best employer in Wales.

Welsh Water 2050 Strategic Response 11

Employer of Choice

"With an ageing population, an increasing shortage of technically skilled employees and increasing demand for more flexible approaches to working we will need to continue to be an employer of choice attracting, developing and inspiring people from a diverse range of backgrounds, to deliver an excellent service for our customers."

The Covid-19 pandemic brought about a rapid shift in working patterns and practices for all office-based staff, and put significant additional pressure on operational teams. The more general move towards home and remote working in the economy raises the issue of how best to attract the best people whatever their location. It has also created opportunities to work differently and more efficiently, and we moved quickly to capitalise on this by creating more collaborative and flexible working environments.

In October 2021 our Board approved a five year strategy to becoming recognised as the Best Employer in Wales. This has four elements – a highly skilled workforce, an engaged workforce, effective systems and processes, and an attractive employer. This includes ensuring that we reflect the diversity of our customer base in our workforce.

Engagement between the Board and employees is a vital part of ensuring we have the right policies and strategies in place to support a resilient workforce. The Chair of the Board and Non-Executive Directors regularly meet with groups of colleagues from all business areas. Regular updates on health and safety, turnover, absence and sickness levels are received and key policies such as Equality, Diversity and Inclusivity, and pay, are reviewed at the Board or at relevant Committee meetings.

The final element is having engaged customers, community and stakeholders. The emphasis on customer engagement, retaining the high levels of trust we have with customers, our approach to working in communities and the way we work with partners and engage stakeholders, are all well covered in other parts of this document. Our non-shareholder Glas model helps us in this regard but we recognise the need to work hard to create and maintain strong bonds externally which helps in myriad ways to support wider resilience of the company.

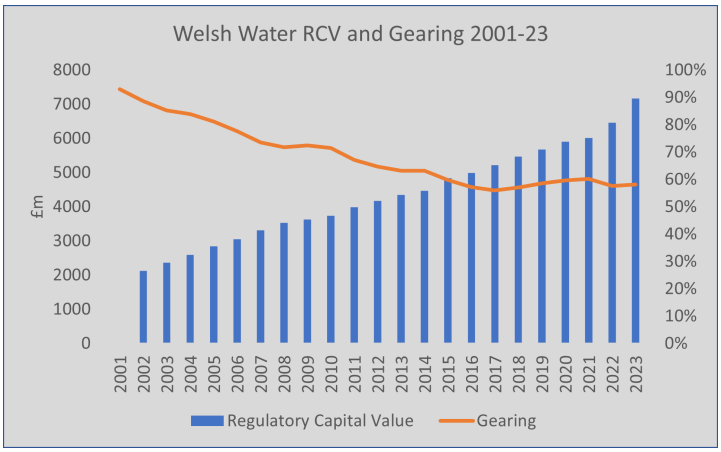
Financial Resilience

Ensuring the financial resilience of our business is a core requirement for PR24, so that customers can trust us to provide the essential services, whatever financial, economic or operational shocks we might face. Financial resilience is also important to customers so that we can maintain sufficient financial resources to smooth the impact on customer bills of any unexpected cost pressures during an AMP period.

Since 2001 when Glas Cymru acquired Welsh Water, the level of gearing (the ratio of net debt to Regulatory Capital Value) has been brought down from around 93% to around 60% by 2015, which has since remained our target level. This demonstrates the high priority placed on the need to establish a strong and stable balance sheet for the company. Our licence requires us to maintain two investment-grade credit ratings. This has not been in question, and we have amongst the strongest credit ratings in the UK water sector, which helps ensure we have access to a range of financial markets when needed.

The specific tests and considerations in relation to the financeability of our AMP8 plan, and how we will ensure financial resilience going forward, are covered below in 13. Financing, incentives and delivery. The result of our analysis is that for both the notional company (under Ofwat assumptions) and the actual company the company will remain financially resilient under a range of plausible 'stress testing' scenarios.

Figure 48 Gearing track record and RCV growth



There is currently an unusually high degree of uncertainty about a number of key financial and macroeconomic indicators, combined with a lot of scrutiny of water companies which has put their reputation and to a degree their 'investability' on the line. We have a significant level of refinancing to be achieved during AMP8, and other companies will be in a similar position. It will therefore be vital that Ofwat makes a reasonable judgement about the returns and the risks encapsulated in PR24 determinations to protect the financeability of the sector as a whole.

Operational Resilience

The key components of operational resilience include the following:

- Emergency planning and business continuity: Our approach includes a comprehensive Incident Response Manual, staff training, major incident exercises, total loss contingency plans, and a full Business Continuity Management System. We are audited and certified annually to ensure obligations under the Security & Emergency Measures (Water & Sewerage Undertakers) Direction 2022.
- Learning from events: Brexit, Covid-19, Storm Dennis (2020) and the freeze-thaw (December 2022) are just some of the major events we have had to respond to in recent years. Each has had its own challenges and presented opportunities to learn. We are committed to reviewing our responses after each such event to gather insights that can be put to use for future incidents.
- Asset health: Asset health is the probability of an asset failing to deliver its function. Understanding and maintaining asset health therefore plays a crucial role in operational resilience (see below).
- Portfolio risk assessment. We are working towards having a fully comprehensive and quantitative portfolio risk assessment capability, as per the commitment in our Resilience Action Plan. Given the complex and multi-layered nature of resilience this is a major challenge. The aim is to look at each system and assess the degree to which components of that system are outside risk tolerance, taking into account system interdependencies from power, telecommunications and other infrastructure.

Portfolio risk assessment: Cardiff water supply resilience

Cardiff is supplied as part of our largest interconnected water resource area - SEWCUS. There are large trunk mains into the city centre down the western side and the eastern side but relatively limited connectivity between the two in the city centre. Whilst it would be an unlikely event, if a major trunk main on either side of the city was lost for a sustained period a significant number of customers would be without water until the issue was resolved.

As part of our Portfolio Risk Assessment work we have commenced a Cardiff resilience study by building a hydraulic model covering all mains in the Cardiff area for the first time. This is the largest hydraulic model we have ever built covering over 200,000 properties. We are working with a company called Optimatics to trial a new piece of software that will systematically knock out lengths of trunk main one by one in the model and then automatically run multiple iterations of rezoning to identify the net risk of each section after the optimal operational intervention has been completed. The results will be used to improve emergency response plans, enhance testing and maintenance of crucial valves and develop a prioritised plan for asset condition surveys. It will also help to develop possible capital mitigations from new trunk mains or cross-connections and new strategic storage in the city centre.

Energy resilience

There has recently been a particular focus on energy resilience given the situation in Ukraine, the spike in energy prices, and the elevated risk of power cuts in winter. We have engaged with both the UK and Welsh Government to highlight the risks to our services and to support wider contingency planning. We took part in the UK Government's national power outage exercise 'Mighty Oak' in 2022. We have developed and tested a 3-hour rota cut plan over the last 18 months and are developing a national power outage plan that will be tested in 2024. We are also engaging with local resilience forums and the wider sector on power resilience.

Asset health

Management of asset health follows the policy set out in the Asset Management Policy, and we are working with others in the industry and Ofwat to develop new tools and models to predict failure and optimise investment.

As explained further elsewhere in this submission (WSH50-Introduction: Our investment approach), we have a range of tools and processes to evaluate asset health. These have been incorporated into our planning for AMP8, and the resulting investments are covered elsewhere in this document, including below under Resilience Enhancement.

There are three common PCs which serve as indicators of asset health. As these measures are not in themselves measures of performance affecting customers, we do not target improvements on these measures specifically. However, we think they should remain broadly stable, with no sustained deterioration, and they may see some improvements as the result of interventions elsewhere to improve performance.

The table below shows these three PCs and the 'targets' set out for them in our plan. As explained above in 8.5 Supply interruptions we would expect to see some reduction in mains repairs arising from the investment in AC mains.

AMP7			Actual	Forecast		PR19 FD
Performance Commitment	Measure	Units	2022-23	2023-24	2024-25	2024-25
Mains repairs	Number of repairs per 1,000 km of mains	No.	156	131	128	131
Unplanned WTW outages	% reduction in peak capacity	%	1.1%	1.5%	1.5%	2.3%
Sewer collapses	Number of collapses per 1,000 km of sewer	No.	6.7	7.1	7.2	7.2

AMP8		PR24 PC targets					LTDS
Performance Commitment	Measure	2025-26	2026-27	2027-28	2028-29	2029-30	2050
Mains repairs	Number of repairs per 1,000 km of mains	127	126	125	124	122	99
Unplanned WTW outages	% reduction in peak capacity	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
Sewer collapses	Number of collapses per 1,000 km of sewer	7.1	7.0	7.0	7.0	6.9	6.4

11.3 Resilience enhancement

PR24 Forum Strategic Steers

- We expect DCWW to strengthen resilience to low likelihood and high impact events, particularly against the background of climate change and the resulting more frequent extreme weather.
- We expect DCWW to develop an integrated and quantified approach to their risk and resilience assessment ahead of PR29 to assist with the prioritisation of further necessary investment over the long-term.

Background

As a result of previous investments and operational improvements, we have a more flexible and 'smarter' water network than ever before. One that allows us to move water faster to where customers need it, and to detect bursts more quickly so we can respond faster. We have invested to protect our critical assets from failures and strengthened physical and cyber security. On the wastewater side we are making better use of data and analysis to understand the causes of sewer flooding and pollution incidents, and to target remedial investments.

These improvements have generally been achieved from 'base' expenditure, and further improvements will be made as technological advances allows us to do more with remote detection and data analysis.

However, as outlined above there are growing risks which are coming to the fore - including climate change, but also others such as growing cybersecurity risks. It will not be possible to sufficiently manage and mitigate the consequences of these trends without dedicating additional resources to address the threats.

The WRMP sets out our long-term plans to ensure our water resources are sufficient, which in our case can be achieved without major new infrastructure. Our first DWMP covers the wastewater side of the business and provides an overview of the scale of investment that is likely to be required. We have covered other elements of the investment plan in the sections above, many of which can be considered to make a contribution to the maintenance or enhancement of resilience more broadly.

This section sets out our proposed 'low regrets' resilience enhancements for AMP8, which we believe are urgent and represent good value, even while we continue to refine our ability to analyse and quantify risk moving forward. They form part of ambitions set out in the LTDS and Welsh Water 2050 to protect customers from growing risks, and to maintain at an acceptable level the risk from low probability but high consequence events.

Welsh Water 2050: Strategic Response 4/Strategic Response 17

Protecting our critical water/wastewater assets

"Faced with an increased risk of disruption, for example from an increase in severe weather as a result of climate change, and reduced customer acceptability of pollution events, we will improve the resilience of our critical water/wastewater assets, which have high consequences of failure."

Customer and stakeholder views

Owing to the complex and long-term nature of resilience, it has not featured prominently in our customer research programme for PR24. We have a wealth of information on customer views of various performance issues and service issues which relate to resilience. But the management of underlying risks is something that customers simply expect companies to manage.

Ofwat acknowledged in its approach to PR24 that the sector needs to respond to climate change, which threatens resilience, both of networks and the water supply (link). Ofwat has a duty to secure the long-term resilience of water and wastewater systems and to ensure companies take steps to ensure they meet the demand for services in the long-term. Ofwat expects companies to assess risk from a broad range of hazards, and expects companies to "provide greater resilience to flooding, regularly review and fully understand the current and long-term flood risk to their infrastructure and systems, identify opportunities to increase resilience, and deliver greater flood resilience for their own infrastructure and services."

Resilience is one of the Strategic Priorities of the Welsh Government set out in its Strategic Priorities Statement to Ofwat (link). It notes that current and future threats to the water sector are likely to grow. It specifically says that Ofwat should challenge companies to "deliver greater flood resilience for their own infrastructure and services, and where appropriate provide wider benefits to their customers and wider community in doing so".

Long-term outcomes and AMP8 plans

Many of the long-term outcomes set out in the Long Term Delivery Strategy, such as reducing supply interruptions, overlap with considerations of resilience. Ofwat's guidance on LTDS does not however include specific resilience objectives within the scope of LTDS 'outcomes'. The PR24 Final Methodology says that resilience expenditure should be covered by 'output' type Deliverables (PCDs), but these are not part of the LTDS.

As a company we have long-term ambitions on specific elements of resilience not already covered by outcomes in the form of the common PCs and the main outputs of the WRMP and DWMP strategic planning frameworks. We need to progress these in AMP8 as the next step in achieving and sustaining resilience over the long-term.

The two main areas of resilience enhancement highlighted here are strengthening the resilience of water supply systems, and protecting critical water and wastewater assets. These are areas where there may be no year-on-year improvements in ongoing performance, but the investment will address the potentially drastic consequences of a low probability event.

Other areas of resilience enhancement have been covered in previous sections, notably 7.2 Tap water compliance (CRI), 7.3 Customer contacts (appearance, taste and odour), and 8.5 Supply interruptions.

Welsh Water 2050: Strategic Response 3

Improving the reliability of drinking water supply systems

"Faced with an increased risk of outages due to agricultural run-off, extreme weather events, terrorism, and cyber attacks, we will build more flexibility and integration into our water treatment and supply systems."

Welsh Water 2050: Strategic Response 4/Strategic Response 17

Protecting our critical water/wastewater assets

"Faced with an increased risk of disruption, for example from an increase in severe weather as a result of climate change, and reduced customer acceptability of pollution events, we will improve the resilience of our critical water/wastewater assets, which have high consequences of failure."

Strengthening the resilience of water supply systems

Our plan for AMP7 included investment to increase connectivity between two of our largest water supply zones, the South East Wales Conjunctive Use System (SEWCUS) and Tywi Conjunctive Use System (TCUS) immediately to the west. This improvement work is currently in construction and the new connection is forecast to be made by 2026. Our hydraulic modelling indicates that if there is a failure in the Tongwynlais area north west of Cardiff, which would previously have presented a major threat to supplies, 22 Ml/day of water could be transferred via the new connection into Cardiff. Temporary pumping will be able to increase this to 30 Ml/day.

The new connection has also increased resilience in TCUS. However, the transfers from the west of TCUS enabled by the new connection are short-term only. We are proposing additional investment in AMP8 that will add additional capacity to sustain these transfers through upgrades at two key pumping stations (Margam and Birchgrove) and the duelling of a critical section of mains. This will add significant additional resilience and reduce the risk of a sustained loss of supply in one of our most populous regions.

During AMP8 further assessment will be undertaken to review future strategic interventions to improve resilience for both the SEWCUS and TCUS. The aim will be to update our adaptive plan for this key area of our supply and develop a modular intervention programme to meet climate change, growth and resilience needs.

We will also be seeking to strengthen resilience through a programme looking at critical mains crossings of roads and railways, and diverting a mains threatened by river erosion.

The total proposed enhancement investment in this area is £54 million.

Protecting critical assets from flooding

As the impacts of climate change on extreme weather become more apparent, we have seen within the last 10 years a number of incidents that have exposed the vulnerability of some critical assets to flooding. These included Mayhill treatment works in Monmouth that suffered a multi-day outage

after Storm Dennis in February 2020. Such incidents cause costly damage to assets, significant clean-up costs and a knock-on impact on insurance premiums. While relatively rare, they have an unacceptable impact upon service and the environment.

We completed flood defence works to Mayhill in 2022, but other assets are in need of protection to prevent similar problems in the future given climate change. In AMP8 our focus is on critical water treatment works and pumping stations. We have included investment of £5 million to protect all critical assets to a 1 in 30 year flood event.

In future AMPs flood resilience will be focused on wastewater treatment works, as set out in the Long Term Delivery Strategy.

11.4 Cybersecurity

Threat landscape

The National Cyber Security Centre (NCSC) has stated that there is a heightened threat level related to external cyber-attack. The current threat level is deemed to be Critical, meaning that cyber-attacks are considered imminent – indeed cyber-attacks against UK companies and organisations are seen on a daily basis. Specifically, and since the invasion of Ukraine in 2022, the threat from Russia-aligned groups has grown significantly.

We have also seen increased cyber activity (e.g. Distributed Denial-of-Service (DDoS) and attempted ransomware attacks) across Critical National Infrastructure (CNI) organisations. We were ourselves subjected to a DDoS attack on our corporate website in July 2022. We were able to withstand this attack thanks to the security arrangements we already have in place.

The nature of the service we provide means that the potential impact of a successful cyber attack is serious, both in terms of protecting customer data and ensuring we can continue to operate our assets without risk to service or our customers.

Aligned to NCSC's threat assessment, we currently view the threat level as Critical and expect it to remain so. We are operating on a heightened alert and engaging with the wider sector and beyond to ensure our defences are as strong as they need to be.

Regulatory landscape

Under the Networks & Information Systems (NIS) Regulations we are considered an Operator of Essential Services (OES), and, therefore, are required to meet the sector requirements on cybersecurity as defined by DWI using the NIS Cyber Assessment Framework (NIS CAF).

In June 2023, an extended CAF (eCAF) was issued by DWI with more stringent compliance levels with a target completion date of 31 March 2028. Our cyber security technology roadmap reflects the obligations of the eCAF and compliance to the revised targets is a key driver in our strategy.

Security roadmap

Up to date, fully supported technology platforms are critical to delivering appropriate cybersecurity protection. As we move to a 'cloud first' strategy for IT this will bring additional cyber challenges, but there are also benefits as it makes available significant security enhancements.

As part of our response to the current threat landscape our AMP8 plan includes £11 million of investment to improve our cybersecurity capabilities. It will ensure that our systems and networks meet the sector targets for NIS CAF compliance and will also improve our Cyber Maturity score against the CIS Critical Security Controls, which is one of our objectives.

Key enhancements planned for AMP8 include:

- Extended Detect and Respond (XDR) solutions for Operational Technology (OT) environments.
- Enhance Security Operations Centre (SOC) capability on Security Information and Event Management (SIEM) across OT environments.
- Cyber culture maturity improvements to reduce people-related cyber risks.
- Next Generation Cyber Threat Intelligence capabilities, leveraging developments in AI and machine learning, enabling us to develop our defensive strategies.
- Enhancements in Identity and Access Management (IDAM) capability.
- Enhanced third-party security management capabilities to provide visibility and mitigation of cyber risks associated with supply chain compromises

11.5 SEMD and physical security

Security and Emergency Measures Direction (SEMD)

The updated Security and Emergency Measures Direction (SEMD) came into effect in March 2022 (previously 1998) under Section 208 of the Water Industry Act. It sets out our duties to maintain water and sewerage service in the event of emergencies or extreme events. The requirements include access to emergency stockpiles of equipment, suitable incident management plans and adequate resources to manage situations. Companies are required to submit annual self-assessment reports against the requirements to the DWI.

Our emergency planning capabilities are being tested more and more frequently. Examples of recent emergency incidents since 2021 are shown below.

Figure 49

Recent Incidents for DCWW		
Incident Name	Date	Type of Incident
Hot Weather	Jul 2021	Extreme Weather
Storm Arwen	Nov 2021	Power Resilience
Storm Eunice	Feb 2022	Power Resilience
Priory Wood PS Fire	May 2022	Loss of Asset
Hot Weather	Jul 2022	Extreme Weather
First Flush Pollution Risk	Jul 2022	Pollution
Penarth & Pontypridd Bursts	Aug 2022	Burst Main
Neath Discolouration	Sep 2022	Water Quality
Llechryd Discolouration	Oct 2022	Water Quality
Cardiff Burst	Nov 2022	Burst Main
Freeze Thaw	Dec 2022	Extreme Weather

In AMP7 we are replacing and upgrading the existing SEMD stockpile, including generators, pumps and alternative water options to meet the new requirements under SEMD introduced in 2022 and coming into affect in 2025.

Physical security

Our operational assets are classified as either National Infrastructure (NI) or in some cases Critical National Infrastructure (CNI). Specific guidance is in place for the continued security management of these assets (within SEMD) and as a result each operational site requires a site-specific security assessment and then security enhancements including fences, gates, and CCTV.

We are already investing in AMP7 to meet our SEMD obligations, focusing on water treatment works, strategic water pumping stations and sites which have suffered from criminality.

As part of a recent government-instructed review, 17 Welsh Water sites have been newly identified as being part of CNI, but are not meeting the required regulatory standards. We therefore have £5 million of investment in our plan to bring newly designated assets up to CNI standards, plus £2 million for upgrades to existing CNI sites. A further £11 million is set aside for wider site upgrades to meet Water UK Security Standards.

This investment will improve overall resilience, ensure our assets are secured from intruders, and reduce the risk of death or serious injury to members of the public, in line with our responsibilities under the Occupiers Liability Act (1984). It will also protect sites from vandalism and reduces the risk of malicious contamination or disruption of the water supply.

PSTN switch-off

The Public Switched Telephone Network (PSTN), on which much of our Operational Technology depends, is being switched off in 2025. We are already well advanced in our preparations, which involve replacing the connections for around 3800 assets, mostly using 4G and Fibre connections, to enable us to continue to monitor and operate these assets remotely. Around 10% of our assets have no 4G or alternative connection available due to being in remote locations. We are working up solutions for these sites, which could involve using low-orbiting satellite connections. These would have an associated cost and a degree of risk by virtue of being an emerging technology. However, we are proceeding with operational testing and looking carefully at any security implications, and are confident that the programme will deliver an effective and resilient solution.

12. Customer bills and affordability

Steers from Welsh Ministers

Ministers..."Acknowledge, with some disappointment, the anticipated customer bill increases arising from increased investment with some concern on the impact this might have on households already facing a cost-of-living crisis. Ministers emphasise the need to sustain and, where possible, enhance effective social tariff schemes to support those customers struggling to pay their bills. These arrangements should be coordinated with other utility providers and relevant authorities wherever possible to optimise benefit and help target support quickly to those who need it most."

PR24 Forum High Level Priorities

"The greatest business planning challenge is the trade-off between maintaining affordable bills and a deliverable and financeable plan whilst also delivering much needed investment to meet current environmental standards, future environmental need linked to climate change, and build resilient water and wastewater infrastructure that will effectively support current and future generations of Wales."

The preceding sections have set out our plans for delivering ambitious improvements in outcomes for customers and the environment by 2050. The necessary investment has to be funded, ultimately, from customer bills.

The long-term ambitions and the phasing of outcomes over the next 25 years have been discussed and agreed with the PR24 Forum.

We have carefully considered the impact of bill increases on customers, and how to achieve the appropriate balance between delivery of investment and bill increases. Some investments that we would like to have implemented in AMP8 have been pushed back into AMP9 on affordability and financeability grounds. We are committed to ensuring that bills remain affordable for the vast majority of customers, with measures in place to support those on the lowest incomes who will be most affected by increases.

The bill proposals for AMP8 are summarised in the table below. The rest of this section covers the long-term forecast for bills as per our Long Term Delivery Strategy, explains how we have derived the bill proposals for 2025-30, and describes our social tariffs and affordability offering in greater detail.

	2025	2026	2027	2028	2029	2030
Average household bill (real terms)	£463	£530	£540	£556	£568	£581
Annual change (%)		15%	2%	3%	2%	2%
Change between 2025 and 2030						£118
% change between 2025 and 2030						26%

12.1 Background

Since Welsh Water came under the ownership of Glas Cymru in 2001 the company was able to keep bill increases below the rate of RPI inflation each year up to 2020, while delivering over £6 billion of investment and significantly improving levels of service. Our bills have increased significantly less then most other WASCs since 2001 (see Figure 50). Over the last 10 years we have delivered falling bills in real terms (see Figure 51).

Figure 50

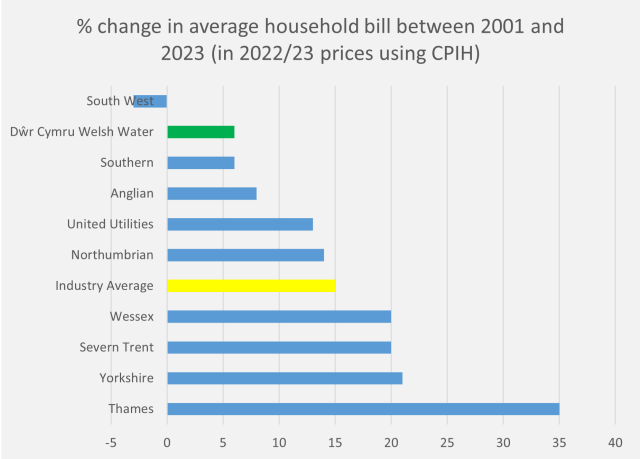
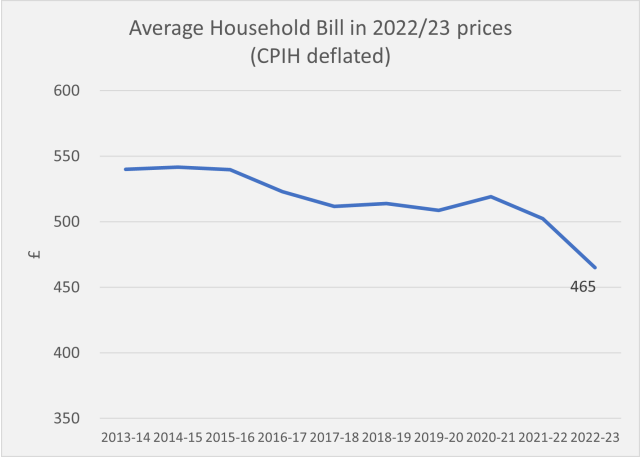


Figure 51



During the current AMP period 2020-25 bills have been falling in real terms for most customers. We expect the average household bill in 2025 to be £463 as compared to £517 in 2020 (in 2022/23 prices).

Despite this, Welsh Water bills remain significantly above the industry average (the wastewater bill is the highest in the industry, while the water bill is close to the average). Bills vary across companies for a variety of reasons, including historic levels of investment and the particular characteristics of the operating area. Our wastewater bill is high owing to high levels of historic investment in coastal treatment works, and also the relatively high number of smaller wastewater treatment works. Ofwat aims to set bills such that companies are efficient and provide good value for money, taking into account all of these factors.

2022-23 Bills	Water	Wastewater	Combined
South West	216	310	526
Wessex	261	243	504
Welsh Water	193	306	499
Anglian	222	270	492
Thames	258	198	456
Yorkshire	198	248	446
United Utilities	210	233	443
Southern	186	253	439
Severn Trent	213	206	419
Northumbrian	188	203	391
Hafren Dyfrdwy	195	177	372

As noted above, our operating area includes some of the most financially deprived areas in England and Wales. A 2021 report by Water UK found that from 2019-2020, 8.7% of households in Wales spent more than 5% of their household disposable income (after housing costs) on their water bill, compared to 6.3% in England (link).

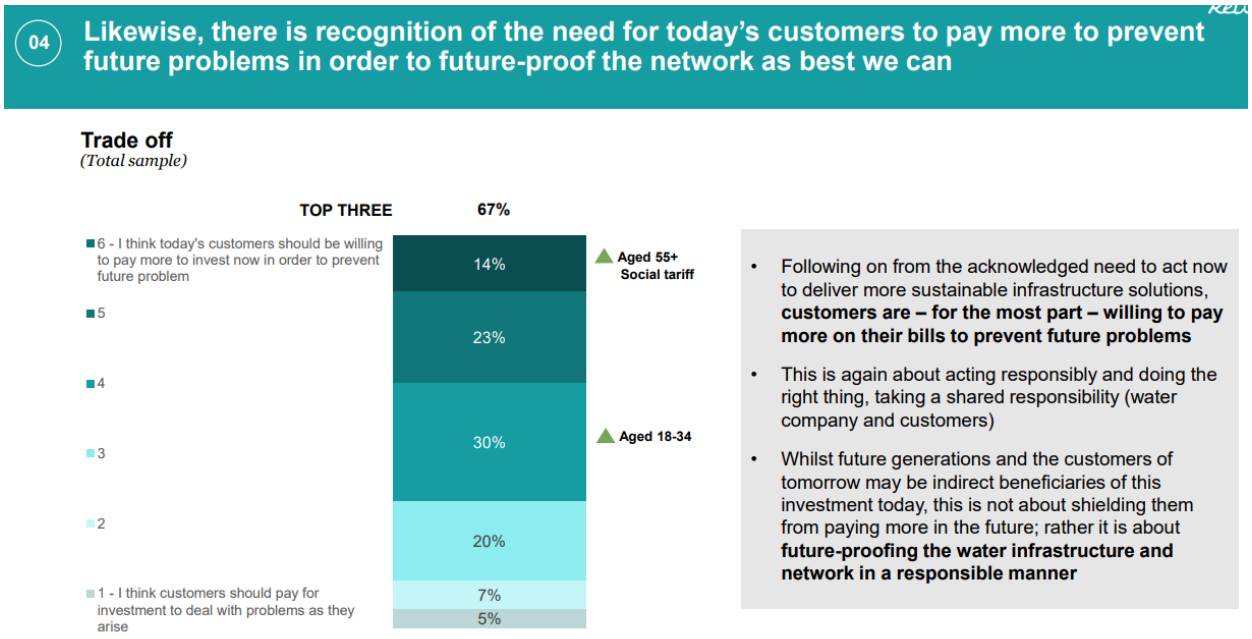
12.2 Customer and stakeholder views

Although specific research on the 'Affordability and Acceptability' of our Business Plan was only conducted in the final stages as Phase 3 (2023), the earlier Phase 1 and Phase 2 research also asked customers questions pertaining to bills and willingness to pay for needed investment.

Phase 1 research (2021)

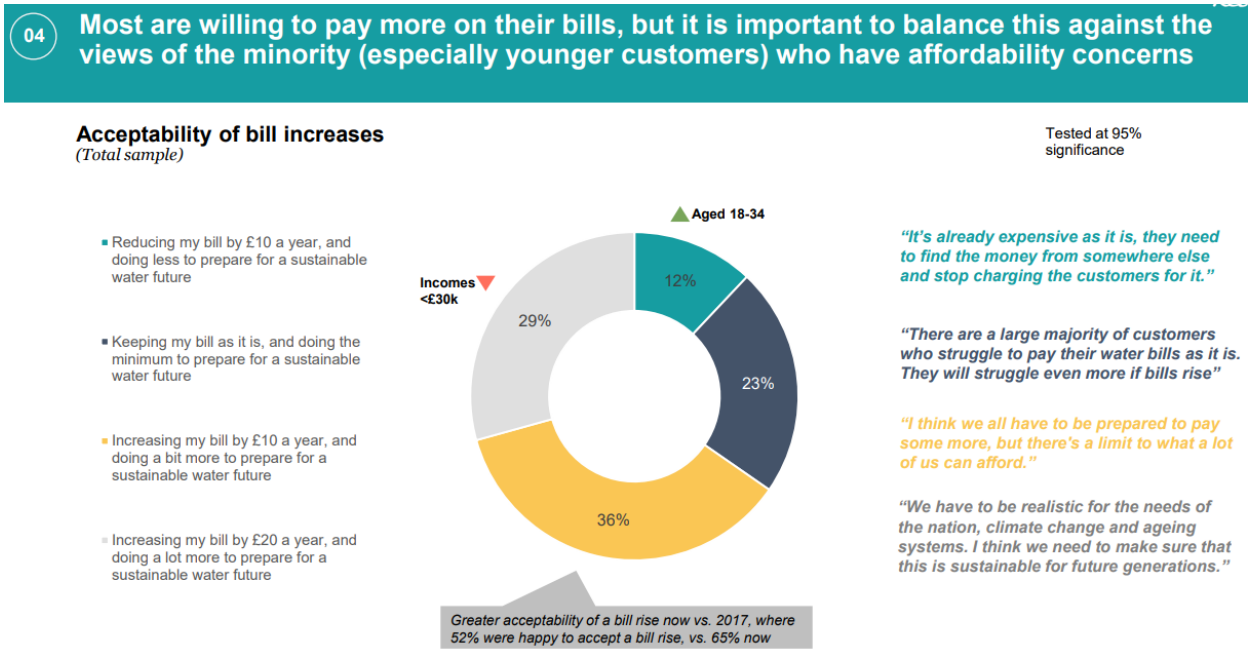
In our Phase 1 research, two thirds of customers agreed with the statement: "I think today's customers should be willing to pay more to invest now in order to prevent future problems." It is important to balance this against the views of a minority (especially younger customers) who face particular difficulty in paying their bills. Overall 65% of customers were reported to be happy to accept a bill rise, an increase from 52% in 2017. (See Figures 52 and 53) below.

Figure 52 Phase 1 customer research



Source: Welsh Water PR24 Customer Research, Phase 1 Research (link).

Figure 53 Phase 1 customer research



Source: Welsh Water PR24 Customer Research, Phase 1 Research (link).

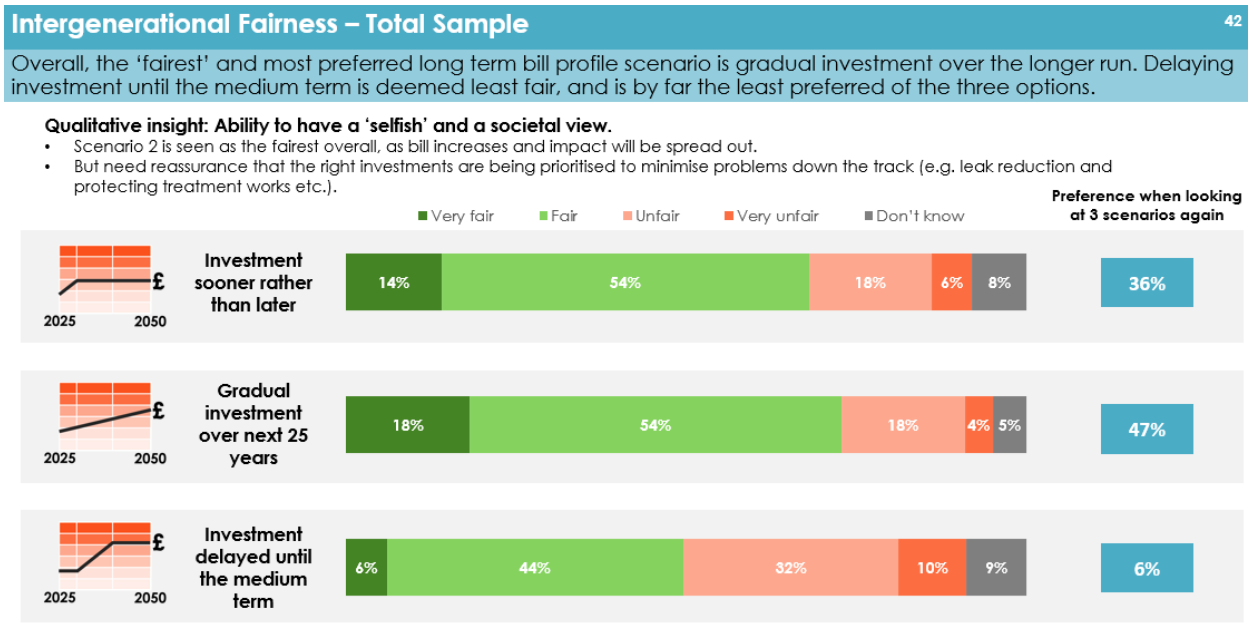
We therefore started out with the notion that bill rises should not be ruled out, but we would need to ensure that our social tariffs had the capacity to support additional applicants in this scenario.

Since the Phase 1 research in 2021 inflation increased substantially and customers were deeply affected by the increase in the cost of living. This impact was clear from the interaction with our Longitudinal Panel, and from the discussions as part of the P2 research on long-term outcomes. This undoubtedly made customers less amenable to bill increases - regardless of the fact that the the Business Plan covers a relatively long timeframe out to 2030 in which economic circumstances were likely to change.

Phase 2

In our Phase 2 research we also asked customers for their preferences between bills rising more now and flattening off earlier, or suppressing bills for now but putting more of a burden on future customers. In general there was a strong preference for a middle way with gradually rising bills over the long-term. We took this into consideration when looking at the phasing of investment and bills in the Long Term Delivery Strategy.

Figure 54 Phase 2 customer research



Source: Welsh Water PR24 Customer Research, Phase 2 Research (link).

This is just a brief summary of the insights on tolerance for bill increases and customer willingness to pay for investment, derived from the Phase 1 and Phase 2 research. We also looked across all of our research and insight, including PR19 research, and found a consistent theme that customers do not wish to see necessary investment delayed, and accept that bills may need to go up if they can see and understand the benefits of investment. More detail is provided in 2.2 Customer research and supporting document (WSH30-Customer engagement and research).

Taking all of the above in the round we concluded that customers:

- Should find a well-explained increase in water bills in AMP8 to be acceptable (see below on Affordability and Acceptability research results), given the current and future challenges.
- Would rightly expect Welsh Water to be efficient both in its ongoing running costs and in the appraisal of investment costs, and to challenge itself hard on the question of whether it could do more for less.
- Consider a steadily increasing bill over the coming AMP periods to be fair between current and future customers ('intergenerational fairness').
- Support the provision of support for customers who most struggle to pay their water bill.

We took these early conclusions into the final stages of building our plan, and into discussions with stakeholders and the PR24 Forum.

Phase 3: Testing the Affordability and Acceptability of our Plan

For PR24, Affordability and Acceptability testing of companies' business plans was part of the collaborative customer research programme, with standardised guidelines and methodologies set jointly by CCW and Ofwat for all water companies. Here we focus on the results in terms of customer views of the bill proposals.

The research took place in two phases. The first phase was qualitative, with a series of focus groups with customers, talking through a selection of the key Performance Commitment proposals, with information shared on current performance against targets and compared to other companies.

Customers were also shown the proposals for bills between 2023 and 2030 and were asked about affordability and acceptability in a 'post task' survey, though this was not a representative sample of customers.

The second phase of the research was a quantitative survey of 189,000 household and 730 customers registered as businesses. Customers were asked how easy or difficult they thought it would be to pay the proposed bills, without the context of what investments the higher bill would be making possible and the environmental and performance improvements that would result. Participants were then shown information about the Performance Commitments in the plan, and asked a series of questions about them. In the final stage, customers were asked about their views of the "acceptability" of the plan overall - including both bills and performance.

Qualitative research results

Focusing on the 'affordability' element of the research, the focus groups were presented with proposed bills based on the average household bill and an estimate of inflation for the purposes of discussion. Later they completed a survey asking for their response to proposed increases based on their own current bill.

In the discussion customers tended to view the bill increases as moderate, based on a £93 average increase spread out over seven years to 2030. In the survey responses around 2 in 10 customers felt that the proposed bills would be difficult to pay, with under half saying it would be easy. But a significant majority, around 3 in 10, said it would be 'neither easy nor difficult', reflecting their uncertainty about future financial circumstances.

Quantitative research results

In the representative survey, customers had much less time to consider details of the plan and were presented with less information. The results therefore provide an 'uninformed' snapshot of customer sentiment about the high-level performance proposals in the plan and, critically, about the bill proposals.

84% of household customers as a whole found the plan to be 'acceptable'. Within this group we analysed the results from customers struggling financially, 80% of whom endorsed the plan as 'acceptable'. Similarly 85% of customers with a 'vulnerability' supported the plan. The result was 82% for non-household customers.

The question on the affordability of bill proposals was asked in the survey before providing any information about the content of the plan. On this basis, 15% of household customers said that the bills would be 'easy' or 'very easy' to afford to pay. This dropped to 2% for those struggling financially, and was 14% for customers with a vulnerability. 47% of household customers said they would find the bills 'difficult' to afford to pay. The results were similar for non-household customers (see table below).

	Household customers	Household with Vulnerable customer	Households struggling financially	Non-household customers	Household and non-household customers
Customers expecting to find it difficult to afford to pay their proposed water and sewerage bill for the years 2025-30	47%	49%	81%	39%	45%
Customers expecting to find it easy to afford to pay their proposed water and sewerage bill for the years 2025-30	15%	14%	2%	18%	16%
Customers responding that the proposed business plan is unacceptable	7%	6%	9%	10%	8%
Customers responding that the proposed business plan is acceptable	84%	85%	80%	82%	84%

The following summarises our interpretation of these results as they apply to our Business Plan:

1. As is often the case with progressive customer research undertaken at different points in time and following different methods, the results can be difficult to interpret and, in some aspects, contradictory. On affordability, when asked about the proposed bills in the absence of any information on what it would pay for, customers had a high propensity to say the bills would be difficult to afford. Having been presented with information about the performance and investment in the plan, they nevertheless said overwhelmingly that the plan was acceptable.
2. While the low number finding the bills 'easy to pay' is disappointing, this should not be surprising. In a time in which bills and prices are rising relentlessly for customers, it is to be expected that few will say that rising water bills will be easy to pay.
3. Around half of customers say they think the bills will be 'difficult to afford to pay', compared to 15% who say they will be 'easy to afford to pay'. We do not consider this means that a significant proportion of our customers will not be able to pay their bill, but they may do so reluctantly and we will have to work hard to retain their trust.
4. The vast majority of customers found the plan overall to be acceptable having regard to performance, investment and bills. This suggests that most of those who say they would find the bills difficult to pay, including those struggling financially, consider the bills to be affordable.
5. While customers certainly will not welcome the rise in bills, the majority will understand and accept this in the context of the increased environmental investment and improved performance and outcomes.

This is consistent with previous research that suggested that customers do not wish to see investment postponed, even at the expense of higher bills. We also note that the more informed customers are about the challenges, and about our plans, the stronger the support from our plans and the willingness to make a contribution through higher bills.

12.3 Long-term bills pathway

Welsh Water 2050: Strategic Response 8

Ensuring affordability of services delivered to customers

With inequality, debt, and poverty on the rise we aim to ensure that our services remain affordable for all customers: both in terms of average bills and for those on social tariffs. We will ensure that we continue to provide the best service in increasingly innovative and efficient ways and pass these savings on to our customers.

As explained in Section 2.6 above, our Long Term Delivery Strategy (LTDS) sets out our long-term ambition in terms of outcomes for customers and the environment, taking into account the current views of stakeholders, regulators and customers. Most of the improvement in those outcomes will require 'enhancement' investment, which puts upward pressure on customer bills spread over a number of AMP periods.

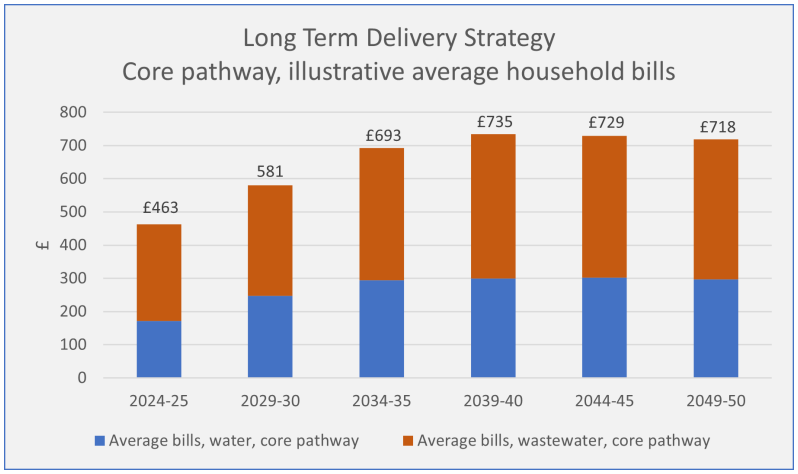
The long-term outlook for bills depends not just on investment but on a range of other factors, including the cost of financing, and the cost of operations and asset maintenance (which are outside the scope of the LTDS). However, making a series of simplifying assumptions we can make an estimate of the impact of the investment requirements in the LTDS on bills over the long-term.

The result of that estimate, as set out in the LTDS 'core pathway', is shown in the graphic and table below. Although the level of investment steps up significantly in AMP8 and then again in AMP9, the impact on bills is attenuated in those periods by the fact that 'enhancement' investment is added to the 'Regulatory Capital Value' (RCV) and paid down over the lifetime of the assets, which is in most cases between 20 and 30 years.

Combined with the reduced expenditure in the core pathway in later periods, the effect is to produce the pathway of bills shown below, with the increase in bills flattening out and slightly reducing in AMPs 11 and 12. Note that these figures are in 2022/23 prices, hence they do not reflect the impact of inflation.

£	2024-25	2029-30	2034-35	2039-40	2044-45	2049-50
Average bills, water, core pathway	172	248	294	300	302	296
Average bills, wastewater, core pathway	291	333	399	435	427	422
Average bills, combined, core pathway	463	581	693	735	729	718

Figure 55 Long-term bills - core pathway



This shows that under the 'core pathway' bills would be expected to rise by a total of 55% between 2025 and 2050 in real terms. It should be pointed out that this is illustrative, in line with the LTDS framework. It is not the company's 'most likely' forecast of future bills. It includes only future investment needed both in 'benign' and more 'adverse' scenarios, and does not include future investment requirements arising from new environmental standards and regulations that are hitherto unknown. It also does not capture any changes that may be required to underlying 'base' costs of maintaining and replacing assets.

Under the core pathway the average household combined bill, in 2022/23 prices, increases from £463 to £718. This is a significant real terms increase, reflecting the cost of improvements to our infrastructure to address harm caused by storm overflows, deal with the impacts of climate change, meet current regulatory and societal expectations, and secure long-term resilience.

The profile is explained in more detail in the LTDS itself. Note that after 2030 there is an increase in water bills of around £20 from the Cwm Taf DPC project coming 'online' which is included in the bill figures above.

Alternative pathways in the LTDS describe some 'plausible futures' where additional investment is needed, which in turn would be expected to push bills up further. It is also important to note that we will gain a clearer view of future investment requirements, particularly in relation to the DWMP, as a result of further work between now and PR29.

We expect this general trend of long-term bill increases to be reflected across the water industry, such that bills for future Welsh Water customers will not be an outlier.

Our not for shareholder model will help to reduce financing costs, we will continue to work collaboratively with stakeholders in Wales to produce effective investment solutions jointly, and we will relentlessly pursue drive for innovation and efficiency to drive down costs. All of this will help to keep bills as possible for our customers.

12.4 Average bill proposals 2025-30

Water bills represent a significant outgoing for households, particularly those on lower incomes. This is why we take incredibly seriously the prospect of increasing bills in real terms for customers, particularly against the background of high inflation. Part of the increase arises from changes in underlying factors beyond the company's control (see below). Part of it comes from the increase in investment, most of which is non-discretionary, as explained in the preceding sections of this document.

All the same, what customers will see is their bills going up year after year, so we have to do all we can to ensure we support customers in making it as easy as possible to pay their bill, while continuing to offer lower 'social tariffs' to customers on the lowest incomes (see Section 12.5 Supporting affordability - social tariffs).

The table below shows the proposed increase in bills in percentage terms in each year of the AMP 2025-30, as well as an illustration of this for the average household. Actual bills will vary based on a range of factors, depending on whether the household is metered or not. Note that the table below is in 2022/23 prices, so the impact of inflation is excluded.

	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30
Average household bill	£463	£530	£540	£556	£568	£581
Annual change		15%	2%	3%	2%	2%
Change 2024-25 to 2029-30						£118
Change 2024-25 to 2029-30						26%

Note that the figures in the table here do not account for the company's contribution to social tariffs, which serve to reduce the amount of the average bill by around £10.

The regulatory 'levers' available to us are the RCV 'run off rate', which matches the estimated lifetime of assets, and the 'Pay As You Go' rate, which we have kept at the 'natural rate' equal to the proportion of expenditure which covers operational and base maintenance costs. We believe this is the fairest way to allocate the costs of investment and expenditure between current and future customers, while maintaining a healthy balance sheet which benefits our credit rating and hence the cost of finance.

Note that actual bills will also be affected by a number of other factors during the period, including the impact of any Outcome Delivery Incentives (financial rewards and penalties for performance). (See Section 13.6 Outcome Delivery Incentives (ODIs) for further discussion on the impact of ODIs.)

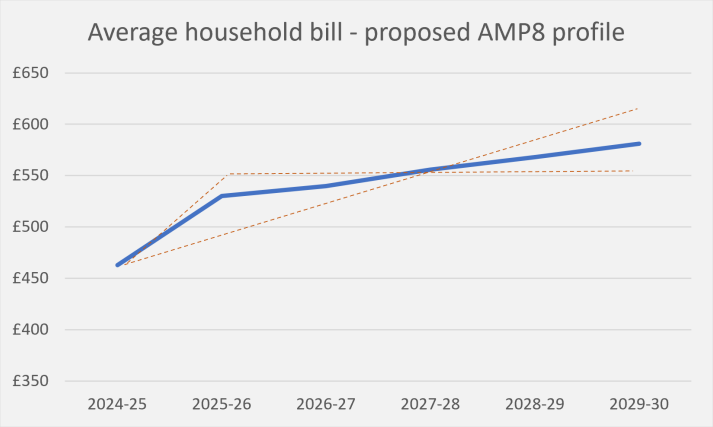
Bill profile

We have some discretion in the profile of the bill increase over the five years of the AMP, informed by customer preferences. Our customers told us at PR19 that they prefer smooth bill changes, but that was in the context of low inflation and falling bills in real terms.

In the context of PR24 we have chosen to apply a step increase in the first year, followed by smaller increases in subsequent years of the AMP. Applying a smoothed profile, without this step increase in the first year, the bill increases in each subsequent year of the AMP would be more significant, and also the final bill level in 2030 would be higher.

At the other extreme we could make a much bigger step increase and then hold bills flat to 2030 with a lower bill level in 2030. However we do not think a step change of that magnitude is necessary or appropriate, and this profile would also likely create the need for a bigger adjustment to 'step up' to the PR29 bills, given the likely investment needed in the LTDS.

Figure 56 AMP8 bill profile



We believe that our proposal is the best way to meet the objective of predictable and stable bills, which we know our customers prefer, while allowing for the necessary increase in average revenues over the period compared to AMP7. It also enables us to match revenues to costs which supports stable financial metrics. See Section 13.1 Financing our plan.

Drivers of the change in bills

The table below shows the increase in the average household bill between the forecast for 2024-25 and the planned level for 2029-30, broken down by the cause of the increase. Note that this analysis can be done in different ways, but we have found this the most informative way of communicating the change with stakeholders.

Causes of change in average bill from 2025 to 2030.

2024/25 Bill (in 2022/23 prices)		**463**
WACC changes		
Change in WACC assumptions	30	
Impact of RPI/CPIH changes on WACC	8	
		38
Regulatory adjustments:		
Regulatory 'true-Up' mechanisms	-2	
Change in ODIs 24/25 (assumes nil in AMP8)	16	
Removal of PR19 bill profiling	11	
		63
Effect of AMP8 Totex Plan:		
Change in Opex and IRE (Including Retail)	15	
Capital Investment	25	
Other	2	
		40
AMP8 Reprofiling	13	
		13
2029/30 Bill (in 2022/23 prices)		**581**

In this analysis, the majority of the increase in bills is accounted for by regulatory changes rather than the increase in expenditure. The single biggest impact on bills is the increase in the WACC (weighted average cost of capital) - using Ofwat's 'early view' of the WACC for AMP8. The transition in the indexing of the RCV from RPI to CPIH inflation pushes bills up by a further £8.

Our assumption of ODI underperformance payments in the final year of AMP7 suppresses bills in 2029-30 by £16, and we have assumed zero net ODI payments in AMP8. The profiling of bills at PR19 also has the effect of suppressing bills in 2024-25, having the effect of a £11 step up into AMP8.

The increase in opex and maintenance of infrastructure (IRE) in AMP8 pushes bills up by £15, and the increase in capital investment compared to AMP7 pushes up bills by £25. Finally, our chosen profile for bills in AMP8 pushes bills up in 2024-25 compared to the 'natural' profile as we have suppressed the amount of the step up in bills in year 1.

In summary, this analysis shows that the increase in expenditure in our Business Plan is not the primary cause of the '*year 5 to year 5*' increase in bills.

12.5 Supporting affordability - social tariffs

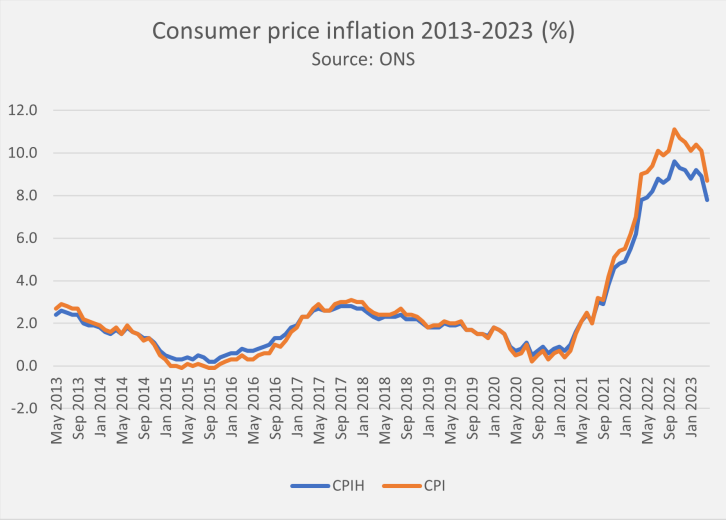
PR24 Forum Strategic Steers: Affordability and social tariffs

- ✓ We expect DCWW to continue to offer flexible payment arrangements and other mechanisms to help customers to pay their water bill and avoid falling into debt.
- ✓ We expect DCWW to indicate how a range of financial assistance options have been considered and how they have worked with the sector and CCW.
- ✓ We expect DCWW to remain flexible and open to adapting to new approaches and challenges.
- ✓ We expect DCWW to support ongoing effective promotion of assistance to customers now and in the future. In doing so companies should have regard to the recommendations of the CCW independent review of water affordability, additional emerging water assistance proposals and ongoing good practice highlighted by CCW.
- ✓ We expect DCWW to maintain and increase where possible the level of affordability support provided through social tariffs.

Introduction

Our customers have been experiencing the worst cost-of-living crisis in the UK since the 1970s. Annual inflation increased to more than 10%, and remained at 6.8% as of July 2023 (see graph below). With incomes failing to rise in line with consumer prices, customers have been under huge financial pressure, and struggling households in particular are likely to remain in difficulty for some time to come.

Figure 57



Energy bills have had a huge impact on household finances. Energy bills are now falling but remain much higher than pre-pandemic levels. Inflation remains significantly higher too than in the last 20 years for many other essential categories of household expenditure, particularly food. Meanwhile interest rates as of August 2023 are seven times higher than they were two years ago, meaning that mortage payments have skyrocketed for many, and even for those in a position to own their own homes getting by has become a great deal more difficult.

It is against this backdrop that we have been preparing our business plan for 2025-30. Policymakers and regulators including the Welsh Government, CCW and Ofwat have rightly challenged water companies to do all they can to minimise bill increases and support customers who are struggling to pay. We already offer the highest level of support to customers in the industry in terms of social tariffs, and plan to increase this in AMP8 to help more customers on the lowest incomes to pay their water bills.

Current approach and level of support

With over 1.4 million household customers in most of Wales and parts of England, we are:

- Making available £64 million across the five years to 2025 to provide financial assistance to our customers. This takes the form of discounted bills (social tariffs) and is available thanks to the non-shareholder 'Glas model'.
- Supporting 132,000 customers through social tariffs as of 31/08/2023 - a larger number as a proportion to the company's size than any other water company in England and Wales. 97,000 of these are on our 'HelpU' tariff (see Box below).
- Through our Specialist Support team, providing a case managed service which brings together financial and non-financial services to customers who need extra help, thereby ensuring that we fully understand a customer's specific circumstances and provide them with the most appropriate support package.
- Working with over 300 local organisations (including Citizen's Advice, Welsh Government's NEST scheme, Job Centre Plus, housing associations and foodbanks) to help identify and support customers who may be eligible for social tariffs.

HelpU social tariff

The HelpU tariff is designed to help the lowest income households in our region. The annual HelpU charge is £291 in the 2023-24 billing year, a significant reduction for an average household with a bill of £509. It is available to households with someone on a means-tested benefit and a combined household income below a set threshold, currently £16,000 for a two person household, or £17,700 for three or more.

Social tariffs in AMP8

To assist with the affordability concerns, we will be continuing and enhancing our sector-leading social tariff, HelpU, which provides a flat lower bill for eligible customers facing financial hardship. HelpU currently represents a 43% discount on the typical household bill.

The level of the company contribution to social tariffs (and other affordability support) in our plans for AMP8 is £13 million a year, which is consistent with the level of support in AMP7 in real terms. This level of funding is made possible by our not-for-shareholder model. The remainder of the cost is funded from a 'cross-subsidy' added to bills for other customers.

Our modelling based on unemployment forecasts for AMP8 suggests that the uptake of social tariffs could increase to a peak of 190,000 in AMP8, from 132,000 currently. Under our plans we will have the funding capacity available to accommodate such an increase.

Our aspiration is to insulate customers on social tariffs from any real terms bill increases, limiting or if possible eliminating any increase in the level of the HelpU bill beyond inflation. However, we wish to retain some flexibility in the level of the discount applied to social tariffs so that we can optimise the design and reach of social tariffs to maximise the benefits for customers depending on the economic outlook.

We will continue to consider a wide range of financial assistance options, and to work with the wider sector and CCW on how to maximise the impact of social tariffs.

Cymuned Scheme

In 2022 we reviewed our social tariffs offering given the uncertainty created by cost of living increases, including support to people in work and therefore not eligible for social tariffs but who may be impacted. This resulted in the pilot of our Cymuned (Community) scheme in December 2022, the only one of its kind in the sector. We launched the scheme formerly in July 2023.

Cymuned offers short-term support to working households who find themselves in a situation where their bills exceed their income.

Qualifying households may receive a three month charge-free period, currently equating to a discount of around £100-£120 on the average bill. Those who apply need to undergo an income and expenditure assessment, which is completed by trusted organisations such as Citizens Advice.

The scheme was initially introduced in Rhondda Cynon Taf in South Wales and Denbighshire in North Wales, and we are now extending its availability more widely.

12.6 Charging innovation

Beyond social tariffs, another way in which we can support affordability for customers who struggle to pay their bill may be through changes to the design of our tariffs. For example, customers who struggle to pay their bill, but can limit themselves to a 'base level' of water use, could pay less for their water per unit than a customer who uses a large 'discretionary' amount of water. Currently, metered household customers all pay the same price for a unit of water.

Ofwat has encouraged water companies to implement trials of innovative tariffs to experiment with different ways of charging for water. These could have a range of benefits, not just in terms of affordability but also stronger incentives for customers to save water where they can. Examples include a rising block tariff along the lines of the illustration above, with higher water users charged at a higher unit rate, which is currently being trialled by Affinity Water.

Currently our relatively low level of meter penetration limits the scope available for us to implement tariff trials, as most alternative tariff structures require information on customer consumption of water. Our meter penetration is currently at around 46%, but by 2030 we expected to have 65% of households paying on metered usage. We estimate that by 2026-27 we may be in a position to arrange for a trial of a rising block tariff, with a view to assessing options for a wider rollout as part of our PR29 plans for 2030-35. The trial would be designed with the objective of establishing the impact of this tariff structure on usage for 'light' and 'heavy' water users, and to identify what mitigations might be needed to avoid unintended consequences.

13. Financing, incentives and delivery

This Business Plan, with its significant increase in investment compared to the current and previous AMPs, represents a major challenge not just in terms of affordability, but also financing and deliverability. This section covers with how we have ensured that the plan is practically implementable in these terms. It also summarises our view of the risks and returns associated with the plan, and the key uncertainties. Finally we explain how the delivery of the plan will be monitored.

13.1 Financing our plan

The robustness of this plan depends on our ability to finance the required expenditure and retain the creditworthiness of the company. Retaining the trust of customers includes demonstrating that we have the financial resources to maintain the essential services we provide, deliver our investment plan, and weather any shocks or stresses that may come our way. Financial resilience is also about the ability to avoid any sudden or unexpected bill increases for customers.

The 'Glas model'

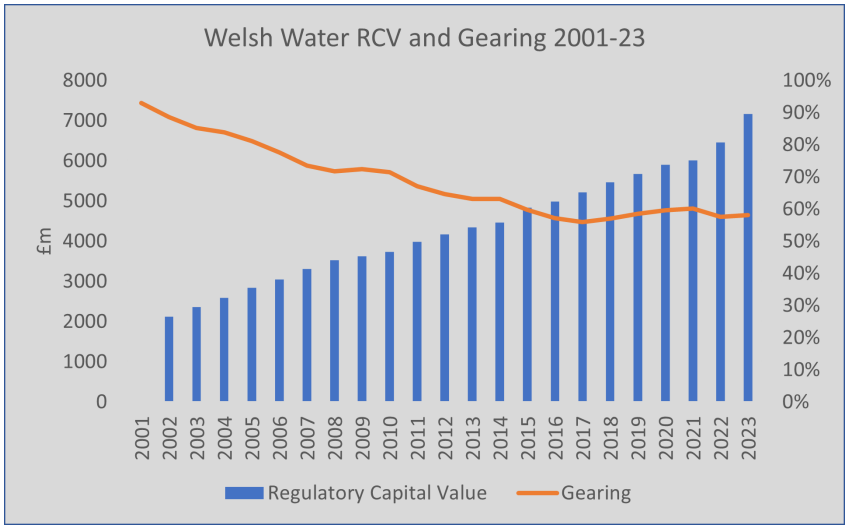
Glas Cymru is a single purpose company formed to own, finance and manage Welsh Water, which it has done since 2001. It is a 'company limited by guarantee' and accordingly has no shareholders, which means that any financial surpluses are retained for the benefit of Welsh Water's customers.

Under the 'Glas model' Welsh Water's assets and capital investment are financed by bonds, which are generally available at lower rates of return than shareholder equity. This aims to reduce Welsh Water's overall financing costs, which is one of the water industry's biggest costs.

Background

The company's level of gearing has been brought down from above 90% at the time of its acquisition by Glas Cymru to below 60%, and is now the second lowest in the industry (as of 2022). This reflected the priority placed on establishing a strong balance sheet, particularly important in the absence of shareholders as lenders of last resort. It also helped our credit rating, enabling us to access debt financing at beneficial rates.

Figure 58



In AMP7, rather than reducing gearing further, we have primarily applied funds arising from our non-shareholder model to invest an additional £160 million for the benefit of our customers through accelerated investment to help improve service delivery and social tariffs to support our most vulnerable customers. This includes an additional discretionary capital investment of £100m in AMP7 to address river water quality, in particular phosphate removal at special area of conservation (SAC) rivers.

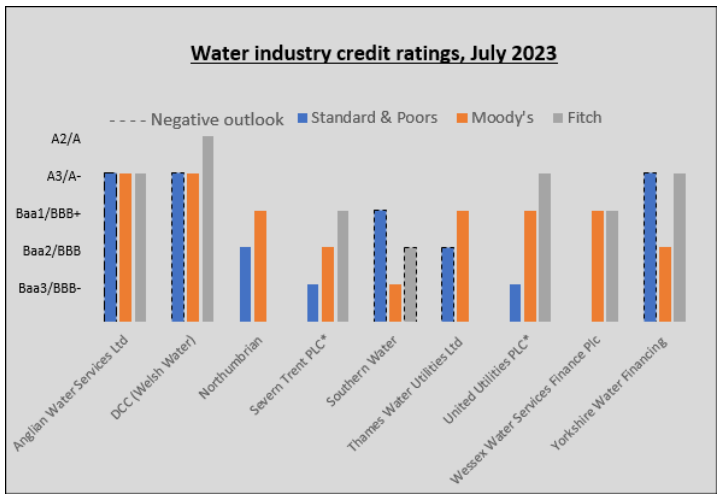
Welsh Water now has amongst the strongest set of credit ratings in the water industry. This facilitates reliable access to a range of financial markets, so we can raise investment when needed and at the optimal timing.

AMP8 plans

Our aims for the (actual) company for AMP8 are to:

- maintain two investment-grade credit ratings, as required by our licence (Instrument of Appointment)
- raise the financing required to underpin the significant step up in the level of investment, at the most beneficial rates possible, while maintaining financial resilience
- maintain a stable level of 'customer dividends' to support the provision of social tariffs required to protect vulnerable customers from bill increases (see Section 12.5 Supporting affordability - social tariffs)

Figure 59 Industry credit ratings 2023



We have used both Ofwat's financial model, and its assumptions, as well as own financial model to assess the financeability of the 'standalone' Welsh Water 'actual' appointed business - that is, the regulated activities of the company which are within the scope of the PR24 process. On this basis, the central case financial projections are also consistent with the maintenance of a secure, investment-grade credit rating. A selection of the key ratios are shown below.

Business Plan credit metrics (notional and actual company)

		2026	2027	2028	2029	2030
Credit rating metrics (Notional Company)	Threshold (Baa1 / BBB+)					
Ofwat Adjusted ICR	1.35x/ 1.7x	1.5x	1.6x	1.5x	1.5x	1.5x
Ofwat FFO/Net Debt	6%/ 9%	9.1%	9.0%	8.7%	8.5%	8.7%
Gearing	60%/ 65%	57%	59%	60%	62%	62%
Credit rating metrics (Notional Company)	Threshold (Baa1 / BBB+)					
Moody's adjusted ICR	1.35x/ 1.7x	1.5x	1.6x	1.5x	1.5x	1.5x
S&P FFO/Net Debt	6%/ 9%	8.3%	8.2%	7.9%	7.7%	7.9%
Gearing	60%/ 65%	57%	59%	60%	62%	62%
Credit rating metrics (Actual Company)	Threshold (A3/A-)					
Moody's adjusted ICR	1.35x/ 1.7x	1.7x	1.8x	1.8x	1.9x	1.9x
S&P FFO/Net Debt	6%/ 9%	6.9%	7.7%	7.7%	8.5%	8.7%
Gearing	60%/ 65%	61%	61%	61%	61%	60%

Our plan is consistent with a credit rating A3/A- for the actual company, which takes into account the credit rating uplifts that result from Welsh Water's 'not for shareholder' structure. This is equivalent to a credit rating of Baa1/BBB+ on the 'notional' company structure assumed by Ofwat.

The plan would see the gearing on the notional company rise from 57% to 62%. However the actual company gearing is forecast to fall slightly. This difference is explained by the fact that the quasi-dividends `distributed' by the actual company, in the form of company support for social tariffs, are significantly lower than the assumed dividends in the notional company.

RCV run-off and PAYG assumptions

In the financial model used to calculate bills and credit ratios we have made decisions about the 'Pay As You Go Rate' (PAYG - the proportion of total expenditure that is passed through directly 'in year' to revenues from bills, as opposed to being added to the Regulatory Capital Value (RCV)) and the 'RCV run-off rate' (the rate at which the RCV is paid down year by year). These values affect the balance of the financial burden between current and future customers, as well as credit metrics. The assumptions are aligned with Owat's guidance as follows.

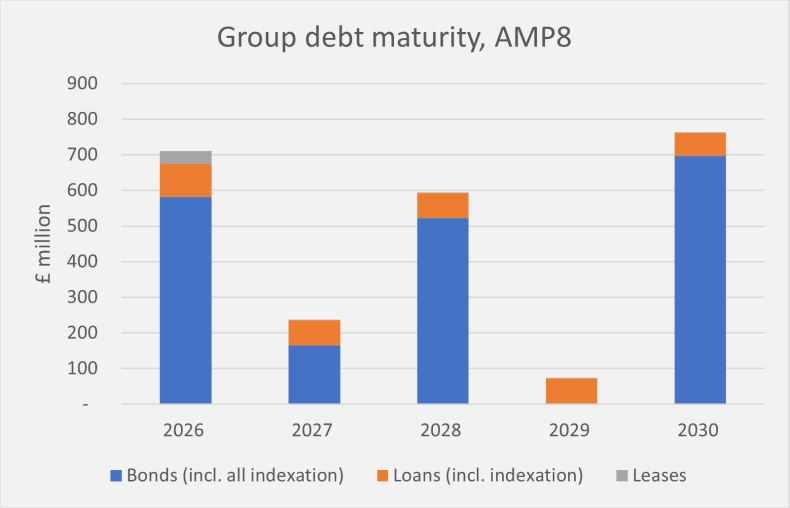
PAYG: As for AMP7, this has been set at the 'natural rate' for each year of AMP8, meaning the proportion of total expenditure that accounts for year-on-year operational and base maintenance costs (as opposed to the costs of investment for the future).

RCV run-off rate: This has been set at a rate that is aligned with the average lifetime of assets within each price control. This means broadly that the burden of paying for a new asset through bills is spread across customers over the lifetime of that asset.

AMP8 refinancing plans

We currently project the need to raise approximately £3.6 billion of debt to fund its requirements in AMP8 to replace maturing debt and to fund new capex requirements.

Figure 60 Refinancing requirements



Most of this is expected to be raised in the sterling bond markets, however we will also look to diversify sources of debt, including the use of a larger revolving bank facility.

The tenor of new debt will be spread out to avoid a concentration of refinancing risk in any one period and will be mostly long term in nature, and will continue to be mostly fixed rate or index-linked. We will continue to target a gearing ratio at or around 60% to maximise liquidity and minimise funding spreads. We will also look to add ESG factors into our debt to reinforce the commitment to our ESG goals and maximise the investor base.

Cost of financing

In the Price Review process the allowed cost of capital is determined by Ofwat, calculated by a weighted combination of an allowed cost of equity and an allowed cost of debt financing (the Weighted Average Cost of Capital - WACC). Ofwat estimates these based on a 'CAPM' methodology which uses data including historic market information to estimate the appropriate levels of the various sub-components

We have made representations on Ofwat's approach to calculating the WACC as part of our response to the consultation on the Draft Methodology for PR24, and have some important reservations about some elements of the methodology which are not repeated here.

As the WACC has such a major impact on company costs and financing arrangements, Ofwat publishes an 'early view' of the WACC in advance, for company business planning purposes, pending a review and re-publication as part of the Draft and Final Determinations.

For PR24 Ofwat's 'early view' of the WACC for 2025-30 is 3.29% (in CPIH deflated terms). This is 0.33% (33 basis points) higher than the 2.96% set at PR19 Final Determinations, reflecting the changes in underlying market data and some methodological changes.

Given the significant movements in underlying market information since the 'early view' WACC was announced we can expect Ofwat's view of the WACC to change significantly at the Draft Determinations stage in July 2024. However, for the time being we have used this 'early view' in our financing calculations for the Business plan. For the retail business we used a net margin of 1% as per Ofwat's guidance.

This does not prejudice any representations we may wish to make on the WACC published at Draft Determinations.

It is crucial that the WACC is ultimately set at the appropriate level based on all relevant information taken in the round, including the overall risk and return balance in the Draft and Final Determinations, and the need for the water sector to raise additional capital in order to deliver on its ambitions for AMP8 and beyond. This may not necessarily be the level that results from the CAPM methodology, which is itself sensitive to decisions around which historic input data is deemed to be appropriate.

Making a determination on the WACC will be particularly difficult for PR24 given the volatility in underlying market factors in the last couple of years, and the high level of uncertainty about how these will evolve in the future. Ofwat introduced at PR19 a 'cost of debt reconciliation mechanism' to allow for uncertainty, but there is no equivalent for the cost of equity.

A further uncertainty will be around the 'wedge' between RPI and CPIH measures of inflation. This is no longer as predictable as it has been in the past. Most sector company debt is still linked to RPI, creating an exposure for companies now that the 'notional' company for PR24 has 100% CPIH-linked debt.

All of this means that a degree of judgement will need to be applied in determining the appropriate WACC for PR24, perhaps more so than at previous price reviews.

Ultimately the anticipated step up in the level of investment across the water industry will need to be financed if the industry it to deliver on its ambitions and stakeholder expectations. This will not be possible without offering investors a reasonable prospect of a fair return on their capital that bears favourable comparison with other infrastructure sectors competing for the same financing.

In Welsh Water's case, we expect to be going to the market for around £3.6 billion of new debt during AMP8 (of which around £2.8 billion is refinancing of existing debt).

13.2 Ensuring financeability

In considering the financeability of central case financial projections and potential downside scenarios, the Board has looked at a wide range of evidence and metrics, including in particular the ratios that are used by the credit rating agencies:

- Gearing
- Adjusted Interest Cover Ratio (ICR)
- Funds from operations (FFO) to net debt ratio

Our current credit ratings are **A3/A-** for the actual company, and **Baa1/BBB+** for the 'notional' company (i.e. as if the company matched exactly Ofwat's financing assumptions applied to all companies).

As noted above, our assessment of the key ratios under our submitted Business Plan suggest that these credit ratings will be maintained, meaning that the Plan as submitted is financeable. Further detail of this assessment is provided in document (WSH16-Risk & Return RR1-RR30).

Financeability stress testing

Our Board has also considered a range of severe but plausible down-side scenarios for the 'notional' and 'actual' company, to demonstrate that the actual capital structure provides sufficient headroom to enable it to continue to deliver its commitments and remain financially resilient. The scenarios we have tested are shown below.

Scenario	Description
Scenario 1	Totex underperformance (10% overspend of totex) over 5 years.
Scenario 2	ODI underperformance payment (3% RoRE) in one year applied in year 2.
Scenario 3	Inflation 2% below the base case in the business plan in each year of the price review.
Scenario 4	Deflation of -1% for 2 years, followed by a return to the long term inflation target.
Scenario 5	10% spike in inflation with a 2% increase in wedge between RPI and CPIH, followed by two years at 5% and a 1% increase in wedge.
Scenario 6	Increase in the level of bad debt (20%) over current bad debt levels applied in years 2 and 3.
Scenario 7	Debt refinanced as it matures, with new debt financed at 2% above the forward projections.
Scenario 8	Financial penalty – equivalent to 6% of one year of Appointee turnover applied in year 2
Combined scenarios 1a	Totex underperformance of 5% in each year of the price control along with an ODI penalty equivalent to 0.75% of RORE in each year and a financial penalty equivalent to 1% of revenue in one year.
Combined scenario 1b	Totex underperformance of 5% in each year of the price control along with an ODI penalty equivalent to 0.75% of RORE in each year and a financial penalty equivalent to 1% of revenue in one year. Plus inflation 1% below forward projections in each year.

In all cases, whilst a decline in credit ratings would be anticipated, there is a reasonable expectation that an investment-grade credit rating would be maintained, though in the most severe scenarios the interest cover ratios imply it could fall by one 'notch' temporarily to BBB-/Baa3.

Full details are provided in document (WSH16-Risk & Return RR1-RR30)

13.3 Direct Procurement for Customers

At PR19 Ofwat introduced a new mechanism for the delivery of major investment projects by water companies, by which they could be 'outsourced' to an appointed partner company, if it could be demonstrated that the partner could deliver better value in the financing, delivery, operations and maintenance of the scheme.

Our solution to the need to replace a number of ageing water treatment works in the Cwm Taf area and improving resilience was a candidate for this Direct Procurement for Customers (DPC) delivery route. The scheme has been progressing through various stages of solution assessment and definition, and is due to be completed by 2030 (see box below). The scheme was officially designated by Ofwat for delivery via DPC in June 2023.

Cwm Taf DPC

We are developing a plan to build new water treatment works and associated facilities in South Wales to replace our existing works at Llwyn Onn, Cantref and Pontsticill which are nearing the end of their operational lives. This makes them more challenging and costly to operate, which is why a new, innovative solution is required so that water supplies to customers are protected into the future. The scheme will serve our customers with fresh, clean drinking water for decades to come.

The new facilities will not only provide new and improved water treatment processes but will also provide enough water storage to cater for future population growth and make it more resilient to the effects of climate change.

The project will be delivered through the Direct Procurement for Customers (DPC) mode for competitively tending services to ensure best value for customers. This means that customers won't start paying for the cost of the scheme on their bills until it is completed.

In early 2022 we held a six week non-statutory consultation period to introduce our early thoughts and design ideas to the local community. We wrote to customers in March 2023 to provide an update and will be providing further details to the community on plans and timelines in due course.

We have assessed our investment plans for AMP8 in accordance with Ofwat's guidance. The guideline threshold for DPC has increased from £100 million at PR19 to £200 million for PR24. Above that level there should be an assumption that a DPC is used as a default, unless companies can demonstrate it is not appropriate or would not deliver value to customers. There is also a technical discreteness and value for money assessment, and we would need to take into account the Welsh Government's position on the introduction of competition as set out in its SPS.

We requested that Aqua Consultants (Aqua) undertake an independent and thorough assessment of programmes and schemes against Ofwat's guidance on DPC. Schemes were selected for this review where they had capex of over £50 million and/or totex of over £100 million.

Aqua undertook the review using a detailed and thorough process based on the following tests:

- programme scalability,
- construction risk, and
- operation and maintenance risk.

Five potential schemes were selected for a rigorous and systematic analysis. The review concluded that none of these schemes were appropriate for DPC delivery. Reasons included value, risk transfer, and scope uncertainty or workload predictability. We have considered this review and also that no schemes are suitable for DPC delivery, and therefore have not included any DPC delivery schemes in our proposals for AMP8.

13.4 Risk, return and uncertainty

Balance of risk and return

Water companies are incentivised through the regulatory framework to deliver the maximum benefits to customers and the environment for the least cost. We are no different in that respect. As a not-for-shareholder company we want to maximise returns in order to increase the funding available to be redeployed to the benefit of our customers - as social tariffs or additional investment. This is

crucial for our reputation, for our company ethos, and for retaining the trust of customers. Our people are incentivised both through our company culture and through our compensation schemes to deliver and where possible outperform on targets.

For the regulatory framework and its incentives to work as intended, the PR24 Final Determination must provide a reasonable prospect of achieving the 'base' return and beating that by 'outperforming', as well as the risk of financial penalties for underperformance. Some risks are beyond the company's control so there must be an appropriate sharing of those risks between the impact on the company's financial returns and on customers' future bills.

An overall balance of risks and returns needs to be struck, taking account of a range of factors including the WACC (see above), the Performance Commitment Levels set by Ofwat, ODI rates and the way in which they are applied, the various reconciliation mechanisms, and the key uncertainties and how they are managed. The range of risks and returns is assessed for all companies against a common metric of each company's regulatory equity - the Return on Regulatory Equity (RORE).[11]

RORE analysis

Ofwat provides a guideline of the risk/return range against the regulatory equity (the 'RORE range') that it expects for each of the components of risk and return, in reasonably high/positive (P90) and reasonably low/negative (P10) eventualities. It expects the overall range of risk and return for all of the components to be broadly symmetrical at -4.85% to +4.8%.

RORE ranges - Ofwat's expectation

Component of risk	Reasonable downside impact on RORE (P10)	Reasonable upside impact on RORE (P90)
Quality and Ambition Assessment (QAA)	-0.30%	0.30%
Totex costs	-1.00%	1.00%
Retail costs	-0.20%	0.20%
Outcome Delivery Incentives	-2.00%	2.00%
Financing	-0.65%	0.7%
Measures of experience (C-Mex, D-Mex, BR-MeX)	-0.65%	0.50%
Revenue incentive mechanisms	-0.05%	0.00%
TOTAL	**-4.85%**	**4.80%**

Our own analysis of the RORE ranges for the key components is based on the following assumptions.

RORE element	Our assumption
Totex costs	We estimate a Totex RORE range of -1.40% to 0.55%. This is based on a potential 10% Totex overspend, based on our performance over 2015-20, or a potential 4% underspend.

[11] Regulatory equity is the total RCV multiplied by 1 minus Ofwat's notional level of gearing (0.55). In our case this is circa £4 billion.

RORE element	Our assumption
Retail costs	We estimate a RORE range of -0.34% to 0.04%. This is based on a range from 20% cost overspend, based on the industry's retail performance in AMP7 to-date, to a 4% cost underspend.
Measure of experience	Our analysis excludes BR-Mex as this is not applicable in Wales, and adjusts the range to reflect our best view of the plausible range of performance, based on Ofwat's proposals in the current consultation on these measures, and the proposed C-MeX range for up to 18% of retail revenue to be 'at risk'.
Outcome Delivery Incentives	We propose a range based on the ODI rates submitted in our plan, not based on Ofwat's 'indicative' ODI rates (see Section 13.6).

Further details of our approach is included in document (WSH16-Risk & Return RR1-RR30). Our estimated RORE ranges are shown below.

RORE ranges - Business Plan

Component of risk	Reasonable downside impact on RORE (P10)	Reasonable upside impact on RORE (P90)
Quality and Ambition Assessment (QAA)	-0.30%	0.30%
Totex costs	-1.40%	0.55%
Retail costs	-0.34%	0.04%
Outcome Delivery Incentives	-2.84%	1.65%
Financing	-1.26%	1.00%
Measures of experience (C-Mex, D-Mex, BR-MeX)	-0.22%	0.07%
Revenue incentive mechanisms	-0.07%	0.02%
TOTAL	**-6.43%**	**3.63%**

Our analysis suggests that the return on regulatory equity could plausibly vary by up to 6.43% on the negative side, or up to 3.63% on the positive side. This variance is around a 'real' (CPIH) equity return, according to Ofwat's 'early view', of 4.14%. Thus the RORE range is significantly skewed to the negative side, and could plausibly eliminate all equity returns. This would not be an appropriate basis for allowing a reasonable prospect of returns on equity in the Price Review and would need to be addressed by Ofwat at the Draft Determination stage, by adjusting upwards the allowed return on equity, or by rebalancing the risk and return using other means.

13.5 Outperformance sharing

Outperformance sharing mechanism

There are a range of regulatory areas covered by this price review where the 'outturn' metrics in 2025-30 are subject to considerable uncertainty. Some, such as performance outcomes, are already subject to incentive mechanisms such that any related benefits to companies are shared with customers. However for other factors, such as the cost of debt, the level of inflation, or gains/losses due to tax changes, benefits that may accrue to companies are not automatically shared with customers. (Naturally there is also downside risk to companies should these factors move in the other direction).

Ofwat has encouraged companies as part of PR24 to come forward with proposed mechanisms by which to share with customers outperformance arising from these areas.

Our not-for-shareholder constitution means that value created in the business is retained in the company or distributed for the benefit of customers. As a result, any outperformance, both in areas subject to incentive mechanisms and areas that are not, are available to be 'shared' on a 100% basis with customers.

Note that Welsh Water's ultimate parent company is Glas Cymru, a company limited by guarantee and which does not have share capital, therefore no dividends are paid outside the Group. In 2016/17 intra-group dividends totalling £30.2 million were paid for investments in commercial projects. No further intra-group dividends have been paid since then and none are expected to be paid in the foreseeable future.

Since 2017, all financial surpluses have been used to support social tariffs and to increase investment in assets to provide our essential services. During the course of AMP7 (2020-2025) we expect a total of £63 million to be returned to customers through company contributions to social tariffs, and £100 million of discretionary capital investment will be delivered with no impact on customer bills.

We expect to continue in a similar vein in AMP8, meaning that 100% of any outperformance will be shared with customers, hence not requiring any special arrangements or commitments beyond those that already exist.

13.6 Outcome Delivery Incentives (ODIs)

Background

ODIs generate a payment to the company, or to customers, depending on whether the company has outperformed or underperformed against each of its regulatory Performance Commitments (PCs). They help to incentivise improved performance and hold the company to account for its commitments.

For these incentives to work optimally, each PC's ODI needs to be set at an appropriate level. In theory this should take into account the marginal benefit and the marginal cost of delivering an additional unit of improvement against the PC. In addition, the total 'package' of ODIs needs to be large enough to have incentive power, but not so large as to undermine investor confidence (on the 'penalty' side) or put disproportionate upward pressure on bills (on the 'reward' side).

In its Final Methodology for PR24, Ofwat stated its intention to move away from the approach taken at PR19, when companies were able to set ODIs based on their own customer research. Instead, Ofwat and CCW would conduct centralised research on customer valuations, and would set standardised ODI rates for the industry on the basis of the results.

This intention proved difficult to implement in practice, and instead Ofwat published a set of 'indicative' ODI rates for companies to use, based on a method which used estimates of the performance ranges for each PC, and an 'allocation' of the regulatory equity of the company for each PC. Companies are expected to use these published rates unless they have 'compelling' evidence that they are incorrect or inappropriate.

Our approach

We commissioned a full independent expert review of Ofwat's approach and calculations of the 'indicative' ODI rates. This review recommended that there are strong grounds for rejecting the 'indicative' ODI rates. These were principally that:

- the overall 'package' of ODIs was too high overall in that it is high relative to Ofwat's 'early view' of allowed equity returns, and in our view high relative to the risk range expected by Ofwat (Ofwat stated that it was likely to be within the required range, but did not provide robust evidence for this)
- the ODI rates were in most cases significantly higher than those in place at PR19, without meeting the required threshold for evidence that such a drastic change was justified or necessary
- a degree of consistency in ODI rates across price reviews is good regulatory practice, in the sense that material changes between periods undermines the incentive power of the ODI regime.
- there were significant weaknesses and flaws in the calculation of individual ODI rates, in particular in the use and application of historic performance ranges.

We are, therefore, putting forward an amended set of ODI rates, calculated in a way that follows the same overall approach, but reduces the overall size of the 'package', and corrects for flaws in Ofwat's calculations of individual rates.

We followed the same overall approach to setting the ODIs as Ofwat, applying the following principles:

- ODI rates should be set with reference to the notional level of regulatory equity (set by Ofwat at 55%).
- ODI rates should be set with reference to historical performance ranges, taking into account the characteristics of different Performance Commitments.

- The package of ODIs should be set at a level that maintains the investability of the firm for notional shareholders.
- The package of ODIs should be roughly symmetrical overall, with balanced opportunities to outperform as to underperform. This means that the approach should take into account the inherent asymmetry of many PCs (particularly those compliance measures for which there is no possibility of outperformance).

The full description of our amended methodology for the calculation of ODIs is set out in detail in document (WSH41-ODI rates.)

Our proposed ODIs package

The table below shows our proposed ODI rates.

£m per unit	Unit	Industry average PR19 ODI rates	Ofwat's PR24 indicative rates	Proposed ODI rates
Internal sewer flooding	Incidents per 1,000km	5.5	6.51	**4.12**
External sewer flooding	Incidents per 1,000km	1.06	2.91	**1.15**
Bathing water quality	Percentage	N/A	5.93	**2.78**
Customer contacts	Contact per 1,000 population	2.54	8.21	**3.18**
CRI	Unit	0.77	0.82	**0.58**
Water supply interruptions	Minutes	0.55	0.88	**0.42**
Mains repairs	Repairs per 1,000km	0.15	0.24	**0.15**
Unplanned outage	Percentage	1.24	1.58	**1.15**
Sewer collapse	Collapses per 1000km	0.29	0.8	**0.36**
Total pollution incidents	Incidents per 10,000km	0.32	0.83	**0.4**
Serious pollution incidents	Incidents	N/A	1.14	**0.8**
Discharge permit compliance	Percentage	1.83	4.4	**2.29**
Leakage	Ml/day	0.24	0.36	**0.23**
PCC	Ml/person/day	0.18	1.12	**0.14**
Business demand	Ml/day	N/A	0.36	**0.11**
Storm overflows harm (bespoke)	%	N/A	N/A	**2.12**
River water quality (phosphorous)	kg	NA	0.0007	**0.0005**

Note that the table above does not include the following PCs:

- SO spills: In line with the Welsh Government and PR24 Forum policy, we are proposing to be incentivised against our 'bespoke' SO harm measure, and not the SO spills measure applicable in England. Instead we provide a proposed ODI rate for our bespoke 'Storm Overflows Harm' measure.
- Greenhouse Gas emissions: Ofwat's methodology states that the ODI rate for this PC will be based on external valuations of a unit of carbon emissions, and invited companies to put forward a proposed rate. We propose a rate of £309 per tonne which is is a UK Government-endorsed figure (link).
- Biodiversity: Again here Ofwat's methodology states that the ODI rate for this PC will be based on external valuations. We do not have a view at this time on the appropriate unit rate but we will reserve our position until we see Ofwat's proposal put forward at the Draft Determination stage.

Figure 61 Comparison of current vs proposed ODI rates

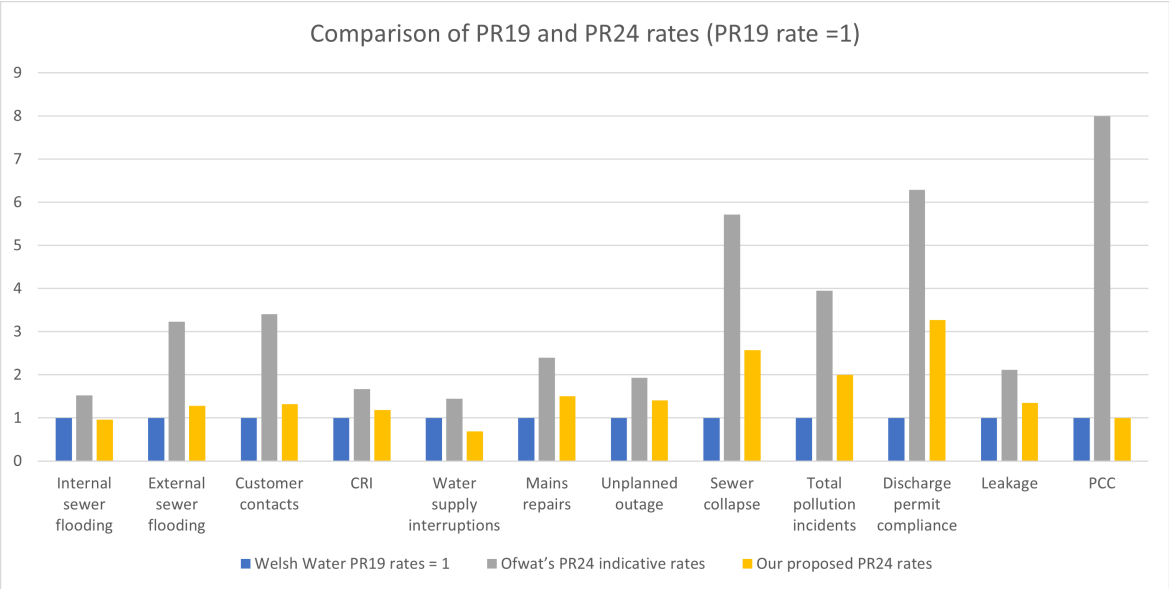


Figure 61 shows a comparison of the ODI rates between the PR19 rates and the proposed PR24 ODI rates, for those PCs that are common to both periods. The ODI rates we are proposing are in almost all cases higher than our PR19 rates, but lower than Ofwat's 'indicative' rates.

ODI risk range (RORE)

We have assessed our proposed package of ODI rates against the guidelines for the percentage of regulatory equity (RORE) which is 'at risk', using 'plausible extreme' upside and downside values for performance compared to targets (P90s and P10s). We used the same approach to estimating the P90s and P10s as were used in the calculation of the ODI rates.

The P10 and P90s for Biodiversity cannot be calculated as we do not have targets at this stage, so is not included.

Ofwat's Final Methodology states that it expects revenues at risk from ODIs to be equivalent to between +/-1% and +/-3% of regulatory equity for each year, for an efficient company. The total range based on our proposed ODI rates is -2.84% to +1.65% of regulatory equity, hence within Ofwat's guideline.

Note that C-Mex and D-MeX are a separate component of the wider RORE risk/return assessment (see 13.4 Risk, return and uncertainty).

13.7 Performance related pay and dividend policies

Performance related executive pay

Ofwat set out its expectations on performance related executive pay in Appendix 10 of the PR24 Final Methodology. Here we explain our Remuneration and Executive Pay Policy in brief, and how it aligns with Ofwat's expectations.

The aim of Welsh Water's Remuneration Policy is to promote the long-term success of the company and to retain and incentivise the Executive Directors to deliver strong and sustainable performance aligned with the interest of customers and the environment.

Remuneration is the responsibility of the Remuneration Committee, a sub-committee of the Board, chaired by our Senior Independent Director, Joanne Kenrick. Its decisions are transparently reported in the company's Annual Report and Accounts each year, and the Remuneration Report is subject to an advisory vote of the members at the company's Annual General Meeting.

The Remuneration Policy for Directors is reviewed and put to Glas Members for approval every three years. It was last approved at the AGM in July 2023. The next full review will take place in 2025, but at this stage we do not anticipate any significant changes except potentially to take appropriate account of the details of the PR24 Final Determination.

The Remuneration Committee is sensitive to the challenges faced by the water industry at present, and the public sentiment around this. This is taken into account when making decisions in relation to the variable pay framework, so as to ensure that we retain the trust of customers and stakeholders, while also recognising the need to retain a high-calibre leadership team.

The Committee also takes into account wider remuneration trends and best practice developments, including guidance from the Financial Reporting Council (FRC), the requirements of the UK Corporate Governance Code and from Ofwat on Board Leadership, Transparency and Governance.

The full Directors' Remuneration Policy for the remainder of AMP7 is set out in our Annual Report and Accounts 2022-23, from page 180 (link). We do not at this time anticipate any changes to the Policy for AMP8 that would impact the way in which it meets Ofwat's expectations in relation to its Board leadership, transparency and governance principles.

Summary

The Remuneration Principles that the Committee follows are shown below:

1	Remuneration should reward/incentivise the long-term interests of the business, promote its long-term sustainable success and reflect its agreed future strategic approach.
2	Remuneration should help align the interests of Directors and employees with the business' customers, and reflect the Company's Purpose and values.
3	Remuneration should be focused on the issues of key concern to the business - water and environmental quality, customer service and financial performance.
4	Remuneration should reflect Welsh Water's aim to be one of the best performing companies in the sector.
5	Remuneration targets should be stretching both in relation to past performance and in comparison with other companies in the sector. Where possible, they should be hard numbers which can be audited.
6	Remuneration is intended to incentivise management in the absence of shareholders and share options.
7	Remuneration should be fair and competitive both in relation to the sector and internally so as to help attract and retain high-calibre individuals.
8	An appropriate proportion of remuneration for the Executive Directors should be variable so as to achieve the right balance in relation to risk-taking.
9	The remuneration structure should be sufficiently clear so that those affected by it understand what it is aiming to achieve.
10	Remuneration will be transparent to Glas Members and subject to their regular approval.
11	Remuneration should take account of the Company's not-for-shareholder corporate structure, the views of Members and other stakeholders.
12	Decisions made by the Committee should take account of workforce remuneration and related policies, and the alignment of incentives and reward with culture.

The components of the Directors' Remuneration Policy include base salary, benefits and pension, an annual variable pay scheme (AVPS), and a long-term variable pay scheme (LTVPS). The AVPS is based on performance measures selected by the Committee each year, with at least 75% of the award based on customer and operational measures, the vast majority of which are regulatory Performance Commitments. The LTVPS is currently 50% based on Totex (total expenditure) performance and 50% on a range of performance development measures relevant to achieving the company's long-term goals, also aligned to regulatory Performance Commitments. Both awards may be varied at the discretion of the Committee to better align with performance achieved, and both are subject to clawback provisions.

When developing the Remuneration Policy and considering its implementation for 2023, the Committee was mindful of the objectives of Ofwat's Guidance on Board Leadership, Transparency and Governance, and the FRC's UK Corporate Governance Code. The Committee considers that the executive remuneration framework appropriately addresses the following factors:

- Clarity: The Committee is committed to being open and transparent on matters of pay and we seek to do this through our high level of disclosure and clear reporting. In taking its decisions, the Committee follows the Objectives of Ofwat's Guidance on Board Leadership, Transparency and Governance, and the requirements of the FRC's UK Corporate Governance Code (the Code). Actual incentive outcomes are set out in the Remuneration Report each year.
- Simplicity: We aim to make our remuneration structure clear to all participants so that all those affected by it understand it and its purpose. We aim that our remuneration principles should be in line with UK best practice.
- Risk: The Committee has full discretion to adjust AVPS and LTVPS outcomes if it considers these inconsistent with overall Company performance, taking into account any relevant factors. Malus and clawback provisions apply to both the AVPS and LTVPS.
- Predictability: Maximum opportunities for AVPS and LTVPS are set out in the policy, with actual outcomes depending on the level of performance achieved against specific measures.
- Proportionality: Our policy has been designed to strike a balance between long-term and short-term measures linked to the Company's strategic plan. A significant proportion of our remuneration arrangements for Executive Directors is tied to the achievement of stretching performance conditions to ensure individuals are rewarded fairly for success.
- Alignment to culture: The use of the same key measures for all variable pay schemes ensures transparency and a sense of shared ownership of the targets – the annual award of every colleague is determined by achievement against the same key targets, to a greater or lesser degree.

The Committee is determined that remuneration should not reward poor performance and that we should be transparent about the reporting of performance. This is closely aligned to the Group's vision 'To Earn the Trust of our Customers Every Day'. The Committee's report each year includes an explanation of the Company's executive pay policy and how the criteria for awarding short and long-term variable remuneration elements are linked to stretching delivery for customers.

Dividend policy

As a company limited by guarantee, we do not have shareholders and therefore we do not pay dividends. All surpluses in the regulated business are retained within the Group for the benefit of our customers by supporting social tariffs and or funding extra investment in assets.

In March 2016 the Glas Board approved a dividend policy to permit up to £100 million of funds to be distributed within the Group, but outside the regulatory ringfence, to facilitate the funding of commercial projects.

In line with this policy intra-Group dividends totalling £30.2 million were paid in 2016-2017. No further intra-Group dividends have been paid since then and none are expected to be paid in the foreseeable future.

The current Dividend Policy was approved by the Board in February 2022 and by Ofwat in April 2022. We do not anticipate any changes to the Policy for 2025-30. The full Policy can be found here (link).

For AMP7 (2020-25) the Policy sets the proposed base dividend yield below the level referenced by Ofwat for a reasonable base dividend yield at PR19 and below the 3% modelled by Ofwat in the PR19 Final Determination. We do not anticipate any change to this base dividend yield for AMP8.

The policy states that in relation to any future dividends (and change in dividend yield) from the Appointed Business the Board will, in recording its decision to pay any Dividend, consider and detail how it has taken into account:

- factors such as obligations and promises to customers, delivery of service to customers, financial resilience and employee interests; and
- how the Appointed Business has delivered against performance levels as set out in the Final Determination and elsewhere, and how performance delivery has impacted on dividends paid.

No dividend will be declared or paid unless the directors reasonably believe that this would not impair the ability of the company to meet its key commitments or finance the business.

13.8 Deliverability

Introduction

The capital investment programme for AMP8 will amount to an increase of around 68% increase on the AMP7 programme. AMP8 investment will be substantially increased across a range of areas, notably nutrient removal, SO spills, and other environmental improvements on the wastewater side of the business. Activity levels in most other areas will be broadly similar to AMP7.

This section, therefore, will focus on what we have done to assure the deliverability of the environmental programme and the preparations we are making to increase capacity ahead of 2025. We have a high degree of confidence that the supply chain is in place to deliver the required programme of works over AMP8.

Early preparations

Given the significant step up in the overall size of the capital programme for AMP8, it is crucial that we make the use of the time available to start the design and enabling work which will in turn facilitate the timely start of the investment from 2025.

As of September 2023 we can confirm the following:

- We have commenced design work on AMP8 schemes with the release of £40 million for early feasibility and design.
- We have design programmes in place for the first £200 million of new AMP8 schemes and these will be ready for final approval to start construction from 1 April 2025.
- We are working on releasing further AMP8 schemes into the design pipeline for AMP8 early delivery. Our target is to get over £600 million of schemes in the delivery pipeline by September 2024.
- We will be 'in contract' for delivery of around £400 million of schemes for delivery in year 1 and 2 ahead of the start of the AMP.

- We are appointing new strategic engineering consultancy partners, who are due to be in place in January 2024.
- We are analysing our programme of works to highlight supply chain pinch points. We have opened discussions with the wider supply chain for parts of the plan where demand is high and have not yet identified any major concerns.

We will continue to engage with the sector-wide assessment of AMP8 deliverability through Water UK.

Below we expand on this in three key areas: preparations for the step up in environmental investment; ensuring sufficient construction capacity; and preparing the supply chain for AMP8.

Environmental design and permitting

Existing design and modelling resources under contract through our current partner frameworks are already engaged to support development in readiness for AMP8. We are bolstering our resources in two key areas around the environment programme in anticipation of the significant increase in investment:

1. Catchment/network hydraulic modelling - to ensure we can build on the outcomes of the Drainage and Wastewater Management Plan to select the optimal solutions for environmental improvements. We have secured the resources within our existing specialist environmental and modelling consultant teams and they are actively engaged on AMP8 schemes. We are in the process of working with these suppliers to secure the additional resources needed for the programme ramp-up.
2. 'Enabling work' teams - to expedite land, planning, community engagement, permitting and environmental assessments processes for the AMP8 environment programme. Early preparation for these complex areas of enabling works is key to smoothing the delivery of the programme. We are working with our in-house teams and existing supply chain resources to ensure we have sufficient resources in place.

In addition we are working with our regulators to facilitate the identification of appropriate permitting resources to handle the volume of work that the WINEP and NEP will bring. We will also be engaging with local planning councils and key local groups early on our plans.

Looking to the longer term will be working with our consulting partners to look to establish skills academies so that we can strengthen the talent pool and succession plans in this key area of the programme for the next three AMPs.

Construction capacity

Our current delivery arrangements can be summarised as follows:

- **Asset Management.** Small maintenance schemes, routine maintenance programmes and investigations to support life cycle management are delivered by our in-house Asset Management teams. They also conduct investigations to identify future asset investment needs, conduct catchment modelling, and undertake zonal studies on our water network .
- **Capital Delivery**: Our Capital Delivery department employs project managers and commercial staff to manage safe and efficient delivery of the capital programme for large and more complex schemes. These typically involve significant design input and more complex construction requirements. Our supply chains are in place for AMP7 with a capacity that will see us delivering £270 million of schemes in Year 5 of AMP7. The additional capacity to step up to the higher scheme delivery run rate of circa £300 million per annum estimated as being required in AMP8 has been secured through the renewal of our Major Frameworks for civil, mechanical and electrical suppliers which went live on the 1 November 2022.

- **Water Network Alliance**: This supply chain arrangement delivers mainly below-ground activities, including the domestic metering programme, leakage and burst main activities, zonal studies (water network), distribution network ancillaries, and elements of new connections. The wastewater business has similar arrangements with suppliers who can undertake planned and reactive maintenance of our sewer network and pumping stations. It will be running at approximately £90 million per annum towards the end of AMP7. We have tested the supply chain and see no constraints in stepping up to £110 million per annum which will be required given the increase in metering and water mains replacement.
- **Operations teams** - These teams deliver small planned and reactive maintenance schemes supported by a geographically dispersed supply chain. They directly employ mechanical, electrical and instrumentation expertise and resource to support the delivery of this programme of works and it will be continuing at the same levels of investment as AMP7.

These arrangements cover the construction capacity needed for AMP8. We have three procurement exercises that are ongoing to replace parts of this delivery capacity, as follows:

1. We are re-procuring the engineering consultancy services which will support our Asset Planning teams with optioneering and solution selection. Although the new arrangements will not be in place until January 2024 we have secured the design capacity from the existing arrangements to progress the early AMP8 scheme design work.
2. We will be looking to upgrade our existing Alliance arrangements with a new 'design and build' framework which will come on stream in September 2024. We are confident that the resources will be available to deliver the programme.
3. We will be re-procuring our Network Alliance to come into play from April 2025. We are confident that the construction resources are in place on the ground in Wales and will either remain with the incumbent supplier or move to a new supplier.

We are working with our new Major Frameworks Suppliers to ensure that the additional capacity that we have secured through these arrangements is in place and actively working on AMP8 schemes 18 months ahead of the April 2025 AMP8 start date.

Some examples of where the new Major Frameworks have brought additional and specialist delivery capacity to our existing Wales based supply chain are as follows:

- Two of the six civils suppliers on the Framework (Alun Griffith and Knights Brown) are currently heavily involved in highways civils in Wales. These skills are highly transferable to Storm Overflow schemes, as surface water removal, highway drainage and attenuation storage tanks are a major part of their current programmes. Further highways civils resources are forecast to become available in AMP8 as road building activity in Wales reduces as expected.
- On the mechanical Framework we have appointed two new suppliers (Galliford Try and Bridges) who have off-site manufacturing capability for chemical dosing rigs that are key for phosphate reduction programmes. We are working with them to agree early production runs to ensure that the equipment needed is available.

Supply chain

Key to successful delivery is engaging the supply chain. Being able to commit early to the supply chain is a vital step in ensuring a smooth ramp up and securing the required capacity for delivery.

We have good visibility on the requirements of the first year of AMP8, with two major schemes that need to be delivered. We are already allocating these to the supply chain and they are progressing with designs. They are also reviewing pinch points and ramping up resources to ensure the capacity is available to us to deliver the plan.

We are also analysing our programme of works to identify supply chain pinch points and will be opening discussions early with the wider supply chain for parts of the plan where demand is high. We will be breaking out the AMP8 programme into scheme types and then identifying the key components for each scheme type so that we can estimate volumes for key items. Where required we will place orders early either for goods or for production time to ensure that we have timely delivery of the key equipment and ancillaries that will be needed.

Assurance

Jacobs have reviewed our analysis, plans and arrangements in terms of deliverability of the capital programme and provided an assurance statement as follows:

"Overall, for the documentation we reviewed, we consider: You have taken steps and put in place systems and processes to support the deliverability of your AMP8 plan, consistent with the requirements of the Ofwat guidance".

13.9 Monitoring and reporting

We pride ourselves on conducting our business in an open and transparent manner. While we believe this plan offers great service and benefits for customers and the environment, it is also important that our stakeholders trust the information contained in this document and our ability to deliver on its commitments. Robust internal and external assurance has, therefore, been at the heart of the process of developing our plan and we will be fully transparent in our performance and progress in its delivery.

Our Board has been fully involved in the process of preparing this plan, providing strategic leadership and direction, and challenging the executive on its proposals. It has received representations directly from the ICG and Glas Cymru Members, and spoke directly to customers on our Longitudinal Panel. It has signed off on all of the strategic decisions in the plan.

We will be held to account against the targets set out in this Business Plan by our Members and other stakeholders. We publish a full account of our performance against all of the measures set out in the plan on an annual basis in our Annual Performance Report. Our Independent Challenge Group also scrutinises our performance and challenges the company to improve in key areas on behalf of customers.

As a result, the Board is able to provide comprehensive assurance this is a high-quality plan that delivers the optimal value to customers and the environment, today and in the future, balancing affordability, quality of service, and resilience.

Alongside this document we are submitting to Ofwat a large volume of data covering, among other things, our historical performance, asset information, financial data, and performance forecasts. This data has been subject to a rigorous process of internal and external audit, following a risk-based Assurance Framework developed by our independent external 'reporter' (Jacobs). This was developed from our well-established company monitoring framework, which governs the production of information for our Annual Performance Report. The highest risk areas were externally audited by independent experts in the relevant areas. Lower risk items have been through two levels of internal audit and signed off by the Executive.

We will report annually on progress through our Annual Performance Report which is itself subjected to rigorous independent audit to ensure customers and stakeholders can have confidence in the accuracy of our reporting. When we find errors or failures in reporting, intentional or otherwise, we will be open about them and share the details with the regulator, as we were with the leakage reporting issues in 2023. We will naturally cooperate fully with Ofwat's ongoing investigation into this.

We will continue to engage the ICG and CCW in regular discussions about our performance, any failures or challenges we are facing, and the results of ongoing customer engagement.

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