

Contents

Chapter 01 Executive summary	03	Chapter 12 Resilience	86
Chapter 02 The thinking behind our plan	08	Chapter 13 Financeability risk and return	98
Chapter 03 Board assurance statement	17	Chapter 14 Water network plus price control	116
Chapter 04 Governance and assurance	23	Chapter 15 Wastewater network plus price control	140
Chapter 05 Our engagement and participation	31	Chapter 16 Water resources price control	173
Chapter 06 Customer service	37	Chapter 17 Bioresources price control	183
Chapter 07 Affordability and vulnerability	43	Chapter 18 Residential retail price control	199
Chapter 08 Cost efficiency	50	Chapter 19 Appointee performance commitments	213
Chapter 09 Decision efficiency	57	Chapter 20 Accounting for past delivery	231
Chapter 10 The six capitals, innovation and transformation	63	Chapter 21 Business retail price control	247
Chapter 11 Procurement, markets and direct procurement for customers	75		



Introduction

We believe that this plan represents a step change for both our customers and our company, and it has been shaped by our customers. In building our PR19 plan our Board has been actively listening to what our customers want and expect.

We believe that this plan builds on what we do well and is driving the company to deliver exceptional improvements in service while keeping bills low, now and into the future. In this chapter you will see how we have:

- Significantly moved the nature of our conversations with our customers to make sure we really understand what they want and expect and make sure we deliver against it.
- Significantly improved our performance in key areas that impact on our customers with ambitious future targets that our customers support.
- Built on our strong efficiency track record to produce our biggest ever programme of efficiencies, delivered using innovation, markets and sustainable thinking to ensure that our service continues to improve and we offer good value for money now and into the future.
- Significantly strengthened our already leading approach to supporting customers who need extra help.

Our delivery during the current period has continued to be very strong. We have been able to generate some £230 million of capital efficiency savings, a substantial part of which we have already begun to reinvest to benefit our customers. We are projected to meet or exceed almost all of our 26 PR14 performance commitments. Our customers and stakeholders have told us that there is still more to do and we must improve not only what we deliver for customers but also how we deliver for the Yorkshire region as a whole.

Over the course of the last two years, we have completely changed the nature of our conversations with our customers. Rather than the traditional approach of talking to them about what we do as a company, our focus has been on understanding individual lifestyles and how they shape what customers want, need and expect from their water company. With the help, support and challenge from the Yorkshire Forum for Water Customers¹ (the Forum) and our new online community Your Water, we have been able to develop a much richer understanding of the diversity of Yorkshire's people, their individual needs and how best we meet these now and into the future.

Continuous customer, stakeholder and colleague engagement informs our day-to-day service delivery and this participation has been crucial to the development of our long-term strategy and our PR19 plan. Since 2015, the scale of our engagement has become the largest and most continuous we have ever undertaken; we have conversed meaningfully with almost 30,000 customers while developing and refining our PR19 plan.

We have also made sure that we understand the wider impact of what we do. We are examining our impact like never before, to shed new light on where we are doing well and where we need to improve.

We have developed and published our Total Impact and Value Assessment, identifying our impacts on our customers, Yorkshire's economy and environment. To help us ensure the affordability and resilience of our essential public services for both current and future generations, we have embedded a multi-dimensional scorecard within our business planning, called the six capitals. This directly looks at our impact on natural capital - the materials and services that we rely on from the environment - and social capital - our impact on society and our customers' trust in us.

Using all of these innovations and insights, we have revised our long-term strategy for the next 25 years. Responding to our customers' feedback, we will change the way we work to meet both customers' expectations and the complex long-term challenges that we face. Our strategy is based around five big goals.

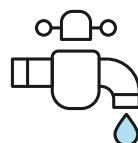
OUR 5 BIG GOALS

Feedback from our customers and the Forum has been extremely positive, with strong recognition that these 5 Big Goals place customers at the heart of our business and show our commitment to working in new ways.

The percentage of customers who either strongly supported or supported our Big Goals:



94%
CUSTOMER
BIG GOAL



96%
WATER SUPPLY
BIG GOAL



95%
ENVIRONMENT
BIG GOAL



92%
TRANSPARENCY
BIG GOAL



95%
BILLS
BIG GOAL

¹ The Yorkshire Forum for Water Customers is our customer challenge group. To find out more about the role of the Forum please visit our website www.yorkshirewater.com/customerforum.

Our industry leading approach to resilience

Our customers do not have a choice in who provides their water services. We provide an essential public service and we must demonstrate that we are a dependable and resilient company. Ofwat quite rightly made resilience one of the key PR19 themes, recognising both that challenges from population growth and climate change are increasing, and the huge disruption caused by any loss of service. We are already a resilient company, with a proven track record for managing extreme events such as the harsh winter and dry summer in 2018. Our previous investments mean that we are one of the most drought resilient companies.

To ensure that we continue to maintain this strength, we have developed an industry leading approach to understanding our whole company resilience. Ofwat challenged companies to consider resilience in the round, emphasising the important role of financial and corporate resilience. Our approach builds on these elements, covering 16 different resilience systems across our assets and operations, as well as the corporate and financial elements highlighted by Ofwat.

The new framework gives us a thorough understanding of the internal and external environments where we operate and how they are changing. Consistent with areas of emphasis elsewhere in our plan, there is strong focus on working better with customers to become more water efficient, or to reduce the misuse of sewers. Overall, our governance structure, processes and programmes ensure a coherent and integrated approach to managing resilience risks and our PR19 plan continues to strengthen our resilience across the business.

Delivering upper quartile cost efficiency and service delivery

Our track record in cost efficiency is very strong. Over a number of price control periods, we have consistently been assessed as a leader in cost efficiency. This is one of the main reasons why we have been able to deliver one of the lowest bills in the industry for our customers.

A key challenge in our PR19 plan has been to maintain our excellence in cost efficiency, while simultaneously delivering a step change in the services that matter most to our customers. We have achieved this using money saved through working efficiently (outperformance) and embracing innovation and new markets.

Ofwat have challenged companies to deliver upper quartile performance in each year. We have used our current cost outperformance to start the necessary work immediately. With the agreement of both the Forum and our Board, we have reinvested some £230 million to kick start our PR19 plan for leakage, supply interruptions, internal sewer flooding and pollution incidents. We are on track to meet or exceed our PR14 targets for all four of these measures, but we have started a programme of activities designed to achieve upper quartile performance as soon as possible.

The activities we have identified are not one off adjustments or more of the same, they represent a fundamental change in how we deliver our services, ensuring these become business as usual and the efficiency gains identified are sustainable now and into the future. For example, we are the first water

company to adopt an open data policy, publishing all our performance data and carrying out “hackathons” to encourage expert data analysis and external ideas for specific improvements. This has already helped us identify new approaches to ‘data visualisation of sound’ which is being used to help us detect leaks for efficiently.

Cost efficiency is also a key focus for our PR19 plan. We are particularly pleased that by embracing the potential of new markets, we have been able to address our one area of historic weakness relating to bioresources costs. As the needs of our industrial customers have changed, we have been able to invest in new technology to reduce costs and increase the energy output from our bioresources assets. We have also anticipated the potential of the new market by undertaking a major market testing exercise. By combining the results of the market testing and the new technology, we will be able to reduce our bioresources costs by 23%.

Our efforts on PR19 costs have by no means been limited to bioresources. We have started a programme of transformation and innovation to ensure that we continue to deliver great value for money. We have benchmarked ourselves against peers and other industries, and the net result is that we will deliver efficiencies of around 14% across our wholesale Network Plus price controls and 10% on our Residential Retail price control. In total, we have some £800 million of efficiencies that we will deliver for our customers during the PR19 period.

Delivering a step change in key performance areas

We are significantly improving our performance in key service areas that are most important to our customers:

- Our leakage will reduce by 40% between 2018-25, reducing our impact on the environment and increasing our resilience.
- We will reduce internal sewer flooding by 70% between 2018-25, reducing our impact on customers.
- We will reduce pollution incidents by more than 50% between 2018-25, reducing our impact on the environment.
- We will reduce interruptions to supply from 7 minutes to 2 minutes or less, reducing our impact on customers.

These service improvements have already begun, funded by reinvestment of outperformance approved by our Board and the Forum.

Our ambition is not limited to these four areas. We are already close to the frontier on per capita consumption (a key measure for long term resilience), but our target is to push the frontier with a further 9% reduction. As part of our response on leakage, we are going to increase the number of supply pipe repairs by over 30%. And on doubtful debt in retail, despite the high levels of deprivation in Yorkshire, we are targeting a further 6% reduction, strengthening our position as one of the industry leaders.

To complete the picture on our package of performance commitments, where it is possible to improve substantially, for almost two thirds of the performance commitments not already mentioned, we are targeting at least a double-digit percentage improvement, with an average improvement of 24%.

The Forum and the Board have been involved at every step of the development of our performance commitments and outcome delivery incentives, challenging and strengthening them to ensure they reflect what our customers want.

Our customers strongly support our performance commitment and outcome delivery incentive package, with 86% finding the performance levels, incentives and bill profile acceptable. Our customers recognise that we have worked hard to understand what they want, and that we will deliver it as soon as possible. They have had the ultimate say on which performance commitments are included and where financial out and underperformance payments are appropriate.

We have heard the message that it is not just what services we deliver, but how we go about it. Customers feel there is more they can do to contribute too, either by making small changes to their behaviour or by getting more involved in the wider activities offered by us and our partners. We also recognise that we need to develop our skills supporting customers to get involved.

Our environmental programme

We know that improving the environment is important to our customers, and our plan includes our largest ever environmental programme to meet the obligations that we are given under the water industry national environment programme. The programme represents almost 20% of our proposed totex, and is some three times larger than at PR14. It will deliver a broad range of environmental improvements, with particular focus on the removal of phosphorus from river water. We will be aligned to the obligations defined by the Environment Agency, and will need to deliver by 2025 (subject to our ongoing conversations with Defra). To meet the new standards we will need to invest at 80 of our wastewater treatment works.

The scale and timing of the environmental programme is still somewhat uncertain. Final decisions on designation of rivers to be improved, and the timings to be followed will be taken by the end of 2019. We are working hard with the Environment Agency and Ofwat to make sure that the programme we are required to deliver can achieve the largest possible benefits, at the lowest possible cost for our customers. If timings allow, we plan to use innovative new ecological approaches to phosphorus removal which will use natural catchment based solutions that deliver wider benefits. If the scale of programme is reduced, we will apply the unit cost adjustment mechanism as soon as possible to ensure that our customers pay no more than necessary.

Great service for all our customers and specific help for those who need it most

We take our societal responsibilities seriously; most of our customers cannot choose their water supplier so it is essential that our bills are fair. We use our data to ensure we are proactively supporting customers who need our help. Our residential retail plan demonstrates how we are using data and technology to tailor the services we provide, to give choice in how and when people contact us and minimise customer effort to contact us. We have already added flexibility to the ways customers can get in touch, for example web chats and call backs.

In our PR19 plan we are going significantly further by harnessing technology from other industries to allow our customers to contact us when and how they want. We will improve our digital offering so that customers can access our services, select convenient appointment slots, track progress of jobs and inform us of any specific needs via their mobile devices – just like they can with various other delivery services.

We know a lot of customers want to adopt more digital ways to contact us. Our aim is to have at least 50% of customers' contacts via digital channels by 2025, but we will of course retain a telephone service, as some customers prefer this.

To help all our customers, we will ensure they are on the best tariff for their lifestyle. We will use our new data and analytic approaches to review customer accounts every year, proactively contacting customers who we believe would benefit from being on a different tariff.

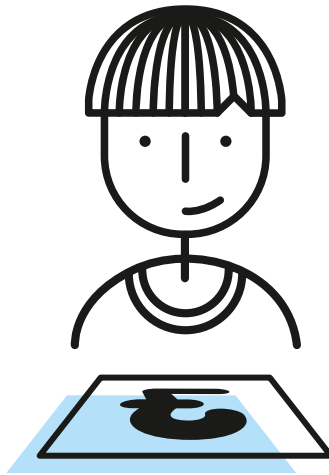
Enhanced data analysis is also the key to helping those who are struggling to pay. We are leading the way in the water industry in how we use data to proactively identify customers who may find it difficult to pay their water bill. We are doubling the amount of money we contribute to social tariff support, and we are working with Rotherham Citizens Advice to create a way to help people with debt to get back on their feet, this will be extended across the region. This initiative covers not just their water bill, but also other debts they may have, helping them regain control.

We interact with our customers every day; we visit their properties, speak with them on the phone and interact through digital channels. We see that some customers can be in situations where they cannot look after themselves or they may be at risk of harm in some way. We are taking a broader role in society to ensure that, where we have engaged with our customers they are safe and free from harm. We are the first water company to recruit a safeguarding lead to support all customers and help keep them safe. To identify at risk customers early, we have partnered with West Yorkshire Police and Yorkshire Fire and Rescue. Through this partnership we receive staff training to help identify those at risk and how to refer them to the right organisations.

Explaining our average bill profile

There are five key factors that have shaped the projected bill:

1. The reduction in the allowed cost of capital by Ofwat and change of inflation measure to the more accurate consumer price measure, together reduce bills by around £19.
2. We are expecting to outperform a number of our PR14 targets and the resulting outperformance payments will increase bills by £5.
3. There are several upward pressures on costs arising from our drive to deliver upper quartile service delivery, the continued growth of the population in Yorkshire and external costs such as energy and chemicals. Taken together, these would increase bills by about £14 if it were not possible to offset them.
4. We have started a programme of transformation and innovation which has more than offset these upward pressures, this reduces bills by £15.



5. We are also facing several opex cost pressures that we have been unable to offset. These cover changes to how we account for software licences, increased expenditure on cyber-security, costs arising from the impact of the traffic management act – for when we undertake roadworks, and recent increases in business rates. These costs amount to some £100 million and increase bills by £7.

Based on this we would have been on track to deliver our customers a bill reduction of about £8. However, the sixth factor, the scale of the water industry national environmental programme (WINEP) means that this is no longer possible. If the scale of the WINEP does not alter, even after we have applied specific targeted efficiencies, we believe the impact will equate to some

£23 on bills. As a result, our overall bill impact is expected to be an increase of around £14². Our customers support our plan and find the proposed bill acceptable.

We understand that affordability is a key concern and that bill increases are never welcome. If the scope of the WINEP can be reduced, this will be passed on to our customers.

To make sure our customers can accept our proposed bill, our PR19 plan and costs have been shared with customers. A great number of residential customers, 86%, find the bill costs acceptable. Customers feel that while the WINEP is undoubtedly large, they are comfortable to pay for the improvements to the environment.

Concluding thoughts

The Forum has played a vital role in the creation of our PR19 plan. We would like to thank the Forum and its sub groups for their commitment, expert advice and challenge, both in our day-to-day business and in the creation of this plan.

Our Board has been integral to the development of the PR19 plan and own the delivery of the plan. They have overseen a comprehensive programme of assurance to provide confidence in the quality and deliverability of the plan, and this is reflected in their assurance statement. We can also confirm that we have complied with Ofwat's new requirements regarding dividend policy, performance related pay and sharing of financial outperformance, and that the plan is financeable.

We have also considered our plan carefully from a regulatory perspective. As a result, it is strongly aligned with each of Ofwat's themes and it delivers a fundamental shift in our performance, efficiency and use of innovation.

Most importantly, the plan is based on a strong understanding of the needs and wants of customers and stakeholders, the duties and responsibilities we must meet, and our impact on Yorkshire in the widest sense. The plan is designed with our customers and stakeholders at its heart, and it makes sure we are sustainably delivering value for money, protecting the environment and keeping bills affordable.

² Over the five year period



Introduction

We contribute positively to Yorkshire, reliably delivering essential public services. We provide high quality drinking water, taking away and treating the region's wastewater.

We know our previous business plan, PR14 (covering 2015-20), offered value for money for our customers and was supported by them. As we deliver on the commitments we made in PR14, we have asked ourselves whether we can do significantly more to ensure we meet the high expectations required of us.

We have:

- Received feedback that our corporate structure was complex and difficult to understand, this causes suspicion.
- Received feedback that the way we build trust and confidence in the information we publish should be improved.
- Looked at our performance with our customers. Comparing it to other water companies.

While we are delivering on the promises we made in our PR14 plan, we decided this alone was not enough and we could connect more effectively with our customers.

We are making things better. We are radically simplifying our corporate structure by selling our non-regulated companies, and have removed those registered in the Cayman Islands. This simplification will continue.

We thoroughly reviewed all our published information, with support and expert challenge from the Yorkshire Forum for Water Customers (the Forum), to make sure it is easy to read, access and understand. We have obtained the Crystal Mark accreditation on several of our recent publications, certifying clarity of our written documents. We have supplemented published information with clear infographic explanations on our website.

Most importantly, over the last two years we have held in-depth conversations with our customers. Innovative and traditional research techniques have helped us develop a much fuller and richer understanding of the vibrant and diverse communities we serve. We now know in much more detail our impact and what our customers want and expect from us. Most of the time this impact is positive, but there are times when it should be better. This has also been reflected in wider, national debate.

We have heard and understand the legitimate challenges put to us, and our PR19 plan reflects this. It has been created with our customers at its heart; transforming the service we deliver. We are making significant improvements in key performance areas that impact on our customers and the environment such as leakage, internal sewer flooding and pollution. We are pushing the industry frontier in interruptions to water supplies and per capita consumption (this is an average amount of water used each day by people in Yorkshire). We are changing how we interact with customers, tailoring our services to deliver more choice.

We know the cost of our bill really matters to customers, so our PR19 plan ensures we remain an upper quartile company for efficiency. This means we will sustain our position as one of the lowest water bills in the country. Through innovation, we are driving significant savings across our business so the service improvements our customers want and expect from us do not affect the amount we charge. We are also significantly growing the support we offer to customers who may be struggling to pay their bills, using data and technology to proactively identify customers who may need extra help.

We believe this plan represents a significant change that fundamentally recognises what our customers and society need and expect of us. We are pushing the boundaries of service improvement and efficiency for our customers, making sure we continuously understand the need to change.

Our plan is centred on innovation. It has been used to hold better conversations with our customers, improve our understanding of future pressures and our impact on the region. Innovation is driving performance and improving efficiency. It is making us fit for the future to serve our customers in ways they expect.

Our conversations with our customers and the creation of the long-term strategy

The creation of our long-term strategy has been a significant turning point for us, with customers, the Forum, and stakeholder conversations central to its development. We wanted to make sure customers were at the heart of our plans, so worked with them to gain a better understanding of our impact alongside crucial insight into the services they really want from us.

This insight has helped us understand better than ever the changing expectations around inclusion, fairness, information, social media, choice, flexibility, control, responsibility, affordability, localism, and risk and tolerance of failure. Knowing and understanding this, we have identified and are focusing on the vital elements that make up the character of our company and what we want to be known for. See Figure 2a.

There are three parts to the character of our business:

- Providing essential **public** water services means we need to plan into the long term to be completely reliable and resilient.
- As a **commercial** company aware of our costs, we are efficient and offer value for money. To do this we are constantly innovating, using markets and data to understand and exceed customer expectations.
- We also have additional **societal** responsibilities because most of our customers cannot choose who serves them and we must respect the communities we serve.

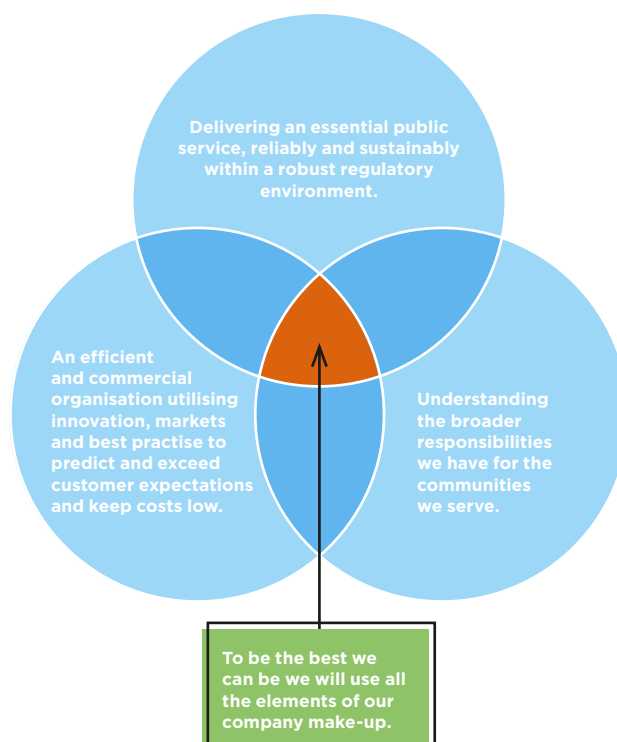


Figure 2a – The characteristics of our company.

Knowing our customers' expectations and the challenges we face

By knowing and understanding these elements of our business we are challenging ourselves to deliver the best for Yorkshire. Our plan is set firmly within the context of our long-term strategy www.yorkshirewater.com/biggoals. This strategy has been developed in close consultation with our varied and diverse customers and considers the future economic, social, cultural and environmental issues that face our region.

A growing population means we need to change to ensure enough water is available and we can continue to take away and recycle wastewater at a price affordable for our customers.

As the weather patterns may change we too need to change what we do to ensure our services are delivered regardless.

Customers want more from our services and expect to be able to tailor the service they receive from us to suit them. We need to meet their expectations.

Knowing our impact

We are taking an innovative approach to our services and the value we create by embedding the six capitals approach into our plan. Insight like this is shaping our plans now and in the future. It ensures our services are resilient and we are making the best possible contribution to our customers, society, the economy and the environment.

Read more about our sector leading six capitals approach in chapter 10.



FINANCIAL CAPITAL

Our financial health and efficiency.



HUMAN CAPITAL

Our workforce's capabilities and wellbeing.



MANUFACTURED CAPITAL

Our pipes, treatment works, offices and IT.



INTELLECTUAL CAPITAL

Our knowledge and processes.



NATURAL CAPITAL

The materials and services we rely on from the environment, especially water.



SOCIAL CAPITAL

Our relationships and customers' trust in us.

Figure 2b – The six capitals.

OUR 5 BIG GOALS:

Our strategy sets out five big goals, based on our analysis of future pressures and what our customers and stakeholders have told us. It says how we are going to meet them.

1. CUSTOMERS:

We will develop the deepest possible understanding of our customers' needs and wants and ensure that we develop a service tailored and personalised to meet those needs.

2. WATER SUPPLY:

We will always provide you with enough safe water, we will not waste water and always protect the environment.

3. ENVIRONMENT:

We will remove surface water from our sewers and recycle all wastewater, protecting the environment from sewer flooding and pollution.

4. TRANSPARENCY:

We will be a global benchmark for openness and transparency.

5. BILLS:

We will use innovation to improve service, eradicate waste and reduce costs so no one need worry about paying our bill. We will not waste money.

Figure 2c - Our 5 Big Goals.

All of this rich research and analysis has formed our long-term strategy and created our 5 Big Goals. The goals will help us change and continue to deliver for our customers by doing things differently; by being resilient and working in new and innovative ways. Our 5 Big Goals also align with Ofwat's key themes for PR19; delivering great customer service, using innovation, making sure bills are affordable and our company is resilient.

Our PR19 plan has been created knowing:

- What society and our customers want and expect from us.
- We need to use innovation to deliver what is needed in the most beneficial way for the customers, the environment and the economy of Yorkshire.
- We must challenge ourselves to deliver stretching performance targets at the lowest possible cost.

This is how our 5 Big Goals are embedded in our PR19 plan, placing customers at the heart of it.

Bills - we will use innovation to improve service, eradicate waste and reduce costs so no one need worry about paying our bill. We will not waste money.

Innovation is key to delivering better services and lower costs. We are already efficient, and have been for many years, which means that our customer bills are kept as low as possible. Innovation is being used to help us find more efficient ways of improving service. For example, to make sure we are always offering value for money we have identified over £800 million of efficiency savings based on our costs now, which is the biggest efficiency programme we have ever undertaken. Innovation and business process improvement across the company will help deliver our ambitious efficiency target.

For example, we are:

- Using digitisation and automation to reduce the costs of running our business.
- Employing leading edge data analysis, forecasting and modelling to inform how we build and maintain assets to provide improved services at lower unit costs.
- Working with markets, collaborating and using open data to help us find the most efficient answers to the challenges we face.
- The first water company to implement a corporate computer system called SAP S/4 HANA. This will help us collect and analyse data and provide significant process efficiencies which will be leading edge.

These savings more than cover the costs of continuing to improve our Services in key performance areas in the period 2020-25 and help absorb additional cost pressures we face.

New ways of working

To keep bills low in the long term we need to look after the water and wastewater treatment works and our pipe networks differently. In our PR19 plan we are making the most of the equipment and resources where we can avoid incurring costs by building more.

We are working with large industrial companies who use a lot of drinking water for cleaning and cooling processes, by helping them to use sustainable water resources. By doing this we can provide potable water for 18,000 new homes without building more water treatment works or abstracting more water from the environment. This approach will help keep bills lower in the future.

Over the next two years we are making significant improvements in service performance by using money saved by being efficient to pay for service improvements in areas like leakage, internal sewer flooding and pollution. We know the impact of interrupting water supplies to our customers, so we are aiming to be one of the best companies overall in our performance. This means our customers are getting a better service at no extra cost. We are tailoring our services, offering multiple ways for customers to interact with us at a time and in ways that suit them.

Supporting our customers

We are leading the way in the water industry in how we use data to proactively identify customers who may be struggling to pay their water bill. We are doubling the amount of money we contribute to affordability schemes and are going further. We are working with Rotherham Citizens Advice to create a way to help people who are struggling with debt to make a fresh start; not just with their water bill but also with other debts they may have, helping them regain control. We are extending this initiative across our region.

By ensuring customers are on the best tariff for their lifestyle we are helping everyone to make sure they are paying the right amount for their water bill. Each year we will review every customer account to make sure customers are only being billed against the best tariff for their individual circumstances. We know for many reasons, people sometimes find it hard to pay their bill.

Using markets to drive down costs

In our Bioresources chapter read how markets are significantly driving efficiency. This is the part of our company that treats the byproducts of our wastewater treatment processes, recycling them to make energy. Historically our costs have been high. To keep our costs low in our PR19 plan we have engaged markets to provide us with further capacity; this is cheaper than building more capacity ourselves. Using markets in the bioresources part of our business will help us reduce costs by 23% by 2020.

Our proposed average bill profile 2020-25

In our executive summary, we have explained the key factors that have influenced the proposed average bill for the period 2020-25. Below is a summary of these movements.

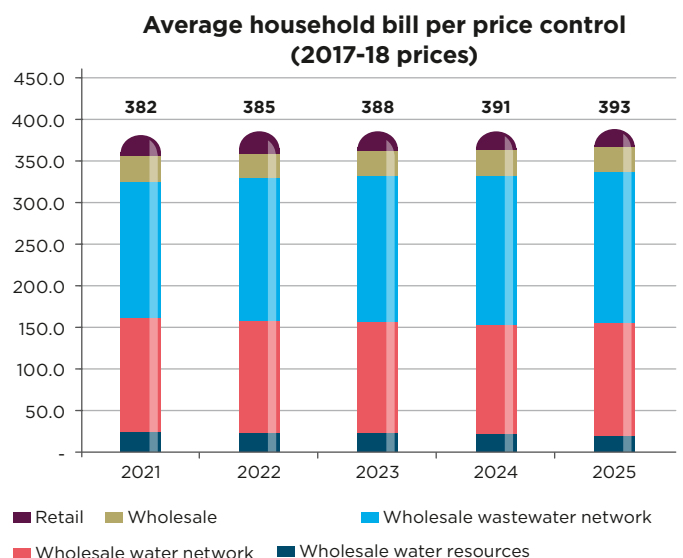


Figure 2d - 2020-25 Bill movement.

Customers - we will develop the deepest possible understanding of our customers' needs and wants and ensure that we develop a service tailored and personalised to meet those needs.

Conversations with customers and various stakeholders like charities, environmental groups, councillors and MPs have given us a greater understanding of what everyone needs and expects from us (Read more about our approach to engagement in chapter 5).

One group offering comprehensive insight into the varied views across customers and stakeholders is the Forum.

The wealth of information gained from our customers means we can translate what people want into our plan.

The Figure 2e below shows customers' main priorities.

Our in depth and innovative conversations with our customers have also helped us understand how rich and diverse the communities are that we serve and how our activities impact on their lives.

We also know around 30% of our customers can be considered as being in a circumstance that makes them vulnerable. Often, customers do not regard themselves as vulnerable, however, they rightly expect us to be able to tailor our services to fit their lifestyles and meet their needs. We will meet their expectations.

See Figure 2f overleaf - Understanding our customers specific needs.

From our engagement so far our customers' main priorities are:



They want a secure supply of drinking water and for any service failures by us to have a minimal impact on their lives.



Customers expect us to lose much less water in leakage.



We are expected to prevent sewage escapes damaging homes and the environment.



They want us to help prevent flooding.



Customers expect us to keep our bills affordable.

Figure 2e - Our customers' main priorities.

Understanding our customers' specific needs



UNDERSTANDING SPECIFIC NEEDS

For some customers the worst aspect of an unplanned disruption would be the psychological and emotional impact of an unexpected cut-off and the disruption this would cause. It could be particularly disruptive for those who need particular types of care as it can often be very important to maintain a set routine. Plus the shock and uncertainty of a situation could cause anxiety which could exacerbate some conditions.



YOUNG FAMILIES

Having to use bottled water if supplies are interrupted causes problems for families with young children who need to be bathed - many would be worried about heating it up to the right temperature. This also applies to parents of very young children as making up baby formula with bottled water is not recommended.



RELIGIOUS COMMUNITIES

Our understanding of our communities allows us to understand the impact we can have on cultural and religious activities and celebrations. For example, water quality is essential for customers during religious or cultural events:

- Strict bathing practices prior to prayers.
- Availability of water at certain times during fasting periods.
- Water can be used as part of a prayer ritual.

Knowing the cultural and religious value of water enables us to understand how our services can have positive and sometimes negative impacts - we want to continue to improve our support of the diverse community we serve now and into the future.



MANUAL WORKERS

Customers who have more manual occupations have told us that it's important for them to be able to shower, particularly in summer, after a physically demanding day at work.



CARERS

If a customer is caring for someone, an interruption to the water supply can cause real problems with things like administering medication, cleaning and washing.

Providing bottled water in these situations does not solve the problem.

Figure 2f - Meeting expectations.

Using technology to improve customer service

Our Residential Retail chapter demonstrates how we are using data and technology to tailor the services we provide, to give choice in how and when people contact us and minimise customer effort in contacting us.

We have already added flexibility to the ways customers can get in touch, for example, web chats and call backs. In our PR19 plan we are going significantly further by harnessing technology from other industries to allow our customers to contact us when and how they want. In the period 2020-25 we will improve our digital offer, so customers can access our services, select convenient appointment slots, track progress of jobs and inform us of any specific needs via their mobile devices – just like they can with various other services.

We know a lot of customers want to adopt more digital ways to contact us, but we will retain a telephone service as some customers prefer this way too.

Ofwat's Out in the Cold report demonstrated that effective, targeted communication is essential when there is an operational issue. We use data and innovation to ensure we target and deliver our messages in helpful ways that work for everyone, allowing us to minimise impacts on customers who are in a vulnerable situation.

Our wider role

We can have a positive impact on people's lives and are the first water company in the UK to have a safeguarding officer to support our customer facing colleagues and better contribute to society. We are working towards becoming a dementia friendly company and in the Residential Retail chapter there is more detail on how we will support people much more effectively as we carry out our work. This is a form of innovation that will have a significant beneficial impact on the people in our communities who need the most help.

Water supply - we will always provide you with enough safe water. We will not waste water and always protect the environment.

We want to make sure we are making the most of the water resources we already have to help us meet the needs of a growing population and keep bills low. Customers do not like to see us waste water through leakage, and in 2017 we know we had a higher percentage of water lost through leakage than many other water companies. We took immediate steps to address this and will reduce our leakage by 15% from 2020-21 at no additional cost to our customers. We will reduce leakage by a further 25% by 2025, an overall reduction of 40%. We are using the savings identified by working more efficiently to cover the additional costs in the period 2020-25 and are using innovations from elsewhere in the industry and beyond to deliver the improvement as efficiently as possible.

We know, through the innovative customer research conversations we have held, the impact of interrupting water supplies on customers' lives and wellbeing. We will radically reduce the number of times we interrupt people's water supply (measured in minutes lost as an average across Yorkshire) from 7 minutes to 2 minutes or less. Making us the leading company based on current performance.

Demand management is also a key part of our water supply strategy. We already have the lowest per capita consumption (PCC) in the UK and our plan includes one of the most ambitious PCC reduction targets in the country. We will use our innovative, sector leading approach to customer segmentation to target water saving messages and work with communities to reduce use.

Exploring future use of markets in our Water Resources price control is high on our agenda and we are the driving force behind the creation of Water Resources North², a forum investigating opportunities to meet water resource deficits in efficient ways.

Environment - we will remove surface water from our sewers and recycle all waste water, protecting the environment from sewer flooding and pollution.

We know customers are increasingly worried about flooding, from our network and the increasing number of wider flooding incidents that have happened in Yorkshire over the last decade. Flooding has a negative impact on people and can affect mental health through stress and worry. It also impacts on people financially. Much like with leakage, when we, and our customers, looked at our current performance compared to other companies it was clear we needed to improve.

We took immediate action to reduce internal sewer flooding incidents (this is when sewage enters someone's property) by 40% by 2020-21 at no extra cost to customers. In our PR19 plan we will reduce incidents by a further 30% by 2025, a 70% reduction overall. Again, we will use the efficiency savings we have identified as part of our plan to cover the costs of this reduction in the period 2020-25. In our PR19 plan we are using ideas gathered through innovative collaboration, like our open data initiative, to gather new ideas. We will also be using collaboration and customer participation in our approach to resolving issues, creating multi beneficial solutions like rain gardens and pocket parks.

We are reducing the number of pollution incidents that occur; this is where sewage escapes from our pipes and equipment and enters the land or water environment. Between now and 2025 we will reduce pollution by 50%. We are funding this through finding efficiency savings in our business. In our PR19 plan read about how we are using data analysis and innovation to create smarter networks and maintenance programmes to make the most of our existing capacity.

²A forum of Northern water companies (United Utilities, Northumbrian, Severn Trent and Yorkshire Water).

To protect customers from wider flooding events, and in line with our long-term strategy to move towards demand management solutions, our plan shows how we will use innovative and collaborative solutions to keep rain water out of the sewers, preventing them from becoming overloaded.

As you read our plan you will see that the 5 Big Goals feature throughout it and our performance commitments are all linked to our 5 Big Goals. This means that we are sure that our long-term strategy is embedded in our plan. The period in the period 2020-25 is the first step in delivering our strategy ensuring we are resilient, sustainable and affordable into the long term. Rather than building expensive underground storage we are working with others to create 17,000m² of green spaces that people can enjoy but also absorbs rainwater. This document will provide many examples of where we have done this however, we are proud of the work that we are doing in Hull, our Living with Water partnership. This will protect 600 people from the risk of flooding, and it is just the start. As we work with others and learn what works best, this will be rolled out across Yorkshire.

Transparency: we will be a global benchmark for openness and transparency

Most customers cannot choose their water company, this means there are, quite rightly, high expectations around how water companies act. We are working hard to make sure we are open about our business, how we operate, our structure and who owns us.

We hear concerns about financial resilience for companies with high levels of debt compared to the overall value of the company (this is often referred to as gearing). We listened and have, over the last three years, reduced our levels of gearing and the cost of our embedded debt. The resilience section of our plans highlights how we are making sure we are financially resilient.

In 2018 we launched our openness charter and are asking our customers to tell us what data they want to see from us, which we are confident we can provide.

To do this, all our performance data, including annual reports and strategic documents, will be stored in one dedicated place to make it easier for our customers to understand who we are and how we are performing. Being transparent and open is about more than our corporate structures; by being open we can also deliver benefits to our customers through collaboration and ideas we would not have had access to previously.

We have held a number of open data events, sharing information from the thousands of monitoring devices on our clean and wastewater networks. These events, called “hackathons”, are already helping us find new and innovative ways to use our data to help solve the pressures that we face.

Making sure our company is resilient

We are addressing the resilience of our business in new ways too. Managing resilience is a never-ending process that is not new to us. A wide range of continually evolving factors; climate change, population growth, cyber threats and the financial environment are shaping our resilience. We are committed to maintaining British Standard for Organisational Resilience (BS65000) through improvement and regular external assessments.

We have one of the most resilient water services in the country following our ongoing investment in Yorkshire’s highly flexible water grid, which has recently been extended to cover 99% of the area’s population. Customers confirm it is a priority for us to further improve the region’s resilience to flooding and we have developed an industry leading, comprehensive and repeatable framework to assess our resilience.

The framework uses latest global best practice and explores:

- All aspects of our business.
- Past, current and future timescales.
- A wide range of shocks and stresses that could ultimately interrupt our services.
- The maturity of our systems and processes, using an extended version of the Cabinet Office model for effective infrastructure resilience.

Our framework informs a cost-effective business plan that maintains and enhances resilience using a wide range of traditional, innovative and partnership options.



Assurance overview

The Board's aim is to produce a high-quality business plan that meets the expectations of its customers in delivering the services they need, now and in the future, at a price they can all afford to pay. This plan has customers at its heart. They have been engaged at every stage of its development so that they can have trust and confidence in the plan and know that it is aiming to deliver for them.

It is important that all stakeholders can have confidence that this plan meets the expectations of a responsible water and sewerage company. The Board has prepared a short and long-term plan based on the results of engagement with stakeholders and regulators, so in delivering for customers, the Board also meets its statutory requirements of:

- The legislative and regulatory framework under which the Company operates.
- UK Government's strategic policy statements.
- Ofwat's final methodology for the 2019 price review.
- The Drinking Water Inspectorate's long-term planning for the quality of drinking water supplies.
- The Environment Agency's water industry strategic environmental requirements and water resource management planning requirements.

The Board has applied robust assurance in the preparation and publication of this plan. Good assurance needs to be provided at the right time, be proportionate to the level of risk identified, ask the right questions and assess the quality of evidence supporting the statements made within the plan. The assurance approach has been risk based and aligned to the 'three levels of assurance' framework. This is best practice and is set out in Yorkshire Water's published Assurance Plan for 2018-19.

To satisfy itself that the plan is accurate, high quality and accessible, all elements of the plan including data are subject to the Board's robust assurance process. In summary, the Board confirms that:

- Assurance has followed the three levels of assurance as set out in its published Assurance Plan.
- The assurance process includes audit checks and challenges by data providers, data managers, senior managers, directors and its independent technical auditors (Jacobs) and financial assurers (Deloitte). Findings from these assurance processes have been fully reviewed and actions to address any concerns have been implemented.
- The Board Audit Committee has received and challenged the findings from the assurance reviews.
- The Board has received assurance that the plan implements the strategy and direction set by the Board.

The Board's assurance process has extended to the preparation, production and publication of the data that underpins the plan. The Board confirms that it considers it has prepared a plan founded on high quality data.

The Board's assurance process has ensured that all relevant audit information and risks have been exposed to its independent assurers.

Board leadership and challenge

The Board of Yorkshire Water has been accountable for the leadership and preparation of this plan, including the quality and transparency of the information provided as well as setting the strategic direction for the business.

To lead the discussion on the development of the plan the Board has conducted a series of full day strategy workshops and has met on eight occasions. The strategy workshops were used as the method to challenge management and satisfy itself that its plan meets the expectations of its customers and all other stakeholders. The Board used the strategy workshops to ensure the plan follows its strategy for addressing the long-term challenges of climate change, population growth, all round resilience and long-term affordability.

The Board has sought to understand and meet the short and long-term challenges of becoming a high performing company delivering excellent service to customers, driving innovation, remaining efficient and resilient, while ensuring its charges remain affordable for customers and providing additional support to customers who need it.

At each strategy workshop the Board has challenged company management across six themes including development of the plan, delivering for customers, financeability, efficiency, and innovation. Management has been required to respond to the Board at the subsequent strategy workshop until the Board was satisfied with its plan. This process of discussion and challenge at the strategy workshops ensures the business plan is high quality. The Board has engaged external experts in considering the challenges and responses and has published its long-term strategy for the Company, setting out a clear and efficient approach to tackling the challenges posed over the long term.

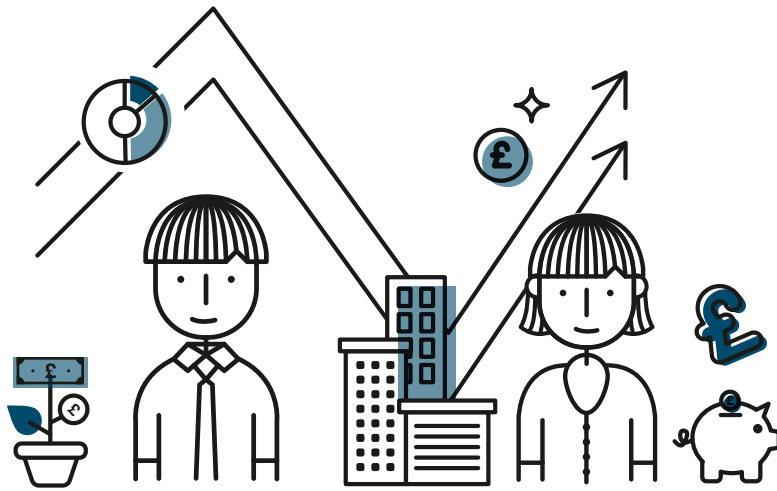
The Board has challenged management to demonstrate that all elements of the plan including the performance commitments are stretching and will drive innovation that delivers benefits to customers. The Board has challenged management to set stretching performance commitment levels for both bespoke and common performance commitments that are of greatest importance to customers.

The Board has challenged management to demonstrate that Yorkshire Water will remain an efficient company when compared with others in the sector and that its planned efficiency is in line with efficient companies beyond the sector.

The Board has challenged management to demonstrate that it understands the risk in the plan and that it has risk management processes in place to ensure the risk can be managed by the Company. The Board has specifically required management to demonstrate that it understands the innovation required to deliver a step change in performance.

The Board has also challenged management to clearly present the full range of benefits being delivered by the plan, given the impact of increased statutory investment requirements and their impact on customer bills.

Only by challenging itself to ensure that customer and statutory expectations are at the heart of its business, can Yorkshire Water remain an efficient and affordable provider of service, a company that supports customers in vulnerable circumstances, and delivers acceptable returns to investors with a clear understanding of its all-round and financial resilience. The Board considers that it has produced a high-quality business plan.



Board assurance of the business plan

During 2017 and 2018, the Board has put in place internal and independent assurance to support it in ensuring that its direction and strategy have been incorporated at an operational level in the best interests of customers.

The Board has sought confirmation throughout the development of the plan that the expectations set out in the UK Government's strategic policy statements have been incorporated. The Board confirms that the plan takes account of all statutory and legal obligations and does not plan to fail in meeting drinking water quality legislation, water resource management planning guidance and environmental legislation now and in the long term.

Management has produced statements of compliance with the standards expected by the Board.

The Board has received independent assurance from its external technical auditors (Jacobs) and financial assessors (Deloitte).

So far as the Board is aware, there is no relevant audit information of which the Company's independent technical assurer is unaware. The directors have taken all the steps that they ought to in order to make themselves aware of any relevant audit information and to establish that the Company's independent auditors are aware of the information.

The Board has reviewed and challenged the final plan through its formal Board meetings and specific Board workshops and has obtained confirmation from the Board Audit Committee that its controls and assurance processes have been implemented.

The Board is satisfied that its plan meets the expectations of a responsible company and is of high quality in the best interests of its customers.

Customer engagement

The Board's plan has been founded upon continuous, comprehensive, robust, high quality customer and stakeholder engagement. The Board is satisfied with the high levels of customer engagement. The engagement has adopted an innovative programme of face to face and online community activity to ensure that the outcomes, performance commitments and incentives meet the expectations of customers and stakeholders. The results of the engagement and the priorities of customers, regulators and stakeholders are at the heart of the plan.

The Board has exposed the customer engagement programme, the development of the plan, the assurance approach, and the plan itself, to the independent Yorkshire Forum for Water Customers (the Forum). The feedback and challenges from the Forum have been incorporated into the plan in the best interest of customers.

The Board has met directly with the Forum to receive first-hand the Forum's views on customer engagement and the development of the plan, proposed outcomes and performance commitments. The Board has received direct confirmation from the Chair of the Forum that the Forum has been sighted in the development of the plan, is supportive of the plan and agreed that it has an important role in holding the Company to account for its delivery in the interest of customers.

The Forum has produced its report on the plan and its development. This has been published alongside the plan to provide an independent opinion on the quality of the customer engagement and how this has been incorporated into the plan.

The Board is committed to continual engagement with its customers to ensure that their priorities are always understood and factored into its long-term strategies and near-term plans. The Board is committed to reporting back to its customers on how it is progressing with delivering customers' stated priorities.

Affordability and vulnerability

The Board has subjected the plan and the associated costs to customer engagement and challenge to ensure the proposed prices are acceptable and affordable. Clear feedback has been received from customers and the Forum that confirms the affordability of the proposed bills.

To ensure that the plan is affordable for all, the Board has established a package of mechanisms to reduce debt, ensure customers are on the best tariff and provide service in ways which reduce the cost to customers. Decisions have been made which balance the immediate and future needs of customers to ensure bills will be affordable in the long term.

The Board has put in place a programme of customer support mechanisms and bespoke services to support customers in vulnerable circumstances so that they receive the service they need, at a price they can afford specific to the circumstances they face. The package of support has been subject to challenge by the Forum.

Outcomes and transparency for customers

In putting customers at the heart of the business plan, the Board has set stretching outcomes, performance commitments and incentives that reflect the preferences of its customers. It has been rigorous in challenging management to ensure the plan can be delivered.

The Board will closely monitor the delivery of its commitments to customers, regulators and stakeholders, through a programme of monthly review. It will utilise its Board committees to monitor performance and distribute resources in the best interests of delivering the Board's commitments.

The Board will expose the delivery of the plan to scrutiny from its independent technical and financial assurers and the Forum so that customers and stakeholders can continue to have trust and confidence in what it reports and the information it publishes.

The Board is committed to high levels of transparency and openness with customers. It has consulted with customers to create an openness and transparency policy. It will continue to develop and enhance its 'Openness Charter', making more data openly available and improving the clarity and accessibility of the data it holds and information it publishes.

The Board's aim is to enable customers to have trust and confidence in Yorkshire Water being a responsible company in the way it goes about delivering services to them. It is committed to remaining transparent on the financial and corporate structure. This is evidenced by the lead it has taken in the presentation of its financial and tax affairs in its accounts and annual performance report, the simplification of its group structure and removal of its Cayman Islands companies.

The Board will publish a quarterly customer focused update on how it is progressing and delivering on its performance commitments and outcome projections on its enhanced performance webpage.

The Board will continue to publish a final annual report that has been subject to external scrutiny and challenge, along with an assured customer focused performance summary annually. This will be available both on the website, through other digital channels and through other accessible formats relevant to customers' needs.

The Board will seek to use a variety of media to present important complex information in ways that are accessible to customers and stakeholders, for example, the use of video to explain its company structure. www.yorkshirewater.com/reports.

Long-term business resilience

The Board has ensured that customers' priorities and expectations for long-term whole business resilience, including operational, corporate and financial, have been incorporated into the development of the plan. It has founded the plan on a systematic and comprehensive risk assessment of its services, systems, processes and financing to ensure long-term resilience in the round. A whole-business resilience framework has been developed with Arup and its design has been reviewed by Deloitte. This approach has been aligned to British Standard 65000:2014 Organisational Resilience.

The Board is confident that the outcomes and benefits of the plan are sustainable and efficient in the long-term and meet the needs of its customers.

Efficient and robust costs

The Board has assured itself that, based on its assessments, the proposed costs are efficient, robust and that the innovation required to execute the programmes of work can be delivered and that risk associated with cost uncertainty can be managed by the Company. It has tested its costs against the best performers within the sector and other relevant comparators outside of the sector in arriving at its cost estimates.

The Board has and will continue to exploit the potential of new markets and market testing to drive innovation and efficiency in the best interest of customers. The Board has actively tested the scope for utilising direct procurement to deliver efficient costs. It has satisfied itself that these innovations and efficiencies are embedded in its activities and costs.

The Board has made responsible use of cost adjustment claims ensuring that the majority of costs are exposed to the efficiency challenge. It has only proposed claims where there are conditions it considers to be specific to the Company's operating circumstances.

Accounting for past performance

The Board's assurance of the PR14 reconciliation, submitted in July 2018, and restated as part of the plan reflects the forecast performance at the time of the original submission. This was subjected to audit checks and challenges by data providers, data managers, table owners, senior managers and directors. It was also subject to independent review and challenge from Jacobs and Deloitte.

Returns, risk and financeability

In establishing the base level of return, the Board has based its proposal on the cost of capital and retail margins set out in Ofwat's early view.

In its plan, the Board has proposed an outperformance sharing mechanism which ensures that a balanced distribution of the benefits of financial and operational outperformance between customers, shareholders and executive management. The mechanism has five components which share the benefits from higher gearing, the cost of debt, outperformance already included in the plan to the benefit of customers, reinvestment of any benefits, and protecting customers from unexpectedly high outcome delivery incentive payments. The Forum will be engaged annually on all elements of the sharing mechanism.

The Board will incentivise executive management to deliver for customers in the short and long term. Annually, management will continue to be incentivised to deliver stretching performance improvements for customers, ensure employees remain safe and well, and keep bills low through driving efficiency. Over the longer term, management will be incentivised to demonstrate a strong balance between longer term financial performance and customer outcomes, without compromising all round resilience. These long-term incentives will be subject to over 90% moderation should customer outcomes not be delivered.

The Board's dividend policy ensures that distributions to shareholders will reflect a yield in line with Ofwat's final determination, allowing for adjustment for the actual capital structure, company performance and legitimate employee interests. They will only be made after robust and transparent financial and financeability testing demonstrates the ability to afford these distributions.

The Board has identified the internal and external risks associated with delivering the plan and tested the sensitivity of the return on regulated equity and financeability to the risks.

The Board will continue to operate its robust corporate risk management processes, as published in its Annual Performance Report, to monitor and control the risks it faces. This risk management process contains appropriate and clearly documented control measures and mitigation plans should the risks materialise.

The Board has tested the financial resilience of plan in the round, including scenario planning of risks within the plan and the potential impact on the short and long term financeability. The Board has estimated the expected monetary value of the risks it faces and updated its long-term viability analysis to confirm the Company's ability to manage the financial exposure.

The work has assured that both notional and actual capital structures remain financeable, that key financial ratios remain at a level that investment grade rating can be maintained, and shareholders will receive returns consistent with the risk being taken and performance delivered.

In carrying out financeability tests over the short and long term the Board has ensured that the use of pay as you go and RCV runoff rates used to manage bills over the short and long-term are supported by customers.

These ensure that both current and future customers are protected against under delivery in the short and long term.

Board Assurance Statement

Signed by Yorkshire Water Services Limited Board of Directors



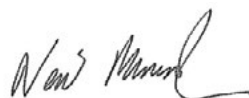
Anthony Rabin
Independent Non-Executive Chairman



Richard Flint
Chief Executive



Liz Barber
Executive Director



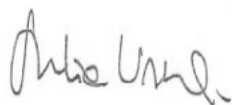
Nevil Muncaster
Executive Director



Pamela Doherty
Executive Director



Ray O'Toole
Independent Non-Executive Director



Julia Unwin
Independent Non-Executive Director



Andrew Wyllie
Independent Non-Executive Director



Andrew Dench
Investor Non-Executive Director



Michael Osborne
Investor Non-Executive Director



Scott Auty
Investor Non-Executive Director



Trust and openness

The right governance and assurance processes are essential to us to ensure that we meet our customer, stakeholder and regulatory expectations around trust and openness. Robust governance and assurance are critical to the effective identification and management of risks in the development of our PR19 plan and in meeting our 5 Big Goals.

This section describes our company governance arrangements and how we have simplified the company structure to make it easier for people to understand. It shows how our governance processes ensure that the Yorkshire Water Board (the Board) has been deeply involved in every aspect of the development of our long-term strategy and PR19 plan.

Assurance of all the data we publish means that everyone can be confident that it is accurate, easy to read and easy to access. This section explains how we secure assurance over the information we use and publish, both day-to-day and for our PR19 plan.

Governance

Yorkshire Water is part of the Kelda Group, which is a privately owned company. The Kelda Group is made up of several businesses and Kelda Holdings Ltd (the top holding company) is owned by a group of investment companies.

We know in the past some of our customers have found our company structure complicated and that having companies registered abroad causes suspicion. We listened, and transferred all bonds held in Cayman Island companies to one UK company and removed the Cayman Island companies from the Yorkshire Water structure. The Cayman Island companies will be wound up later in 2018. We are in the process of divesting Kelda Group of non-regulated businesses (we are now

over 75% complete in this divestment) which has been a further step to simplify our corporate structure and focus management attention on Yorkshire Water.

We have a board structure that complies with best practise and regulatory expectations, for example the balance between independent, shareholder and executive members and the adoption and publication of governance charters. We were the only water company in the 2017 Company Framework Assessment carried out by Ofwat to exceed expectations in our compliance with Ofwat's principles of board leadership, transparency and governance. To support our drive to understand our impact and ensure maximum benefit for Yorkshire, our Corporate Responsibility Committee was ceased in 2017/18. A new committee with enhanced governance and influence was set up which has responsibility for governing our social contract and for ensuring maximum customer and environmental beneficial impact is delivered. It is called the Social Value Committee.

We hold the licence to provide water and sewerage services to customers in Yorkshire and Ofwat regulates us for our economic activities. All the companies within the Group share common values, in relation to governance, and directors may be on the Board of more than one company in the Group.

Full details of our company structure are available in our **Annual Performance Report (page 99)** www.yorkshirewater.com.

The role of our Board

The Board is accountable to our customers and stakeholders for its activities. It is responsible for the control of our business, strategy and the decisions we make. It is focused on the strategic development and delivery needed to meet the service and performance expectations of our customers and stakeholders. The Board and our Decision Making Framework allows for well-informed, high-quality decisions in the best interests of our customers, the environment and our company. The composition of the Board is subject to the requirements of the UK Corporate Governance Code (the Code). Appointments are made following a rigorous process to ensure it is equipped to carry out long-term strategic, sustainable decision-making in the interests of customers. We are mindful of the recent consultation published by Ofwat “Consultation on revised Board Leadership, Transparency and Governance principles” and our PR19 plan demonstrates our commitment to meet the expectations of our customers, stakeholders and regulators.

The Board has been central to the development of our PR19 plan. We have held eight Board strategy days in 2017 and 2018. At these days the Board has considered the future pressures that the company faces, and the outcomes of our innovative lifestyles and other customer research to create a deep understanding of what our customers want and expect from us. The Board strategy days have been central to the development of our refreshed long-term strategy and our PR19 plan, which is the first 5-year step to delivering our strategy.

The Board has added significant value to the development of the long-term strategy and the PR19 plan. For example, one key intervention was the Board’s desire to understand, at a much more granular level the diversity of our customers’ needs and how lifestyles interacted with water. This led directly to our innovative lifestyles research and the rich understanding our customers and our impact on them, that underpins our PR19 plan.

The diversity of our Board has ensured that every aspect of the plan has undergone challenge and development. Examples of this include our use of markets to drive down costs in bioresources, our approach to supporting customers in vulnerable situations and our plans to tailor the services we provide through digitisation and knowing our customers better.

The Board has also held a joint working session the Yorkshire Forum for Water Customers (the Forum) to develop the proposed outcomes and performance commitments. The Chair of the Forum meets with the

Chair of the Yorkshire Water Board, and Chief Executive and Director of Finance, Markets and Regulation. The Chair of the Forum has also attended a PR19 Board session.

The Forum has played a vital role in the creation of our PR19 plan and you will read about its involvement throughout. We would like to thank the Forum and its sub groups for their commitment and expert advice and challenge, both in our day to day business and in the creation of this plan.

The Board owns the PR19 plan and the commitments we are making to our customers now and in the future; it is responsible for ensuring the plan is of high quality, is based on what our customers have said to us, is stretching but deliverable and that the assurance is robust. The Board Assurance Statement (chapter 3) demonstrates the Board ownership of the plan and they key areas that the Board has considered in the creation of the plan.

The Board has five principal committees and five other committees, each with its own terms of reference. The five principal committees are the Audit, Remuneration and Nomination Committees (all required by the Code), the Safety, Health and Environment (SHE) Committee and the Social Value Committee. Membership of the Audit, Remuneration and Nomination Committees includes a majority of independent Non-Executive Directors as required by the Code. These committees have also played an integral role in the development of the plan:

The **Board Audit Committee** has overseen and scrutinised our approach both to the assurance of the plan and our assessment of risk within the plan and our approach to mitigating that risk to ensure it does not impact on our customers through the application of the long-term viability assessment approach to ensure our resilience.

The **Remuneration Committee** has developed an executive variable pay package that will reflect the level of delivery of our ambition to improve services whilst maintaining efficiency and long-term resilience directly into the variable element of the remuneration received by executives.

The **Social Value Committee** has shaped our approach to the development and ongoing monitoring of our six capitals approach, ensuring best benefit is delivered to our customers and the environment.

The other committees are the Kelda Management Team, Board Investment Committee, Regulation Committee, Legal Committee and the Non-Household Retail Committee. These committees typically comprise Executive Directors and other Senior Managers within the business with limited authority delegated to them by the Board, as set out in their terms of reference. These committees are mostly focused on operational day-to-day matters and report on their activity to the Board. The Kelda Management Team is the principal committee charged with overseeing the day-to-day operations of the Company and meets on a weekly basis.

The Regulation Committee has met monthly to oversee the day to day progress of our PR19 plan and ensure that it was developed to a high standard, to time and reflecting the expectations set by our customers, stakeholders and regulators.

These committees will support the Board in monitoring our performance in delivering on our commitments to customers. The Board will continue to drive its programme of transparency and openness through our 'Openness Charter'. The Board plans to report on how it is progressing and delivering on its performance by publishing a quarterly customer focused update on its enhanced performance page of our website.

The most up to date composition of our Board and our corporate governance terms of reference and policy are available on our **website**.

Company assurance approach

It is vital that everyone can trust the information in our PR19 plan, as well as all other information that we publish. This section explains the assurance we have in place, to give confidence that the information in our PR19 plan is accurate. Our overall assurance approach is detailed in our **assurance plan** which covers all information that we plan to publish in 2017-18 and 2018-19. In it we explain where we will put more focused assurance on our reporting. We have spoken to our customers and stakeholders to understand the risks, strengths and weaknesses with our reporting and consulted on a draft version of the assurance plan.

The feedback we received has helped shape the assurance plan and will continue to influence how we report in the future. The feedback told us that getting assurance right is important, and that overall our plan gives confidence that we will do this.

We continue to work closely with the Forum to make sure that our performance reporting meets everyone's needs and expectations. The Plain English Campaign have reviewed our assurance plan for clarity to make sure it is easy to read. As a result it was Crystal Mark approved. We know that things can change so we will continue to review our assurance plan to make sure it is up to date.

The assurance process gives confidence in the information we publish. Our assurance approach is risk based and uses the best practice 'three levels of assurance' method, endorsed by the Institute for Internal Auditors (IIA). Our current assurance plan is published on the reports page of our **website** and highlights the areas subject to targeted assurance.

We are investing time and effort into how we communicate with customers and stakeholders about our performance and corporate governance. We have completed a radical review of our assurance processes to ensure our data is accurate, easy to read and access. Our improvement has also been recognised by being placed back into the targeted category of the Company Monitoring Framework in 2017 by Ofwat. The Forum take an active part to scrutinising our reported information, to improve and ensure accessibility of our reported information, and draft documents are tested by representative customer focus groups.

Meeting our statutory obligations

Our activities are governed by a range of legislation as well as the requirements of our licence. Our business plan needs to make sure we deliver what our customers and stakeholders have told us they expect from us and that we continue to meet our obligations. By working collaboratively with our regulators and stakeholders we ensure we are accounting for our obligations and wider considerations for the environment, resilience, flood management, and customer expectations in our proposals.

We have robust compliance arrangements to make sure we meet statutory, licence and regulatory obligations. The cycle that we adopt to ensure compliance with our statutory obligations is summarised in Figure 4a.

To ensure we understand our obligations we have a network of "legislation champions". These "champions" are subject matter experts who work with stakeholders to identify new obligations, assess non-compliance risk, and agree the risk appetite, and review how the business can mitigate risk to the agreed level. They translate the requirements into compliant policies and procedures that our colleagues apply. Our three levels of assurance provide management with confidence that agreed business processes are operating to meet our obligations. Where gaps or non-compliance are found actions are agreed to address the problem. The completeness and outcome of this assurance is mapped and shared with the Risk and Board Audit Committees. Each year, we publish our risk and compliance statement to demonstrate our adherence to our statutory obligations. It is available on the reports page of our website.

As part of monitoring our compliance, the annual Controls and Risk Self-Assessment (CRSA) process requires all senior managers to assess their team's level of compliance against all obligations. Action to address the residual risk where the level of compliance is below expected is agreed by managers.



Figure 4a – The compliance cycle.

The CRSA outturn for 2017-18 indicates we have a high level of compliance at 92%. Compliance with, and awareness to, human resources (93%), procurement (93%), environment (98%), finance (100%) and health and safety (90%) related legislation were scored as high. Compliance with, and awareness to, our Corporate Governance Manual (89%) as well as data and security related regulatory requirements (76%) are key areas for improvement, especially with GDPR and the Network and Information Security Directive that came into force in May 2018.

PR19 programme governance and assurance

Developing the PR19 plan has been a complex process and to be sure our plan was right for customers we needed to make sure that our PR19 programme was a well-managed process. This section describes how our PR19 programme has been incorporated into our existing governance arrangements and has used our three levels of assurance approach to deliver a high quality plan for our customers.

Programme organisation

The programme is managed through a combination of internationally recognised programme principles (Prince 2 and managing successful programmes). Figure 4b summarises the organisational structure and outlines the key deliverables for each area of the programme.

The PR19 business plan activities have four workstreams, each with a steering group supported by four enabling projects: customer engagement and participation, whole company innovation, whole company resilience and assurance. The Forum has been involved throughout the development of the plan and has had access to all workstreams, enabling projects to ensure the plan reflects what customers and stakeholders have said to us and to provide challenge and builds.

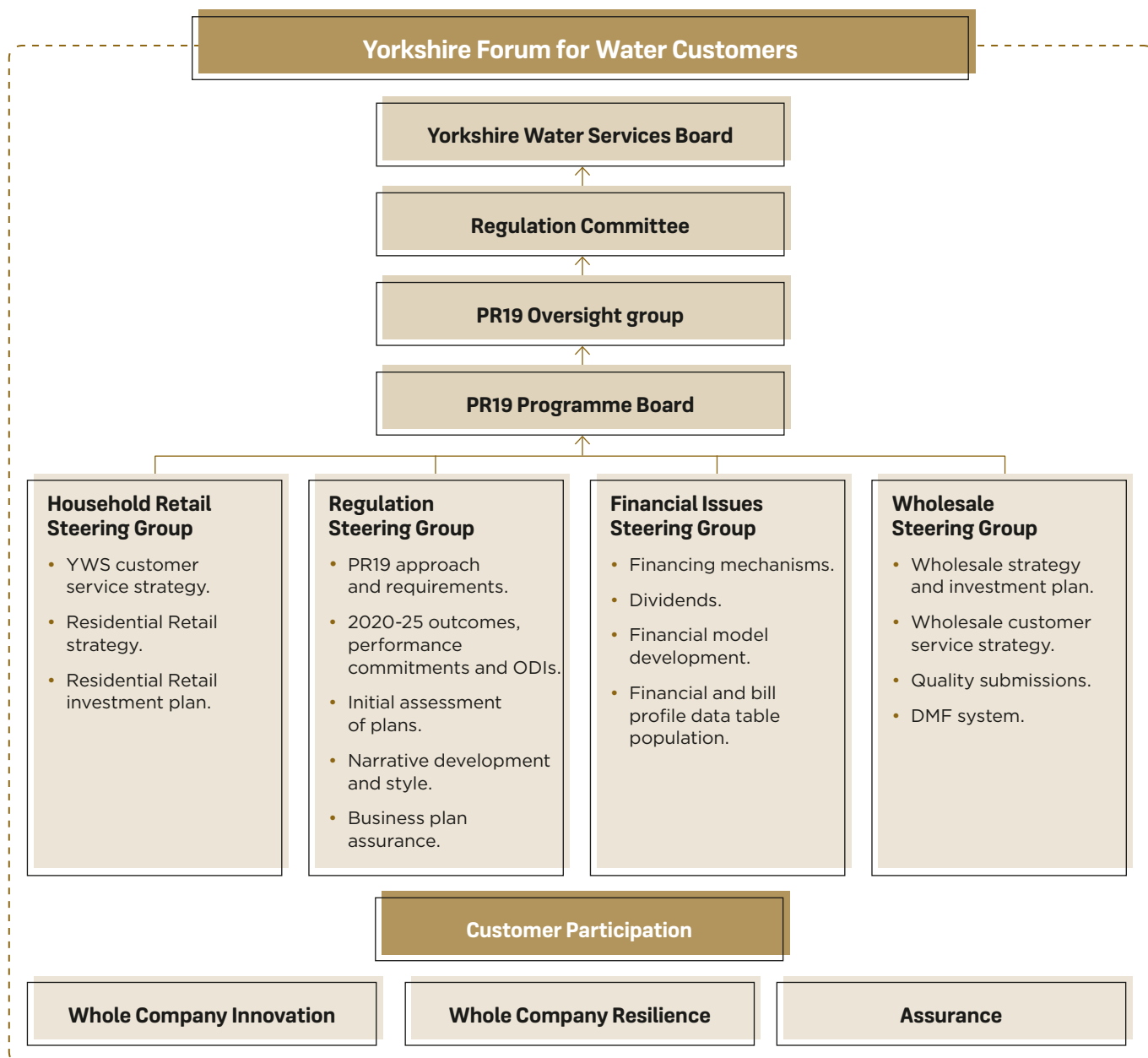


Figure 4b - PR19 programme organisation.

Programme monitoring and control

The programme organisation is supported by, and aligned with, information management and reporting mechanisms to enable quick and informed decisions. An overview is given in Figure 4c. Evidence of our Board involvement throughout the final year of business plan development is provided in appendix 4a.

In addition, the PR19 programme has been managed through three key control measures approval, risk and issue management and change control.

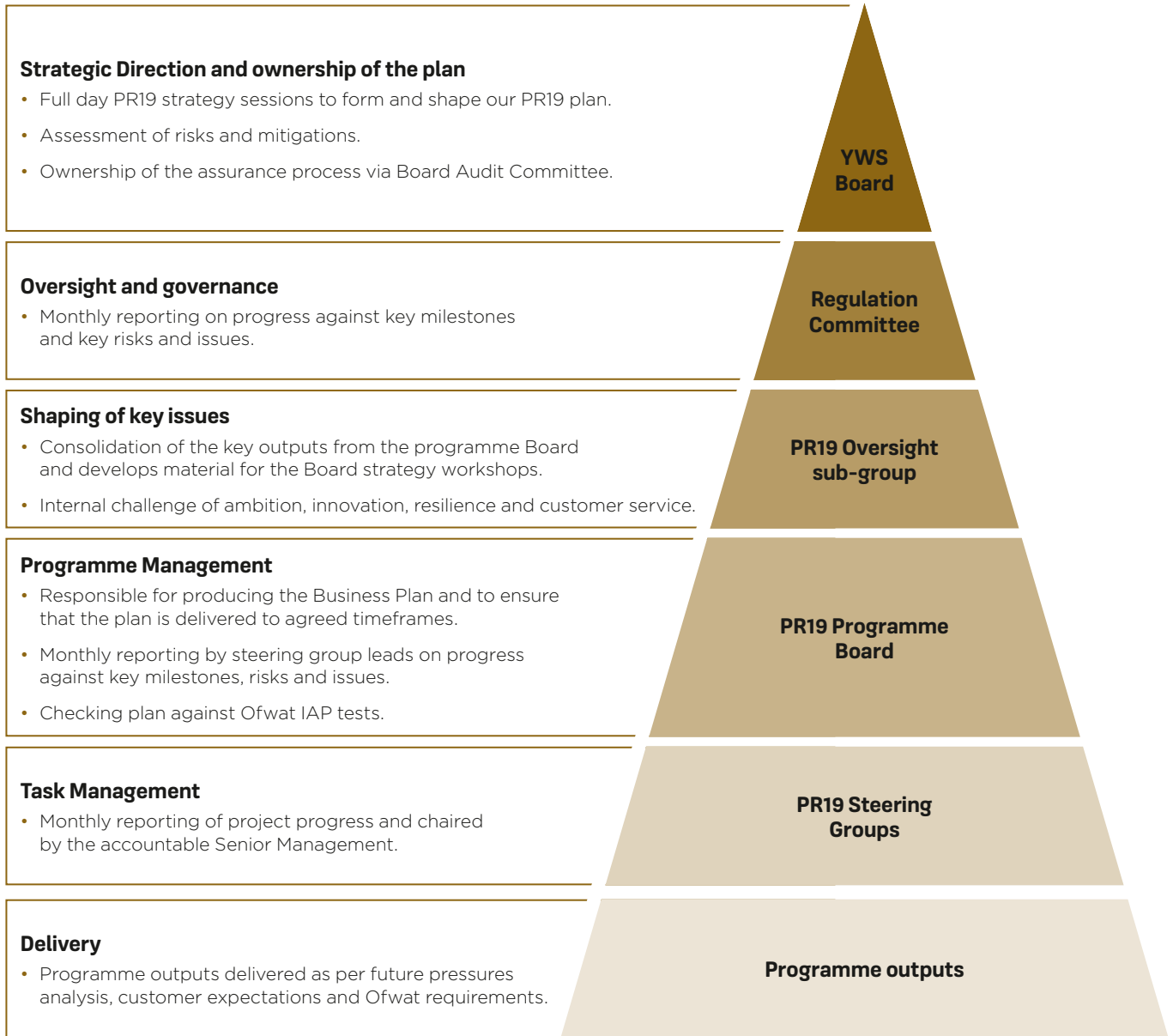


Figure 4c – PR19 programme monitoring and control.

Programme assurance

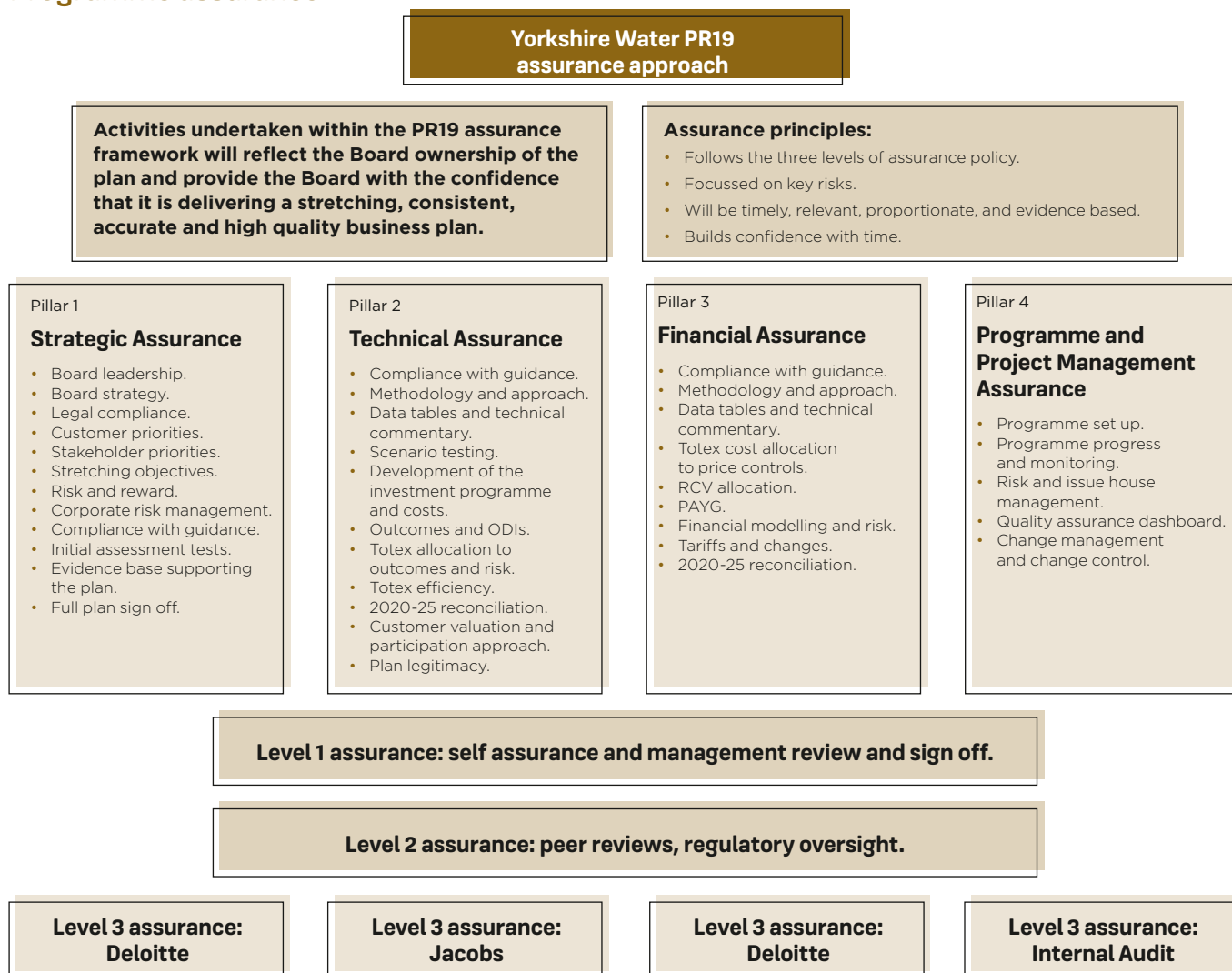


Figure 4d – Assurance approach to the PR19 programme.

The assurance of the PR19 plan follows our company approach to assurance. Figure 4e provides the detail to the assurance of the PR19 plan. **We have identified two principle risks.**

Risk Effect	Risk Cause	Risk Effect	Risk Cause
R1: Plan fails to achieve Ofwat's fast track standard or better.	<ul style="list-style-type: none"> • Failure to demonstrate the sector-leading approach to high quality customer engagement and participation. • Failure to demonstrate the plan is affordable for customers and supports those in need of assistance. • Failure to produce a high quality plan with sector-leading approaches, ambition and innovation in all elements of the plan. • Failure to demonstrate stretching performance commitments and incentives that reward exceptional performance and protect customers. 	R2: Plan achieves Ofwat's status of fast track or better but is not deliverable.	<ul style="list-style-type: none"> • Failure to demonstrate the plan is founded on robust risk assessments and is resilient in the long-term. • Failure to demonstrate a sector-leading approach to the use of markets to drive innovation and efficiency. • Failure to demonstrate that costs shift the efficiency frontier. • Failure to ensure the plan remains deliverable at the same time as driving ambition, innovation and efficiency. • Failure to meet the standards required to support the Board Assurance Statement.

Figure 4e – Risk assessment.

We have completed a risk assessment for both scenarios. The principal assurance activities applied to data tables and commentary in our business plan are outlined in appendix 4b. Targeted assurance has been delivered on the following areas of our PR19 business plan:

- Performance commitments.
- Drinking Water Inspectorate (DWI) long term strategy statement.
- Cost adjustments.
- Quality programme (comprising Water Industry National Environment Programme, Water Framework Directive, Urban Waste Water Treatment Directive).

Executive variable pay

The Remuneration Committee has designed a pay structure which clearly reflects the requirements in the plan to deliver sustainable, reliable services at the levels our customers want and expect.

We have engaged with our customers, the wider public and stakeholders about how we define our role in providing a trusted, critical public service. This conversation has been central to both our long-term strategic plan and our PR19 customer plan.

Our ongoing, innovative and detailed customer research has enabled us to understand our priorities as defined by our customers. Our PR19 plan is designed to deliver significantly higher standards of performance in the areas that matter most to our diverse customers.

In delivering our service improvements we have also identified our biggest ever efficiency programme. This efficiency must be delivered in a sustainable and resilient way to ensure we offer a safe and reliable service now and into the long term.

These factors add up to an ambitious and stretching plan that will challenge our company. Our senior executives are accountable for the company achieving the ambition and stretch in our PR19 plan, leading the company day-to-day, as well as meeting our long-term strategic direction as approved by the Board. To attract the best people to lead the business, the Remuneration Committee has developed a pay structure for 2020-25 which will attract and retain the best available executives while meeting the challenge of legitimacy for customers and other stakeholders.

The pay structure for executives must be clear, transparent and reflect the true performance of executives in delivering for the public as well as shareholders. The plan must incentivise the right short and long-term performance, striking the right balance between service, financial performance and resilience. Overall pay should also be compared to comparator groups with clear justification for divergence.

An important and significant element of pay should be entirely dependent on measurable performance, these elements are known as variable pay or incentives which come in two forms:

- A bonus that is awarded annually (annual performance award).
- A long-term incentive plan (LTIP).

Annual performance award

The annual performance award is designed to:

- Incentivise through stretching performance targets to maximise the positive impact we have on our customers in that year.
- Ensure all our colleagues remain safe and motivated to deliver that stretching performance.
- Ensure performance is delivered efficiently.

To incentivise success, we measure the performance commitments that most impact customers in a year and are in period measures. We are splitting these further between primary and secondary measures. Primary measures are those that impact customers the most and are valued by them as seen in the PR19 research. Secondary measures, while important, do not have an immediate impact on customers.

All measures will have stretching targets and the primary measures will be significantly more weighted. This weighting will be given more precision as we progress through the price review process.

Full details of the measures can be found in appendix 4c.

Alongside performance commitments delivery, the annual performance award will be evaluated considering achievement of budgeted costs, health and safety performance and our colleague engagement score.

Using these measures makes sure our senior executives are incentivised to deliver a leading service for our customers every year, keeping bills low by meeting efficiency targets and ensuring colleagues remain safe and motivated.

Long term incentive plan (LTIP)

The LTIP award is designed to ensure directors are incentivised to look after the long-term health of the company. It has been developed to ensure the annual incentive is not earned at the expense of long-term corporate health and resilience.

We have applied the leading edge six capitals approach to develop our understanding of our overall contribution and impact on society and the environment and our long-term corporate health and resilience. This work has informed the thinking of the Remuneration Committee and enabled it to design a reward mechanism that reflects long-term customer and financial performance, while maintaining or improving long-term resilience.

Financial performance (and financial resilience) will be assessed via the achievement of longer term stretching totex targets, outperforming financing costs and strong working capital management which are all essential to maintaining efficiency. These are important to financial health, customer sharing mechanisms and achieving gearing targets. The realisation of net ODIs will also be included as they incentivise innovation (intellectual capital) and are rewarded for strong customer performance, allowing a balance between longer-term financial performance and customer outcomes.

The initial target performance is assessed against stretching financial targets, including net ODI performance. This performance, and that of the annual incentive, must not compromise long-term resilience. Any award is reduced where there has been a deterioration or non-performance in key aspects of long-term resilience. The combined approach to the six capitals work on resilience and the development of the performance commitments with customers suggests that the following moderators are applied:

Human capital: up to 20% reduction

- 10% for not meeting key long-term health and safety targets.
- 10% for not meeting key long-term colleague engagement targets.

Social capital: up to 40% reduction

- 15% for not meeting long-term C-MeX targets.
- 5% for not meeting long-term D-MeX targets.
- 5% each for not meeting each of the long-term targets: affordability of bills, direct support given to customers, priority services awareness.

Manufactured capital: up to 10% reduction

- 2.5% for not meeting long-term treatment works compliance targets.
- 2.5% for not meeting long-term sewer collapse targets.
- 2.5% for not meeting long-term unplanned outage targets.
- 2.5% for not meeting long-term mains repairs targets.

Environmental : up to 30% reduction

- 10% reduction for not meeting the long-term leakage target.
- 5% for not meeting the long-term risk of severe restrictions in a drought target.
- 5% for not meeting the risk of sewer flooding in a storm long-term target.
- 2% each for not meeting each of the long-term targets for: working with others, land conserved and enhanced, integrated catchment management, surface water management, per capita consumption.

Financial capital strength is measured by achieving the above financial performance targets. There is no specific moderator for intellectual capital (although it is incentivised via the ODI element of financial performance) as there is no associated performance commitment. We are undergoing significant transformation plans and the delivery against these will be built into the annual incentive. This work will be completed by 2020 however, where transformation continues, this will be built into the remuneration package.

Some performance commitments measuring customer service (C-MeX and D-MeX), customers who may need extra help (affordability of bills, priority services satisfaction) and leakage feature in both arrangements. These have an immediate impact in any year but are also essential to key aspects of long-term resilience. This is also the case for people and safety, although we anticipate those measures will be different and more reflective of the time periods involved. Read more about our senior executive pay in appendix 4c.

In summary

The overall risk associated with delivering the level of service and initiatives outlined in this plan has been assessed and is considered stretching but tolerable.

We have an embedded risk management process and culture to ensure risks are understood, escalated and managed at the right level of the business. We use an established matrix to assess the likelihood of a risk manifesting and the potential impact across six criteria: health and safety, value, service, reputation, compliance and our people. The Board sets a corporate risk appetite for each of these criteria. The Risk Committee reviews the totality of risk each month, assessing if it is tolerable in terms of risk appetite and long-term viability.

We have used the same process to assess the tolerability of the level of risk we will be taking to achieve the significant performance improvements set out in this plan. This assessment included business as usual risk, such as cyber security, and new or escalated risk arising from our new level of ambition. The Risk Committee and the Board have reviewed this against our current appetite.

The assessment reveals the increased level of risk the business will be taking and the balance between those risks. The Board has accepted the need for a more open appetite to the value at risk and maintaining the right people skills and capacity. This reflects our need to innovate and transform the way we deliver services over the next seven years. The Board is clear that its appetite for service risk, safety risk and risks to compliance with our regulatory and environmental commitments remains cautious. The actions required to monitor and manage corporate risk to appetite have been agreed and are being put in place.

In line with this assessment we have translated the overall level of risk into an estimated monetary value. We have used this to model the financial impact of 19 severe but plausible risk scenarios to 2025. We have compared this to our financial constraints over that period and are confident that whilst in some years the headroom to trigger level is below the Board's risk appetite, and tighter than the current period. It remains manageable and the business long-term viability is maintained. This aligns with the long-term viability statement published in our 2018 annual report.

Technical assurance statement

We engaged our appointed external auditors to provide external assurance of the plan. In line with its duty to the Yorkshire Water Board, the auditors have provided assurance statements. These can be found in appendix 4d and 4e.



Engaging with our customers

Most customers cannot choose who supplies their water. With this in mind, our customers have huge expectations of us, therefore it is essential that we have our customers' best interest at heart in order to build and maintain trust. Our customers' expectations of us are central to our PR19 plan.

Our approach to customer engagement is also much wider than our PR19 planning process. We continuously talk to customers to learn more about them, the things that are important to them, how they interact with water in their day-to-day lives, and what they want, need and expect from us. These conversations ensure we know where to focus our energy now and in the future, using innovation to meet those expectations in beneficial ways for Yorkshire.

We are innovative in the ways we engage with people and organisations, in how we gather views and how we analyse outcomes. We work hard to use new and tailored approaches to engagement, gaining broad and representative views of what people think and want from us.

We are proud of how we work with, and talk to, our customers and stakeholders in Yorkshire, and the results can be seen throughout our plan.

Our engagement activity has produced quality customer conversations, providing us with in-depth customer insight that drives our service priorities and increases our focus on customer participation.

Continuous customer, stakeholder and colleague engagement informs our day-to-day service delivery. This participation has been crucial to the development of our PR19 plan.

Since 2015, the scale of our engagement has become the largest and most continuous we have ever undertaken; we have talked to almost

30,000 customers while developing our PR19 plan.

Getting to know our customers better is our key objective; more conversations means improved insight into the diverse and changing needs of the communities we serve.

One group that has played a significant role is the Yorkshire Forum for Water Customers (the Forum) and their Communications Sub Group. The Forum has helped us ensure that we are holding conversations with customers and conducting research in the most effective way to fully understand our customers' expectations and needs. They have also played a crucial role in ensuring that these views are translated appropriately into our PR19 plan.

This chapter provides a snapshot of our approach to engagement. What we have learned is embedded throughout our plan. For further detail please see our 'Approach to Customer and Stakeholder Participation and Engagement' document (appendix 5a).

Knowing what our customers want and expect

Talking with customers is not something new to us, and these conversations are reflected in our planning. By speaking with customers on a day-to-day basis through multiple channels we can be sure we meet their needs, and act when we are not meeting their expectations.

As part of the development of our long-term strategy, we spent time understanding our customers' lifestyles, how they interact with water and how we impact on them. We are using data to help us understand our customers' specific needs and tailor our services to meet those needs.

Our customers tell us water plays a different role for different people; a 'one size fits all' approach is not good enough. Our customer insights programme has deepened our understanding of the individual needs of our customers.

Effectively using existing data to inform our conversations with our customers

We have innovated in how we piece information together. This is called triangulation and it gives us the fullest picture possible by linking customer research, service development and our internal data. Figure 5a illustrates our approach to triangulation and how it has transformed the development of our approach to customer engagement and participation.

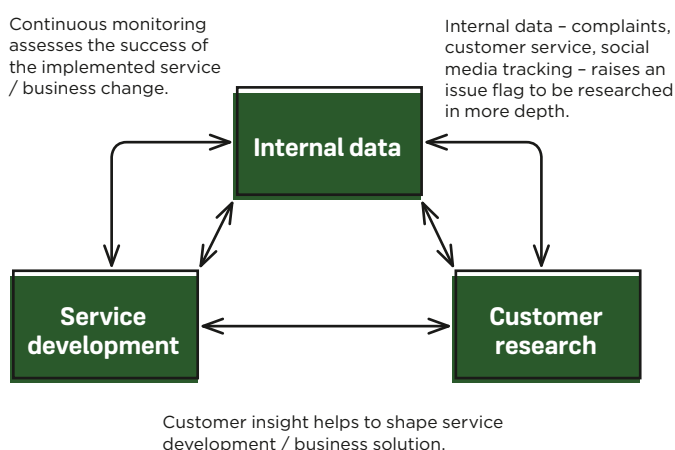


Figure 5a - Approach to triangulation.

We use this information to analyse persistent issues for further research, generating insight that leads to service improvement in priority areas. Service is monitored to gauge success and this information feeds back into our internal data. This is part of the culture change we are delivering. For example, we are:

- Moving away from awareness-based customer communication campaigns to a participative approach, including behaviour-led campaigns.
- Using customer feedback and insight to develop a personalised service, such as the development of our Best Tariff initiative; a project to identify and proactively contact customers who are financially better off with a meter.
- Reducing sewer flooding incidents through our 'Fats to Fuel' initiative. We identify areas that suffer from repeated sewer blockages, due to cooking fat being poured down the sink, and work in collaboration with the communities involved to provide an alternative method of disposal.

For our PR19 research programme, we analysed existing data to understand the service areas causing issues for customers and studied the largest volume of contacts through our contact centre and digital channels. We also developed research projects to understand customers' priorities of service, such as 'Customer Valuation'.

We speak to all customers

Our directors talk directly to our customers regularly on a range of topics. At our customer closeness sessions directors meet with customers to hear first-hand what they think of our performance on the areas of service important to them, such as leakage and pollution. For example, we heard first-hand that our customers were unhappy with our comparative performance, and these discussions confirmed our decision to improve performance in key service areas by 2020 at no additional cost to customers, using money saved by operating efficiently. These closeness sessions provide us with valuable insight that directly influences decisions.

To ensure conversations continue outside the sessions, our Twitter account, [@YWDirectors](#), gives customers a direct link to our senior management, news and industry topics.

Learning through cross-sector collaboration

We collaborate to understand the needs of future customers. Working with Infrastructure North, we commissioned a project with Northern Gas Networks, Northern Powergrid and Northumbrian Water to explore shared issues that would impact or interest future customers. From this, we gained a good understanding of future customers' priorities, including affordability, innovation, and the environment. Working collaboratively also helped us all to understand how customers prefer to interact with and receive updates from energy and water providers. This has been used to improve our digital contact channels and redesign the look of our bill.

Knowing what our customers value

Our customer valuation work has given us a robust, balanced, and proportionate evidence base to really

understand customers' needs and preferences. We have used new and innovative techniques. We established six work packages (see Figure 5b) to allow us to carry out methodological triangulation. Some of the techniques used are completely new to the water industry. This cutting-edge approach has given us a richer picture than traditional techniques alone. Further detail on each of the work packages can be found in our 'Approach to Customer and Stakeholder Participation and Engagement' document.

We know innovations like this add significant value to an overall project. The improvements to our approach to customer valuation, detailed below, have resulted in 91% of customers surveyed saying they understand what was being asked of them, compared to just 74% at PR14.

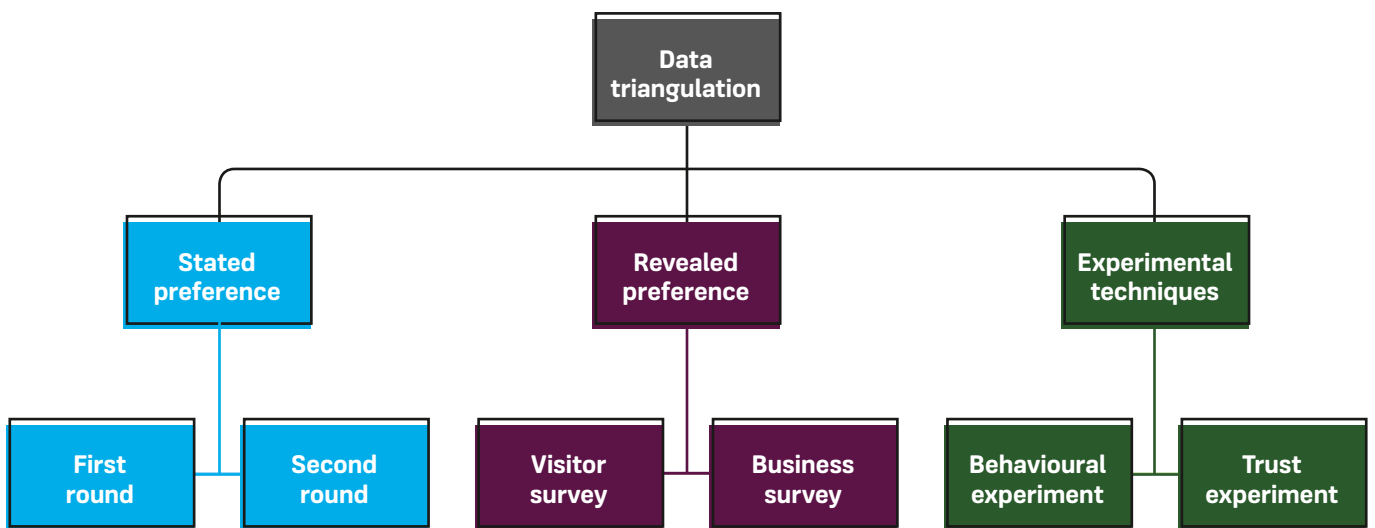


Figure 5b – Overview of six work packages.

We have strengthened our approach to customer valuation by:

- Improving the way we carry out our customer valuation survey.
- Recognising the role of behavioural economics in customer preference surveying, and knowing what helps customers understand the information being presented.
- Introducing a new approach to understanding the difference between 'use' and 'non-use' values for environmental measures.
- Making more and better use of evidence gained through day-to-day contact with customers, such as data generated through complaints, general contacts or social media.
- Moving towards triangulation, where different sources of information relating to customer preferences can be used to cumulatively refine or validate research outputs.

Customers talk to us because we understand them

We know our customers have a variety of needs and expectations relating to how water interacts with their lifestyles and are working with customers to encourage them to talk to us about the aspects of our business that matter most to them.

Saving customers money with our Best Tariff initiative

Our customers tell us they want to reduce household costs, so we have introduced a new proactive metering strategy, targeting 100,000 customers in high rateable value properties with small numbers of occupants. We are offering customers a water meter trial and will assess if they have saved money throughout the trial, allowing them to switch back to the rateable value tariff if they have not made any savings. If the project is successful, we will roll out the initiative to all unmetered customers. Driven by customer insight, **this is the first initiative of its kind in the water industry and we are proud to be investigating the benefits.**

Customer service and lifestyles segmentation

A significant strand of our research programme has given us a deeper understanding of customers and the diversity of their needs to make sure we meet their expectations. We developed a model using Experian's Mosaic segmentation tool to identify core customer sectors by life stage and location. The model provides a broad overview of key life stage preferences, for example, preferred communications channels, readiness to use digital channels, and affordability indicators. This model has had immediate benefits, particularly when reviewing appropriate channels to use during local area service incidents or when reviewing customer journeys on our website.

The segmentation model has changed our approach to communications too. We can now target specific communications and campaigns at a local level in ways that work best for those customers. For example, we launched a targeted 'flushing wipes blocks pipes' campaign encouraging customers to dispose of wet wipes appropriately. The messages were delivered based on the media consumption patterns of customers in particular areas.

We now have a greater local understanding of our customers, their life stage, lifestyles, media consumption and how they interact with companies. By learning more about our customers, we are ensuring the sustainability of our services.

We are working with data scientists to apply service and lifestyle data to identify existing service hotspots and provide forecasts on the changing demographics across the region. For example, generational migration from city centres to suburbs which may impact on future service provision at a local level.

Building trust by being open, improving services with innovation

Our customers and stakeholders tell us they expect us to be more open and transparent. We have developed an openness strategy to become 'open by default' by 2025. We are working with the Leeds Data Mill and Open Data Institute to support this customer driven initiative. Our first open data participation events were held in 2018 and addressed leakage and pollution.

'Open by default'

We are the first in the water sector to commit to an 'open by default' data approach.

We are empowering customers to act and scrutinise data, creating a new cohort of 'citizen regulators' holding us to account on our performance. In the future, we want customers to be able to create their own service dashboards, tracking our performance in areas most important to them. Openness also stimulates innovation by encouraging experts outside our sector to look at our operational performance and identify new and innovative solutions to traditional industry issues. Openness will spur on the development of data tools to provide customers with more information and control, improve services and reduce costs.

The openness strategy will strengthen public trust in the water sector, giving stakeholders and the public can

easily access a variety of company data such as tax arrangements, directors' remuneration packages, gender and ethnicity pay gaps, pollution, sewer flooding and leakage performance. By committing to being open, customers will identify areas where we need improve to further build trust.

Customer charrette

We know the intensive design and collaborative planning of a charrette model works, engaging local communities in problems multiple agencies and communities can solve together. We are expanding on the success of our Living with Water charrette, holding further customer charrettes in Hull and Haltemprice to ensure our customers have their say on proposed solutions to reduce the threat of flooding in their area. The charrette model will feature heavily in our customer engagement approach throughout 2020-25 and beyond.

Making sure we are scrutinised and challenged – the Yorkshire Forum for Water Customers

The Yorkshire Forum for Water Customers (the Forum) plays a crucial role. It is an independent customer challenge group that ensures our customers' views are fairly reflected in our business plan and makes sure we meet the performance commitments made to customers. The forum scrutinises and contributes to our business plans and is responsible for:

- Challenging the quality of our customer engagement process.
- Challenging how well our proposed 5 Big Goals, performance commitments and outcome delivery incentives reflect our customers' views and priorities.
- Monitoring progress against our performance commitments.
- Providing an independent evaluation to Ofwat on how well we have reflected our customers' priorities within our business plans.

The Forum has been in place since 2012. It is made up of many customer and stakeholder representative bodies and is independently chaired by Andrea Cook OBE. The full membership of the Forum is provided on our website along with the terms of reference and minutes from the meetings www.yorkshirewater.com/customerforum.

The Forum has scrutinised, challenged and contributed to every aspect of the development of the PR19 plan. To ensure it is sufficiently represented across all business plan activity, three subgroups were created (Environment, Vulnerability and Affordability, and Communication).

The Forum meets monthly and invites company representatives to attend to cover the agreed agenda items. The Chair attended Yorkshire Water Board PR19 strategy workshops to make sure their views are heard and to facilitate regular conversation between the Yorkshire Water Board and Chair. Yorkshire Water shareholders, Independent Non-Executive Directors and Chairman, the Director of Finance, Regulation and Markets, Director of Service Delivery, Director of Communications and Chief Executive Officer have all attended meetings.

It is essential that our customers can be confident in our customer research. Every element of our PR19 customer research has been designed with input and challenge from the Forum and all outputs shared. The Forum report demonstrates its involvement and influence over the development process of the business plan. All our submissions are shared with the Forum to allow for challenge, influence and ultimately endorsement.

The following submissions have been created with challenge and input from the Forum:

- Annual Performance Reports 2015-16, 2016-17, 2017-18.
- Risk, Strengths and Weaknesses Statements 2015-16, 2016-17, 2017-18.
- Assurance Plans 2015-16, 2016-17, 2017-18.
- Draft Water Resource Management Plan.
- Drinking Water Inspectorate Submission.
- Draft Performance Commitments Definitions.
- Indicative Cost Adjustment Claim.
- PR19 Methodology consultation responses.
- Not Just Water – our strategic direction.
- Performance commitments – our proposed performance commitments 2020-25.

The Forum has played a vital role and added considerable value in the creation of our PR19 plan because of its expert builds and challenges. The Forum is already embedded in our day to day business and we look forward to further increasing its valuable insight as we begin to deliver our plan.

Stakeholders

Stakeholders play a vital role in challenging and scrutinising our plans, helping build on our ideas. We have a great track record of involving stakeholders in our activities, and we engage with and consider their views on our day-to-day performance, issues and pressures, and plan development. Using new and innovative methods, alongside tried and trusted ones, we have engaged our stakeholders in the following ways.

PR19 stakeholder engagement strategy

Critical to our PR19 plan is our ongoing stakeholder contact programme, to ensure leaders and Chief Executives of each local authority in the Yorkshire region meet with one of our directors at least annually. We meet with each of the region's Members of Parliament (MPs) and key Non-Governmental Organisations (NGOs) at least annually. This contact programme ensures stakeholders can meet with senior members in our business regularly to keep up-to-date on our work, explore opportunities for collaboration and raise issues. This also helps to keep us front of mind with our key local stakeholders.

Learning from PR14, where we shared our business plan at these meetings, we developed a stakeholder engagement strategy for PR19 to provide earlier, more meaningful engagement for stakeholders, which allowed them to have a direct impact on the creation of our PR19 plan.

Our stakeholder engagement strategy for PR19 involved two phases of engagement:

- Phase one (May to December 2017) was based around early engagement to understand their challenges, priorities and ideas for collaborative working to meet shared aims. Our strategy focused on listening to our stakeholders without shaping their input with our own ideas. This approach gave us an accurate understanding of the challenges faced by our stakeholders and the wider region.
- Phase two (January to August 2018) focused on testing our plan with the stakeholders we engaged with in phase one. We tested to see if we had correctly understood and accounted for their feedback and asked how supportive stakeholders were of the plan.

Our main strategy for engaging with our stakeholders for PR19 was to begin earlier and provide more details and more opportunities to shape our business plan this time around.

The section below details how this strategy was applied and the results of the engagement.

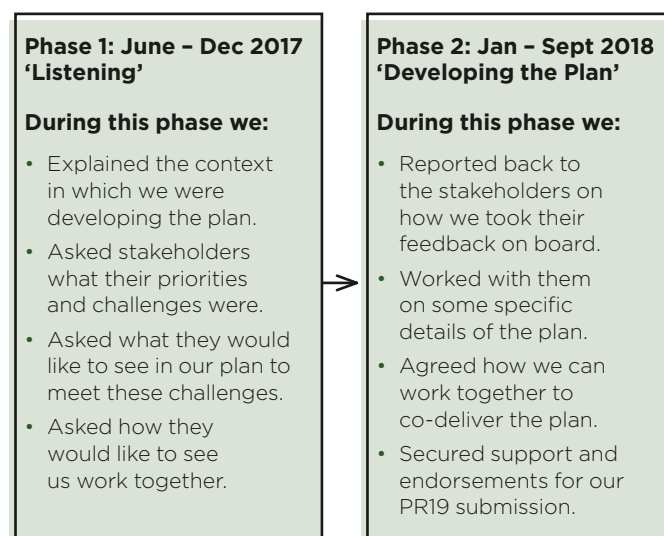


Figure 5c – Two phases of stakeholder engagement.

Applying the strategy – phase one

During phase one, we held meetings with 110 stakeholders to hear about their challenges and their views on how we could help support the region.

The ongoing stakeholder contact programme means we already have a good understanding of our local authorities, MPs, regulators and the environmental NGO community. However, we wanted to go beyond this regular group of stakeholders for PR19, meeting with Local Enterprise Partnerships (LEPs), social NGOs, developers and other local infrastructure providers. We expanded our engagement beyond the Yorkshire region to talk to our national contacts at organisations including Defra, Environment Agency, Natural England, Consumer Council for Water and Drinking Water Inspectorate.

To gain as much feedback as possible we used numerous engagement methods.

Individual stakeholder meetings

Individual stakeholder meetings allow time for detailed discussions and help to build long-term relationships. Providing individual stakeholders with a single point of contact at director level ensures our relationships grow, and feedback is given straight to the director.

Our stakeholders approached these meetings differently, providing a variety of insight, ranging from high-level discussion about our direction to more detailed dialogue. For example, Yorkshire Wildlife Trust produced a document entitled 'Our Blueprint for PR19'¹, outlining its asks for our plan, based on the Blueprint for Water Coalition's national document of the same name.

Operational site visits

Site visits are a good way of engaging stakeholders and provide exposure to our work, alongside opportunities to learn about our activities and enable future discussion.

For PR19 these visits allowed us to begin a dialogue with stakeholders about the future; we have been able to explain the new challenges we are facing now and in the future.

Of the 110 stakeholders engaged with during phase one of the PR19 contact programme, 25 meetings took place at operational sites.

Multi-stakeholder roundtable discussions

Multi-stakeholder meetings provide the chance to hear the often conflicting views of other stakeholders.

We arranged three roundtable discussions on key topics for stakeholders to share their views. These meetings allowed everyone to explore issues together and helped to ensure they understood the competing views that we must manage while developing our plans.

The three roundtables were:

- Safeguarding and vulnerable customers - 6th October 2017: Attendees included West Yorkshire Police, Bradford Council, Carers Leeds, Mind and Step Change.
- Flooding and natural flood management - 15th December 2017: Attendees included Shadow Water Minister Holly Lynch MP, Forest Enterprise, Pennine Prospects, Yorkshire Dales National Park, National Farmers Union, North and East Yorkshire LEP and Moors for the Future.
- Planning and future development 12th January 2018: Attendees included Shadow Secretary of State for Housing John Healy MP, Co-Chair of the Water APPG Angela Smith MP, Sheffield City Council, Hull City Council, Barnsley Council, Policy Connect, Home Builders Federation and University of Chester.

Applying the strategy – phase two

Phase two started in January 2018 with the launch of our long-term strategy. To access our long-term strategy, please [click here](#). The approach was similar to phase one but provided stakeholders with the opportunity to see how their views had been incorporated into our long-term strategy. This early engagement allowed us to make changes to our business plan as it was finalised.

Engaging our colleagues

Engagement with our colleagues is equally important. Colleagues are often customers too, so we want as many colleagues as possible to have the opportunity to understand and contribute to our plans.

Our colleagues provide informed insight and help spread our messages through their own channels. For example, colleague insight and input has been integral to shaping behaviour-change campaigns such as Fats to Fuel. To find out more about Fats to Fuel please [click here](#).

Ensuring our colleagues are engaged in our plans helps create a culture of participation. Below are just a few examples where colleagues have stepped up to assist with company initiatives:

- Community Ambassadors – our online community of colleagues have shared key messages and activity on PR19 issues with family, friends and people in their local communities through their own social media channels. Topics covered have been far-reaching, including sewer blockages, saving water and service improvement.
- 'Slow the flow' – as part of our commitment to manage flood risk we have an initiative to plant 200,000 trees in the Calder Valley to help 'slow the flow'. Our colleagues provided significant help with the heavy lifting.
- 'Soak it Up' – we launched a major community initiative, in conjunction with the Yorkshire Wildlife Trust, to reduce the pressure on our surface water network by building sustainable urban drainage systems on community assets, such as schools and community centres. This provided another great opportunity for our colleagues to participate in delivering a key business outcome.

In summary

In 2015 we set out to interact with our customers in different, innovative and better ways, by gaining understanding of their lifestyles, individual needs and expectations. Alongside new approaches we have kept best practice from previous years to ensure we have a full and legitimate view of what our customers and stakeholders want. We have worked hard to ensure that the data we already have informs our conversations with our customers.

All our conversations have shaped our long-term strategy and our 5 Big Goals. The 5 Big Goals signal a change not just in what we do but how we do it. Our customers and stakeholders helped us develop this approach. Our plan is grounded on what our customers and stakeholders want and expect from us.

¹ Our Blueprint for Water, Yorkshire Wildlife Trust, June 2017.

² Blueprint for PR19, Blueprint for Water, April 2017.



Customer experience

Our in-depth conversations with our customers have directly informed our overall approach to service. Our customers are at the heart of our plan. We want to ensure all customers can access our services and get what they need from us, especially if they find themselves in circumstances that could make them vulnerable, or have a particular lifestyle or commercial reliance on water.

We are increasing our understanding of customers, so we can offer and tailor services in the best way to suit their individual needs and expectations. This section provides a view of how the end-to-end customer experience will be delivered.

Our customer service plan is revolutionising the customer journey. We know we have a wide range of customer types in Yorkshire including:

- Residential bill payers and consumers.
- Businesses of all sizes.
- Retailers.
- Tenants and landowners.
- Land users.
- Local authorities.
- Communities.
- Property developers.

We serve our customers through multiple channels, predominantly by phone, supported by our website and social media channels. We have already taken steps over the last 18 months to increase the ways in which customers can access our services. Our customers tell us what they want and are increasingly comfortable with the use of digital channels for information and transactions. By offering a personal service we are driving inclusivity, affordability and choice for all customers.

Our research tells us:

- Customer expectations differ depending on circumstances.
- We need flexible approaches to meet lifestyle differences.

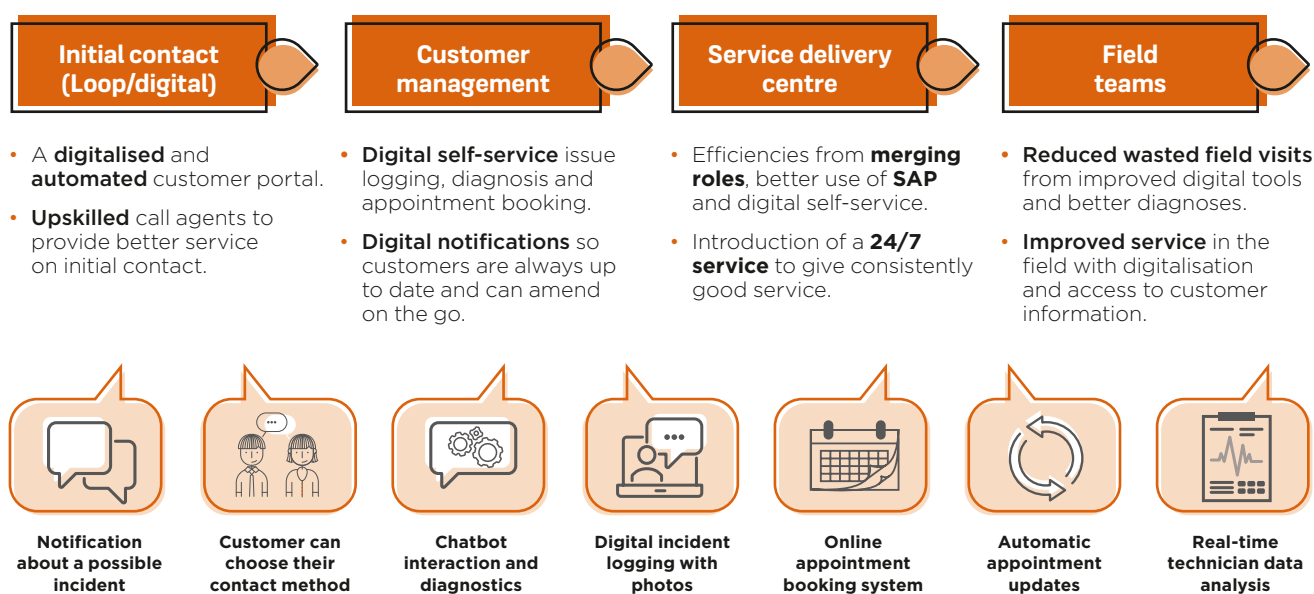


Figure 6a – Customer Service Plan.

Big Goal: Customers

Our Customers Big Goal is founded on our PR14 customer promise, which has been refreshed so that it remains current and modern. Our Big Goal sets out what customers can expect from us and helps colleagues understand how they should deliver service to all our customers. It sets our aspiration of the experience we wish to deliver to all our customers.

We will develop the deepest possible understanding of our customers' needs and wants and ensure that we develop a service tailored and personalised to meet those needs.



We are easy to deal with

- We are revolutionising and personalising our service by knowing our diverse customers better. We will improve satisfaction against our customer and developer services experience performance commitments, C-MeX and D-MeX (described in the Residential Retail price control and Appointee Performance Commitments chapters), and we have a target of 95% priority services satisfaction.
- We are increasing and improving digital services, retaining traditional contact channels for those who need it and want it, giving customers the choice and control about how they interact with us – ensuring that we fit in with their lives.
- We continue to use data to tailor our services ensuring everyone receives a personalised experience. Customers are given a choice on the service they receive because we better understand our customers' lifestyles and preferences.
- We know the effectiveness of targeted, proactive communication, we keep customers informed so they do not have to worry.

We get it right first time

- Our customer management system upgrade means information flows and processes are efficient and effective for all customers.
- Our customer improvement programmes are focused on improving the customer journey, using insight to focus on:
 - Right first time: fixing customer issues effectively to an exceptional standard.
 - Speed of resolution: matching our response and resolution times to customer circumstances, allowing customers to set the expectations of resolution times while focusing on resolving the issue quickly and efficiently.
 - Communication: ensuring a customer can access information when it suits them, so they are fully informed throughout the customer journey.

- Ongoing engagement with customers, local authorities and community networks to improve services in relating to areas such as fats, oils and greases, flooding and leakage.
- Leakage technology, to innovatively inform SMART networks, metering and proactive detection, to improve service and reduce disruption.

We are helpful and friendly

Our people are at the heart of what we do and our plan focuses on creating the right environment for colleagues to deliver our Customers Big Goal while adapting to new and improved ways of working. We are creating a culture of innovation, where development of our service spans multiple categories, including digital, customer service, billing, debt management, and vulnerability. To support this, we are investing in people, processes and technology to create transformational and sustainable change.

- Resource Management – we are using SAP S/4 HANA to provide efficient resource management and introducing new operational managers to support the delivery of exceptional service to the people of Yorkshire.
- Collaboration – we work collaboratively with partners, charities, local authorities, businesses, colleagues and customers to learn from their experiences.
- By understanding the relationship between colleague and customer satisfaction we incentivise colleagues to drive customer service improvements.
- We continue to adapt and review our colleague conditions, in terms of flexible working and benefits, to ensure the working environment is supportive, engaging and reflective of our plans for a resilient, customer service driven business.

Company and colleague culture is focused on the relationship our customers have with water to drive effective and efficient resolutions for all customers.

Customer service experience and approach

Our service plan for 2020-25 is to deliver our performance commitments through offering a personal service to drive affordability and choice for all customers. Our ambition is to create a step change within our business to provide a leading experience for our customers that is fair, flexible and accessible. We recognise the benefits to all our customers of having a streamlined approach across our business. We will deliver our plan by focusing on the following seven approaches:

Our service approach	What we are doing
A digital first approach for all processes and promote the value of digital to our customers.	<p>New customer portals and an improved website will enhance the customer journey by:</p> <ul style="list-style-type: none"> • Providing an easily accessible platform to allow customers to contact us or self-serve in the way that best suits them. • Ensuring all required information is captured so we do not have to go back to ask again and can solve issues first time. • Ensuring customers can view the progress of a query or request in the way that suits them. • Providing an easy to use repository of information for customers to visit to help make it easy to self-serve.
Personalisation based on segmentation and real-time use of customer data.	<p>We need to ensure we are providing our customers with the individual services they require while maintaining a consistent high level of service.</p> <p>This includes providing a multi-channel approach for customers to interact with us in the way that works best for them. We understand our customers all have different preferences and, for example, offer a range of financial support options to residential customers.</p>
Pro-active customer communication together with transparency of process, progress and issues.	<p>As part of the portal development and the website re-design we have included functionality to provide customers with our latest news, links to publications and access to key documentation.</p> <p>We will also provide guides on our processes and how customers can interact with us, track progress, and raise issues.</p>
End-to-end digital services promoting a 'self-service' approach for our customers, with traditional contact channels for those who need it.	<p>A full review of the processes of our services to customers has led to a focus on migrating these onto our new digital platforms to the same standard and satisfaction customers currently receive when they contact us on the phone.</p> <p>Some customers tell us they prefer the traditional contact channels, so these options will remain available.</p> <p>We will review these processes in parallel to ensure a consistent level of service and customer experience is provided no matter how customers contact us.</p>
Data driven experiences - predictive, measured and analytical to support decision making.	<p>The portals and website allow us to monitor the traffic on each platform enabling us to:</p> <ul style="list-style-type: none"> • Plan and implement further improvements to enhance the customer experience. • Provide knowledge sharing sessions to our customers where issues or lack of understanding of process exists.
The value of being digital first and using third party platforms that are already available in the customers' world.	<p>We know our customers use a variety of methods and devices to communicate with us. We have ensured that as part of the SAP refresh programme, our Business Retail service portal, developer services portal and website functionality is available whether our customers use a traditional workstation, laptop or tablet.</p> <p>We continue to monitor the market and are open to new technologies and innovations that may enhance how we provide services to our customers and how they can communicate with us.</p>
Affordable and competitive services for all our customers.	<p>We have undertaken a thorough review of our supply chain for all the services that we deliver to:</p> <ul style="list-style-type: none"> • Provide the best value for money services to our customers and a range of financial support and social tariffs. • Understand our own charges and costs in more detail. • Ensure we minimise and remove any unnecessary charges/costs and that these are not passed on to our customers. • Provide transparency about the cost of our services where they are higher than other providers. • Take what we learn from the water and other sectors on how best to operate our supply chain, including our third-party partners.

Table 6a - Our seven approaches to providing leading customer service.

To achieve customer satisfaction, we match our services to the complex lifestyles of our customers. By profiling typical customer personas, we are able to segment customer groups and develop helpful, friendly customer journeys, making sure we get it right first time. Many of our processes are becoming automated, giving customers the opportunity to self-serve. Colleagues will spend more time on complex calls or issues and supporting customers who find themselves in circumstances that could make them vulnerable.

A typical customer journey will be faster and easier, giving the customer choice and control. For example, the illustration below figure 6b shows that we will know that Fatima just wants a quick resolution to her reported internal sewer flooding and to self-serve through her phone, based on our knowledge of her preferences, behaviour and service expectations.

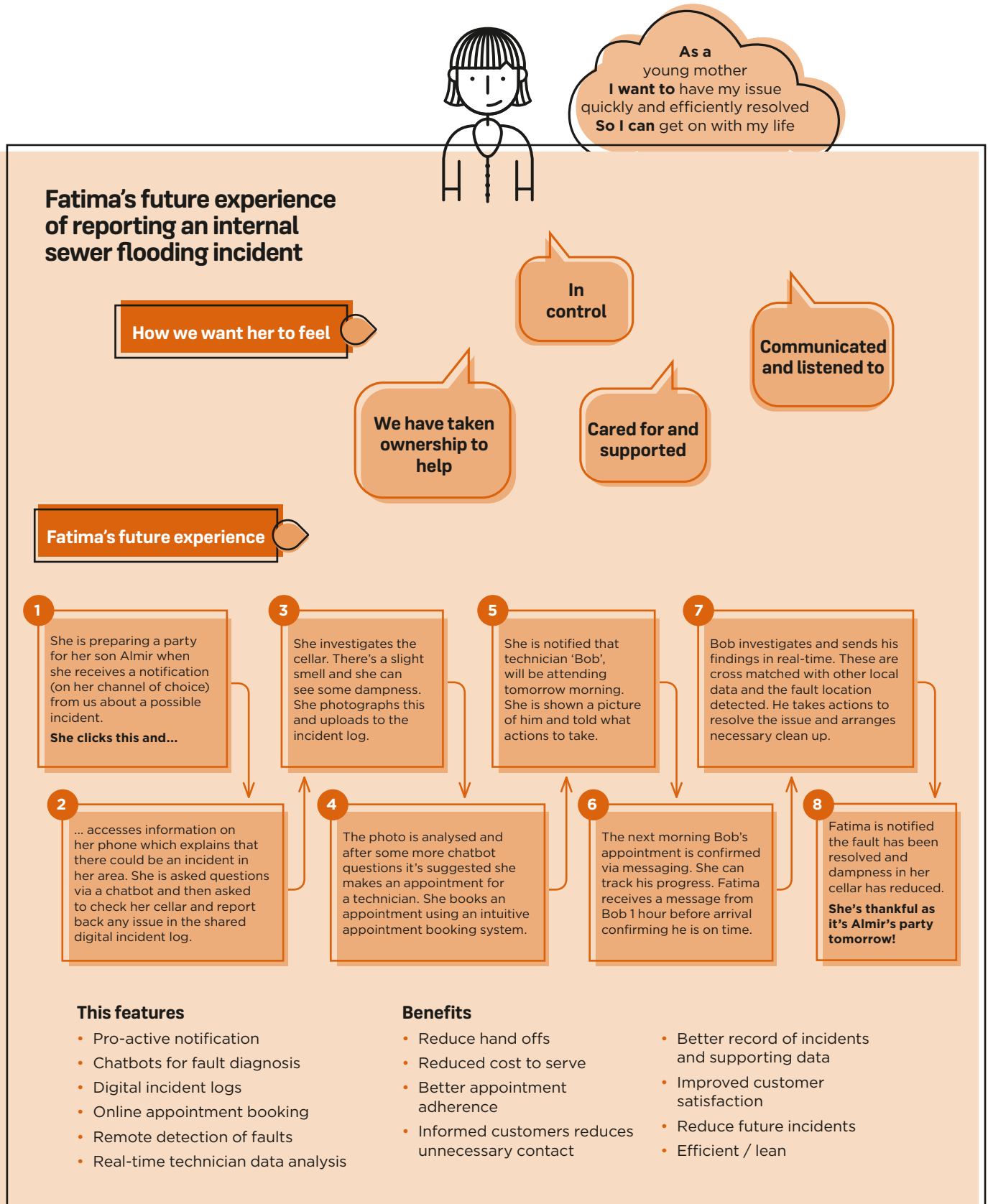


Figure 6b - Providing the experience our customers want.

Wholesale service

We want to deliver excellent service to all our customers, to transform our operational service and become an upper quartile operating business by improving performance across leakage, water supply interruptions, pollution incidents and internal sewer flooding, which impact our customers the most.

As we change and evolve to deliver what our customers need from us, we need to have a clear and consistent sense of what is important. Our new operating model in wholesale sets out that we need to do three things:

- Deliver what our customers need and expect from us.
- Adhere to our processes everyday so that we are working as efficiently as possible.
- Work safely to protect ourselves and those around us.

We know that most of our customers cannot change their water company and this rightly means that there are high expectations of us. In considering our PR19 plan we have listened to what our customers want and expect from us. The Service Delivery operating model has been designed to make sure that we meet those expectations. We know that our customer base is varied and diverse and we will personalise the service we provide to customers based on their individual lifestyle and needs.

To ensure we can do this, we will increase our ability through technology investment and increased technical resources to predict and prevent failure. We will become a truly 24/7 business and ensure we have resources available when our customers and assets need them. Our ambition for service is to totally transform the experience our customers receive to a position where they can choose when we visit them and who visits them to ensure any personal needs are met. Even more importantly, we fix their problem first time. We are already changing. We will deliver a water and wastewater customer service, no matter what the weather.

Our service to retailers and businesses

Our service aim for retailers and business customers is to ensure that we are easy to deal with, we get things right first time and we are helpful and friendly.

Businesses rely on us to provide an uninterrupted supply of clean water and to remove their wastewater. Our focus on the customer promise for our end-to-end service ensures we offer a consistent level of service to all our business customers for whom we no longer provide retail services. This can be seen in the investment in our operational performance and level of customer service within the operation of clean and wastewater networks. We are proud of our performance and our customer service levels when dealing with incidents and issues that can affect business customers, including proactive and reactive communication with business customers when addressing service failures.

We are building on the successful launch of the business retail market and our market performance is one of the best in the industry, as measured by the market performance framework.

Feedback from Utility Week and our retailer research has been positive, particularly concerning managing data, account management and transparency, and helpfulness of tariffs. This research has also provided us with information to improve our service even more. Retailers tell us some of our wholesale information is not easy to access and we need to get better at communicating with them during operational events.

Acting on what we have heard, we will improve the visibility of our wholesale performance to retailers through the development of a wholesale performance dashboard, which we will make available to retailers using a multi-channel approach. We will also deliver electronic notifications to retailers for operational events through enhancements to existing systems.

We continue to improve our performance in the market, becoming leaders in the industry as measured by the market performance framework, and by working proactively with the market operator and other trading parties to develop the effectiveness of this framework.

Our service strategy and engagement ensure we consider retailers as customers and we have consulted with them during the development of our PR19 plan.

Our engagement with retailers has revealed that voids and gap sites are not a key area of focus for them, however they acknowledge it would be positive if steps to manage them were introduced. In Scotland, where competition was introduced in 2008, vacancy management has been a challenge and various methods have been used to mitigate matters arising from the new market. We are considering initiatives which support effective management of voids and gap sites and will pilot retailer incentive schemes and wholesale initiatives before the end of the current period. We will evaluate the most efficient way of managing voids and gap sites, which may result in a combination of incentive schemes and wholesale initiatives.

Based on the results, we will implement enhancements in the 2020-25 period. Key to our evaluation is to make sure we balance the regulatory obligation of effective management of voids and gap sites, while ensuring we provide excellent value for money for customers.

Our service to developers

We put customers at the heart of everything we do. We aim to provide a reliable and helpful service to property developers, domestic and commercial customers for clean water and sewerage provisions. We are committed to providing a seamless and consistent end-to-end customer experience while protecting our network and assets for the future. Our ambition is to improve our service, providing a fair, flexible and accessible experience for our developer services customers. As part of the new connection services charges arrangements, we will incentivise environmental interventions, for example, the use of sustainable drainage systems to remove surface water from the sewer network through reductions on infrastructure charges.



Affordability

We know that in Yorkshire affordability is a key concern. Most customers cannot choose their water company, so it is essential that we provide our services as efficiently as possible so that our customers get value for money and feel that our bill is affordable. This section of our PR19 plan explains how we will keep bills fair and reasonable for all customers, including those who, for a variety of reasons, find it a struggle to pay their water bill.

The price of our bills, quite rightly, has always been and remains a top priority for our customers, and we know we must make sure bills stay affordable now and in the future. Keeping bills fair and reasonable must be done alongside delivering great service and resilience. We are using markets and innovations to deliver cost efficient services, striking the right balance for everyone by operating in ways that offer long-term value for money.

Our ongoing conversations with our customers, alongside innovative approaches to customer research, have allowed us a much deeper understanding of our customers and their needs. Using this knowledge, we can provide targeted support early to those who need it most. This helps us meet our Bills Big Goal to ensure no customer worries about paying their bill.

What we know

Using data effectively is essential to identify and help people who may be struggling to pay their bills. We have carried out a lot of detailed research and there are several factors in Yorkshire that mean more people may be more likely to need support than the national average.

Disposable income in Yorkshire is on average 12% less than other areas in England and Wales (see appendix 7a). Our region also has a high proportion of families on low incomes. Yorkshire also has a higher proportion of over 65s on low incomes. This group of customers rely on income from pensions and

are impacted by future economic shocks. Our research shows us that people in these circumstances are often most affected by rising living costs and more at risk when services are interrupted.

We also know that 10% of our customers are at high risk of falling into debt; this is higher than the national average of 7%. Northern regions have a higher percentage of unoccupied homes than elsewhere in England at over 3%. Compared to between 1.6% and 2.8% elsewhere, this impacts the levels of income collected which in turn impacts on bills.

Our communities are varied and some areas need more targeted help. For example, nearly a third of households in Bradford have an income lower than £15,000, and close to half of households in Hull are in the 10% most deprived neighbourhoods in England.

All this information means we need to make sure that we are using data and information effectively to identify people who may need help.

Helping our communities to be safe, well and free from worry

It is nationally recognised that debt can adversely affect a person's mental health, for example, through increased stress and anxiety. We know that our region has some characteristics that mean more people than average may struggle to pay their bill and we want to help relieve that stress and anxiety. This is not new to us. In our PR19 plan we are looking to increase our use of data and innovation to identify customers that may need our help and increase the support we provide. Our strategy is a simple one, we will:

- Keep bills affordable for customers and free them from worry.
- Innovate to deliver services efficiently.
- Deepen our understanding of customers' needs, allowing us to anticipate them.
- Prevent customers from falling into debt by knowing their individual circumstances.
- Deliver prompt and meaningful support when it is needed.
- Where debt occurs, help get customers back on their feet as quickly as we can.

This strategy does not just help people who are struggling to pay their bills. It is the most cost-effective strategy overall, aimed at delivering swift and targeted support when it is needed, avoiding spending money on attempting to collect debts that people cannot pay and channelling that money into a long term beneficial solution for all.

Affordability for everyone

Our plan has been informed by direct research and engagement with current and future customers. We have listened to their views through our affordability and customer inclusion group, and these messages are consistent with what we hear on a day-to-day-basis; our customers rightly demand excellent service at a price they can afford.

We give support early to those who need it most. By 2025, we are going to increase the number of customers who find their bills affordable to 85%. To do this, each year we will review everyone's bill to ensure they have the best, most suitable tariff, and we will refund the difference for customers who have paid more than necessary. By doing this, we can be confident in the knowledge that customers need not worry about their bill unnecessarily.

Using data effectively to provide the right help at the right time

Our track record of innovatively using data to identify affordability issues early has given us a great platform to continue this work in our PR19 plan. Customers we have supported financially tell us we have made a real difference to their lives. Our ability to tackle debt early is good, particularly considering the levels of deprivation across Yorkshire, and it will continue to improve.

Working with expert organisations to make sure we get it right

The use of data and establishing relationships with partner organisations, such as Citizens Advice Rotherham, is helping us to reach those who might not otherwise engage with us. Working in this innovative way ensures we identify as early as possible those households who may fall into debt. Information built into our daily operations helps customers sign-up to our support schemes with ease.

Our support is well thought out. We keep bills low by talking to customers to offer the right tariff and provide water efficiency advice. We use partners to engage with those who are hard to reach and provide meaningful help when people are having a difficult time. If the situation is worse, we help people get back on their feet with their water bill and arrange for them to have the support they need, whether it is help managing their budget or protecting them from other circumstances that may make them vulnerable.

Keeping bills low

To identify occupiers of empty properties, we work with experts to locate unbilled houses. This helps ensure that all customers pay their fair share and means that the average billed is lowered.

The way our billing activities are combined with our debt recovery performance is industry leading. To keep improving we are pioneering innovative ways to identify customer needs and improving engagement to drive down the cost of bad debt.

A cross sector benchmarking exercise completed by Economic Insight in June 2018 (see appendix 7b) concluded that bad debt costs in Yorkshire are already at an efficient level and any reduction would represent an ambitious and stretching efficiency target for us. Accounting for increases in revenue, we are committed to a challenging target to reduce doubtful debt by 6% from 2020.

Increasing choice and reducing cost

Delivering customer service by phone or letter is no longer the most efficient way to talk to customers. Digital channels are helping us to provide more choice and improved service, while allowing us to be even more efficient as they can be delivered at a lower cost than traditional forms of communication. By offering increased ways that people can contact us, knowing that these methods are wanted, we forecast in queries received by telephone to reduce to 50%.

An affordable and predictable bill

Customers expect us to be open and transparent about bills and do not want to see unexpected rises in their bills. From 2020-25, our charges will rise by only 3.7% in line with their expectations, while we still deliver on their priorities. We continue to ask customers what they want from us to tailor services accordingly, keeping a close eye on each household's payment plans to make sure they do not see unexpected spikes in bills.

We also want to be sure that our customers are on the best value tariff for them. We launched our Best Tariff initiative in 2018 (see appendix 7c). By ensuring that

customers are on the best tariff for their lifestyle, we are helping all customers make sure that they are paying the right amount of money for their water bill. We are proactively contacting customers who we believe will pay less by swapping onto a metered tariff and offering them a two-year free trial. If they are not better off they can swap back at any time in that period.

By working collaboratively with others, we aim to keep our costs down and achieve shared goals. For example, we are delivering cost efficient solutions for our customers through our 'Living with Water' partnership in Hull. Working in partnership, we are addressing long term sewer capacity issues with blue-green infrastructure, increasing resilience to flooding and providing social and environmental benefit. For further information on our 'Living with Water' partnership, see: www.livingwithwater.co.uk.

To provide an efficient and reliable service to customers, our SMART water network makes use of data and technology to provide insight and visibility to support decision makers to intervene before issues impact our customers.

Affordability in the long term

We need to meet the demands of a growing population in a world of unpredictable weather and an uncertain economy. The number of households in Yorkshire is predicted to increase 30% by 2033 and our analysis indicates a growth too in the number of households who may be struggling financially. Our plan not only meets the needs and wants of our customers for the next five years, but also considers the future impact on our communities.

We have tested our PR19 plan with current and future customers and have balanced what must be done right now with future needs. We are confident we have established the right level of resilience against the many shocks and stresses we may face in the future. We have a thorough understanding of the internal and external environments we operate in and have included the right level of risk so that we are sustainable and keep bills low.

Making the right decisions

An efficient plan is about using money wisely. With this in mind, we have refreshed our approach to making decisions for PR19 and beyond, and introduced what we call the Decision Making Framework. This is an innovative set of processes and tools, aimed at making the most efficient expenditure decisions to ensure excellent service and benefit to customers. You can read more about our Decision Making Framework, in chapter 9.

To meet future challenges, we need to do things differently. We are evolving the way we plan and invest in our networks; this includes having a 25-year understanding of the current and predicted future performance of our networks across the region, helping to deliver sustainable and affordable improvements. To deliver this we are embarking on a programme to develop and engage in effective partnerships across the region with a wide range of stakeholders.

The way we are financed ensures a fair balance of cost between current and future generations. During 2020-25 any borrowing will come from investors, and to do this efficiently for our customers we need continued access to low cost finance, which we have through our current investment grade ratings.

Efficient solutions and innovative demand management keep bills low for future generations. However, pressure on household budgets will remain for some. Our Bills Big Goal is to remove this worry by continuing to increase the support we provide to customers. By 2030 at least 90% of our customers will find their bill affordable.

Affordability for those who are at risk of, or are already struggling to pay their water bill

Pressure on household budgets continues to be an issue for many in our region. Our analysis of economic impact tells us some people will be worse off in the future, and as income levels in Yorkshire lag national averages, improving debt levels will be challenging. In Yorkshire, low-income families and some people over the age of 65 are predicted to have less disposable income in the future.

Using data to identify who needs our help

The burden of debt is unevenly distributed, both geographically and demographically. Using data to identify customers most at risk of incurring arrears allows us to target our advice effectively and efficiently. By profiling our customers using lifestyle data from credit reference agencies and our own customer behaviour information, we can identify how to best meet customer expectations while becoming more efficient. Our contact and collection strategy allows us to influence customer behaviour and confidently identify those who need support.

Our approach to debt prevention and the innovative ways that we use data to help us understand our customers means we have industry leading bad debt levels. We have led the way in data sharing and are the first water company to introduce full credit reference arrangements. Our use of data helps identify those most at risk and our processes are designed to prevent debt and provide easy access to help. Our social tariff, WaterSupport, was designed to prevent those struggling to pay from falling into debt. This is still unique in the industry and is founded on the successful use of data sharing.

We are proud of how easy it is for customers to access support and the efficiency of our processes. Research in 2017 (see appendix 7d) demonstrated:

- 97% of customers consider sign-up for our financial assistance scheme, WaterSupport, to be very easy.
- 84% of customers stated the tariff helped make their bill affordable.

Awareness of our social tariff (see appendix 7e) and access to the scheme has been successful. We aimed to transfer 10,000 to the tariff in this period, currently we have over 14,000. Our easy to use process works much better for customers compared to alternative options, such as paper-only applications. Working with credit reference agencies, we can verify applications live on the phone. We know that relying on paper applications for access can be a barrier to those considered the most vulnerable.

Our recent research shows there is an appetite to provide more financial help for bills. In our PR19 plan we are raising awareness of the WaterSupport scheme and we will increase the number of customers who use it to 30,000, substantially increasing the number of customers receiving meaningful help.

Working with partners to get the best outcomes for our customers

Well-designed processes in place and engaged customers are keys to providing successful and effective support. We know that due to various circumstances, some customers that we could help are difficult to reach. We have working relationships with organisations that allow us to better connect with a range of communities in Yorkshire. One great example is our partnership with Citizens Advice Rotherham, through which we provide financial support when it is really needed. The reduced bills help people who experience challenging circumstances that temporarily affect their finances, giving them breathing space and removing worry during a difficult time.

To make sure our support for these types of customers is properly targeted, we have introduced the Fresh Start scheme. This is specifically designed to support hard to reach customers who are in circumstances that make them vulnerable. Using data analysis, we can identify these customers and proactively contact them. If they engage, we will work with them to remove ongoing debt and arrange manageable future payments, taking away the psychological worry and making future bills more manageable. The funds for this approach would previously have been employed in chasing debts that the customers would not be able to repay. Applying the money to get people back into workable payment plans benefits all customers in the long term.

Support for our plan

Our strategy encompasses commissioned research, including customer engagement. The Yorkshire Forum for Water Customers (the Forum) has tested and challenged the plan, including the acceptability of bills and bill profiles. As a result, we have agreed to provide more financial support than ever before.

To develop this business plan, we have carried out extensive customer engagement, using new and innovative methods, alongside tried and trusted ones, working with customers and stakeholders in lots of different ways. The scale of the ongoing engagement for the 2020-25 period is significantly larger than for previous periods. To prepare for the PR19 business planning process, we spoke to almost 30,000 customers and stakeholders, compared to 8,000 at PR14. Our engagement activity has produced quality customer conversations, providing us with in-depth customer insight that drives our service priorities and increases our focus on customer participation. Overall, 86% of our customers surveyed (1964 household and 366 business customers) said they were supportive of our plan.

Meeting customer expectations while keeping bills affordable for everyone is a challenge. By engaging with customers and stakeholders, we have developed a plan supported by customers that achieves this

goal. We have set ambitious targets within each price control, all of which require innovative solutions to deliver the levels of service in an efficient way. Ongoing conversations with customers help us to adapt our plan and recognise our diverse population's changing needs. We will remain true to our strategy, keeping bills affordable and customers free from worry.

Vulnerability

Customers who find themselves in vulnerable situations

We must be sure that our customers have equal access to all our services. This part of our business plan explains how we plan to improve services for customers who find themselves in vulnerable situations or circumstances.

By understanding our customers and their families, we can tailor services to suit their needs. Our commitment is that all customers who find themselves in vulnerable situations or circumstances know what is available to them, and how to access the service appropriate to them. This is founded on ongoing conversations that we have with our customers, customer research, collaborative working with expert partners and discussions with the Forum.

Ofwat's Vulnerability Focus Report 2016 referred to three principles of good service; excellent service to all customers; effective use of data; and partnership working. Our strategy is based on these principles in order to provide an inclusive customer service. Ofwat case studied our use of data within the Practitioner's Pack for Water Companies as an effective way of preventing debt. We are continuing to build on this successful approach and widening our reach through strong relationships with partner organisations.

What we know

Through our extensive customer engagement process we know that customer (residential and small businesses) vulnerability can manifest itself in many ways; it can be temporary or permanent, it could result in reducing customers' ability to access or benefit from our services or their ability to pay their bill.

We will use our data innovatively to proactively identify customers who could benefit from alternative services and choices. We understand our region and recognise the need to consider factors, both in and out of our control that may trigger vulnerability, such as:

- In Yorkshire we have over 1 million people with an illness or disability causing significant difficulty with day-to-day activities¹ (see appendix 7f).
- 20.2% of the region's population will be over 65 by 2024² (see appendix 7g).
- 80,000 people in our area will be living with Dementia by 2021³ (see appendix 7h).
- The Yorkshire region has the third highest cancer diagnoses each week⁴ (see appendix 7i).

¹ Office for Disability, DWP 2014. ² Office for National Statistics figures. ³ Research from the Alzheimer's Society.

⁴ Yorkshire Cancer Research www.yorkshirecancerresearch.org.uk/cancerinyorkshire.

- The impact of our planned and unplanned outages on customers' lifestyles and health (see appendix 7k).
- The financial issues faced by some of our customers.

By working with customer groups and expert partners we are improving our services. This has shown us (see appendix 7a):

- Customer expectations differ depending on circumstances.
- We need flexible approaches to meet lifestyle differences.
- We need to support people who find themselves in vulnerable circumstances.

Our track record for supporting customers who find themselves in vulnerable circumstances is excellent, and in 2018 we were the first in our sector to introduce a safeguarding strategy (see appendix 7l) to protect colleagues and customers. We were also the first water company to pioneer the use of data sharing, which has informed how we can proactively support customers to prevent them from falling into debt.

We know through extensive conversations with our customers that tackling financial vulnerability is a priority.

Providing a tailored service

This section explains how we are identifying customers that find themselves in vulnerable circumstances, what we are doing to improve the service they receive, and how we are working with experts to deliver it. There are three critical elements:

- An inclusive service: all our customers know the services we have to offer and will easily be able to access them.
- Safeguarding: we help protect our customers.
- Culture: we are industry leading in ensuring all aspects of our work considers customers, particularly those in vulnerable circumstances.

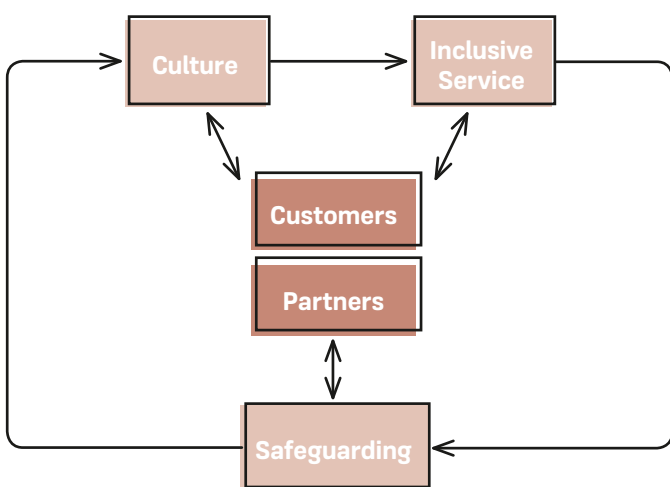


Figure 7a – Inclusive service.

Inclusive service

Priority Service Register

For several years we have used a Priority Services Register (PSR) to record customer needs, which has given us an insight into the needs of some of our customers. We want to improve this service. To do this we are continuing to review the services we offer by working with partner organisations with specialist expertise, such as charities and those that deal with people who find themselves in vulnerable situations or circumstances daily.

Case Study: Tailored service

To meet the needs of people with reduced dexterity or strength we offer bottled water in different sized containers. Seeking to constantly improve this position, we are testing alternatives to bottled water which may be easier for some customers to use.

We continuously update our systems, so customers can choose to give us more information when signing up to our PSR. The extra data provides a detailed picture of customers' individual needs, which helps us continually develop the services we provide.

We know that we have access to important customer information and we champion the use of sharing that information. We are part of the National Water Industry Working Group seeking to formalise data sharing of PSR customers with other utility companies.

We are collaborating with Northern Powergrid, Northern Gas Networks and Northumbrian Water, to share best practice to improve our customer services and support customers who find themselves in vulnerable circumstances. We are learning from others to improve the service we give to our customers.

Community engagement week

We are using our data to reach the right communities. We are holding our first ever event to raise awareness of PSR services. The event will highlight seasonal information for customers, such as how to prepare for winter.

We use multiple sources of data to identify where customer circumstances may have changed. For example, increased water usage may occur as a result of a medical condition which requires extra washing. Customers are proactively contacted by a specialist team to establish if any of our services can help. If not, we signpost or refer the customer directly to other organisations that can provide support.

Case Study: Data sharing benefiting customers

Our ongoing relationship with Northern Powergrid has provided an opportunity to trial data sharing to build detailed information about a community in preparation for planned work. The data allowed for a distinct communications plan to be developed, considering financial circumstances, languages spoken and other local characteristics. The result was targeted engagement with the largest mosque in the area, providing printed accessible information.

We have created an Inclusive Customer Service Group made up of local partners, charities and other organisations such as Alzheimer’s Society. This group helps us gain a better understanding of customers who are traditionally harder to reach and reviews the service we provide to those perceived as ‘at risk’. We also use these relationships to explore how other parts of our service can be changed to benefit all customers.

Partnerships allow us to tailor our services to better meet the specific needs of our communities. For example, we gained a greater understanding of the communication needs from Hull and East Yorkshire Deaf Centre. Following on from this, we implemented new spoken word translation and British Sign Language services to improve our accessibility across the whole business.

We are working with Rotherham Citizens Advice Rotherham to provide financial support for customers who are going through a temporary life-changing event such as a cancer diagnosis. This trial is being conducted in partnership to aid people during very difficult times.

“Citizens Advice Rotherham are excited to be working on an innovative new project with Yorkshire Water. Payment Assist aims to help people before they get into financial difficulty. By working closely with Yorkshire Water, Citizens Advice will identify clients who are in danger of slipping into arrears and put a three-month payment freeze onto their accounts. When customers face life changing events such as losing a job, dealing with a terminal illness or experiencing domestic abuse, we aim to give them the breathing room they need to adjust to the circumstances in which they find themselves. We know just how challenging these situations can be and want to make sure that customers have one less thing to worry about. Over the next six months, hundreds of customers will benefit from our partnership” – Advice Services Director, Citizens Advice.

Safeguarding

We interact with our customers every day, we visit their properties or speak with them on the phone. We see that some customers can be in situations where they cannot look after themselves or they may be at risk of harm in some way. We are taking a broader role in society to ensure that, where we have engaged with our customers, they are safe and free from harm.

We are the first water company to recruit a safeguarding lead to support all customers and help keep them safe. To identify at risk customers early, we have partnered with West Yorkshire Police and Yorkshire Fire and Rescue. Through this partnership we receive staff training to help identify those at risk and how to refer them to the right organisations.

Partnership training, particularly for our safeguarding champions, ensures we learn how to identify vulnerability, how to recognise the signs, and how to record incidents correctly.

A life saved... a Yorkshire Water colleague attended an address which was cold and in a state of disrepair. She discovered that the customer had mobility issues. Due to perceived risk of harm to the customer, social services were informed. The following day the man living at the address was found so ill that an ambulance was called, which saved his life. The social care team manager said, **“This is the first time any private company has ever passed us information about someone at risk of harm. More companies should be doing this”.**

Culture

We have a business culture that provides the best outcome for all our customers. Examples include:

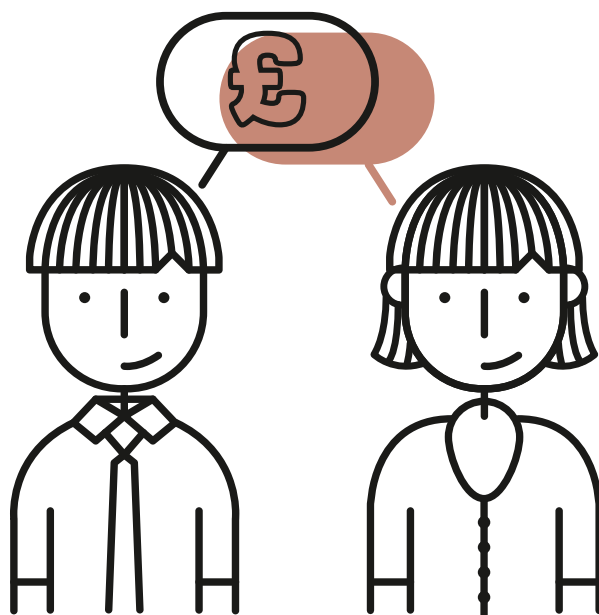
- Safeguarding champions.
- We have been presented with the ‘Good Access Scheme’ award from the charity Open Country after making improvements at over 10 sites, making them accessible for all.
- We are working towards becoming a dementia friendly business.
- We have an established inclusion and diversity ethic, which includes a successful mentoring and coaching programme for people with autism.

Click here to see how our Talent City interns are discovering their hidden talents.

We are incorporating customer service, safeguarding and community engagement into our procurement processes for construction partners on projects during the 2020-25 period. We recognise by working collaboratively we help integrate our desire for fully inclusive customer service in all aspects of our work. By understanding our impact, we can demonstrate how we are improving and increasing benefits for society.

Case Study: Partnerships to support health and wellbeing

We are working with Connected Health Cities, a University of Sheffield led community programme, to improve health and wellbeing in Yorkshire’s cities. This project has given us a better understanding of local people’s needs through effective use of data sharing. Part of the project to date has involved assisting with the set-up of a talking newspaper in Leeds, which previously was the largest city in England without this vital service.



Protecting customers in the future

Increasing awareness of the PSR allows customers the chance to use our services. The satisfaction of our customers is critical to ensuring that their needs are met, while the process of testing it allows for continual feedback on our successes and areas for improvement. There will be a yearly review of our services by national charities to determine how well we are delivering accessible and relevant services to customers with additional needs. We believe this gives us the platform for continual development of the complete customer experience, specifically for those in circumstances which make them vulnerable.

This will also allow us to show our customers how we are performing in this area from an independent view, that is easily understood by all. This process will be guided by the Forum to ensure we are testing our current services and processes against accessibility and effectiveness, while allowing proposals for future development. Sharing the results with our customers and partners for transparency will provide reassurance of our commitment and performance in this area.

During the 2020-25 period we will fund partnerships with other organisations so that collaboratively we can identify those at risk and in need of specialist services. By doing this we will provide the community with benefits to health, wellbeing and safeguarding.

To make sure our plans are effective, we will be measured through three performance commitments:

- Priority services awareness.
- Priority services satisfaction.
- Inclusive customer service.

These performance commitments are vital to the effectiveness of our work as they will measure whether the people who need access to the PSR know what it is and how it can help them. These commitments also ensure that we are working to deliver those services needed and asked for by our customers. You can read more about these performance commitments in our Residential Retail price control, chapter 18.

We will be taking a more holistic approach to customer service for all our customers including those in vulnerable circumstances. We will be identifying and taking action to safeguard customers when we can, ensuring that our customers know about what we offer, so they can use the services when they need them, and importantly ensuring our services are reviewed both by customers and partners. Our approach ensures that we deliver an excellent level of customer service at a cost that is affordable to all.



Our approach to efficiency

We know our customers expect high levels of service from us at an affordable cost. To meet their expectations, we must be as efficient as possible. Efficiency is delivering an ambitious plan using innovation and collaboration to ensure the cost of delivery is at the economic level and offers good value for money. To achieve this throughout our business plan we are applying innovation by using:

- Markets.
- Technology and digitisation.
- Customer and stakeholder collaboration.

We are changing the ways we engage and utilise markets and procurement. We are redesigning our delivery model to meet our customers' expectations. For example, we are committed to delivering upper quartile performance in leakage, internal sewer flooding and pollution incidents and be a frontier performer in interruptions to supply and per capita consumption.

We want to be upper quartile in efficiency as well as performance so we have considered how to do things differently to unlock value for our customers through efficiency gains.

Our track record in cost efficiency is strong. In most assessments we have been at or beyond the regulatory benchmark. We are striving to deliver good value for money for our customers. PR19 delivers improvements in key performance areas for our customers, that provides further efficiencies in 2020-25 and beyond. This will mean that we will meet customer expectations by delivering improved service at the lowest possible cost.

We have engaged with our customers widely in the development of our PR19 plan. In developing our 5 Big Goals we have taken the time to understand our customers' relationship with water and their priorities for the services we offer. Affordability and bill stability are key. To deliver these aims, our statutory and environmental obligations and improve our service levels, we have had to challenge our cost efficiency substantially.

Developing and delivering an efficient PR19 plan is essential to ensure sustainable affordability in a constantly changing society. We face challenges that would, if not delivered through new approaches and innovation, lead to increases in bills. We believe an efficient plan should improve the service our customers receive and sustain and enhance Yorkshire's environment.

We have considered wider costs and benefits beyond traditional financial considerations. Implementing the six capitals within our Decision Making Framework (DMF) allows us to understand the impact of our investment decisions on a more rounded basis with respect to natural, social, human, intellectual, financial and manufactured capitals.

We are embedding the six capitals within our optimisation approach. This, along with being innovative, understanding our customers' priorities and collaborating with them and stakeholders has ensured that our plan maximises benefits and minimises cost while ensuring our programme delivers the improved service levels to our customers and meets our statutory, regulatory and legislative obligations, ensuring bills are affordable now and into the future.

In this section we set out our approach to addressing efficiency and how we are delivering further efficiencies in areas where we are at, or close to the frontier benchmark for the sector. We outline our headline projects that will deliver our efficiency targets for 2020-25, these include learnings from industries outside of our own. All of this will evidence how we are to achieve the step change in efficiency which is set out in this plan.

We have considered each price control on its own, considering our relative efficiency for each price control is very different. Assessing and setting

differential challenges at a price control level will ensure we drive maximum efficiency throughout the period leading to an efficient plan. Appendix 8a and 8b provide the context of why our efficiency challenges have been set. We have challenged ourselves to achieve upper quartile or better levels of cost efficiency for all price controls alongside delivering a marked change in key performance areas.

Our approach to delivering efficiency in PR19 and beyond

Historically our activities have been assessed as efficient. At our last price review our water services activities were more efficient than our wastewater services.

Our PR19 plan builds on our efficient historical performance and delivers a step change to ensure upper quartile efficiency across the whole of our activities, regardless of whether it is providing clean, safe drinking water or managing and treating wastewater.

The activities set out are not one-off adjustments. They represent a fundamental change in how we deliver our services, ensuring these are business as usual and the efficiency gains identified are sustainable now and into the future.

Investing and transforming to maintain an efficient business

We have made a number of key investments, as well as additional activity in 2020-25 that will support the delivery of an even more efficient service throughout the next period and beyond. We have challenged ourselves to be efficient in all parts of our activities from asset planning through to hour-by-hour operational activity based on the life cycle shown in figure 8a.

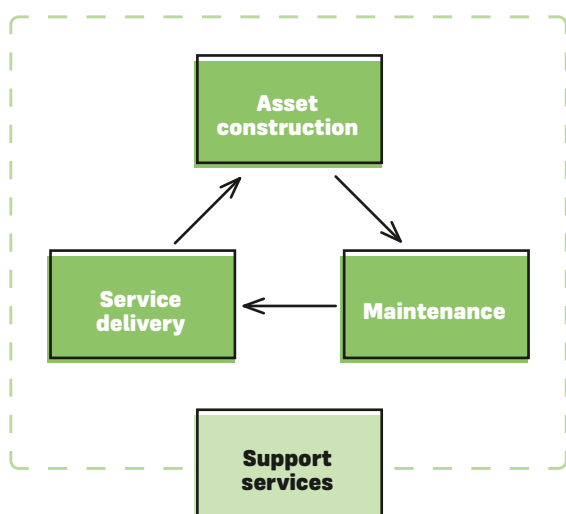


Figure 8a - Efficiency cycle.

Further details of these projects and additional initiatives we have included in our plan to deliver our ambitious efficiency challenge are set out in the referenced chapters.

To unlock efficiencies in the period 2020-25 we have invested in the following areas:

- Improving how we make efficient decisions - Chapter 9.
- Effective and integrated use of our data SAP S/4 HANA - Chapter 10.
- Understanding and responding to our customers' needs - Chapter 6.
- Efficient and effective use of alternative delivery models - Chapter 11.
- Using markets to deliver innovations that drive down costs - Chapter 11.
- Implementing more effective and efficient delivery models - Chapter 10.
- Unlocking efficiencies from our procurement processes - Chapter 11.

Assessing cost efficiency

Our plans represent a significant change in efficiency, contributing to an improvement for the industry. To build trust that our costs are efficient and to ensure we deliver improved service at great value for money, it was critical that we challenged ourselves against other water companies and industries. We have asked ourselves three important questions:

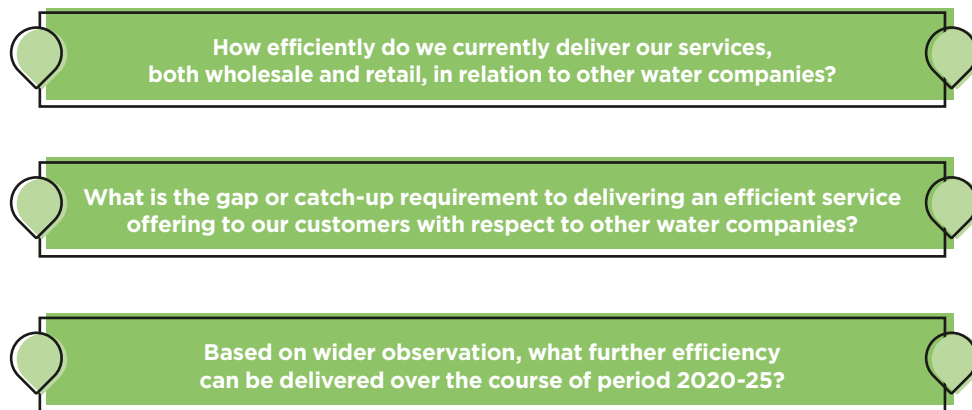


Figure 8b - Assessing cost efficiency.

We have used many assessment techniques to understand the answers to these questions and ensure the challenges we set ourselves for the 2020-25 period deliver the best outcome for our customers. They consider both internal and external evidence in relation to cost efficiency.

Examples of the techniques we have used to assess and set the challenge are as follows:

- **Benchmark modelling** at various levels of detail for wholesale and retail.
 - **Aggregate** - understand how our costs compare to other water companies at a wholesale and retail level.
 - **Price control** - understand how our costs compare to other water companies at a price control level.
 - **Activity level** - understand how our costs compare to other water companies and activity level below the price control.
- **Wider assessment** of real unit operating expenditure (RUOE) analysis from other industries.
- **Total factor** productivity analysis.

Full details of these activities can be found in our efficiencies appendices.

The analysis shows us how efficient we are now and how efficient we could be based on other water companies and other industry observations. By setting this efficiency challenge we can see where we are lagging and where we can lead.

The evidence gathered and commissioned has directed the efficiencies we are targeting within this plan. In developing the plan, we have considered practical issues shown in the price control sections of the business plan.

We are confident the evidence set out in this approach document and our price control sections show that we have challenged ourselves to deliver an efficient plan that offers a radical shift in efficiency for our customers.

Our efficiency challenges

We have used the outputs of the analysis to test the plan at various stages to ensure it is sufficiently challenging, considering water utilities and wider industry best practice. It has also ensured we are able to understand the full level of risk we are undertaking.

In the sections below, we have set out our efficiency target by a combined service, water and wastewater, and by price control, and how this compares to the ranges that are established from the full evidence and analysis we have compiled for this plan. Full details on how the ranges have been compiled is set out in appendix 8c. The ranges include both catch up and frontier shift efficiencies and include the considerations from our sector efficiency observations.

We have set out more detail on our process of ensuring and securing cost efficiency with respect to the challenges by price control in sections.

Water service (combined)

Our combined water service efficiency target goes beyond an upper quartile benchmark range and into the range for frontier benchmark. We have considered two ways of combining the Water Resources and Water Network Plus price controls and developed an efficiency range for water service, one where price control models are combined and one where the benchmark is assessed at a service level. Our target is a combination of our efficiencies by price controls.

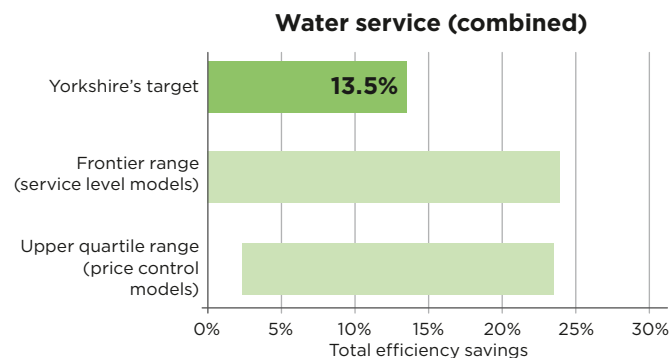


Figure 8c - Efficiency challenge for Water service (combined).

Water Resources

We assessed our relative efficiency in Water Resources, identifying potential efficiencies.

As stated in appendix 8a and our response to modelling consultation in May 2018, modelling for the resource controls (Bioresources and Water Resources) is inherently challenging. We do have concerns, especially on the Water Resources price control, disaggregated models give rise to large efficiency ranges even when controlling for potential outliers. As such we have set our efficiency challenge at the more prudent end of the modelling outputs. Whilst this means that we are not in the ranges as shown in figure 8d we are, at a combined water service level, delivering significant efficiencies that go beyond the upper quartile range.

We have embedded the following where the lowest and the highest appropriate total efficiency challenges are shown in figure 8d (further details are in appendix 8c):

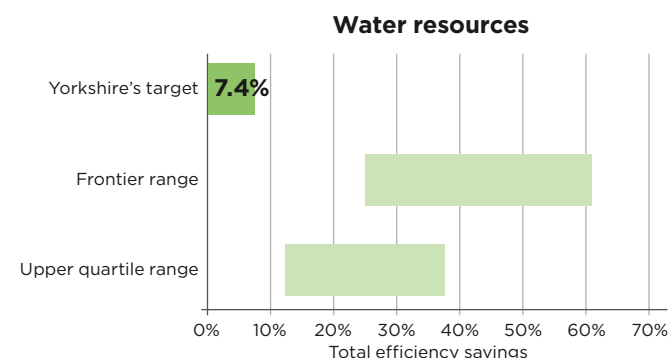


Figure 8d - Efficiency challenge for Water resources.

Water Network plus

The assessment in Water Network Plus has indicated we are one of the best performers in relation to efficient delivery of water services. We continue to challenge ourselves to be sure we are delivering best value for our customers, and we have identified significant scope for further efficiency gains.

This is shown in our efficiency scale (figure 8e) where we are challenging ourselves to deliver the highest level of efficiency identified through our analysis.

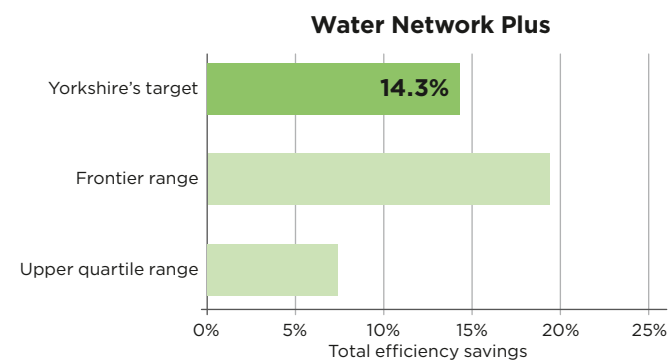


Figure 8e - Efficiency challenge for Water Network Plus.

Wastewater service (combined)

Our combined wastewater service efficiency target is the same as our water service target in that it goes beyond an upper quartile benchmark range and into that based on a frontier benchmark. As with the water service assessment we have considered two ways of combining the Water Network Plus and Bioresources price control and developing an efficiency range for wastewater service, one where price control models are combined and one where the benchmark is assessed at a service level. Our target is a combination of our efficiencies by price controls.

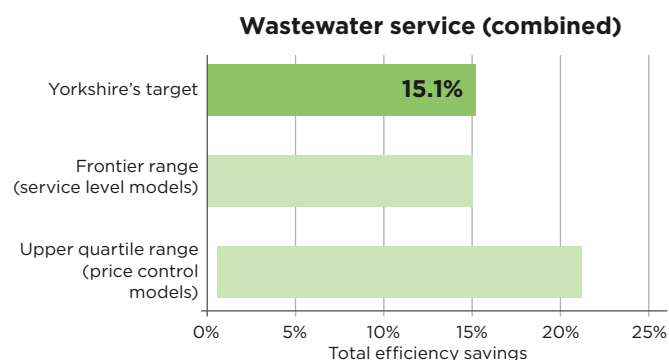


Figure 8f - Efficiency challenge for Wastewater service (combined).

Wastewater Network Plus

Our assessment of Wastewater Network Plus has established a modest efficiency challenge for us to achieve efficient cost levels. Currently it suggests we are delivering our services for an above average level of cost efficiency.

Our Wastewater Network Plus element of this plan challenges us to deliver additional efficiencies to ensure we continue to offer good value for money for our customers. This is shown in our efficiency scale (figure 8g) where our PR19 plan will deliver at the higher level of efficiency identified through our analysis.

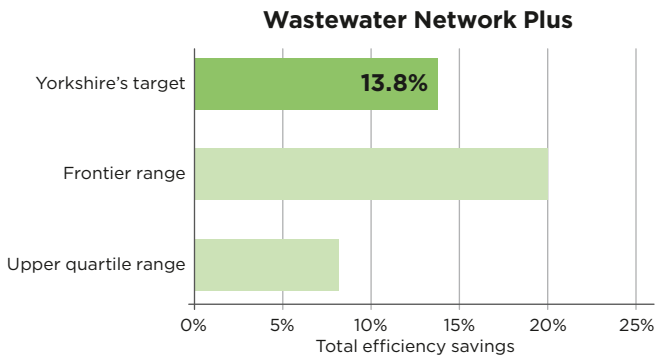


Figure 8g - Efficiency challenge Wastewater Network Plus.

Bioresources

It is clear from the analysis undertaken as part of business plan development, our Bioresources activities are not as efficient as they could be. The modelling has identified a substantial efficiency improvement that can offer better value for money to our customers. The development of our Bioresources plan has fundamentally improved our current delivery model. Through the creation of this price control we realised that markets can help us achieve a more efficient Bioresources price control.

We have addressed the relative inefficiency within the 2020-25 period. It represents a big change in how we deliver our Bioresources activities and the cost of it to our customers. This is shown in our efficiency scale where we are challenging ourselves to deliver the higher level of efficiency identified through our analysis.

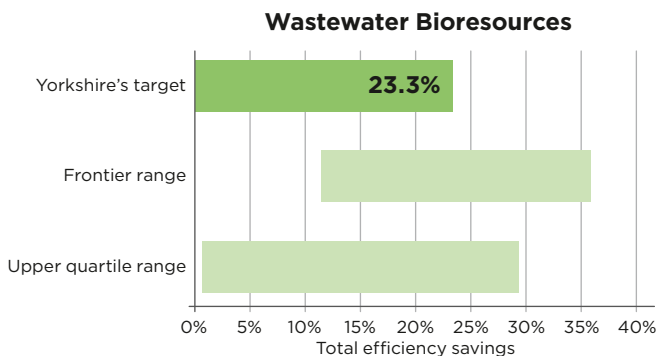


Figure 8h - Efficiency challenge for Bioresources.

Residential Retail efficiency

We set out the detailed assessment we have undertaken in appendix 8b and 8e Residential Retail efficiency. This assessment has shown us that while we are one of the leaders in the industry when it comes to managing the cost of bad debt, we are not a top performer when considering our cost to provide the customer service element of retail costs.

In challenging our efficiency in this area, we have focused on our customer service costs using innovation and digitalisation to drive down costs. This provides the majority of our total efficiency. We are also challenging ourselves on the cost of bad debt. We are efficient relative to other water companies, but we know other industries are performing more efficiently.

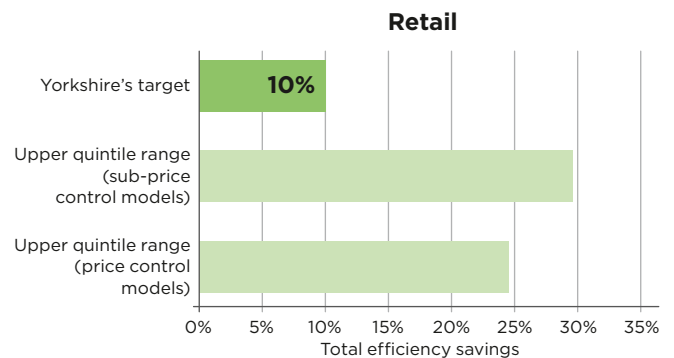


Figure 8i - Efficiency challenge for Residential Retail.

Our efficiency challenge is at the higher end of the scale (figure 8i). The aim is to ensure we are still a leader in retail cost efficiency throughout the 2020-25 period and beyond.

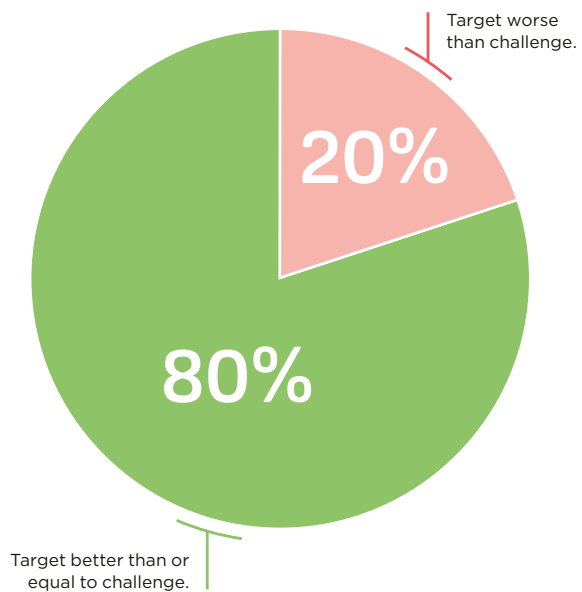


Figure 8j - percentage of retail benchmarking models predicting an upper quintile catch-up challenge greater than Yorkshire's 10% target.

Enhancement expenditure

We have ensured our efficiency challenges apply to our base expenditures and challenged ourselves to deliver our enhancement expenditure as efficiently as possible. This applies to statutory obligations and strategic decisions made in conjunction with our customers. Further details can be found in our enhancement cost appendix 8f.

Water Industry National Environmental Programme (WINEP)

We have included a sizeable WINEP. Our requirements over the period 2020-25 are larger than our previous obligations. This means the investment requirement is larger than previous price control periods which places a significant pressure on our total investment programme and impacts on our customers' bills.

Working with the Environment Agency our historical delivery is over twice as inefficient in comparison to other water companies. We have significantly challenged our plans to ensure cost efficiency in complying with our statutory obligations to make sure that we are offering good value for money for our customers.

Full details on our WINEP and how we have challenged our cost of delivery can be found in appendix 8g. This also sets out our proposed mechanism for dealing with the uncertainty surrounding our environmental programme. The unit cost mechanism will return any unrequired expenditure back to our customers based on the final delivery requirement as set out by our environmental regulators.

Cost adjustment claims

To maintain and build trust we need to demonstrate we are not proposing to charge our customers more than is necessary due to inefficiency in our business. We have considered whether we are required to use the cost adjustment claims process to highlight situations where we may have higher than expected costs due to circumstances out of our control.

We have set out our detailed approach to assessing and developing cost adjustment claims in appendix 8h. This sets out the work undertaken to develop our cost adjustments. Additionally, appendix 8i sets out our evidence of assessment, for which we commissioned Oxera. This work has allowed us to consider whether the cost adjustment claims are appropriate with respect to where we may be overly compensated from other areas of modelling. This is critical to protect our customers by only using cost adjustment claims that are necessary.

Our cost adjustment claims are well evidenced, supported by customers and needed to deliver the services agreed as part of our wider PR19 plan engagement. The claims submitted as part of this plan are well evidenced, robust and crucial to deliver the services we have agreed with our customers.

As part of our early submissions in May we formally submitted five claims set out in table 8a.

Table 8a

Cost adjustment claims, early submission May 2018			
Claims being submitted (May)	Type	Claim reference	Value (£m)
Cellared properties	Regional operating circumstances	WWN+01	150.60
Hull and Haltemprice	Regional operating circumstances	WWN+02	30.00
Growth (wastewater)	Atypically large investment	WWN+04	54.60
Raw water quality	Regional operating circumstances	WN+01	73.50
Leakage	Atypically large investment	WN+02	224.70
		Total	533.40

We provide detailed supporting documents along with the required proforma. We are committed to further developing and evidencing our claims from the submission date. Based on this further evidence, development and through consideration of the 'in the round' work by Oxera, table 8b contains our final claims which we are submitting as part of our business plan. Further details of the claims can be found in the Wastewater Network Plus and Bioresources price controls and the appendices in the table below.

Table 8b

Cost adjustment claims September 2018				
Claims being submitted (September)	Type	Claim reference	Value (£m)	Specific appendix
Cellared properties	Regional operating circumstances	WWN+01	105.93	Appendix 8k: Cellared properties
Growth (wastewater)	Atypically large investment	WWN+04	55.31	Appendix 8l: Growth (wastewater)
Bioresources enhancement	Atypically large investment	BIO01	60.36	Appendix 8m: Bioresources enhancement
		Total	221.6	Appendix 8h: Approach to cost adjustment claims

In summary

The approach set out in this chapter has allowed us to challenge ourselves to present an ambitious plan that is affordable for our customers and is efficient considering the wider economy best practice. Benchmarking has ensured we are delivering an extensive change in efficiency and supporting our aspiration to achieve upper quartile efficiency in all price controls.

In summary our plan aims to deliver the following efficiencies when compared 2015-20 costs.

Table 8c

Planned efficiency by price control		
Price control	Percentage efficiency	Efficiency (£m)
Water Resources	7%	18
Water Network Plus	14%	308
Wastewater Network Plus	14%	403
Bioresources	23%	114
Residential Retail	10%	30



The Decision Making Framework

Most of our customers cannot choose their water company so they, rightly, have high expectations of us. We know that affordability is a key concern for our customers, so we must ensure that our plan is cost efficient, and part of being cost efficient is being able to demonstrate that we are making the right decisions about where and how we spend customers' money to improve service, improve our impact on Yorkshire's people and environment, and remain resilient.

We believe that our PR19 plan is efficient because we have made the right decisions. The use of markets, effective procurement, data and technology supports cost efficiency. Alongside these elements, the decisions we make about how we look after our equipment and pipe networks (our assets) also need to be demonstrably efficient to meet our customers' priorities.

An efficient plan is not just about delivering our activities as efficiently as possible in a year or even the five-year period. To ensure we are making the best overall decisions, the whole life cost associated with any investment needs to be considered as well as any wider benefit a solution may have on society. The work we have done to understand our impact on Yorkshire's people and environment, measured through the six capitals, allows us to understand this in a far more meaningful way and attribute monetary value to wider benefits.

To make sure that we deliver the best overall value for our customers, we have refreshed our approach to making decisions and introduced our Decision Making Framework (DMF). This innovative set of processes and tools means that we make the most efficient expenditure decisions to deliver service and benefit to customers.

Our previous tool LEADA+ (Leading Edge Asset Decisions Analysis) was developed 15 years ago. It helped us decide where to spend our capital investment and enabled a common approach to assessing benefit. At the time, it was at the forefront of efficient decision-making and shaped the UKWIR Capital Maintenance Planning Common Framework. It helped us to become one of the most efficient water utility companies in the UK.

LEADA+ underwent some enhancements in subsequent years, but developments in best practice and the move to a totex and outcomes-based approach meant a new tool and approach was required to ensure we were making the most beneficial and cost-effective decisions.

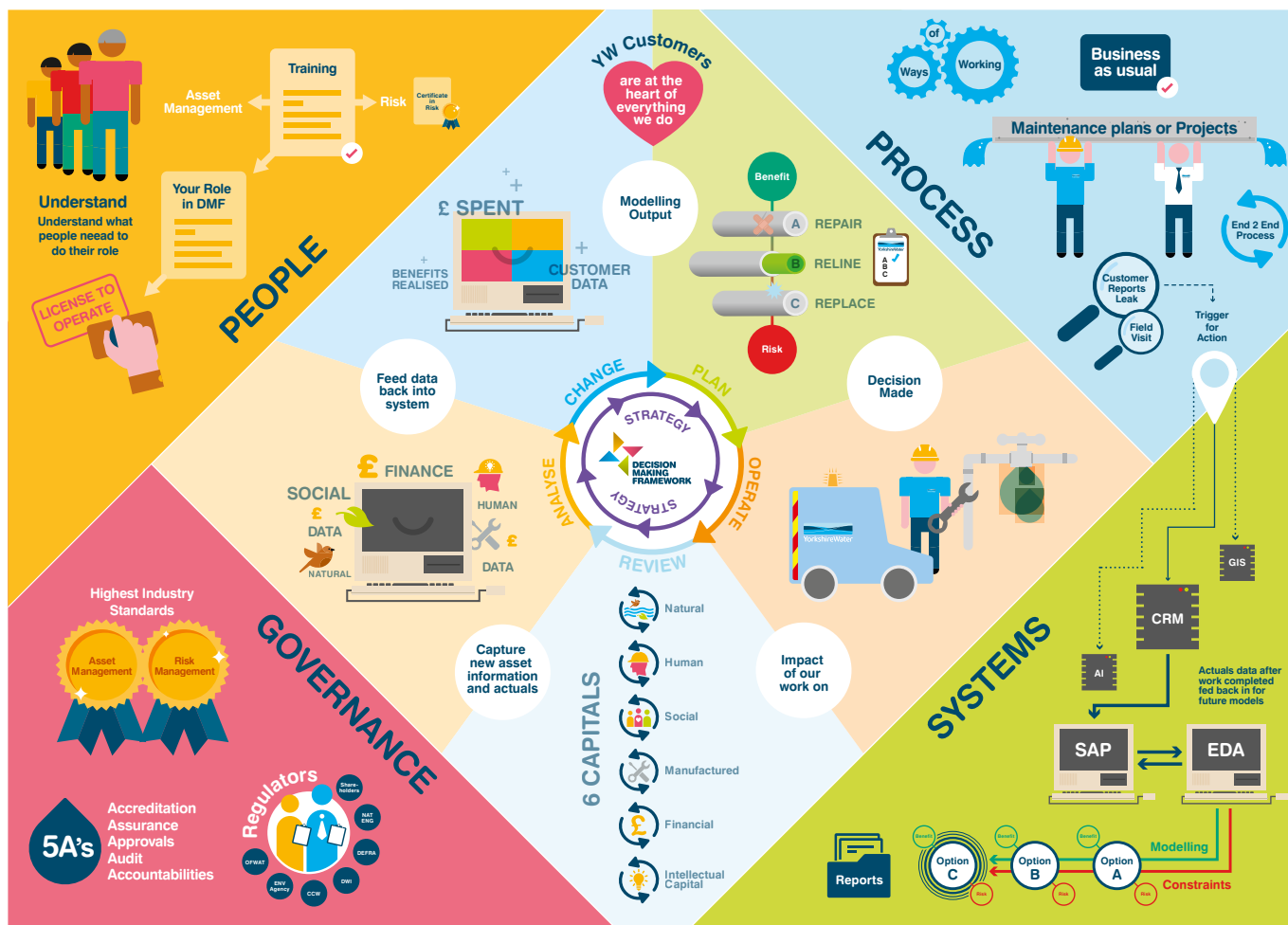


Figure 9a - DMF four key elements and process relationship.

The DMF is our response to these new challenges. It is a substantial enhancement to the underpinning principles of our LEADA+ approach to decision making. As well as informing our PR19 plan, it will be embedded as an asset management process to help us make day-to-day decisions. There are four key elements to the DMF, all are equally important. Figure 9a shows how the four key areas integrate into an overall process:

- 1. Systems** – this is the platform our modelling, optimisation, reporting and visualisation is carried out on. We have purchased the Enterprise Decision Analytics (EDA) tool and introduced some bespoke developments to meet our requirements.
- 2. Process** – we are introducing a new end-to-end asset management process to deliver our investment programmes. We have teams with clearly defined roles and responsibilities within the decision-making process.
- 3. People** – we understand what training and competence is required to work with and within the system. This assures data quality and consistency in our risk application.
- 4. Governance** – the process sets out the key governance points within the framework, understanding the levels of assurance, and approval for key decisions to be made.

We created a video to bring to life the changes made as part of our DMF. It highlights a world leading approach to the application of the six capitals across all schemes within a portfolio, rather than specific 'one off' scheme considerations. **The video is available here.**

Throughout the development of the DMF we have worked with the Yorkshire Forum for Water Customers (the Forum) to discuss the concept of it, progress in its development, the use of capitals and the outputs of the system in the form of our PR19 plan. The Forum has supported us in this process by challenging how the capitals are captured and how we explain the DMF system in our plan.

Deriving the underpinning valuations formed part of our overall market research activity detailed in appendix 5a. Underpinning the DMF is our Service Measure and Valuation Framework. This identifies the reasons we need to invest and the value of doing so. It allows us to link expenditure to service and understand the benefits of our programme at a much more detailed level. The benefits are measured and valued according to the different service impacts on natural, social, human, financial and manufactured capitals. The following figure (Figure 9b) shows an example of how a service measure translates to a benefit impact.

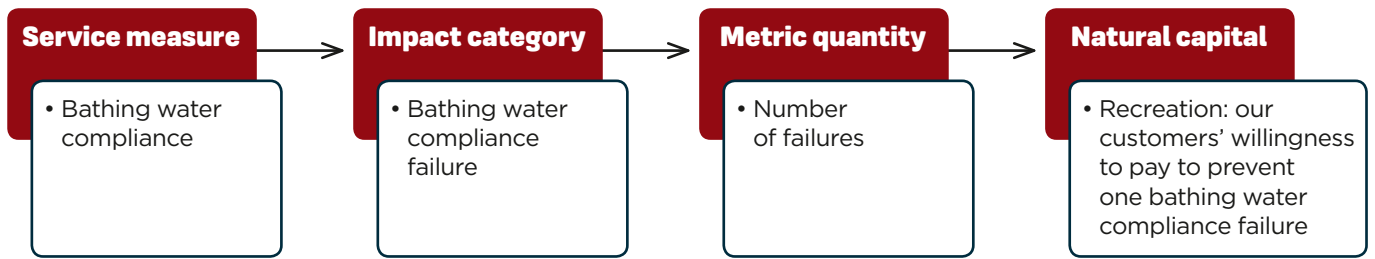


Figure 9b - Service to benefit relationship.

We used a combination of benefits transfer (this means using available, relevant information from existing studies and adjusting where necessary), desk-based study and primary research to identify and estimate monetary values for the benefits of the capitals. Additionally, different economic valuation approaches were used to gauge values. This includes price or cost approaches (using market price as a proxy for economic value), revealed preference valuation and stated preference valuation.

Where we use benefits transfer, we assess whether the source of relevant monetary values for the benefits under the capitals are robust, valid and appropriate.

The following criteria is used:

- Context of the study - the area of interest of the study needs to mirror what we are interested in and relate to the service measures and impacts in the Service Measures Framework, for example, value of recreation in a river due to changing river quality.
- Date of original study - the older the study, the more likely that the values estimated are no longer appropriate. For example, changing consumer expectations or incomes.
- Area of original study - values estimated from a study done in or closer to the Yorkshire region will be more

appropriate compared to values from a study carried out in another country.

- Information included in the study - we can make better judgements on the quality of the study and its results if there is enough information on the method(s) and assumptions used and if there is evidence on validation and testing of outputs.
- Method used - studies that have been done repeatedly using the same method are more likely to produce consistent results.
- Official sources - studies considered as official sources of data, for example UK government carbon cost values are preferred. These studies are more likely to have undergone a rigorous assurance process.

An internal study was undertaken to calculate monetary values under the financial and manufactured capitals. These values relate to our internal costs (or avoided costs) due to the consequence of a deterioration (or improvement) in service. Our data has been used to estimate these monetary values, but external sources have also been used where we have data gaps, using the same criteria as in the benefits transfer above.

We have embedded the elements of this enhanced benefit valuation approach in our PR19 plan. See Figure 9c below.

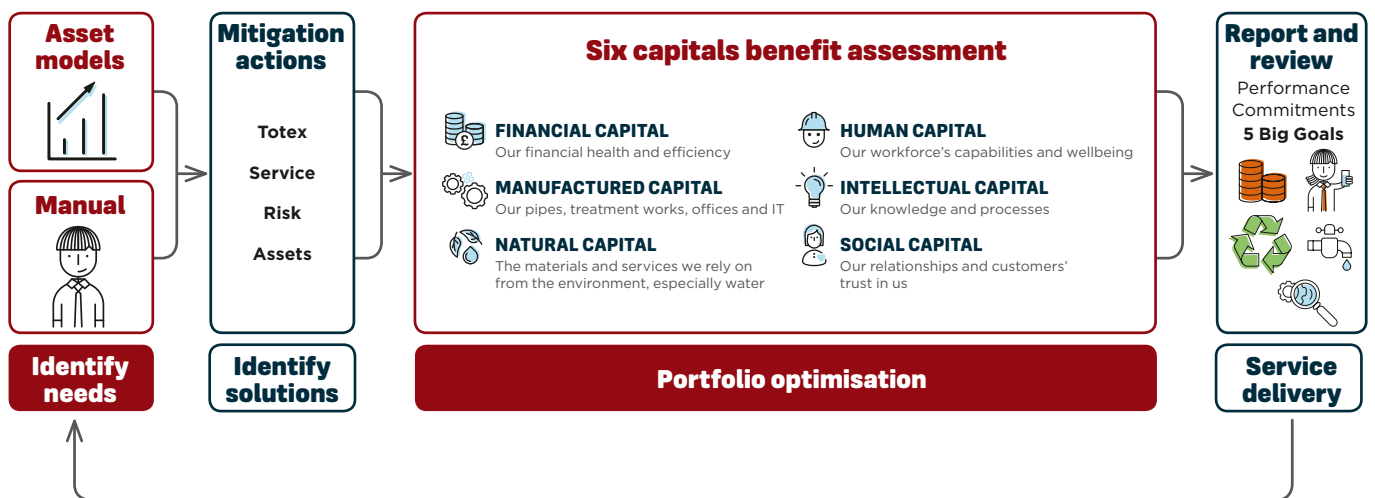


Figure 9c - Application of six capitals in business planning.

The section of the Figure 9c above titled 'Portfolio Optimisation' is the application of annuitised costs and benefits aligned to the HM Treasury Green Book, and the Ofwat recommended Spackman approach to annuitising and discounting. This ensures the maximum net benefit is derived for the service objectives set by our customers.

We have two approaches to assessing needs. Our primary approach is to use asset models, but where this is not possible or appropriate, we undertake targeted investigations.

Step 1 – Assessing needs

Before we can identify the most efficient way of spending money to achieve best benefit for our customers, we need to develop an understanding of the risks to service (known as needs) that exist across our business. For our business planning approach, we completed a comprehensive assessment of all the areas of risk and opportunities that exist in the business (needs) and mapped them to our service measure and valuation framework.

We have developed a common set of steps to calculate the expected service impact of a need. This is demonstrated in Figure 9d below and highlights how our risk-based approach also aligns to four components of infrastructure resilience as defined in the Cabinet Office publication - Keeping the Country Running: Natural Hazards and Infrastructure.

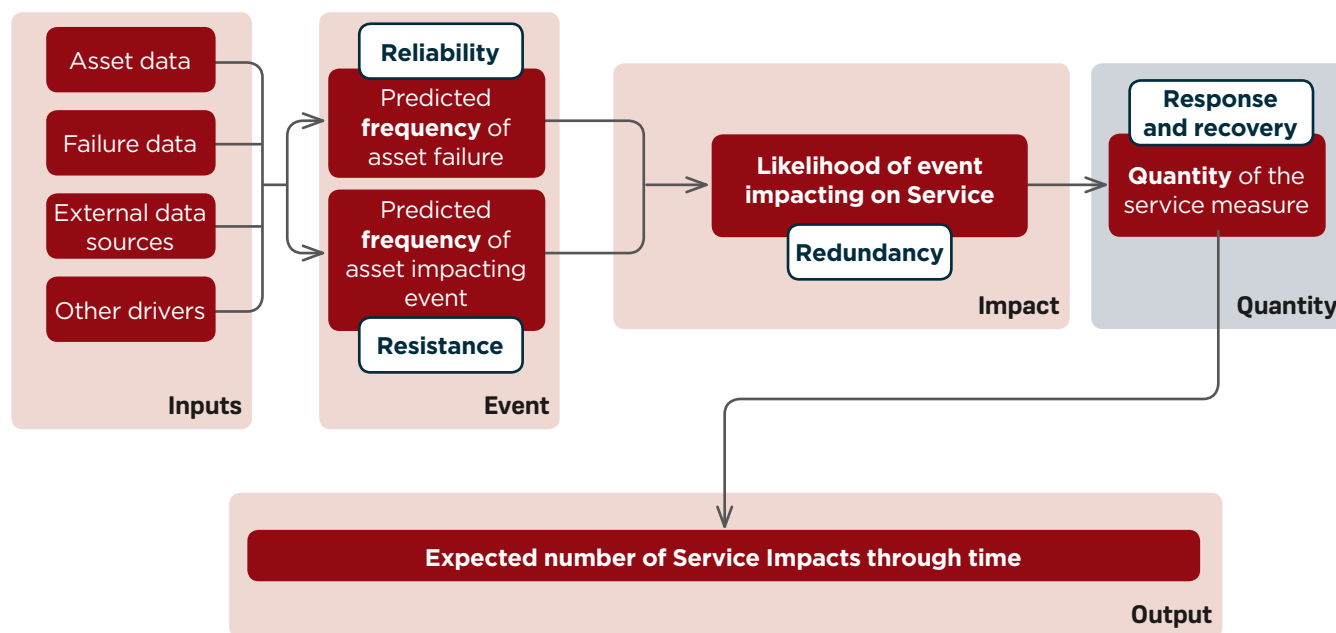


Figure 9d - Approach to assessing service impact in the DMF.

Step 1a – Assessing need using asset models

Our asset base is extensive and much of it is underground. It is not practical to individually investigate and assess every asset. To understand the risks of asset failure, we have developed a suite of asset models to predict asset deterioration and its service impact.

We have three key models which follow the approach shown in Figure 9d above:

- An above ground model to focus on mechanical, electrical and civil assets across our business. For example, water and wastewater treatment works, pumping stations, service reservoirs, storm tanks and mechanical sewer overflows.
- A water infrastructure model to assess the risk of bursts on our water network.
- A wastewater infrastructure model to predict collapses and blockages across our sewer network.

Step 1b – Assessing need using targeted investigations (manual)

Not all risks to service are due to asset deterioration and can be modelled. For some assets, a complex modelling approach is not appropriate. Where this is the case, we generate needs from a series of targeted investigations to ensure we have a complete understanding of our risks and opportunities in the future. Some of the investigations completed include:

- Needs that require complex solutions where we have completed detailed investigations.
- New quality drivers.
- Other statutory investments, such as reservoir safety and security.
- Ongoing annual investments, such as maintenance of our manholes and hydrants.
- Investment in IT hardware and software.

The service impact of identified needs is assessed following the same approach as those identified through asset modelling, providing a consistent comparison.

Step 2 – Assess and cost solution options modelling

The next stage for both modelled and investigated needs is to assess the potential solution options to address them. When assessing solutions, we consider the following:

- What potential solution options are there? (Is a capital solution required? Can the risk be operationally mitigated? Are there any new innovative approaches that may address the risk at a lower cost?)
- What impact does the solution have on the risk identified in the need? (Are there any secondary risks or benefits created by the solution?)
- What does the solution cost?

Accurate and efficient costs of addressing each need are crucial to identify the best option for customers. We use modelling to estimate a variety of costs, in our decision making, including capital interventions and operational and carbon costs.

Capital cost models

Our capital costs are based on the outturn cost of assets procured during 2010-18 and are reflective of the capital efficiencies we are delivering in the current period.

Whenever a scheme is completed, the actual observed cost information is used to create historical cost models for activities undertaken. Taking actual observed costs ensures we only allow for the costs likely to occur. We do not build in any overestimates by assessing scheme risk separately. By doing this, we are modelling the efficient and effective delivery processes and materials used.

Historical cost data has been captured for over 20 years, leading to a unit cost model set developed and used by trained experts within the business and by our consultants. Our modelling philosophy is to use as much recent data as possible, with a maximum age limit of seven years, with exceptions being made where particular models lack data or where data comes from very large assets that are delivered infrequently.

The unit cost model data set has been used wherever feasible to cost the plan, to ensure that current efficiencies are embedded in our cost estimates for the business plan.

Opex cost models

Operating cost estimates have also been based on actual costs reflecting the real efficiencies we have delivered to date. These models have been developed in-house and reflect the efficient operational expenditure (for example maintenance, energy and chemicals) associated with running our assets.

Carbon cost models

We use modelling to understand the carbon impact of our investment. Embodied carbon models are developed in a similar way to our capital costs. The observed assets are delivered, measuring the embodied carbon associated with their material, construction and installation. We assess operational carbon by linking the operational costs to unit rates of carbon impact.

The output of this approach is the ability to link totex and carbon costs directly to the service benefit they achieve.

Step 3 – Complete cost benefit analysis

Once we have understood our risks to service, identified our potential interventions and estimated efficient costs, we assess whether the solutions are viable. This is where our industry leading approach to benefits valuation, described below, comes in to its own.

We have mapped each service measure against the six capitals framework. We identify which are likely to be impacted with a unit change in service, using a variety of techniques to identify the unit value of this change.

This approach means we carry out an assessment of our whole programme against the six capitals rather than just individual schemes.






Capital		Example Valuations
Natural		Crops and livestock Global climate Air quality recreation
Social		Physical activity Quality of place Trust
Human		Employment Health & Safety Local economy
Intellectual		Skills Intellectual property
Financial and Manufactured		Delivery costs Private costs of failure Private benefits / income

Figure 9e – Benefits valuation - the six capitals approach.

We identify where our service measures can have an impact on one or more of the capitals shown in Figure 9e. We obtain a value for a unit change in service for each of these mappings. Much of our valuation work comes directly from customers and is described in chapter 5.

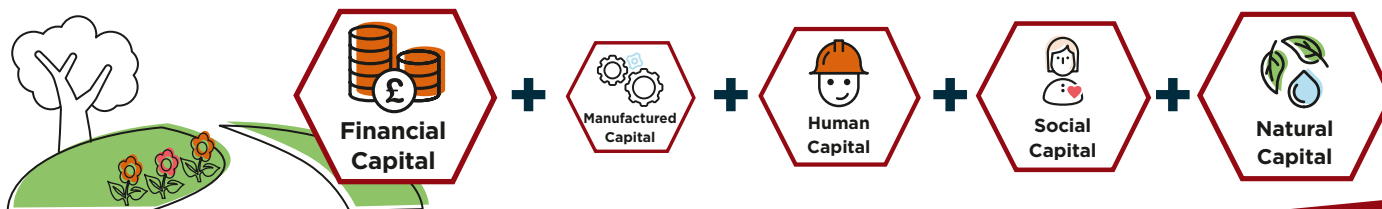
Using this valuation work, we can understand, against each capital, the benefit of an improvement in a service position. By understanding the costs and monetised benefits, we can calculate the net-benefit of a given scheme or programme.

The diagram below (figure 9f) shows the difference in capital between an engineering led and environmental solution to address a flooding problem. It conveys additional benefit of investment in the resilient sustainable option, when all the wider benefits to natural, social and human capital are included in the valuation, the pipe could be constructed larger or a sustainable drainage systems (SuDS) solution could be used.

Assigning Benefits



Assigning Benefits



Increasing Resilience

Figure 9f - Benefits valuation for addressing a flooding problem.

Step 4 - Optimisation and creating our plan

The efficient operation of our business is about understanding the best way to target resources to achieve the service levels customers want and value. It meets our statutory and environmental obligations. It does not address every risk we have.

The preceding steps allow each solution option to be assessed using a common currency and net benefit to be calculated over time. We have used these valuations to inform high level decisions.

We use our portfolio model to identify the optimal combination of solutions. We set goals and boundaries on the portfolio, such as certain service targets, or affordability constraints. Our tools allow us to visualise the outputs of multiple scenarios with varying constraints to enable our governance groups to make informed decisions on what to include in our plan.

We have run over 10,000 optimisation simulations covering our entire asset base to explore a vast range of future scenarios. This has pushed the boundaries of cloud-based computing and provided insights about our past and future like never before. These simulations ensure our plans are resilient to future asset risk and place long-term sustainability at the heart of our investment decisions.

We know how an investment decision impacts service directly. We also know the impact of not investing money elsewhere, through holistically embracing the totex approach regionally. This ensures we are not making inefficient decisions at a programme level.

We will continually challenge the outputs of the DMF, monitoring its accuracy and refining models as more data is provided.

Uncertainty analysis for cost and service ensures we can achieve our plans.

The DMF – business as usual

Informing our PR19 plan is just the first stage of the DMF. It is the wider change management project which will impact on all levels of our future decision making. We are reworking our processes, governance and training to incorporate the DMF approach into current decision making, ensuring the six capitals are considered in everything we do.

This is an innovative approach. It is leading in the industry and allows us to make decisions that efficiently achieve what our customers want and need.



The six capitals, innovation and transformation

Our evolving business

The concept of the six capitals is emerging thinking and is a technology adopted by forward thinking organisations that understand that the long term resilience and sustainability of an organisation depends not only on the financial balance sheet, but also on the skills of its people (human capital), the value placed on it by society (societal capital), and its dependence and impact on the environment (natural capital). Also, in the current climate of rapid technological change and developing societal expectations, resilience and sustainability also depends on the ability to innovate (intellectual capital). We believe that being able to measure our impact on Yorkshire and our internal strengths across the capitals makes sure that we are continually improving our impact and assessing our ability to deliver the best for Yorkshire, resiliently and into the long term.



FINANCIAL CAPITAL

Our financial health and efficiency



MANUFACTURED CAPITAL

Our pipes, treatment works, offices and IT



NATURAL CAPITAL

The materials and services we rely on from the environment, especially water



HUMAN CAPITAL

Our workforce's capabilities and wellbeing



INTELLECTUAL CAPITAL

Our knowledge and processes



SOCIAL CAPITAL

Our relationships and customers' trust in us

Figure 10a – The six capitals.

The six capitals

We are working to embed sustainable accounting across our business, quantifying the natural, social, human impact of projects and decisions alongside financial assessments.

These are:

Human

- We are developing new skills in customer participation. We are investing in ways to motivate and reward our colleagues and are developing a culture of continuous improvement, innovation and learning. We are ensuring our safety and the safety of others always comes first.

Intellectual

- We are using a range of methods and tools to ensure we are making the right decisions and are monitoring our results. For example, by making the most of: data, digital technology and analysis, new and improved processes, business intelligence tools (SAP), expert partners, catchment management projects, our new Design Making Framework, markets modelling and our impact assessment.

Manufactured

- When we need manufactured capital we will do it at the most efficient cost. Operating safely, maintaining in a data led way and ensuring resilience.

Social

- We deliver the best service to all communities based on use of data and analysis to ensure that we know our customers. This involves engaging with communities to communicate about how water affects them, their lifestyles, the environment and society. We will use our land and assets to create additional societal benefits for the communities we serve.

Natural

- We are working with communities and stakeholders to use innovation to use less water and reduce waste through demand management solutions. We are investing to protect and restore Yorkshire's land and water environment to secure the affordability and resilience of water and wastewater services.

Financial

- We are measuring and ensuring we are financially resilient by managing risk and continuing to create efficiency in all our business processes.

We are embedding the concept of the six capitals into our short and long-term business planning to help ensure the affordability and resilience of our essential public services for current and future generations. The six capitals approach is critical to our success and is aligned with our 5 Big Goals.

The effective management of the six capitals ensures the resilience of our business now and in the long term.

Our contribution to Yorkshire: Total Impact and Value Assessment

Total Impact and Valuation Assessment (TIVA) enhances our understanding of our impact on customers and the environment, both positively and negatively (see appendix 10a). We are using a mix of accounting, economic and sustainability techniques to quantify our impact throughout our value chain, and where sensible, put a monetary value on the impact across the six capitals. This innovative approach is providing a broader view of the risks to our services and the value we create for society. It is also highlighting opportunities to enhance our impact and value, and the trade-offs that need to be considered when making decisions. We are using this fresh insight to shape our current approach and future strategy to ensure our services are resilient and we are maximising our potential contribution to society, the economy and the environment. (see www.yorkshirewater.com/capitals).

Innovation

Innovation is vital for us to meet the expectations of our customers, stakeholders and regulators and deliver the best results for Yorkshire's people and environment. Through fostering a culture that challenges established practice and seeks better ways of doing things, we will deliver the service our customers want at a price they find affordable, while protecting and enhancing the environment.

We are an efficient company, delivering some of the lowest prices in the sector. In our ongoing conversations with our customers, they tell us that we need to improve our service in some areas. Our plan to improve performance in key service areas by 2021 is a first step and will be furthered by our ambitious targets, in areas such as leakage and internal sewer flooding, in our PR19 plan. Innovation has a key role to play in the transformation of our business. We want transformation to become business as usual.

This chapter explains how transformation and innovation will help us deliver great customer service at an affordable price. Innovation is embedded throughout our business, so examples of past success and future plans are demonstrated throughout our PR19 plan.

Strategy

Our strategy for innovation is driven by the expectations of our customers, stakeholders and regulators as well as our own ambition. It is underpinned by strong design and governance principles for data, process and technology. Our ability to improve in a controlled and sustainable way is enabled through lean and continuous improvement methodologies and business process management (BPM) practices. Through these strong foundations, performance risks and opportunities are identified and prioritised. Innovation is targeted through:

- Cultural innovation.
- Supply chain innovation.
- Research and development (R&D) innovation.

Cultural innovation

Our colleagues are committed to delivering great service. We have a culture of innovation which allows people to be creative and collaborative, making positive changes in how we deliver our services and the impact we have on the people, environment and economy of Yorkshire. It is the day-to-day process of continuous improvement and is strongly aligned to our BPM capability. It also demonstrates the effectiveness of our partners and their drive to share innovations with us to instigate change. Our business processes are designed to enable people to identify opportunities for innovation.

Case Study: Colleague driven UAV use

The innovative thinking and skills of two of our colleagues has increased our ability to operate safely and efficiently. Unmanned aerial vehicles (UAV), or drones, are emerging as tools to capture images to inform many diverse aspects of our asset management and operational practices. Inspections in dangerous or confined environments can be carried out by drones rather than people, reducing exposure risk and cost.

Two of our colleagues, who are registered UAV pilots, have stimulated the development of our in-house capability, broadening the way we use drones using their personal experience. Forming a governance group, their energy and enthusiasm has greatly furthered our UAV inspection capability and use.

Supply chain innovation

We know that collaboration in innovation is critical because we do not have all the answers to the challenges we face. If a risk or opportunity cannot be mitigated or realised through process change, we look to collaborate with the supply chain. Our approach is two-way, incentivising partners and suppliers to offer innovative solutions, and relies on our ability to clearly communicate our needs.

Case Study: Development of specialist leakage detection kit

Working with us, JD7 – a specialist pipeline inspection company – has delivered a novel camera system which incorporates a hydrophone and sonde for detecting leaks which would be very difficult to detect and locate using traditional techniques.

With JD7, we have had great success using the new camera system by establishing specialist 'Camera Teams'. The expected benefits are currently being quantified, but initial results have indicated the accelerated resolution of long standing issues in the distribution network with reduced leakage volumes. In the first phase of deployment in Sheffield City Centre and Belton, Doncaster, 0.45Ml/d of difficult to locate leakage was stopped.

Case Study: Sustainable futures programme – multi beneficial solutions

Our raw water stocks are affected by soil runoff and pesticide contamination of rivers from some arable farming practices. Our Sustainable Futures programme has engaged 199 farmers, and their direct supply chain in North Yorkshire, to adapt their techniques to protect soil health. By following the programme, farmers are better off, the supply chain can track produce farmed in favour of the environment and our customers benefit because our water quality is better. This reduces the need for costly treatment techniques.

Research & Development (R&D) innovation

R&D innovation helps us to fill gaps in knowledge, services and products which cannot be provided through the supply chain or process change. We primarily focus on smaller numbers of significant high-value projects to drive transformational change, and balance this with a programme delivering incremental benefit.

R&D innovation is measured through a series of metrics. Return on investment (ROI) forecasts anticipate what could be delivered with successful implementation, whilst Forecast Spend Profile ensures the supply chain of projects is affordable. We target an 800% ROI, so for every £1 invested we return £8 in benefit.

We also consider the level of grant funding and seek to work collaboratively to encourage further ambition and balance risk exposure.

Case Study: Reimagining waste into value

At Esholt wastewater treatment works (WwTW), following a £44 million investment to meet tightened river water quality standards, 13 hectares of percolating filter beds containing 500,000 tonnes of filter bed media (gravel and blast furnace slag) were made redundant. This left us with a potential £20 million cost to demolish the redundant beds, dispose of the 'waste' filter bed media and prepare the land for redevelopment. This high cost meant that redevelopment, releasing the benefit to customers and broader society, would not proceed.

An R&D innovation programme of material testing and environmental impact assessment established a process to recover the filter bed media, enabling it to be given 'product' status. In 2015, work commenced to recover and process the filter bed media into construction grade aggregate for sale to third parties or use in our construction. 25,000 tonnes were used in the construction of the Apperley Bridge Railway Station, adjacent to Esholt WwTW. This material was processed, transported and used in the station construction without a lorry hitting the highway.

Once completed, the remaining footprint will be prepared for brownfield redevelopment. This is part of our larger ambition to make the Esholt site one of the most sustainable in the world and an internationally leading demonstration of the circular economy in practice.

The project cost £50,000. It has avoided £20 million in remediation cost and generated revenues of £3 million. Early indications from the West Yorkshire Combined Authority suggest that Gross Value Added (GVA) of several hundreds of millions of pounds a year will be realised in the local economy.

By reimagining what is considered waste, we have enabled the delivery of 500,000 tonnes of aggregate into the local economy from a redundant asset and released land for development, stimulating job creation and GVA, which helps to keep bills low.

Strong foundations

Innovation thrives where big challenges and a desire to explore new areas exists. One way that we engender this environment is through setting aspirational targets to encourage innovative thinking. This is established practice, for example in a previous initiative called our Z³S.

Case Study: Z³S initiative - zero interruptions to customer supplies

Our Z³S initiative in the 2005-10 period challenged colleagues and partners working across water distribution to deliver zero interruptions to customer supplies, among other measures.

While the zero targets were never likely to be achieved, significant performance improvement was delivered. Customer interruptions reduced from 700,000 properties to 160,000 properties over a three-year period and numerous innovations were introduced to the sector, such as Through Bore Hydrants, Stop Tap Adaptors and Whirlwind by Air.

We were proud of this performance improvement but through our customer engagement we better understand the varying impact that supply interruptions have on differing customer groups, so we are now aiming for leading performance in our water supply interruptions performance commitment.

Innovation is not just about products and technology, it relates to the way we work. To better enable innovation, we have refined our platform of simple, standard and efficient processes with trusted data flowing through them. This platform enables us to easily identify gaps in processes and introduce innovation in a more controlled and sustainable manner, delivering ever greater service to our customers.

Case Study: SAP S/4 HANA, an industry first

Our Integrated Customer and Operations Management programme employed innovative systems to deliver sector leading service to our customers. In 2019, the re-implementation of our core SAP solution will see further enhancements focused on how we engage with and manage our assets.

We will become the first UK utility company to implement the SAP S/4 HANA solution to manage several core background processes, including asset management, work management, health and safety, procurement, human resources and finance, all in a real-time and integrated way. By employing new and improved data and process governance tools we anticipate a sustainable improvement in asset performance; enabling new maintenance practices, significantly reducing maintenance costs and improving asset reliability.

The efficiency gains will enable us to improve our service in key areas while keeping bills affordable for our customers.

A key initiative in the current period has been to improve the BPM capability of teams across our business, an approach recognised as a cornerstone of continuous improvement and sustainable innovation. Aligned to parallel initiatives to improve the integrity and governance of the data which flows through our business processes, we are delivering a step change improvement in our decision-making capabilities. We are creating the conditions and governance frameworks by which processes can be continuously and sustainably improved through the application of technology, innovation and controlled change. This means that we can deliver the service that customers expect and want at a price they find affordable.

Case Study: Engineering Reliability

By embracing the BPM philosophy, our engineering reliability colleagues have significantly improved their process understanding and management, reducing waste, unlocking constraints and significantly improving asset repair and maintenance services to their internal customers.

Their success has provided the evidence to support a case for further investment in this essential process. As part of the integrated plan to drive upper quartile performance, better process management will be used to support the ongoing reduction of working backlogs and sustain that reduced backlog in the future. Work baskets for reactive repairs (jobs needing to be completed) have been driven down from 8,000 to 6,000 in the last three months, enabled in part by work management process and productivity improvements, which have seen a 30% increase in the job completion rate. This means that process improvements have enabled efficiencies that help us remain good value for money.

Data and technology

Data and technology play a fundamental role in helping us deliver and improve. We are embedding digital capability across the business to help connect us with our customers, suppliers, partners, stakeholders and colleagues, create greater collaboration opportunities, improve transparency and deliver a platform for participation. This allows us to exploit new technology, share trusted and valuable information quickly, manage our risks, improve our decision making, drive value and deliver excellent service to customers.

Creating a connected business requires us all to learn new skills and operate in different ways, evolving our business processes and the quality of data that flows through them.

We are adopting an open data first policy to collaborate with others and unlock innovation. Insight from others helps us better understand our own performance and stimulates new opportunities to create customer value from data.

Our IT has evolved into a variety of bespoke solutions. Despite serving us well, these solutions no longer support our need to make more integrated decisions supported by real-time data. We are rationalising our technology landscape, replacing bespoke applications with modern integrated solutions, and are becoming more agile in our response to changing business requirements.

Our delivery capability is accelerating, supported by our digital factory. This team comprises technology and business colleagues focused solely on the agile development and deployment of digital solutions to create value for customers.

Delivering technology solutions at different speeds is a relatively new concept for us and requires a new operating model. This operating model will be in place by the end of the 2015-20 period and reflect the need to maintain and develop different layers of technology at different pace. In this way, we will create stable platforms upon which our core business processes will operate and will quickly spin-up new and exciting applications to differentiate our service, care for our assets, reduce costs and engage our customers.

Case Study: Digital technology and data in customer engagement

Recent examples of using digital channels to engage in a different way and deploy solutions quickly include new real-time Web Chat capabilities and Call-Back options within 10-minute appointment slots, specified by the customer. These capabilities are being used by customers and helped us sustain and enhance the customer experience during the recent 'Beast from the East' adverse weather conditions. During the 2015 Boxing Day floods, which affected large areas of Yorkshire, we employed an earlier iteration of this digital capability to support the emergency services and local authorities in proactively targeting and contacting residents in the affected areas, providing essential personal safety information.

People and culture

Colleagues and partners are encouraged to collaborate. We use water industry networks and seek insight from academics, entrepreneurs, customers and other sectors. This approach is business as usual and has helped us develop a core skill of learning from others and integrating innovation into the sector.

Case Study: The origins of our 'fats to fuel' recycling project

Sewer Network Protection colleagues identified a risk to our sewerage network in the Low Moor area of Bradford despite significant investment. The deteriorated sewer network was impacting customers and the environment through flooding and pollution; however, the issue was compounded by disproportionately high levels of fats oils and greases (FOG) disposed to sewer. The risk was that despite the investment, blockages would continue unless customer habits changed.

Driven by our Sewer Network Protection colleagues and working in partnership with Living Fuels, Bradford Council and the Karmand Community Centre, we carried out a trial of domestic waste oil collection. Each household was supplied with a FOG collection vessel, which was collected and taken to the Karmand Centre for deposit and cleaning. Living Fuels collected the FOG from the Karmand Community Centre for use at their energy generation facility.

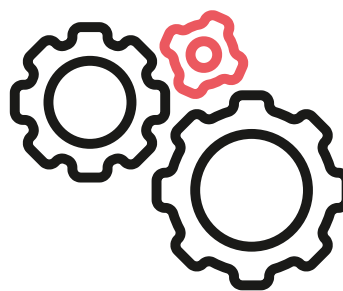
The project has already reduced the need for intervention in the sewer and is now entering a new phase. We are including restaurants in the scheme to establish a self-sustaining commercial model, with the aim of rolling it out to other areas of Yorkshire. The successful implementation of this initiative will result in more efficient and sustainable use of our existing sewer networks, leading to lower bills for customers.

We have a colleague recognition process that rewards positive behaviour and innovation. People leaders are empowered to recognise colleague performance, endeavour and behaviour through regular and meaningful contact.

Collaboration and internal communication are supported by Yammer and other Office365 applications. Launched across the business in 2017 under the Digital Workplace initiative, these applications are being harnessed to provide a digital platform for ideas to be shared, developed and recognised.

We have an established team hub approach implemented across the business. The performance hubs follow a set process with a clear, standard agenda focused on continuous improvement.

We always seek to think differently about how we resource our business and how we attract talent from the widest pools to ensure diversity of thought and that we reflect our customer base. Our Talent City programme is a prime example of this.



Case Study: Talent City programme

Our Talent City programme is run in partnership with the Lighthouse Futures Trust. We want to challenge the low proportion of adults with an autistic spectrum condition who gain paid employment. To address this, we have developed a disability internship programme where students work across the business and have access to a trained job coach to support them. We are now in our second year and a number of our first-year interns are now in paid employment within the organisation. **Find out more about our Talent City internships by clicking here**

Creating benefit for customers

The benefits of innovation are only realised on implementation. Successful implementation requires a deep understanding and control of business processes. Our recent focus on strengthening our foundations for data and processes has created the platform for guided and controlled change management, through which sustained improvements can be delivered.

We have improved our engineering capability through recruitment. Our technical groups, set up to maintain and improve asset and engineering standards, are using this resource to ensure that new implemented technologies align with or inform asset and engineering standards. Using these standards as a baseline, joint delivery teams collaborate to consider alternative technologies and delivery mechanisms.

Case Study: Implementation of engineering design standards

By challenging established engineering norms and standards, we have secured over £50 million in efficiencies through the redesign of activated sludge infrastructure, from an innovation investment of just £250,000. Engineering design standards have been engrained within asset delivery for decades. The industry has typically adopted the GPSX system, using well established and trusted metrics. Partnering with a small, agile and expert user of a different model, Biowin, we have reduced tank dimensions and the need for aeration capacity. This has resulted in continued reduction in cost and the need for construction materials and footprint. The process changes were completed in the 2010-15 period, with benefits realised into the current period. Process changes of this scale and impact often take many years of controlled and driven implementation to realise benefit, but the results can lead to significant reduction in cost to customers.

Deployment of digital technologies and processes follows a similar process, with Business Liaison Managers working with colleagues and partners to explore risks, opportunities and the development of options to ensure smooth alignment to upstream and downstream systems.

As well as improved traditional methods of delivering assets and services, we have broadened our capacity and vision for enhanced services, as demonstrated by our approach to increasing sewer capacity prior to storm events.

Case Study: Increasing sewer capacity prior to storm events

Substantial sewer jetting prior to storm events can be a high cost solution, with significant redundancy of jetting fleet outside of storm events. Learning from the RAC model and using a markets approach, we have secured the capacity of 200 jetting vehicles that can be called upon as needed. The solution delivers rapid implementation at lower cost, reducing the impact of flooding and pollution.

Case Study: Hull – Living with Water

We have developed a world leading partnership in Hull to solve flood risk. Because the scale of flooding is so large the partnership is continually deriving new approaches. Some of these are explained below and are being used in other schemes and activities across our business.

We have developed a single integrated drainage model with the Environment Agency and our local authority partners to develop the long-term solution. This has already demonstrated the huge scale of the challenge, showing that 16 million cubic metres of water fall on the catchment in four hours at the design return period. This is equivalent to two major dam bursts over the city.

The Living with Water Partnership now has closely aligned objectives for the next five years to invest and resolve flood risk.

- Outline plans include aligned investment schemes that are prioritised for the city.
- An integrated city planning policy has been developed for the east Yorkshire region.
- To engage customers, we are running a 10k city obstacle race in October, the Hultimate Challenge, to promote flood action and create a water culture amongst residents.
- In 2018 Hull was successful in being selected as one of five global cities to develop a Water resilient city index to assess resilience to water related shocks and stresses.

We are applying the same principles to our Bioresources function. Improving service, resilience and efficiency by engaging with markets to deliver bespoke solutions. This process is well underway, initiated by our highly successful Supplier Day in May 2018.

Learning

We expect 50% of our investment to return positive implementable outcomes. As part of every project closeout, we review learning on practical and technical issues that have emerged during the project. Learning is incorporated into the project management lifecycle process to ensure continuous improvement.

In some circumstances positive outcomes are derived but benefits are not realised as planned. A significant example is Advanced Thermal Conversion Gasification (ATC).

Case Study: Advanced Thermal Conversion Gasification (ATC)

A ten-year programme of R&D projects delivered technical and commercial model for deployment of this transformational sludge treatment process, a significant and positive outcome for the £20 million investment. Despite this, we have concluded that we are not best placed to deploy the new technology through standard delivery mechanisms.

Using a markets approach and understanding that commercialisation of technology is not a core capability of our business, we are seeking commercial entities to invest capital and specific technical expertise to launch this exciting new treatment process and create long-term value for the sector.

In the development of assets, we now use our business intelligence and ambition to articulate market potential. We set the challenge for supply chain innovation to deliver solutions for either capital investment deployment or servitised models. The regeneration of coagulants from spent water treatment sludge is an example of this.

Case Study: Regeneration of coagulants from spent water treatment sludge

Working with an immature supply chain partner, we have evaluated the technology to achieve coagulant regeneration using super critical water oxidation. Learning from ATC, it is clear the technology requires developing further to reach commercial maturity.

We are not yet mature enough to deliver this to market and rather than taking the challenge on outside of our technical capability, we are facilitating the development through in-kind support and guidance from an end client perspective. Communicating the opportunity to the market, we are incentivising innovation and commercial investment to realise efficiency for future customers.

As part of our asset management approach we have taken learning from airline and hazardous industry sectors to develop an approach to reliability centred maintenance that we are rolling out across our asset base. This is an engineered strategy to bring reliability to our assets and therefore greater service levels and resilience for customers. This is being integrated with our new SAP implementation to ensure rigour in its application and consistency in results. Early trials at our Saltend WwTW in Hull have shown a reduction in maintenance costs, alongside greater reliability of the works and zero odour complaints in recent years compared to hundreds early in the current period.

Case Study: Flood resilience

The 2015 Boxing Day floods gave rise to a number of innovations for flood risk management. A key initiative was the work we did over the winter of 2017-18 to hold the water levels in six reservoirs in Calderdale above Hebden Bridge at a level that maintained available storage of 10% by volume. This gave additional flood protection to Hebden Bridge in the event of rainfall. We will likely repeat this in future years. This is an unprecedented action, backed up by good science and minimum risk in this instance to water supply in Yorkshire.

Transformation

The need to transform to deliver for our customers

To deliver our ambitious plan we know that we need to change the way we do business. To facilitate this change, we have initiated a business wide transformation programme. It is the role of the newly appointed Transformation Director to support the business through innovation in delivering upper-quartile cost efficiency and customer service while keeping bills low.

Transformation as usual

Our aim is to make transformation as usual, to deliver for our customers. Our transformation road map (see Figure 10b below) begins to explain our thinking regarding our transformation requirements. We realise there are a lot of things already ongoing in our business to drive us forward, but know that what is required to ensure we create the conditions for transformation as usual, is something very different.

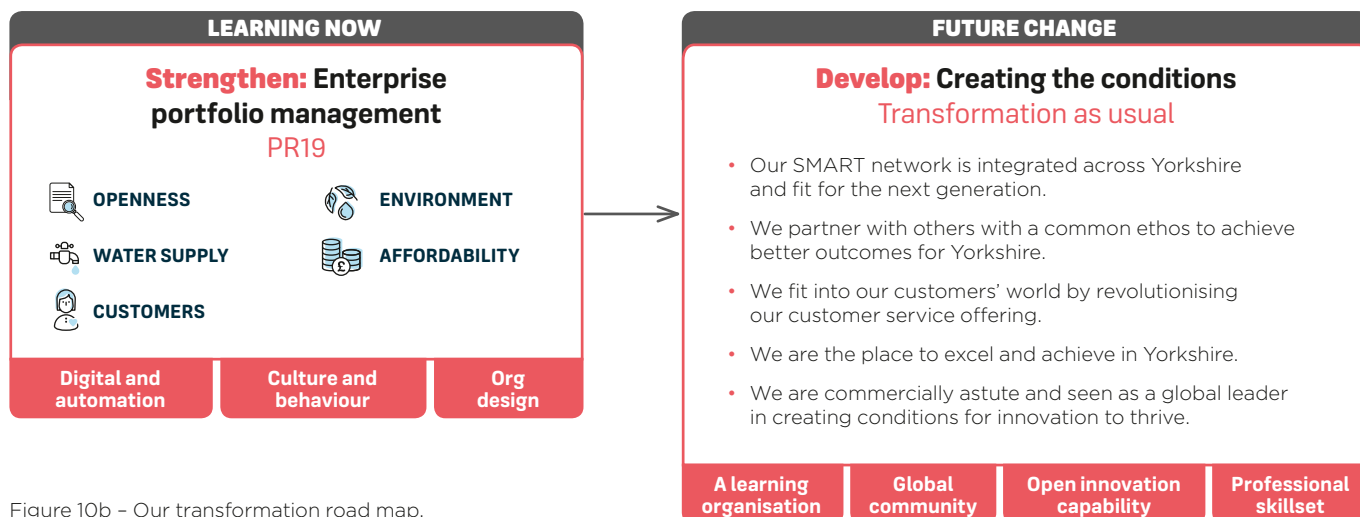


Figure 10b - Our transformation road map.

Getting started

We need to build on our current plan and drive performance and efficiency further before 2020. Continuing our journey to embed the right behaviours and environment for an innovative and creative culture to thrive will be a key area for our transformation. Transformation and innovation is not new to us, but we recognise it is not yet truly embedded in our nature. We need it to become part of 'The Yorkshire Water Way' and the way we do business.

We are delivering several change initiatives which are focused on achieving upper-quartile performance and efficiency, while embedding different behaviours and simple consistent processes enabled through the introduction of SAP S/4 HANA.

Delivering customer expectations on performance and maintaining bills

We are proud to be able to say that our investment in our upper quartile service in the 2015-20 period will be cost neutral for customers. We have already started to make innovative changes that will deliver over £800 million of the efficiency.

We are creating a service delivery function that is available when our customers need it. Table 10a provides the themes and initiatives that will deliver the efficiencies whilst improving customer service.

Table 10a

Themes and initiatives to improve customer service and efficiency	
Theme	Initiatives
Be customer centric	<p>Fundamental redesign of the wastewater customer process end-to-end to deliver service excellence.</p> <p>Fundamental redesign of the water customer process end-to-end to deliver service excellence.</p>
Be commercially aggressive in the customers' best interests	<p>Re let water repair and maintenance contract under a new commercial framework to provide best value and operational resilience.</p> <p>Fundamental review of waste water repair and maintenance contract and delivery to enable significant service improvement, resilience and value benefits.</p>
Operate 24/7 with a highly skilled and productive workforce	<p>Upskill Service Delivery Centre 24/7 with technical and service capability to deliver customer needs and manage our assets safely.</p> <p>Develop and implement effective, safe and resilient resource model in water production.</p> <p>Develop and implement effective, safe and resilient resource model in wastewater process and pumping.</p> <p>Implement industry-leading recruitment, training and productivity model for leakage activity which sets the standard for the company and enables upper quartile performance.</p>
Smarter asset maintenance	<p>Implement and embed proactive maintenance strategy and plans to build greater service resilience and avoid service failures.</p>

We are developing an asset management function that will reduce asset failures resulting in improved customer service. Table 10b provides the themes and initiatives that will deliver the efficiencies while reducing assets failures.

Table 10b

Themes and initiatives to deliver efficiencies and reduce asset failures	
Theme	Initiatives
Implement dynamic maintenance plans to deliver asset integrity, reliability and resilience	<p>Ensure safety and integrity through risk based inspection, process safety management and monitoring asset health.</p> <p>Implement reliability centred maintenance and condition based monitoring strategy.</p>
Drive value through commercially aligned arrangements	<p>Implement a commercially focused, effective and resilient capital delivery framework.</p> <p>Implement new end to end engineering design approach to deliver by informed risk management with safety and reliability by design.</p>
Establish SMART networks to optimise asset performance and provide real time visibility	<p>Integrated water network monitoring, modelling and intervention system.</p> <p>Integrated wastewater network monitoring, modelling and intervention system.</p> <p>Innovative resilience projects through partnership working.</p>
Create strategic planning partnerships to bring global expertise and deliver innovative integrated catchment solutions	<p>Integrate the six capital decision making framework to deliver sustainable best value for customers.</p> <p>Strategic planning to rationalise and optimise the asset base to deliver service excellence.</p>

Establishing the necessary capabilities

We recognised that having groups of experts, or Programme Management Office governance, will not deliver transformation; we need to make transformation and innovation ‘the way we do things at Yorkshire Water’, make it part of our DNA and get everyone involved.

We are creating a working environment that makes transformation and innovation business as usual, providing colleagues with the space and authority to think, behave and act innovatively, and have mechanisms to apply what we have learnt. This will make Yorkshire Water the place to achieve for our employees, partners and stakeholders, delivering improved customer service while keeping bills low.

The new age of innovation

We will face into our future challenges by utilising our newly developed Open Innovation playbook.

Our Open Innovation playbook is the first method developed in the water industry that clearly sets out what type of innovation approach fits the problem or solution requirements best. This will become ‘the way we innovate’ at Yorkshire Water. This will allow colleagues to understand when to utilise our in-house capability, when to engage with our supply chain and when to seek support from outside of our business.

Examples from our playbook can be found in appendix 10b which explains our types of innovation, our choice tree, and features of competition. We are currently working with colleagues to ensure that they understand what method to use and when to get best results.

It is our intention to continue to develop this playbook, ensuring that all colleagues can raise ideas and see how their ideas are progressing.

We are developing an innovation score card to show how we are progressing with innovative ideas, share good news stories and allow colleagues and customers to openly engage. In appendix 10c we have shared an example of how the innovation score card might look.

Global communities that widen our knowledge base and engage passionate people

We are committed to creating partnerships to develop better solutions for our customers and the wider society of Yorkshire. This has already been demonstrated on a local level with our ‘Living with Water’ partnership.

We will engage with global leaders to ensure we are pushing the boundaries of innovation and creating the best conditions for success. We are already working in partnership with:

- The Massachusetts Institute of Technology – the world’s experts in this topic, to further develop our Open Innovation capability.
- The United Nations – to learn how they have engaged worldwide business and communities to drive sustainable development goals for clean water and sanitation.

We will create opportunities for our customers to be part of our global community, not only working with us to solve local problems but act as customer ambassadors who share all the things that we do with all our customers.

Processes that put customers at the heart of what we do

We will develop our process management maturity by embedding standardised processes through SAP implementation, driving process ownership and discipline to ensure that we deliver an efficient and effective service to our customers.

Systems that enable us to respond to our customers’ needs

We recognise that exceptional customer service is enabled through supporting systems which allow the integration of future technology advances. Technology plays a fundamental role in helping us to improve and deliver operational, financial and customer service performance, now and in the future. Our ambition is to embed digital capability across the business that will connect us with each other, our customers, suppliers, partners and other stakeholders to create greater collaboration opportunities, improve transparency, and deliver a platform for participation.

Technology that works for us all

Recognising the broad range of strategic challenges, we have identified seven digital capabilities required to deliver a digital transformation, enabling upper quartile performance in the short-term and sustainable delivery of the 5 Big Goals longer-term.

They are:

- **Situational awareness:** providing real-time, accurate and actionable risk and performance information and visualisations to decision makers, including the creation of a Digital Twin to support integrated complex modelling and forecasting.
- **Process excellence:** creating and maintaining conditions which enable the optimisation of the business processes that we now understand through automation, machine learning and artificial intelligence.
- **Customer self-service:** providing tailored services and information to customers through the channels they prefer.
- **Community participation:** through enhanced digital platforms and open data, enabling and encouraging customer and community participation in all aspects of our business.
- **Digital market place:** expanding trading opportunities and driving value by facilitating simple, secure, auditable and transparent interactions with all potential suppliers and smarter contracting and financial transactions using Blockchain.
- **SMART assets and networks:** collecting, analysing and represent asset data in a way that enables more complex modelling, smarter strategic decisions and more refined customer engagements.

- **Fluid field resources:** enabling multi-functional field resources, maximising our opportunity to safely fulfil any business requirement with the most cost-effective solution supported by a virtual expert who is available 24/7.

Developing these digital business capabilities is part of the Digital Transformation Strategy that seeks to embrace new digital technology in a cost effective and agile way. While ensuring the reliable provision of day-to-day services, the strategy targets new tools and ways to deliver business objectives quickly in a sustainable and secure way.

Our strategy will exploit data to provide improved maintenance plans and provide real-time visibility of asset performance. This will create a learning organisation that understands its assets and asset systems, meaning that we can make faster, more integrated, automated and ultimately better decisions.

People and leaders fit for the next revolution

People, leadership and behaviours are a key area of focus for our transformation. We need to ensure we have the right skills and capabilities to deliver the needs of our customers and that those skills and capabilities can flex as changes occur.

We will ensure that our leadership is fit for the future and in line with the World Economic Forum's view of how leadership skills will change from now into the future. It will be less about business school qualifications and more about collaborative learning, cognitive flexibility and disruptive thinking. We have already started this process with our senior colleagues, spending time understanding how their behaviours and skills will need to change for the future.

Our transformation community is built on our continuous improvement community, where people come together every two weeks to discuss topics and debate how we might apply external learning. As an example, the group piloted a globally recognised method for understanding and addressing human motivation and behaviour. By understanding what motivates each other, we can create the conditions for us all to be more productive and therefore deliver more for our customers.

To ensure we make the right decisions we rely on being a learning organisation, using our global communities, our performance data and data techniques to provide evidence-based interventions.

We will create an environment for personal learning by developing an organisation that welcomes and embraces feedback at all levels. We will instil a 'Yorkshire Water approach' for giving and receiving feedback that takes into consideration the diversity of our colleagues and how they respond in different ways. As well as this we will allow all colleagues to recognise feedback, be clear on the feedback they are being given and given the opportunity to act on it.

The future Yorkshire Water way: Transformation as usual

Maintaining high levels of learning and innovation as 'business as usual' into the future requires cultural, as well as technical, transformation. To ensure this becomes 'how we do things' at Yorkshire Water, we will create a 'beat, not meet' mentality, ensuring we always go the extra mile for our customers. We will ensure the skills our people have are fit for the 'fourth industrial revolution', and we will transform our behaviour, working with global experts and communities to improve the way we manage, lead and create the conditions for success.

Aims and behaviours of our transformation

Learning from our history and understanding what makes others successful in delivering sustainable transformation, we have developed a number of key aims and behaviours that will be the backbone of our transformation efforts.

- Our business transformation team will take the lead in creating the conditions for success.
- It will be organisation-wide and involve everyone in the business.
- It will be industry leading in approach and feel different to anything we have done before.
- We will keep our momentum and role model our ambition, for example, using new ways of collaborating with cross functional teams in our transformation community.
- We will re-shape, accelerate or stop things where required and in a considered way using our enterprise management capability.
- We will be evidence driven in our cases for change, ensuring we learn about the whole business system.

Outcomes of our transformation

It is important for us to be able to describe what Yorkshire Water will look and feel like once we are 'transforming as usual'. To do this we have developed a number of outcomes that build on our historical strengths.

They include:

- Everyone, everyday safe and well, and we know it.
- Our SMART network is integrated across Yorkshire Water, and fit for future generations.
- We fit into our customers world by revolutionising our customer service offering, ensuring we offer digital services where wanted.
- We partner with others with a common ethos to achieve better outcomes for Yorkshire.
- Yorkshire Water is the place to achieve and excel in Yorkshire.
- We are commercially astute and seen as a global leader in creating the conditions for innovation to thrive.

We will need to understand how we continue to drive the things that are moving us forward, whilst creating a pull towards the Yorkshire Water of 2025. This approach and our outcomes will continue to be developed with our community as we learn more.



The Yorkshire Water way - making transformation and innovation what we do around here.

Our transformation framework will provide one way of understanding, delivering and sustaining organisational transformation, with the aim to enable transformation and innovation to be 'business as usual'.

Our framework will be world class and the first in the industry, it will be transparent for our customers and employees, and will develop, strengthen and evolve alongside our business.

In developing our framework, we will measure and track the more human elements of our move towards embedding transformation and innovation as 'what we do at Yorkshire Water', for example, using colleague surveys.

An ever changing business for an ever changing world

As the pace of change accelerates and the world evolves around us, our ability to respond to the changing needs of our customers through the services we provide must become a core capability. While we are proud of our track record of driving innovation within the water sector, our recent performance demonstrates that we cannot afford to be complacent. Our deep appreciation of the financial, economic, environmental and service challenges ahead leads us to one conclusion. Change needs to become our standard, re-invention our mantra, transformation our norm.

Building on the foundations laid in 2015-20 we will use simple, standard processes, effective change governance and a more consistent approach to risk and opportunity management to introduce and sustain positive changes in a more controlled way. In this way we will safeguard and improve the services we provide, ensuring they deliver for our customers and the environment, now and in the future.



Procurement, markets and direct procurement for customers

How our procurement delivers for our customers

Most of our customers cannot choose their water supplier, so it is important that we make sure that our PR19 plan offers good value for money. We need to ensure that our procurement process helps deliver exceptional, resilient and sustainable value and service to customers. Alongside making sure we offer good value for money, our customers tell us we should support an ethical and sustainable supply chain and invest in skills development in Yorkshire.

To get the best outcomes from our procurement process we actively collaborate with our partners to ensure resilience and affordability for all our customers. We are delivering our plan by ensuring we focus our procurement and contract management arrangements in ways that sustainably build on our previous success. Employing the six capitals approach we are collaborating with our partners to achieve the highest standards, ensuring our partners help us innovate to meet the stretching performance targets our customers have told us they expect from us.

Our sustainable procurement strategy

It is important that our procurement routes are sustainable and resilient, so we are bringing together partners and suppliers in long-term agreements to ensure best practice and transparent processes, employing an efficient and innovative approach based on collaboration.

Partners and suppliers help shape and develop how agreements are formulated. This approach delivers best value for customers by combining what we know with partner knowledge to ensure that the best solutions are chosen.

We only work with partners who share our ambition and values. A typical lifecycle approach follows the stages outlined in figure 11a. Throughout the 2020-25 period we will continue to focus on delivering best practice in health, safety, welfare, resilience, ethics and carbon reduction.



Figure 11a – Sustainable procurement process.

Case Study: Enhanced direct delivery

Enhanced direct delivery (EDD) involves us acting as an 'intelligent client', working with experts to create solutions to be delivered by organisations with lower operating costs. It is based on appropriate sharing of risk. As well as delivering cost savings, this approach has increased productivity, improved timely delivery and reduced the need for independent assurance. We have established four frameworks:

- Mechanical, electrical, instrumentation, control and automation.
- Security and emergency measures.
- Electrical inspections and testing.
- Civil construction.

On average these frameworks are driving savings of around 15-18% (this is in the region of £4.5 million) compared to traditional framework models.

Contract management

Our contracting arrangements are agile, innovative and designed with the outcomes we want to deliver for our customers at the heart. They are designed to deliver better services, resolve risk and deliver resilient assets, alongside value for money for customers. We have taken learning from the current investment period, 2015-20, to inform how we design procurement for our PR19 plan. In the current period we trialled enhanced direct delivery and found this to be an efficient and successful process. In our PR19 procurement plan we intend to continue to evolve this approach to deliver sustainable value for money.

Collaborate to innovate

A collaborative approach identifies previously inaccessible innovations. To highlight our expectations from our suppliers and the benefits of collaboration, we hosted an open invitation launch event for our 2020-25 Supply Chain Strategy, attended by 400 individuals from a wide range of organisations. The event was an opportunity for attendees to find out more about our future aspirations and desire to drive strategic change, and focused on:

- Customer engagement and affordability.
- Health, safety and welfare.
- Totex hierarchy and low carbon approaches.
- Asset base resilience.
- Future skills investment.
- Innovative approaches to resolving risk.
- Use of new and emerging technology.

We have seen many benefits since the launch event, including development of relationships outside formal contracts. Potential contract partners and suppliers have been able to share thoughts and ideas as well as barriers and challenges, which has allowed us to draft better agreements that improve the resilience of the supply chain.

We also hosted a series of 'Developing the Future' collaborative workshops, which gave interested parties the opportunity to work with us to develop the following areas:

- Structure and management of agreements.
- Commercial model and incentivisation, including performance commitments.
- Key performance measures and performance monitoring.
- Innovation.
- Shared services.
- Supply chain arrangements.
- Information, applications and reports.
- Assurance.

Each workshop brought together supply chain representatives with our colleagues. The biggest benefit has been the shared objective to build framework agreements that meet all parties' aspirations. The simplicity achieved in agreements will reduce costs and deliver progress in innovation and resilience, providing affordable, environmentally sustainable solutions.

As an example of what we have learned through these events, we are taking a different approach to reporting and monitoring. Working with potential supply chain partners, we will use collaborative systems to hold common data, reducing time and cost. We will streamline the approach to risk sharing and standardise approaches to assessing research and development projects to drive future innovation. This approach has already led to process efficiency, bringing procurement cycle times down to 12 months from in excess of 18 months, saving the time of our colleagues, supply chain and partners. Reducing this time means that we can improve the service that we give to our customers.

Case Study: Embedding innovation

We want to make sure that we embed innovation into our thinking at all points, so in January 2018 we appointed a Strategic Planning Partner (SPP) to introduce challenge and worldwide expertise and innovation. The SPP's knowledge and experience of water and other sectors is adding value to contracting strategies and commercial models by challenging traditional thinking. The SPP is adding a layer to the 'intelligent client' approach and supporting our colleagues to present no build solutions in line with the totex hierarchy.

Sharing best practice

To advance collaboration across the water industry and beyond, we have presented our approach to the development of delivery strategies and collaborative procurement at numerous industry conferences. This activity shares best practice and is essential to demonstrate the transparency and openness that is at the centre of our collaborative procurement approach.

The six capitals approach

Our PR19 plan is based on knowing what our customers and stakeholders expect from us and knowing our whole impact on Yorkshire in meeting those expectations. Knowing our impact means that we can use innovation to meet expectations while delivering the best overall impact for Yorkshire.

To make sure that we know our impact, we are incorporating the six capitals approach into our procurement process for work programmes. Below we highlight some of the considerations we make against each of the capitals.

Table 11a

Six capitals procurement considerations	
 Financial <ul style="list-style-type: none"> • Financial stability. We must ensure that any potential partners are not putting themselves or us at risk by over-stretching. • The use of local supply chains. We want to see partners aiding the Yorkshire economy. 	 Manufactured <ul style="list-style-type: none"> • Asset health. We expect partners to match the importance we place on this. • Capacity. We expect partners to be able to support us in periods of escalation. • Technology. We want to see technology led approaches to developing solutions.
 Intellectual <ul style="list-style-type: none"> • Knowhow. We assess how partners can deploy knowhow to effectively deliver services that complement our own. • Business process management. We expect to see strong governance and optimisation processes. 	 Human <ul style="list-style-type: none"> • Health, safety and wellbeing. We will only work with competent partners who meet our safety criteria. • Equality, diversity and inclusion. Our partners' commitment to equality, diversity and inclusion should be evident. • Future skills. We will assess and monitor our partners' skills investment and development.
 Social <ul style="list-style-type: none"> • Ethics. We expect all partners to proactively ensure that no ethical breaches occur, including compliance with the Modern Slavery Act 2015, and expect this to be relayed down partners' own supply chains. • Contract conditions. We encourage partners to sign up to the Prompt Payment Code and, where appropriate, the Construction Supply Chain Payment Charter. • Supporting social enterprises. We expect our support for these organisations to be reflected by partners. 	 Natural <ul style="list-style-type: none"> • Carbon. We expect our partners to prioritise lower-carbon solutions over traditional methods and work to reduce their carbon footprint. • Water sourcing. We will consider our partners approach to water sourcing, consumption and efficiency. • Waste hierarchy. We expect to see partners follow the waste hierarchy, 'reduce, re-use, recycle', and reduce waste to landfill.

Supply chain resilience

To be able to demonstrate that we are resilient across everything we do, we are working with our strategic suppliers to increase the transparency of all the links in our supply chains. The ability to trace the flow of both materials and services back to raw materials and original suppliers enables us to identify social, economic and environmental risks that could lead to supply interruptions. This information allows us to mitigate or eliminate risks.

What does this mean?

Our procurement strategy is designed to reflect the ambition in our PR19 plan. We know what our customers, stakeholders and regulators expect from us and we understand our impact on Yorkshire in how we can meet those expectations. Our procurement strategy unlocks innovation through collaboration to ensure that we meet all expectations, resiliently and sustainably delivering the best overall impact for Yorkshire.

Making the most of markets

We know our customers expect our plan to offer good value for money and embracing the use of markets lets us find ways to deliver better services and lower costs. Markets also help us to improve our sustainability and resilience and reduce our impact on the environment. We make the most from our resources through the use of markets, using competitive delivery routes and innovative solutions.

Markets already help us introduce sustainable savings and innovation. Our catchment management approach, for example, has consistently involved collaborating with landowners, land managers and the agricultural sector to enhance the resilience of our raw water sources. Read more about our approach to catchment management in our integrated catchment management performance commitment chapter 19.

Using markets has let us find alternative ways to meet the challenges that we face such as population growth and changing weather patterns. Markets provide us with access to advances in technology and specialist expertise.

Working with markets means that we will be able to share resources and support innovation; recycling products previously seen as waste and ensuring our data is easily available to increase innovations and identify improvements.

The need for an open and thriving market is crucial to our approach. To support this, we recognise the need to develop the water bidding market, and have collaborated

in a nationwide sludge trading hub. We are carrying out a range of engagement activities to stimulate interest from other companies to help us find the best way to manage the pressures we face.

For the 2020-25 period, our approach to markets supports the key themes of PR19 introduced by Ofwat, see figure 11b.

Our long term strategy demonstrates that to remain resilient and affordable into the long-term we need to explore new ways of delivering a sustainable, resilient service. For example, we know there are ways to make more of our existing capacity, by trading or market delivered enhancements, focusing less on traditional approaches to manage population growth that would mean extracting more water and building more treatment works.

For example:

- Developing the bioresources (sludge created as a byproduct of our treatment processes) and water trading markets.
- Using innovations from other organisations to develop our Bioresources investment programme.
- Using innovation to trial ways to recover chemicals like phosphorus as part of our wastewater treatment processes.
- Working with other water companies to create economies of scale in the way we build new equipment.



Figure 11b – Our approach to markets supports the key themes of PR19.

Our market initiatives

Our market initiatives allow us to get the best value for our customers from the use of markets across our business, and these are shown in the diagram below.

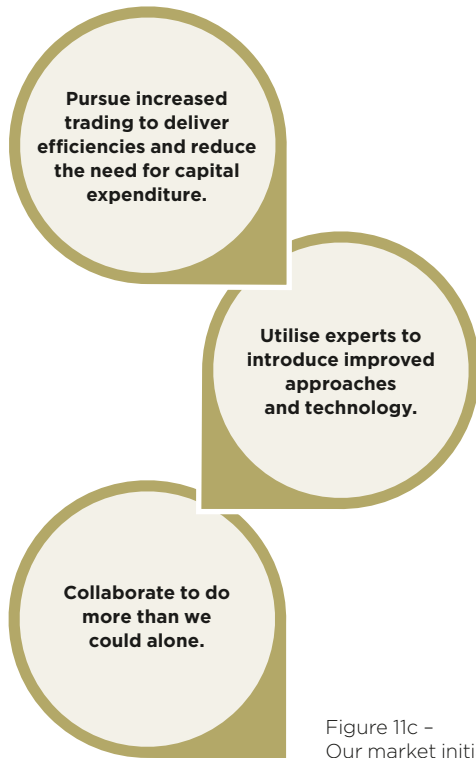


Figure 11c - Our market initiatives.

1. Our increased focus on trading helps keep bills low and increases our resilience. Creating trading agreements with other providers delivers cost efficiencies and reduces service risk by creating additional capacity.
2. New technologies and expertise brought by third parties will engender innovation, improve performance and provide additional resilience. Market testing 80% of our Bioresources capital programme has suggested delivery of significant efficiencies, which have been built into our plan.
3. Collaborating with others allows us to trial new innovative approaches to target efficiencies we cannot manage alone. Working with other organisations stimulates innovation, improves our service performance and provides additional resilience. Stimulating market development will help us deliver these sustainable approaches for the long term.

Pursuing trading opportunities

Our customers want us to be cost effective. The work we have done understanding our impact through the six capitals means that we can identify the most beneficial solutions to the pressures we face. Knowing what our customers and stakeholders expect from us, and knowing our impact, allows us to actively pursue increased trading in a targeted way. For example, in Bioresources, we will use existing treatment infrastructure within (or near) our region if there is availability, rather than building further assets. We have sludge trade agreements with four neighbouring water and sewerage companies. We are also pursuing in-region water abstraction licenses as pilot schemes, to give us insight into how these markets can operate effectively.

As a founding member of Water Resources North¹ we are exploring opportunities and infrastructure requirements for future trading of water across the country. At the moment, engagement with other northern water companies suggests they are meeting water resource needs without additional supply. However, we want to be ready for any increase in demand from other regions, and we are investigating cost for transporting water from the North to the South of the country, to protect our national resilience.

We are developing a Yorkshire Water markets portal to facilitate market development and provide transparent ways for regional and national trading.

Our markets portal

Encouraging sustainable and active markets allows us to continue to drive down costs for our customers. The Yorkshire Water markets portal, will be a one-stop shop for all our market opportunities that will be available from 2020, providing a route for:

- Exposing potential opportunities to the market, maximising value and encouraging innovation, including market testing to find the best solutions.
- Organisations or individuals to offer services or assets (physical or virtual assets, such as water abstraction licenses).
- Receiving information on innovative ideas, processes and methods in the market.

The portal will allow us to provide timely and detailed information on our business needs, maximising the opportunity for markets to support us to meet our customers' expectations. Our procurement process will support the portal, enabling us to work with a wider range and variety of suppliers.

Linked to trading, our company land strategy is pursuing more sustainable methods of achieving value from our land, by exploring opportunities to offer the use of segments of our land in exchange for added value. We believe this is an advantageous approach to tendering for specific solutions, as we are not defining how the land should be used, giving the market the greatest opportunity for innovation.

A pilot investigation identified ten operational sites with development opportunities to achieve more value, these include:

- Recreation and tourism.
- Flood risk alleviation.
- Grid-scale energy storage.
- Large scale solar power on land and reservoirs.

Our next steps include a systematic review of land use, its value and liabilities across our estate, in addition to clarifying which of the ten sites can be made available to realise these opportunities. We propose to advertise a greater range of land opportunities in the 2020-25 period through our Yorkshire Water markets portal. The potential opening of these areas to the market will help us keep bills low.

Working with experts to drive down costs and improve service

To increase our service performance and efficiency we are working with a wide range of companies to help us think differently about how we provide our services. Other organisations have expertise that we do not, and we know there is an opportunity to use these specialisms more effectively. Working with others we carried out an extensive market testing exercise looking at 80% of our Bioresources capital programme. The results suggested significant market-driven efficiencies of around £100 million compared to our originally costed solutions.

We are investigating how third parties can help us deliver phosphorus recovery and recycling for less than an in-house solution. The requirements of the Water Industry National Environment Programme (WINEP) are thought to impact 80 of our sites, resulting in considerable planned expenditure to meet the new or tightened consents.

Case Study: Third party phosphorus recovery and recycling

The results of WINEP are thought to impact 80 of our wastewater treatment sites, resulting in considerable planned expenditure to meet the new or tightened phosphorus consents. We want to understand how market solutions can help us meet these consents efficiently, particularly for some of our larger sites, which will incur the highest proportion of expenditure and where we can apply Biological Nutrient Removal.

Work has begun with a few specialist providers to understand what a market-delivered service might look like, including exploring reactions to different contractual models and incentives. This includes for phosphorus recovery, in line with our Bioresources aspiration to use resources more effectively.

We continue to work to understand what different options there are for market delivery. To give best value for customers, we are exploring new and conventional solutions to meet the WINEP requirements.

The launch of an Offsite Construction Framework in collaboration with other water companies will revitalise the way we procure capital solutions, reducing overall costs.

There are already a number of areas of the business where third-party expertise is recognised. For example, achieving one of our most ambitious targets of reducing leakage by 40% relies heavily on working with external companies to introduce innovative leakage solutions, such as drone and satellite technology to see how we can identify leaks from the air.

Case Study: Third party industrialisation of asset design

We are partnering with Anglian Water and Scottish Water to develop an Offsite Construction Framework; an approach that will allow collaborative exploration and development of SMART delivery technology with specialist third party providers, circumventing more traditional delivery routes.

The concept of SMART delivery is based on construction industrialisation, seen many times across other industries, where efficiencies are delivered through building offsite in a controlled environment and in larger numbers than those usually required by a water company.

Within the first stage of construction industrialisation the intent is for us to work together with Anglian Water and Scottish Water to share business knowledge, designs and processes, and to work to standardise asset standards across the three organisations. Development of the Offsite Construction Framework is revolutionary for the water industry, because we are trialling the SMART delivery approach, and a delivery route which selects for specialist skills rather than traditional, broader capabilities. It is also innovative, as collectively we will be able to work closely with the market to design new products which can be rolled out across each company's asset base, driving down costs through increased scale.

This innovative approach to asset design is expected to deliver savings to customers through the method of building and the efficiencies of scale. It should also improve performance, as downtime at any site for installation will be substantially reduced. Finally, it will increase resilience, as spare assets can be held and rapidly deployed to, and assembled at, a range of sites as required.

Our customers tell us they want a reliable sustainable service at an affordable price. In line with their expectations, we are stimulating the development of the market in a number of ways such as, through our developer services area, removing the income offset and asset payment regime. This has simplified the framework and lowered our infrastructure charges.

Collaborate to do more

We are partnering with business customers to introduce alternative water supplies and collaborating with developers to build low consumption properties. This is part of our plans to continue to reduce per capita consumption.

Across the wider business we are using an open data approach to real-time information, we are working with the growing Yorkshire community of digital developers to help find new and innovative solutions to pollution and leakage problems.

Case Study: An open data approach to real-time information

We are the first company in the water sector to commit to an 'open by default' data approach. In partnership with Open Data Institute Leeds, we are increasing transparency and boosting operational performance.

By encouraging outside experts to look at operational performance and identify new and innovative solutions to traditional industry issues, we are stimulating innovation and learning more about our own performance. The majority of our operational and service data is being released by 2020.

We are working with farmers and other local landowners to improve water quality at source by influencing behaviours, rather than building additional technologies. Our customers tell us they want a reliable sustainable service at an affordable price. In line with their expectations, we are stimulating the development of the market in a number of ways such as, through our developer services area, removing the income offset and asset payment regime. This has simplified the framework and lowered our infrastructure charges.

Case Study: Using the market to protect and enhance ecosystem services

We have a number of on going activities targeted at enhancing the natural environment and associated ecosystem services through market platforms, for example, our integrated catchment management, length of river improved and land conserved and enhanced performance commitments.

We will be working with specialist third parties and stakeholder organisations, which can often be more effective and efficient. We are also looking to other landowners and tenants to help us achieve our outcomes. This includes using:

Catchment partnerships – Delivering river quality improvement schemes through catchment partnerships rather than our standard contractors. This opens delivery to any of the members of the partnership who can achieve the best outcome for the lowest cost.

Delivery competitions – Holding open competitions to deliver conservation work on our land has led to more meaningful outcomes for nature, at a lower cost than our standard contractors. We also receive additional benefits in respect to on-going management, community participation and stakeholder engagement.

Incentivised delivery – Rewarding farmers and landowners for using land differently, for instance through existing collaborator schemes.

Our achievements so far

Using markets is not a new concept for us, some of our recent achievements, aimed at delivering great value and driving efficiency for customers, have seen us venture successfully into new markets, including the development of our Bioresources approach, third party phosphorus recovery and the industrialisation of asset design.

Our approach to procurement, contract management and markets helps keep costs low for our customers. Our plan supports the ethical and sustainable supply chain, invests in developing local skills and improves resilience, all the while driving down cost.

With more opportunities for procurement, contract management and markets planned for 2020-25, we are increasing our options to deliver a better, efficient service for our customers.

We have a range of partnerships planned for 2020-25, including flooding prevention, raw water quality, and environmental quality partnerships. Read more about this in our price control and appointee performance commitment chapters, 14-19.

Direct procurement for customers

One approach to securing best value for our customers is through direct procurement for customers (DPC). This initiative has great potential to provide significant benefits for our customers by promoting innovation through our procurement programme, making capital and operational cost savings and reducing financing cost.

We are committed to exploring every opportunity for DPC now and in the future. This section of the business plan addresses our approach to DPC and provides detailed information on all schemes considered. It demonstrates the extensive assessment process we have developed. While we do not have any qualifying schemes at the point of submitting our PR19 plan, the creation of the assessment framework means that we can continue to apply it going forward to identify any schemes that do meet the assessment criteria.

Initial review of criteria

To ensure we really understood the DPC methodology we worked with Ofwat's lead DPC team and attended the DPC workshop held by Ofwat. We carried out initial market testing with potential providers to gauge interest and risk appetite. The testing helped us understand what might attract investment and told us that investors see the greatest risk in complex schemes (non-discreet arrangements involving complex operating regimes).

Once we had defined our assessment criteria we highlighted three potential qualifying areas for us to consider:

- Large-scale single investments (a one off large investment such as the creation of a new large-scale treatment works).
- Discreet programmes of investment (several investments that fit well into a single programme of work such as a city-wide flood resilience scheme).
- Bundling of related investments (bringing together a number of similar construction projects such as the refurbishment of a large number of small treatment works).

Following the guidance provided by Ofwat our initial review excluded schemes forecast to fall below £100 million totex and those that form part of the Bioresources price control. Our forecasts were made using costing data from our Decision Making Framework (DMF), which sits at the heart of our risk and value process (you can find out more about the DMF system in chapter 9).

The initial review allowed us to indicate to Ofwat six potential schemes:

Table 11b

DPC potentially qualifying schemes		
DPC Type	Potentially Qualifying Schemes	Totex value (£m 25 yrs)
1. Large scale single investment	Dales / Thornton Steward resilience <ul style="list-style-type: none"> • A potential large pipeline scheme within the water network to increase the resilience of supplies in the North Yorkshire area. 	£138m
	Huddersfield Wastewater Treatment Works (WwTW) <ul style="list-style-type: none"> • A potential rationalisation of several smaller WwTW into a single asset to achieve the required level of compliance for wastewater discharges. 	£145m
2. Discreet programme of investment	Hull Sewer flooding <ul style="list-style-type: none"> • A potential amalgamation of many flood alleviation schemes in Hull and the wider area. This would likely involve a range of soft and hard engineering solutions. 	£655m
	National Environment Programme <ul style="list-style-type: none"> • A potential amalgamation of a large number of solutions at several sites to achieve tighter nutrient (phosphorus) consents. 	£100m
3. Bundling of related investments	Wastewater Treatment Works new sites bundle <ul style="list-style-type: none"> • A potential collection of design, build and operation arrangements for 3 new works - Withernsea, Green Hammerton and Parlington. 	£105m
	Water Treatment Works (WTW) bundle <ul style="list-style-type: none"> • A potential collection of design, build and operation arrangements for six existing WTW's: Chellow, Tophill Low, Doncaster Boreholes, Loxley, Fixby, and Langsett. 	£241m

At this initial stage, these schemes were notional (provisional costings), as we were still developing our proposed investment programme for PR19, using our DMF system.

Final review of criteria

Once our programme was better understood our focus moved to:

- Reassessing the totex value anticipated (the amount of money each investment was expected to cost).
- Consideration of the ‘single or small number of large discreet infrastructure projects that meet a common need’ test (a way of assessing if the scheme was suitable for DPC).
- Consideration of the ‘minimal complex interfaces’ test (a way of assessing if the scheme was suitable for DPC).

The updated data set did not identify any further potential schemes, so our testing was applied to the six included in our September 2017 consultation response. Below we explain the guiding principles behind our application of the ‘single or small number of large discreet infrastructure projects that meet a common need’ and ‘minimal complex interfaces’ tests.

Single or small number of large discreet infrastructure projects

The rationale for this test is based on the likelihood of creating better value outcomes for customers given the complexity of arrangement we are creating. A single large project would represent least risk. Increasing the number of projects increases risk, as does the inclusion of projects that would be not included by themselves. The risk of non-delivery also increases significantly when commercial arrangement risks are diverse. To enable analysis against this test, we used the following risk matrix:

Table 11c

Single or small number of large discrete infrastructure projects			
Single or small number of large discreet infrastructure projects	Consistent risks	Portfolio of risks on equal rating	Portfolio of risks of varying scales
Single project	Low	Low	High
Small directly connected cluster	Low	High	High
Multiple sites	High	High	High

Minimal complex interfaces

This test is based around the risk of maintaining the performance of affected and other linked treatment works or other equipment. This is due to the complexity of how the new equipment (asset) will be operated in the future and interaction with connected assets. Projects where the whole site is covered under a DPC arrangement would represent least risk. Risk increases with the complexity of processes and level of interaction with assets not covered by the proposed DPC arrangement. To enable analysis against this test, we used the following risk matrix:

Table 11d

Minimal complex interfaces			
Minimal complex interfaces	DPC arrangement covers entire site	DPC arrangement covers major processes end-to-end	DPC arrangement covers a proportion of the major processes end-to-end
Standalone asset	Low	Low	High
Linearly connected asset	Low	High	High
Complex asset configuration	High	High	High

Decision making summary

We support the principle and methodology of DPC. Despite taking the broadest possible interpretation of the methodology, we have concluded that at the moment we do not have qualifying schemes, however we have developed a robust assessment methodology and intend to use this to search for future qualifying opportunities. The image below shows at which point potential schemes were discounted. For further detail concerning why schemes were discounted, please see appendix 11a.

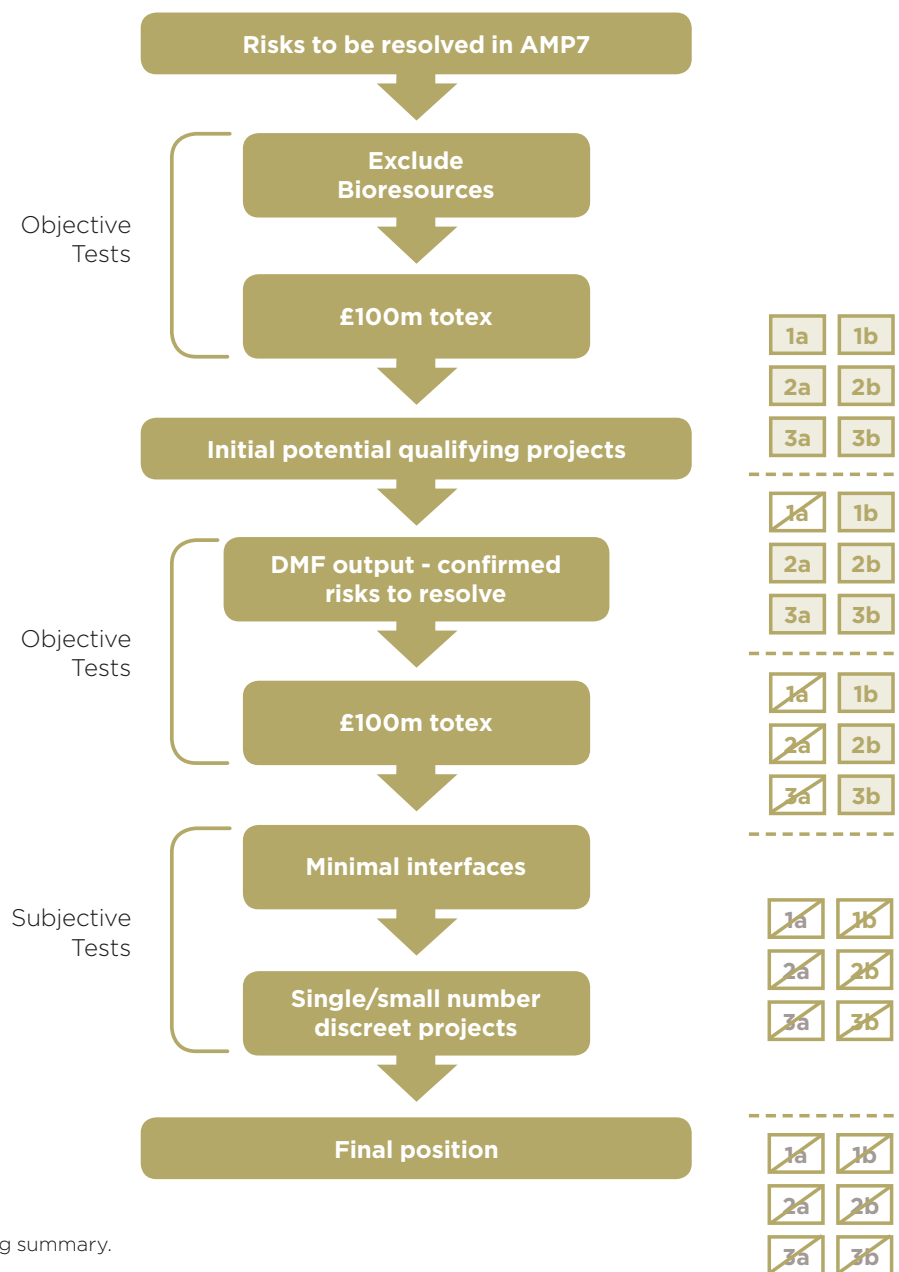


Figure 11d – Decision making summary.

Table 11e

Potential schemes	
Large-scale single investment	1(a) Dales / Thornton Steward resilience
	1(b) Huddersfield WwTW rationalisation
Discreet programme of investment	2(a) Hull sewer flooding
	2(b) National Environment Programme
Bundling of related investments	3(a) WwTW new sites bundle
	3(b) WTW bundle

Future value for money assessments

In the future, when our assessment criteria confirm a qualifying scheme, we will carry out a detailed value for money assessment, guided by the findings of the technical review carried out by KPMG on behalf of Ofwat.

We commit to producing high quality and well-evidenced value for money assessments to make accurate comparisons against our default (in-house) delivery approach. Future suitable projects will be subject to a robust and iterative business case. We will assess how DPC arrangements deliver innovation against in-house delivery, with the intent to monetise innovation where possible.

Having reviewed option models for business case creation, we have concluded that the advocated Treasury five case model is the best fit and we will use this model in full, covering the five different cases:

Table 11f

The five case model	
The strategic case	Any qualifying schemes will be reviewed based on how appropriate they are to our strategy. We will give particular attention to our performance commitments and risk appetite for the assets in question.
The economic case	We will use our DMF to define the cost of in-house delivery for comparison with going to the market. It is critical that we control for scope to ensure that we make an accurate comparison. We consider value for money to be achieved where monetised benefits outweigh monetised risks. We will articulate the rationale for the selection of the tender model (for example, early, late or hybrid), based on the benefit being sought. Where the case relies on improved financing costs this will be evidenced through a degree of market intelligence.
The commercial case	<p>We will be clear on the commercial model and provide a full assessment of the feasibility of the proposed DPC scheme. We will be clear on contractual risks and protections within arrangements, and any risk transfers to the competitively appointed provider (CAP). Varying risk transfer is likely to alter the attractiveness of market pricing, and as such the balance needs to be articulated and understood.</p> <p>We will ensure that the commercial model and proposed procurement process are compliant with the regulations and meet the test of openness and transparency.</p>
The financial case	Our analysis will be clear on the impact on the financing of the appointed company, including the cashflow and accounting implications of a DPC. We will ensure independent assurance is provided for forecasts of the capital and operating costs, and revenue profiles of each option. We will be clear on financing risks and protections within arrangements, and be clear on any risk transfers to the CAP.
The management case	We will focus on the deliverability of a DPC arrangement, analysing deliverability from a commercial life cycle perspective. This will include the initial procurement process, the subsequent contract management, the interaction with assets which are not part of the DPC arrangement, and the end of the contract. Risks and issues of delivery will be appropriately recorded in a risk register and compared in the same way as an in-house delivery scenario.

Strategy for implementation

We do not have a single strategy for implementing DPC schemes, as full case-by-case analysis is required. It is likely that 'early' tender models have the greatest potential of being innovative and generating value for money for customers, however this may not be accurate in all cases. Following a positive outcome from any value for money assessment, we will engage with the supply chain, openly and transparently, at the earliest opportunity. This will be followed by a series of sessions for interested bidders to meet with us to understand the project and review data sets. Early engagement gives a high degree of data access to potential bidders to lower risk and drive innovation. The next steps from this point will be determined by the tender model undertaken which is fully compliant with the Utilities Procurement Regulations.



Business resilience framework

In this chapter we explain our new cutting-edge whole business resilience framework, including how customers and stakeholders have shaped it and how independent assurance confirms our robust approach. We have provided a summary of the resilience of each part of our business, how we are maintaining and enhancing resilience through our plan to 2025 and our strategy beyond. You can find more detail in our resilience publication which can be found on our website: www.yorkshirewater.com/resilience (appendix 12a).

Resilience is a long-standing focus for us. Customers highlight resilience as a top priority and we know the significant impacts that can result from disruption to public water and wastewater services. The reliability of our essential services is critical to our communities, economic growth, environmental protection, and ultimately to human life and livelihoods.

We have a resilient business, successfully maintaining services through many extreme events over recent years, as well as responding to long term trends. However, there are always limits to levels of resilience and we can never be complacent. There are many factors that we monitor and plan for, including extreme weather, climate change, population growth, cyber threats, complex international supply chains and global financial instabilities.

We need to enhance the performance of increasingly complex systems in the face of multiple hazards, as well as preventing or mitigating the loss of assets and services due to specific events. To advance our approach to resilience at company, project and community levels, we have:

- Engaged customers and stakeholders to understand their resilience priorities to shape our new plan.

- Worked with international resilience experts to develop a best practice framework which enables us to better govern and openly report our resilience.
- Undertaken a range of detailed resilience assessments to help shape our PR19 plan and specific proposals within it.
- Working with Arup and the Rockefeller Foundation to pilot the new, innovative City Water Resilience Framework in Hull with our Living with Water partners.
- Aligned our framework and integrated management system to the British Standard for Organisational Resilience (BS 65000). We were the first water company to ask the experts at the Cabinet Office Emergency Planning College (EPC) to independently assess our maturity to the best practice standard.

We have ensured our current activities all have resilience at their hearts. We have a thorough understanding of the internal and external environments that we operate in and how they are changing. Our governance structure, processes and programmes ensure a coherent and integrated approach to managing these risks and we are taking the right steps to continue to strengthen our resilience across the business.

The most efficient and effective plan has been developed with a mix of innovative and partnership solutions alongside mature and accepted traditional solutions where they remain the best option. We have used our Decision Making Framework (DMF) to assess mitigation options to ensure our solutions included in the PR19 plan represent the best value for money. Delivering for and with our customers and the environment is central to our plan because this is critical to our ability to continue delivering highly resilient services at an affordable price.

Our resilience framework

We have developed a bespoke framework that helps us quantify the resilience of all our activities through a robust and comprehensive evidence-based assessment. Our framework uses a systems thinking approach which recognises the complexity of our operations and our links with external systems such as our customers, the natural environment, the economy and other infrastructure sectors.

The result is an approach that:

- Informs better decision-making by helping us improve how we measure and track our resilience, ensuring our approach is based on an extensive assessment of the shocks and stresses that could impact on our corporate, financial and operational resilience.
- Enables us to be more transparent with our customers about the resilience we provide to them and the impact of our activities and investments.
- Advances best practice within the water industry and more widely.

The framework consists of four principal building blocks shown in figure 12a, which form a circular process that drives continuous improvement. Our new process will be owned at the highest levels in our governance structure by expanding our Risk Committee to become the Risk and Resilience Committee - ensuring an aligned approach between these closely related activities.



Figure 12a - Our resilience framework.

Adopting international best practice

The framework has been developed by tailoring best practice to complement our existing risk and resilience processes.

For example, we use the:

- British Standard for Organisational Resilience (BS 65000) by aligning our approach to the standard and independently assessed our maturity against it.
- Organisation for Economic Co-operation and Development (OECD) guidelines for resilience systems analysis.
- Rockefeller Foundation city resilience framework.
- University of Cambridge Centre for Risk Studies taxonomy of threats.
- Cabinet Office guide to critical infrastructure resilience.
- UK Water Industry Research (UKWIR) good practice guide on resilience planning.

We have also built on our own data and processes, including our:

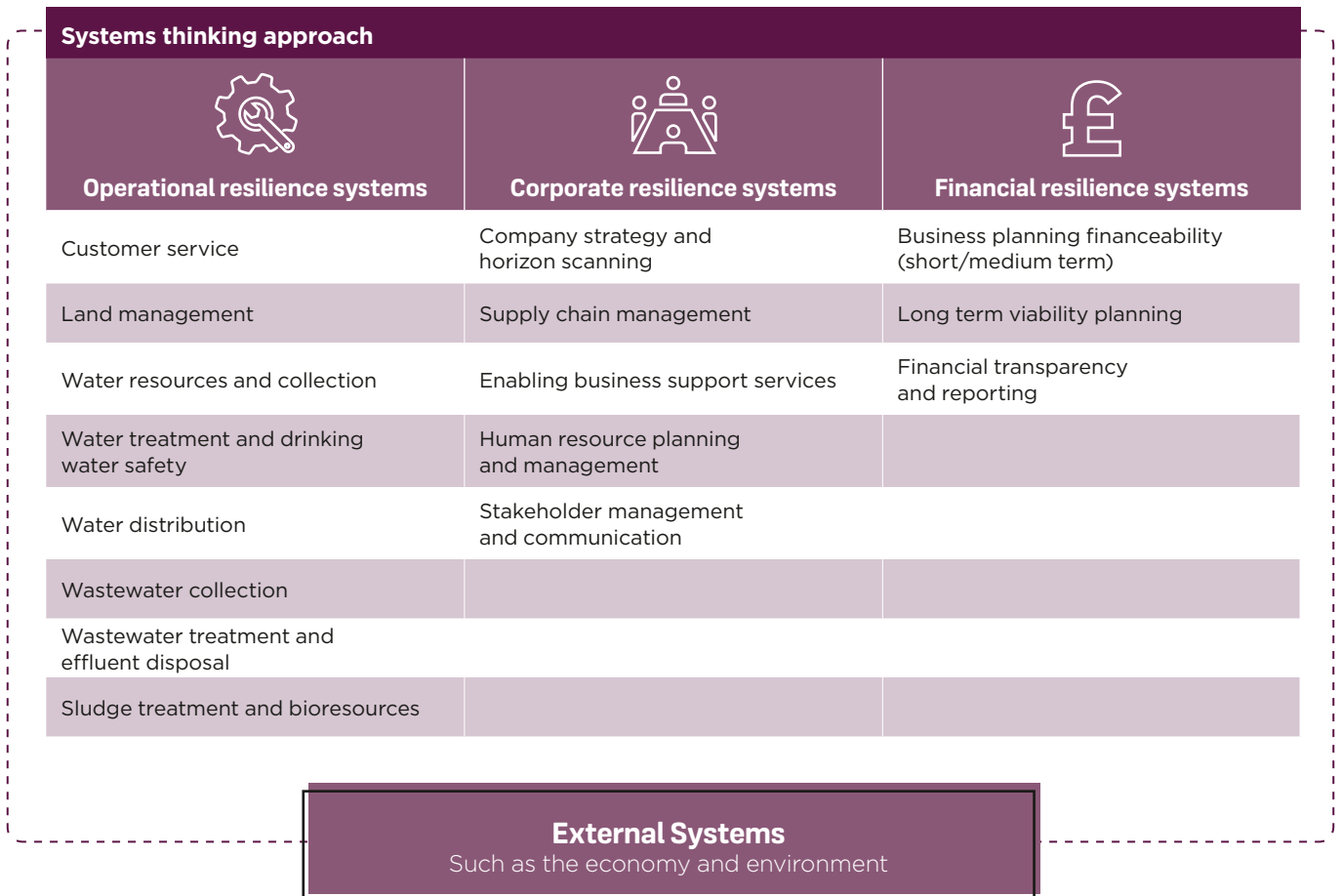
- Climate change strategy and risk assessment which we introduced in 2014 and updated for our latest adaptation report to Government, www.yorkshirewater.co.uk/climatechange.

- Corporate risk framework.
- Granular risk and resilience quantification studies and tools for all areas of priority, such as our water, wastewater and bioresources assets.
- DMF, including our cutting-edge six capitals optimisation system, to assess best value solutions, supported by our customers.

Using a systems thinking approach

Systems thinking is useful in managing resilience as it improves understanding and management by providing a holistic view of a complex process. We defined and mapped 16 systems that cover all our operational, financial and corporate activities. Interdependency analysis was carried out to understand the connections between these internal systems and their relationships with the external systems in which we operate. The 16 systems are summarised in the diagram below and more detailed maps of each system and their interdependencies can be found in our resilience publication.

Table 12a



A comprehensive assessment of shocks and stresses

Through horizon scanning, examination of best practice, and feedback from our colleagues, customers and other stakeholders, we have developed a detailed catalogue of the disruptive events (shocks) and long-term trends (stresses) that may impact on our systems and services. More than 120 shocks and stresses have been reviewed, the framework enables us to look at different levels of granularity with a standard focus on 34 priorities.

Our identification of the priority external systems in which we operate has helped understand the sources of the shocks and stresses, and the interdependencies between our operation and other sectors such as other national critical infrastructure and supply chain. It has also helped us understand the consequences of disruptions on our customers and local communities.

Five qualities of resilience

The five qualities of resilience included in our framework are shown in figure 12b. In their 2011 guidance, 'Keeping the country running', the Cabinet Office shared a model of the four components of effective infrastructure resilience. We embedded this model in our planning approach at the last price review. Our resilience framework has built on this approach by further developing this best practice model with a fifth quality of resilience, called Reflection.

- **Resistance:** Protection to withstand a hazard (e.g. a flood wall).
- **Reliability:** The ability of an asset to operate in a range of conditions (e.g. asset design).
- **Redundancy:** Designing capacity into a system (e.g. backup pumps).
- **Response and Recovery:** Enabling fast and effective response to, and recovery from, an event (e.g. emergency planning).
- **Reflection:** Continuously evolving as a result of learning from past experiences (e.g. raising actions in an incident review).

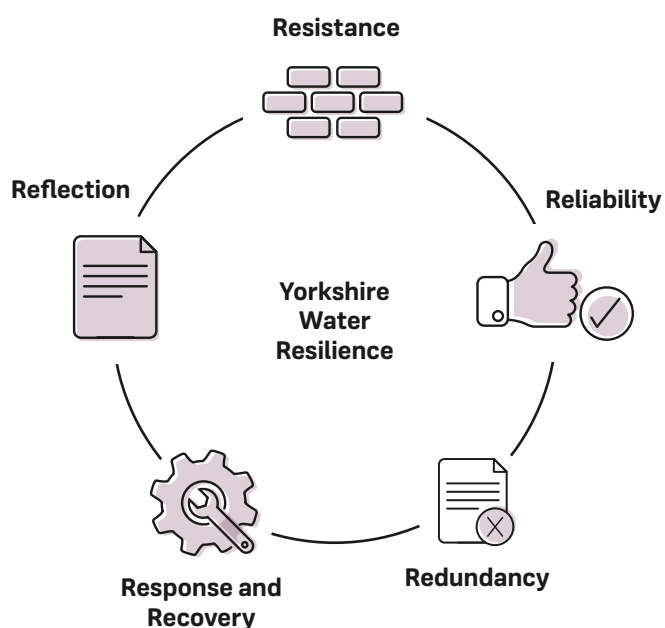


Figure 12b – Five qualities of resilience.

Quantifying the maturity of our resilience

The levels of resilience in different systems across our business have been assessed and quantified through a resilience maturity model using the maturity scale in BS 65000, extended to set out specific criteria across the five qualities of resilience. The six levels of maturity are shown in figure 12c, and full definitions can be found in our resilience publication.

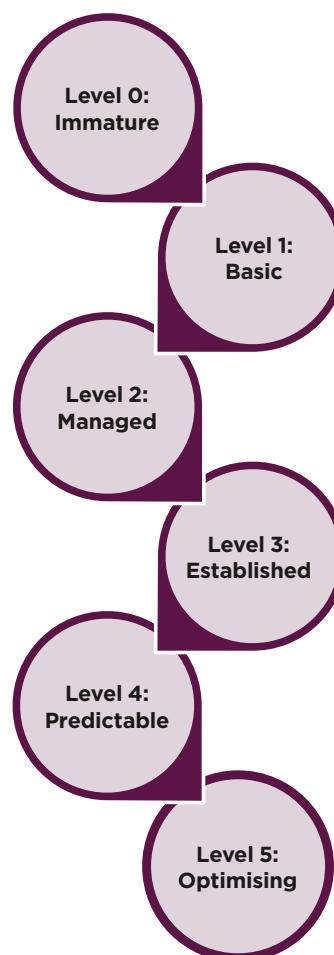
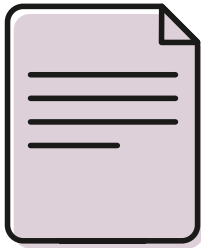


Figure 12c – Six levels of maturity.

There are limited opportunities to directly compare our specific maturity scores and rates of improvement as our approach, alongside the British Standard, are new and few others have yet published parallel information. We have sourced other information to show our comparative performance. We have taken a conservative approach to ensure under rather than over statement of our resilience, and to support our drive for continued improvement.

Our assessment has been extensive and supported by third parties to ensure an accurate and complete picture. We carried out a large programme of internal stakeholder engagement, including over 40 workshops and interviews with colleagues across operational, financial and corporate parts of the business. We recorded current and planned activities against the five qualities of resilience, which formed the evidence base for the maturity assessment. We will share our latest work to inform debate about a water industry standard approach.



Assessing our resilience over time

Our assessment covers different timescales, from privatisation to 2050, to provide a long-term view of resilience. This helps us ensure our business plan and long-term strategy are effective for securing resilience of water and wastewater services for customers today as well as in the future.

Supported by detailed resilience assessments

The resilience framework provides the strategic view across all parts of our business and services, allowing comparison and informing strategic decisions. This is supported with a broad range of detailed resilience assessments to give a depth of understanding in priority areas:

- Financial modelling to ensure the short and long-term financial viability of the business.
- Assessments on the impact of climate change, population growth and industrial water needs to inform a Water Resources Management Plan (WRMP) which ensures we can continue to balance supply and demand.
- A detailed review of the resilience of our water and wastewater infrastructure supported by an expert organisation.
- Emergency planning exercises with partners to test operational processes.

These detailed assessments have shaped our PR19 plan and specific proposals within it. To complement this, the findings of the new resilience framework were discussed with the Board to ensure the balance of the final plan is appropriate from the resilience perspective.

Assessment findings

Table 12b shows the headline findings of our resilience assessment across the 16 internal systems that cover all our activities, and how this changes over four timescales. To ensure an accurate and complete reflection of the maturity of our resilience, the results are based on a thorough assessment involving a large range of colleagues from many parts of the business and all levels of seniority.

All 16 systems show maintained and improving resilience. The maturity and rate of improvement varies depending on the combination of shocks and stresses facing that part of the business, and the potential for mitigating actions and supporting levels of investment. The improving resilience is despite increasing pressure from climate change, population growth and other factors which would erode resilience if we did not act.

The table also shows how our PR19 performance commitments align with our 16 resilience systems. Reporting on these commitments will help monitor resilience throughout the 2020-25 period.

In our resilience publication we share the quantified scores of each system over the four timescales we have assessed, and the scores specific to the five qualities which are all needed to deliver truly effective infrastructure resilience.

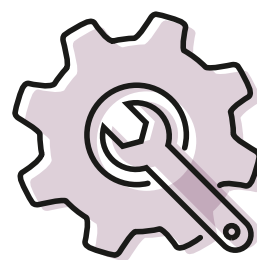


Table 12b

Resilience assessment findings							
No.	System	Priority shocks and stresses	Level of maturity				Proposed Performance commitments
			1989	Now to 2020	2025	2050	
1	Customer service	Change in customer behaviour, communities and customers that might find themselves in vulnerable circumstances and skills shortage.	Basic	Established	Established	Predictable	<ul style="list-style-type: none"> Priority services awareness Priority services satisfaction Inclusive customer service D-MeX C-MeX
2	Land management	Climate change, environmental change and change in customer behaviour.	Basic	Established	Established	Predictable	<ul style="list-style-type: none"> Land conserved and enhanced Integrated catchment management Biosecurity implementation
3	Water resources and collection	Climate change, population growth and environmental pressures.	Basic	Established	Established	Optimising	<ul style="list-style-type: none"> Water recycling Per capita consumption (PCC) Risk of severe restrictions in a drought Abstraction incentive mechanism (AIM)
4	Water treatment and drinking water safety	Ageing infrastructure, vandalism and environmental pollution.	Basic	Established	Established	Predictable	<ul style="list-style-type: none"> Drinking water quality Unplanned outage Drinking water contracts
5	Water distribution	Climate change, ageing infrastructure and disruptive technology.	Basic	Established	Established	Optimising	<ul style="list-style-type: none"> Water supply interruptions Leakage Mains repairs Significant water supply events Low pressure Repairing or replacing customer owned pipes
6	Wastewater collection	Ageing infrastructure, extreme rainfall and change in customer's behaviour.	Basic	Established	Established	Predictable	<ul style="list-style-type: none"> Internal sewer flooding Sewer collapses Risk of sewer flooding in a storm External sewer flooding Surface water management
7	Wastewater treatment and effluent disposal	Extreme rainfall, population growth and skill shortage.	Basic	Established	Established	Predictable	<ul style="list-style-type: none"> Length of river improved Pollution incidents Treatment works compliance Bathing water quality
8	Sludge treatment and bioresources	Climate change, extreme weather and ageing infrastructure.	Basic	Established	Established	Predictable	<ul style="list-style-type: none"> Creating value from waste Quality agricultural products Renewable energy generation Carbon
9	Company strategy and horizon scanning	Population growth, climate change and change in customer behaviours.	Managed	Established	Established	Optimising	
10	Supply chain management	Extreme weather, climate change and financial crisis.	Basic	Established	Established	Predictable	
11	Enabling business support services	Cyber security, vandalism and disruptive technologies.	Managed	Established	Established	Predictable	
12	Human resource planning and management	Skills shortage, extreme weather, and infectious human disease.	Basic	Established	Established	Predictable	
13	Stakeholder management and communication	Extreme weather, change in customer behaviours and communities and customers who find themselves in vulnerable circumstances.	Basic	Established	Established	Optimising	<ul style="list-style-type: none"> Working with others Education
14	Business planning financeability (short/medium term)	Cost increase, bad debt and financial crisis.	Established	Predictable	Predictable	Predictable	<ul style="list-style-type: none"> Affordability of bills Direct support given to customers Gap sites Voids verification
15	Long term viability planning	Cost increase, bad debt and financial crisis.	Established	Predictable	Predictable	Predictable	<ul style="list-style-type: none"> Cost of bad debt
16	Financial transparency and reporting	Cost increase, bad debt and financial crisis.	Managed	Predictable	Predictable	Optimising	

Our plan to maintain and enhance resilience

In the next section, we examine how our plan is maintaining and enhancing resilience in practice and how our resilience compares to others.

Our cutting-edge resilience framework and assessments show our plan will maintain and enhance resilience in all areas of our business and services. In this section we explain how we ensure the resilience of our water and wastewater services, our finances and some of our critical enabling services. See table 12c below.

Table 12c

Ensuring resilience	
Resistance - Protection to withstand a hazard	
<p>Water demand management by cutting leakage and supporting customers to use less (per capita consumption).</p> <p>Sewer demand management by reducing the amount of rainwater entering the network and working with customers to reduce abuse.</p> <p>Catchment management to protect raw water quality while delivering wider benefits for recreation, biodiversity and carbon storage.</p>	<p>Protecting critical assets to maintain services despite extreme events.</p> <p>Investing in defensive technologies to protect against increasing cyber-attacks.</p>
Reliability - The ability of an asset to operate in a range of conditions	
<p>Maintenance to ensure assets are functioning as designed and ready when called upon.</p> <p>Enhancement to ensure assets meet latest best practice and legal requirements.</p> <p>Design standards to ensure new assets and processes are planned to be robust for now and through their expected lifespan.</p>	<p>Innovation to increase our ability to respond to priority resilience threats and opportunities.</p> <p>Diversity, training and development of our workforce to ensure agility, competence and expertise.</p>
Redundancy - Designing capacity into a system	
<p>Enhancing network capacity and flexibility so we have options to move water and wastewater to where it needs to be.</p> <p>Backup systems in operations, information technology and supply chains to ensure continued service when something fails.</p> <p>Managing gearing to provide financial headroom in case of an economic shock.</p>	<p>Catchment management to reduce flood risk by working with nature to make space for storm water while delivering wider benefits.</p> <p>Multi-agency partnerships to deliver a joined-up approach to long-term planning and preparedness, for example on flood management.</p>
Response and recovery - Enabling fast and effective response to, and recovery from, an event	
<p>Emergency planning and equipment to improve readiness for unusual events.</p> <p>Communication to support and engage the public during an event or emergency.</p> <p>Collaboration with other agencies to ensure a joined-up emergency response. Real time monitoring and control to see and manage our assets.</p>	<p>Mutual aid agreement with other water companies to share resources in times of need.</p> <p>Insurance to support the costs of loss or damage we might incur because of extreme events.</p>
Reflection - Continuously evolving as a result of learning from past experiences	
<p>Incident reviews to learn from events and raise improvement actions.</p> <p>Internal and independent audits to test our approach and raise areas for attention.</p>	<p>National engagement to share our latest insight and learn from others.</p> <p>Risk and Resilience Committee to ensure regular, ongoing Board and senior management oversight and direction.</p>

Delivering for and with customers and stakeholders

Working with us, customers and stakeholders have three essential roles to ensure the resilience of water and wastewater services in Yorkshire:

- Co-creating the plans and strategy to deliver customer priorities for resilience.
- Approving our plan meets their resilience needs and expectations.
- Co-delivering parts of the plan to aid resilience, for example by using water and sewers wisely.

We have gone further than ever before to get a deep understanding of our customers' needs, priorities, relationship with water and our services. We have examined resilience throughout our customer engagement programme to fully understand how customers view our current and future performance, both in isolation and relative to the service other water customers receive.

Figure 12b shows the aspects of our services which are most important to customers for resilience. Customers consistently tell us the most important issue is being able to receive reliable, uninterrupted services. Customers tell us to prioritise the reduction of leakage, pollution incidents and sewer flooding. These priorities are shaping our current activities and future plans with extra investment going into these areas to significantly improve service, supported by stretching performance commitments. 86% of customers also told us that they were confident or very confident that our plan would cope with future challenges like population growth and climate change.

We are substantially growing our programmes to support customers to co-deliver water resilience in Yorkshire.

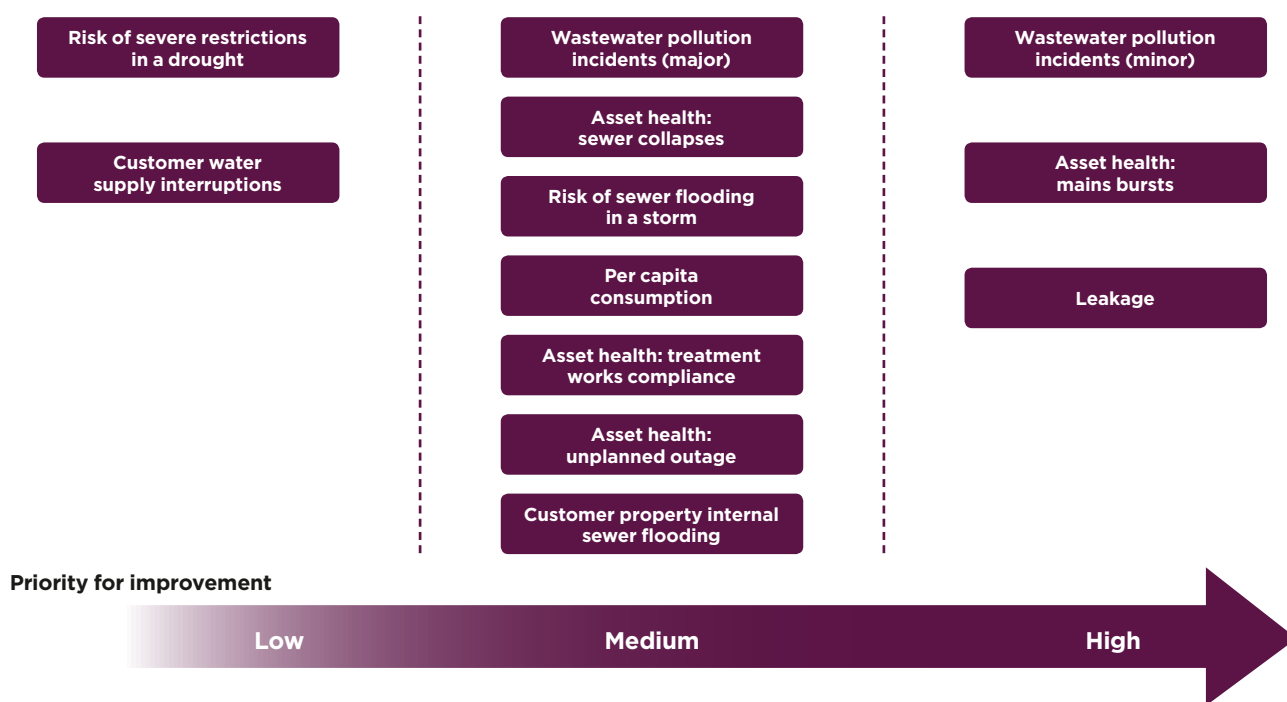


Figure 12d – Our customers top priorities in relation to resilience.

Maintaining and enhancing water services

We have had no hosepipe bans or other widespread restrictions to our water supplies since the drought in 1995-96, despite several more extreme dry periods since then. We have also maintained water supplies throughout severe floods and cold snaps in Yorkshire over recent years, with only a very small proportion of customers interrupted during the hard winter and dry summer experienced in 2018. We learn from these events and revise our incident management plans to help us respond quickly and safely to any kind of disruption.

We have a nationally leading level of resilience due to the flexibility we have built into our water supply network and through our mature and tested operational procedures and emergency planning. The independent work for Water UK's Water Resources Long Term

Planning Framework report, published in late 2016, stated we plan "to a higher level of resilience than any other part of the country" and only Southern Water and ourselves "plan for resilience to droughts that are worse than those seen in the historic record".

The assessments we completed for our WRMP show a long-term challenge to our ability to maintain the supply demand balance. This is primarily a consequence of climate change and population growth. Our Water Supply Big Goal seeks to meet the needs of the growing population without taking more from the environment. We are doing this by substantially reducing demand, as this is the most affordable and sustainable approach. We also have a range of new supply options should they become essential.

Working with customers to be more water efficient

We have long been supporting customers to use water wisely. We are going much further to enhance water resilience by addressing water wastage throughout our own operations.

We introduced a performance commitment in 2015 to monitor average use across the region, known as PCC. Along with our customers we have been successful in reducing PCC, with the lowest in the country. We are further reducing for PCC by 2025, working with customers to help save water by:

- Increasing the amount of water and wastewater education we provide.
- Proactively encouraging 100,000 customers to switch to a water meter where they will financially benefit from having one, as well as offering free meter installation for any customer that wants one.
- Piloting the professional installation of water saving measures in homes.
- Working with large industrial water consumers to be more water efficient and switch to lower grades of water where potable water is not needed.

We are using the latest technology to support targeted, tailored messages to local communities. Providing locally specific messages helps secure higher levels of engagement, which in turn supports resilience by using water more wisely.

Managing land to protect natural water resilience

The condition and management of the land from which we source water to supply customers is critical to the resilience of our water service. The quality of the water that comes from many of Yorkshire's source catchments is deteriorating, creating substantial operational and capital investment at treatment works to ensure we can provide safe water to customers. This drives up financial and environmental costs and increases operational complexity.

Excessive pollution could force us to abandon sources of water in the long term and, if this happens on a large scale, it would threaten the resilience of water supplies. Research shows we should plan for increasing pressure on Yorkshire's source catchments from the changing climate and current land management practices.

We have responded to resilience risks by working innovatively with a variety of partners. Together, we have developed and matured techniques to protect and restore parts of Yorkshire's natural environment with growing scale; protecting water quality, restoring the water table and delivering other benefits for society such as recreation, biodiversity and carbon storage. These activities go hand in hand with our work to reduce flood risk by 'slowing the flow' in upstream catchments.

We have long standing programmes on the substantial land estate we own. Working with other landowners, we have significantly enhanced and expanded these programmes. For example, we introduced a new industry leading regime for our farm tenancies called Beyond Nature, which has been rolled out to six of our farms and growing. We work in partnership to agree and deliver a sustainable management plan

for the farm which generates food and income for the farmer, protecting the environment to secure the required water and other social benefits.

Water trading and supporting national water resilience

Water resilience is a national challenge. We are acting to support national resilience over the long term through water trading. To inform our latest WRMP we completed a detailed assessment of trading opportunities and engaged with a range of potential trading partners. Over the long term we want to be self sufficient for water and able to support national resilience.

Maintaining and enhancing wastewater services

The quality of Yorkshire's rivers and coasts have been transformed over recent decades to their healthiest condition since the industrial revolution. This is an outcome of our substantial investments in wastewater treatment, fish passage and river restoration, along with further action by many others.

We know there is more to do, and we must maintain wastewater standards for the growing population. We are adopting an innovative and broad portfolio of approaches to better protect the water environment. For example, helping to improve rivers without the need for costly capital investment at wastewater treatment works. By April 2020 we will have delivered a total of 440km of river improvement activities, including 97.6km of improved river through 13 fish passage schemes. We will maintain this performance and go notably further by 2025.

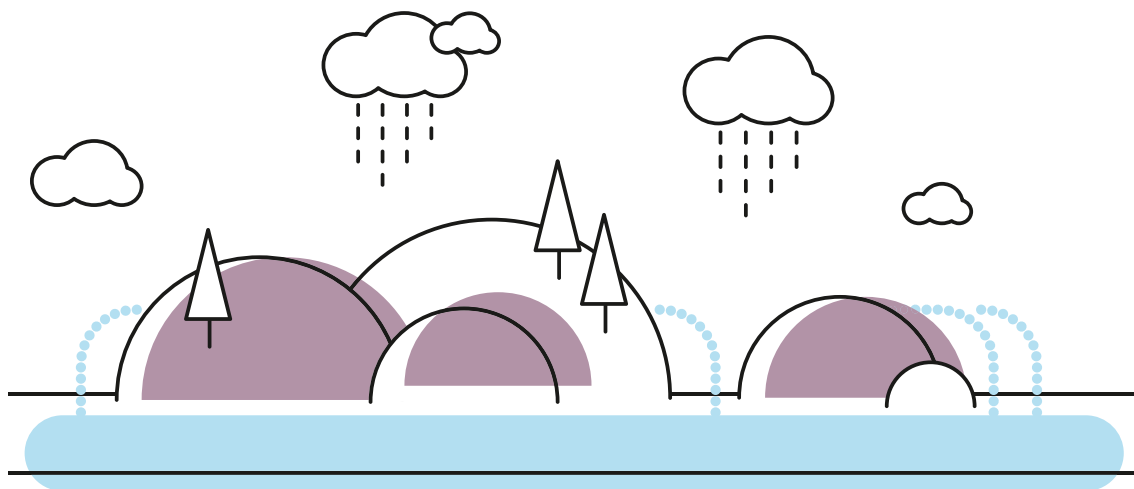
Customer behaviours

Customers can support resilient wastewater services by helping to prevent sewer blockages. We are encouraging customers to think about what they put down the toilets and drains with a number of campaigns across the region. For example, a successful pilot in Bradford is harnessing the biofuel potential of waste cooking oil, while protecting local sewers and increasing the resilience of the public sewerage system. We have created a behaviour change communications campaign specifically aimed at preventing sewer abuse caused by the incorrect disposal of wet wipes. The campaign targets messages in areas with reoccurring blockages caused by wet wipes. Given the locality of messages in affected areas, we hope to see a long-term reduction in the incorrect disposal of wet wipes in these areas.

Collaborating to reduce the risk and impact of flooding

Yorkshire communities have experienced the damage, distress and health impacts of numerous flood events in recent years. Customers highlight it is a priority for us to improve resilience to sewer flooding and we recognise our role in supporting the improved management of overall flood risk.

We collaborate with many organisations to effectively manage flooding in Yorkshire. We share equipment and resources to ensure an effective response to emergencies and hold training exercises together to practice how we will respond. To inform joined-up long-term plans for Yorkshire we share our data, risk information and investment plans, and we work increasingly closely when investing in solutions.



By working with others and using storm water management techniques, like sustainable drainage systems, we are reducing flood risk and protecting the finite capacity of our sewers by easing the amount of surface water entering them. 'Living with Water' is an example of our approach in and around Hull, where we have been instrumental in establishing a partnership approach essential to effectively and efficiently managing the substantial flood risk facing local communities.

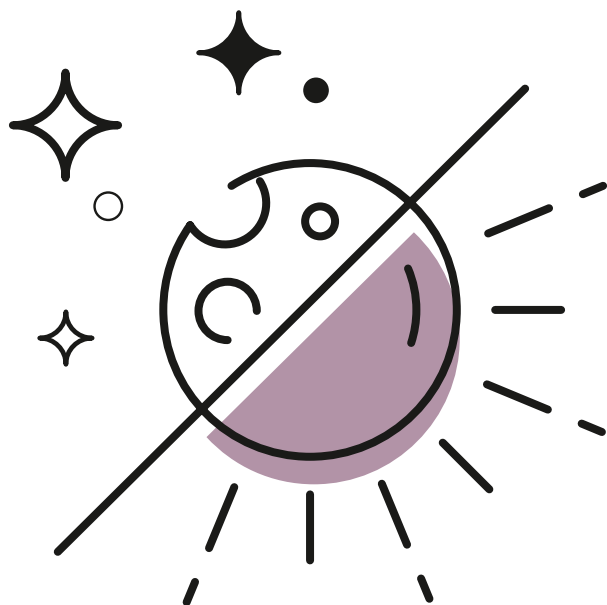
Managing land to reduce flood risk

Increasing urban development and intensive agricultural practices in rural areas enables rapid water run off which overloads the drainage system and causes flooding. Effective land management is at the heart of our flagship partnership scheme in Hull. We are also implementing natural capital approaches across Yorkshire, in which we apply collaborative and sustainable methods that offer multiple benefits to our customers and wider society. We are planting one million trees over the next ten years in a bid to reduce flood risk, while also offsetting carbon emissions and supporting the creation of a Northern Forest. We have already started planting in the Calder Valley through a partnership with the White Rose Forest and others, where a healthy and resilient natural environment is being created to help keep water out of harm's way. A healthy natural environment can hold storm water upstream out of harm's way.

Enhancing energy resilience and reducing carbon

The movement and treatment of water is energy and carbon intensive. The substantial improvements we have made to protect the water environment has involved large scale engineering solutions which use lots of concrete, metal and energy. We are reducing our greenhouse gas emissions to play our part in minimising future climate change. Our actions help us to be more resilient by reducing our need for energy and other materials that have volatile and increasing prices, and for which supplies can be interrupted.

We have reduced our operational emissions by around a third over the last ten years by becoming more energy efficient and generating more of own energy from cost effective renewable sources. We have invested to recycle sludge (byproduct of our treatment processes) and create energy. We are going further with a stretching carbon performance commitment for 2020-25. We have started to reduce the emissions associated with the materials we use to maintain and enhance our infrastructure. We are also getting a better understanding of the carbon locked in our peat and woodland, and how we can use our land management programmes to store more carbon over time.



Critical enabling activities

Our resilience framework incorporates all the essential functions to the ongoing running of the business and the public services we provide.

For example:

A resilient workforce

- To ensure we have a culture where safety is the top priority we have delivered an extensive behavioural engagement programme, including the introduction of 10 Life Saving Rules.
- We are proactively addressing the skills shortages in Science, Technology, Engineering and Maths (STEM) through a range of measures, including the establishment of an award-winning apprenticeship programme to complement our long-standing graduate scheme.
- We have extensive resource planning, including progression and succession plans.

A resilient supply chain

- We have a mature process and risk model for the assessment and management of our complex supply chain.
- Our procurement team monitors expenditure to manage exposure to any single supplier. We have reviewed many critical supplies for the reliability of the supply chain, identifying, for example, where we have single source supplies which present risk of interruption.
- To support long-term resilience we are driving up standards in our supply chains by embedding a range of sustainability checks in our standard process.

Physical and digital security

- We take an integrated approach to the security of our sites and systems as we embed the latest technologies. We have a history of managing physical site security and more recently have adopted best practice approaches to manage increasing threats to our cyber security.
- We use a three-levels security framework to govern cyber, information, communication, physical asset and personnel security.
- We follow the best practice requirements of ISO 22301 for Business Continuity and ISO 27001 for Information Security.
- We are embedding business process management throughout our business and will shortly complete our major upgrade to the latest SAP S/4 HANA, enabling substantial advances in the management of data and application of processes.
- We are working closely with Defra and leading the national water industry group to draft water sector guidance regarding the new National Infrastructure Security Directive.

Financial resilience and transparency

Our assessment shows our financial processes are some of our most resilient, with mature and comprehensive governance. This is evident in our Annual Performance Report (APR) and Annual Report and Financial Statements (ARFS) at www.yorkshirewater.com/reports.

Financial resilience

In 2009, we established a financing structure known as whole business securitisation. This supports our resilience by establishing protections to make the business more safe and reliable, for example limiting borrowings, dividends and the ability to lend money to others. The protections also require profits to more than cover the amount of interest that we pay. Lenders are more prepared to offer lower rates of interest than would otherwise be the case, helping keep bills low for customers.

Gearing (this is the proportion of debt to the overall value of the company) is important to our resilience because sufficient headroom is an important option, should we need to borrow money to respond to unforeseen events. Our gearing is relatively high within the water industry and we have taken measures to strengthen our financial resilience and reduce gearing, including:

- Paying low levels of dividends (£45 million in the 2015-20 period) to our shareholders. This is a standard part of our policy that ensures shareholder dividends are appropriate and mindful of financial resilience.
- Selling other companies within the Kelda Group and investing the proceeds into Yorkshire Water.
- Reducing our interest costs.

We undertake extensive modelling and management controls to plan and externally confirm our financial resilience. This includes stress testing against unlikely scenarios. We publish the results of our long-term viability assessment in our annual accounts. In this assessment we consider our viability for up to nine years, through to the end of the current and subsequent reporting period. In our latest assessment we have matured our approach to add further rigour.

Customer affordability

Customers' willingness and ability to pay their water bill is essential to our long-term resilience. In line with our customers expectation of us we have consistently kept bills amongst the lowest in the industry. We lead the industry in our approach to debt management, proactively helping those struggling to pay through a range of support packages including our innovative social tariff. We take effective action where customers will not pay.

Assuring our resilience

We have an integrated approach to the assurance of our resilience, following our model for three levels of assurance. Our most recent independent assessments include the following in 2018:

- Jacobs audited our approach to resilience in our planning for each of the performance commitments and key investment areas.

- Deloitte audited our financial resilience and our new resilience framework.
- The Cabinet Office Emergency Planning College have audited the maturity of our resilience to BS 65000.

All audits concluded we have an effective approach to resilience, with areas of strength and best practice. The audits also suggested areas for continued improvement which have been, or are being, actioned.

Our Board has discussed our resilience and taken steps to ensure our plan and long-term strategy will maintain appropriate levels of resilience.

Resilience acceptability

We have examined resilience throughout our customer engagement programme over the last two years to fully understand how customers view our current and future performance, both in isolation and relative to the service other water customers receive. Overall, customer feedback has been very positive. From a survey of nearly 2,000 household customers, 86% confirmed they are supportive or very supportive of our final business plan. 72% of customers also told us that they were confident or very confident that our plan would cope with future challenges like population growth and climate change. We have confirmed with our customers that our plan will provide the right level of reliable and good quality service at a cost they are willing to pay.

Continuing to develop our approach

We are collaborating internationally to deliver a peer reviewed global view of water sector resilience best practices and future innovation opportunities. This project is being led by experts from Cranfield University with collaborators from international water companies. We will continue to learn from other leaders, share our learning and facilitate debate to enhance water industry resilience best practice.

Our approach to resilience will continue to evolve over time with latest evidence and understanding and in response to societal expectations and customers' wants and needs. We are reviewing our standard approach to the governance of resilience and embedding the regular use and review of our new whole business resilience framework to shape our strategy, investments and operations. As part of our Big Goal to be open and transparent, we will regularly report on our progress and latest resilience assessments. We will also continue to ask independent experts to audit our approach.



Financial resilience

Our core financial strategy is to secure an overall risk and return package which is attractive enough to raise the necessary capital to fund our planned investment delivers an acceptable price for our customers, and also ensures the company remains financially resilient.

In conjunction with our Big Goal aim to keep bills as low as possible for our customers, it is essential for us and the industry as a whole to remain financially viable and resilient; the balance of risk and return needs to be appropriately set to provide us with the financial stability needed to deliver the service demanded by our customers.

This section of the PR19 plan sets out the steps we have taken to ensure the financial resilience of the company and the individual price controls. We have ensured that our aggregated revenues, costs and cash flows enable us to maintain financial ratios which will enable us to finance our functions efficiently.

The sections that follow outline our approach to ensuring the financeability of the company and the overall risk and return package.

Our financial strategy

Our proposed outcomes, which have been accepted by our customers, show that there is a need for significant new investment across the next five years. In addition to the on going need for investment and maintenance of our assets we have an obligation to deliver the Water Industry National Environment Programme which amounts to £862 million of enhancement expenditure during 2020-25 period.

For us to achieve this investment, it is critical that we remain attractive to investors who can provide the finance necessary for the large-scale investment programmes. Attractiveness to investors does not come at any cost and we are committed to maintain legitimacy in the eyes of customers and wider society.

Approach to financial resilience

The water industry is a long-term industry which requires a long-term, stable approach to the financing and management of its assets. Financial resilience is a primary strategic objective along with service, operational and corporate resilience.

During the current period our approach to financial resilience has developed significantly resulting in a considerable strengthening of our financial resilience and balance sheet.

Process

Our approach to financial resilience is managed through the Finance Governance Group. This group meets monthly (and ad-hoc where necessary) to consider all aspects of our financial arrangements and resulting indicators. It is chaired by the Director of Finance, Regulation and Markets and includes senior leaders from the Treasury, Finance and Regulatory functions to take a holistic approach to our financial arrangements.

To facilitate this process, we have a single financial plan with common assumptions that underpins many different processes including annual business planning, five-year business planning long term viability and longer-term valuation assessments.

Long term financial review

In 2015, at the start of the current period, we undertook a review of our financial strategy. As a result of this review many key actions were put in place:

- **Reduced gearing.** During the current period we have, overall, paid dividends from the appointed business to cover Kelda Group operating costs and interest costs only. This has amounted to an average of £24 million per annum. The exception to this is 2016-17 when a dividend was paid, amounting to £45 million, that was distributed to Kelda shareholders. This has resulted in a significant reduction in gearing of 6% across the period. Without the additional reinvestment of £260 million and exceptional refinancing costs (see below) of £250 million, gearing would have been reduced by a further 7%, resulting in a gearing level of 69% at March 2020.
- **A comprehensive review and restructuring of the our hedging (swap) portfolio.** Throughout the 2015-20 period, we have taken active steps in managing our portfolio of inflation linked swaps to improve our financial resilience for 2020-25 and beyond. This has involved four restructuring transactions that amended the terms of certain inflation linked swaps. These transactions have achieved the following:
 - Extended mandatory breaks on £117.5 million of inflation swaps from February 2020 to August 2030.
 - Reduced our annual net interest cost by £50.8 million for each of the five years of the 2020-25 period, with the majority of the saving continuing through to the 2025-30 period. This will provide further headroom in interest cover metrics, that are part of our financial covenants and used by ratings agencies as part of their assessment for publicly issued credit ratings.
 - Facilitated the introduction of institutional investors, who have a greater appetite and capacity than traditional bank counterparties for long dated, inflation linked cash flows.
 - Allowed us to use cheaper Class A debt to finance some parts of the restructuring transactions.

The actions that we have taken illustrate the importance we place on financial resilience, resulting in a significant strengthening of our balance sheet and financial resilience.

Risk and Return

Framework for risk and return

The regulatory framework enables us to earn a fair reward in exchange for managing and bearing a number of the key risks within the industry. This sharing of risk and reward is achieved via a number of regulatory mechanisms which incentivise performance to push the industry forward and enhance the quality of services provided to all customers, while also mitigating or allocating risks.

The new and existing incentive mechanisms are designed to encourage us to deliver our services efficiently, while providing the best possible service to our customers. These incentives ensure that the benefits or rewards of efficient delivery of services are shared between us and our customers. The allocation of rewards reflects the risks borne.

We have always responded to incentives, yielding gains for us and our customers. The range of incentives included within our plan will encourage us to exceed our performance commitments ensuring we continue to improve services for our customers, while also continuing to reduce costs to keep bills as low as possible in the long term.

We consider that our plan includes a sharing of risk and reward between us and our customers. We work on the principle of placing risk where it is most efficiently managed for the benefit of customers.

Our rewards are principally earned through the following three mechanisms:

- **The weighted average cost of capital (WACC)** – base notional allowed return.
- **Outcome delivery incentives (ODI)** – outperformance/underperformance linked to our performance commitments.
- **Totex incentive mechanisms** – rewards/penalties linked to our efficiency when delivering our investment plans.

Overall risk and return package

We have examined our plan and its resilience to changes in circumstances, the operating environment and inherent uncertainty. Having identified a number of risks that could impact upon the delivery of our plan, we have run a number of scenarios to determine the financial impact of those risks versus the potential to earn rewards through enhanced performance.

Figure 13a shows the output of this scenario analysis in the form of a return on regulatory equity (RoRE) chart. This shows we consider that we have a potential RoRE range of +4.6% to -4.8%, around a mid-point of a 4.0% RPI stripped equity return, which is broadly consistent with Ofwat's illustrative range provided within the PR19 methodology.

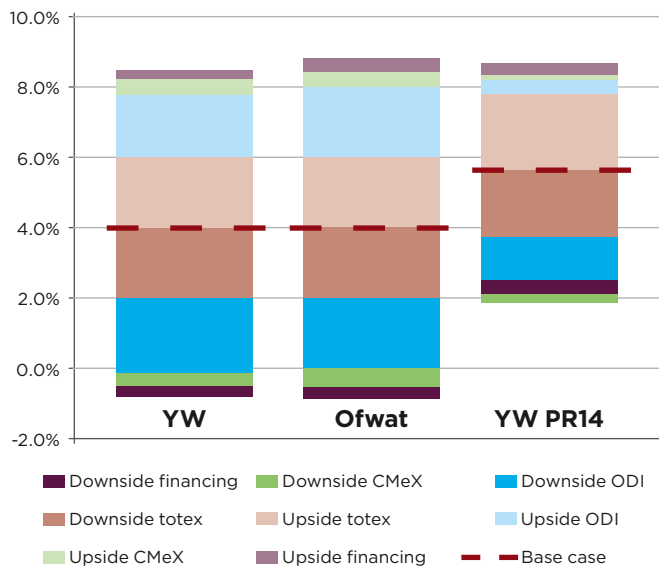


Figure 13a – Base return reduction.

Figure 13a shows that the base return for our investors has fallen from 5.6% at PR14 to 4.0%.

There is a potential to earn a similar overall reward, dependent upon delivering service improvements to our customers. This illustrates the principle and intention that there is a much closer link between performance to customers and the risk and reward available to us than has been the case in the past.

Based on the analysis, we consider that there is a balance of risk and reward between us and our customers.

Cost of capital and returns

There are a range of views on the rate of return that we need to earn in the period 2020-25 to ensure we can finance our plan. In line with the regulator’s guidance, we have utilised Ofwat’s December 2017 preliminary estimate of appointee cost of capital of 5.47% (2.40% real RPI stripped at 3.0%) within our plan. We have also allocated the cost of capital and retail margins across the separate price controls in line with the Ofwat’s guidance.

This real return of 2.40% represents a significant decrease in the return from the last price review of 3.74%. As there is the potential to earn a comparable return through an enhanced incentive regime if our performance commitments are met, we consider that there is an overall balance between risk and reward presented within this plan.

Our plan has been assured by our Board in August 2018. Prior to our final determination market conditions could change, which may result in a change to the outlook for the 2020-25 period. The final PR19 rate of return will need to be assessed closer to the time of the final determination, considering all the information that is available to us in 2019.

Wholesale cost of capital

In line with regulatory guidance we have used Ofwat’s December 2017 preliminary estimate of the proposed wholesale cost of capital of 5.37% (2.30% real RPI stripped at 3.0%) in our plan.

We have considered whether a different wholesale WACC would be appropriate for any of the individual price controls due to a different risk profile; we have not found a compelling reason to indicate that the risk profile for the different price controls diverges enough to have a material impact. We have, therefore, applied a consistent WACC across all wholesale price controls.

Retail margins

In line with regulatory guidance we have used Ofwat’s December 2017 preliminary estimate of retail margins included within our plan as follows:

- 1.0% pre-tax retail margin – non-contestable retail activities.
- 1.3% pre-tax retail margin – contestable retail activities.

The 2020-25 annual average aggregate retail margin is 3.6%. This is higher than the initial 2.5% aggregate margin from the PR16 determination because of the allowed increase in customer group 2 gross margins, towards the uniform gross margin caps. The 3.6% reduces to 1.3% (profit before interest and tax) after costs not included in the build-up of the default tariffs. Further explanation can be found in the Business Retail appendix 21a.

Incentives to drive company performance

Incentive mechanisms are designed to encourage us to enhance the quality of the services we provide, while also delivering our services more efficiently. The incentives ensure that the benefits or rewards of efficient delivery of services are shared between us and customers, with the allocation of rewards reflecting the allocation of the risk.

The PR19 plan methodology has highlighted a reduction in the notional allowed return (WACC), which is offset by an increased emphasis on performance based financial incentives. We will need to enhance our performance to achieve comparable returns with previous price reviews.

We consider that this is a fairer approach, ensuring that enhanced returns can only be earned once improvements requested by our customers have been delivered.

Following consultation with our customers and the Forum, we consider we have developed a fair range of incentives that will meet our customers service requirements while also ensuring an affordable bill.

The overall package of incentives within our plan, provides us with the potential to earn a sufficient return to attract investors and ensure we can raise the necessary funds to finance our investment programme, if we deliver the service improvements promised to our customers.

Outcome delivery incentives (ODIs)

We have developed a suite of outcomes and measures of success through engagement with our customers, in addition to the comparative measures outlined within the business plan methodology.

The graph below illustrates the risk and reward available as a result of our ODIs.

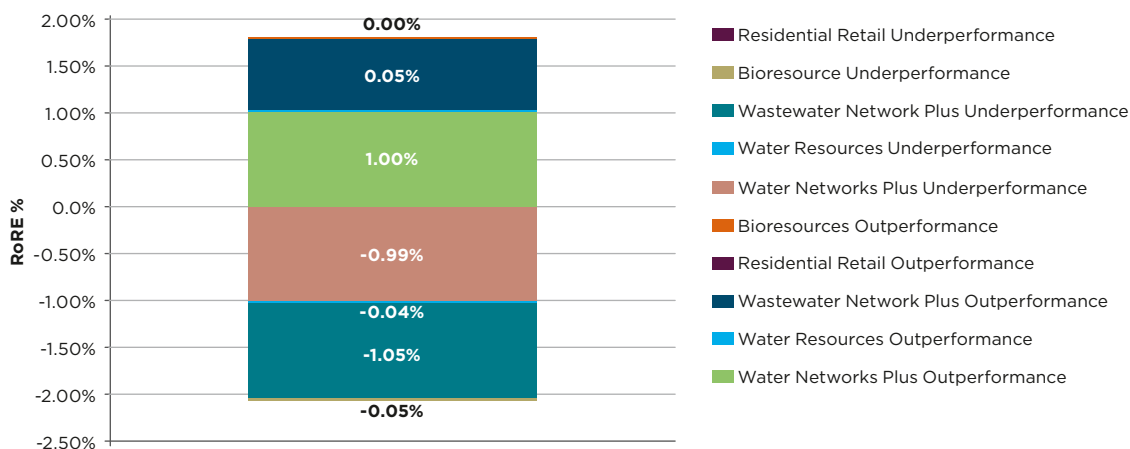


Figure 13b – The risk and reward available as a result of our ODIs.

Incentives for cost performance

Our plan is based on efficient costs. It is important that we are incentivised to continue innovating and become more efficient, enabling future cost savings to be passed on to our customers.

Cost incentive mechanisms have created a financial stimulus for us to become more efficient. These financial incentives enhance the whole industry when the most efficient companies cause the frontier to shift.

It is important for these incentives to continue so that we continue to fund innovative and efficient ways of delivering service and environmental improvements now and in the future, as we do not see the need for further investment to reduce in the future.

Understanding the risks that could affect our plan

Overall, we consider the mechanisms within the current framework ensure that risks are allocated to those best placed to manage them. The mechanisms also ensure that the rewards gained from our efficient delivery of services are shared between us and customers, in a way that is reflective of the risk allocation.

We embed risk identification in all our management systems. A network of risk champions work with leadership teams to prompt risk identification, consistent measurement and review. Risks are logged and we run risk identification workshops with our Board twice a year, as well as with key programmes. Each risk is allocated to a risk owner who is responsible for the monitoring, management and reporting of that risk through the risk management process for the life of the risk.

We have also examined our plan and considered its resilience to changes in circumstances, the operating environment and inherent uncertainty to identify any further risks specifically associated with the delivery of our plan.

Our approach to risk management

Effective risk management is essential for us to manage uncertainties and achieve our objectives. It is embedded in our normal business process and culture, and overseen by an executive-led Risk Committee.

The Risk Committee consists of senior executives from across the business and is chaired by the Director of Finance, Regulation and Markets. This improves our ability to predict and prepare for challenges to the achievement of our priorities and supports the creation and protection of value in our company.

We manage risk in line with the following key principles:

- **Transparent risk culture:** all risks are measured, managed, monitored and reported.
- **Proactive approach:** risk management is dynamic with risks and opportunities identified and escalated to be managed at the appropriate level in the business.
- **Risk governance:** all risks are subject to appropriate controls and governance.
- **Risk appetite:** a clearly defined risk appetite framework is aligned to the business strategy and reflects our Board's approach to risk taking.

RoRE analysis

We have implemented a thorough and robust approach to appraising the risks associated with our PR19 plan specifically, the modelling of the RoRE risks scenarios specified by Ofwat:

- Revenue risk.
- Totex risk.
- Retail risk (residential and business).
- ODI related risk.
- WaterworCX performance risk.
- Financing risk.
- Water trading risk.

The graph below summarise the RoRE risk ranges implied by our analysis, in comparison to Ofwat’s published guidelines for PR19 and our final determination for FD14.

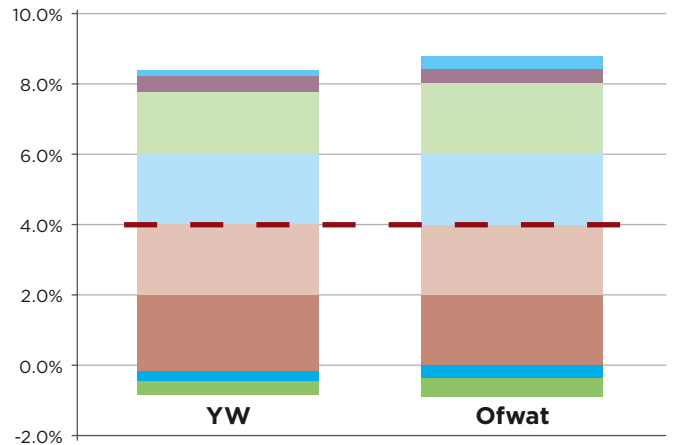


Figure 13c - RoRE risk ranges.

- Downside ODI2
- Downside CMEx
- Downside ODI
- Downside totex
- Upside ODI
- Upside CMEx
- Upside financing
- Base case

A summary of the approach used for each of the scenarios is provided below. We have taken care, not only to ensure that the analysis we have undertaken is fully consistent with Ofwat’s methodology, but also that the depth and breadth of our evidence is comprehensive.

Further details on specific methods used for each scenario are provided in appendices 13a and consultancy reports.

Overview of our approach and summary of key points

Key features of our approach include:

- Our work started from a risk framework (developed in consultation with Arup), to ensure that the full spectrum of financial risks have been included. Further details on this risk framework are provided within the resilience section.
- We have considered risk mitigation and our efficient management responses.
- High and low risk scenarios are specified in terms of P10 and P90 values at the appointee level. That being where risk impacts are shown by price control area, this still reflects appointee level risk, rather than simply summing individual risks, which as Ofwat notes, is inappropriate. All impacts are reported relative to our base case and are in 2017/18 prices. Where RoRE ranges are reported, these reflect notional gearing, as specified by Ofwat.

- We have drawn on a range of evidence, including both bottom-up and top-down analysis, using a combination of historical and forward-looking data, plus independent expert opinion where appropriate.
- Our approach to modelling risk has been especially detailed, drawing on a Monte Carlo simulation model developed by Economic Insight.
- We have applied our thorough assurance process across our risk analysis.
- The overall RoRE risk range arising from our plan is in line with Ofwat’s published guidelines and assurance advice received from our consultants.

Our method and analysis

Across each of the RoRE risk scenarios, we applied a common methodology which consisted of the following steps:

- Identifying relevant risks.
- Quantifying risk impacts.
- Monte Carlo analysis.
- Factoring in risk mitigation and efficient responses.
- Assurance.

In the following, we briefly expand on each of these steps.

Step 1: Identifying relevant risks

All our analysis began from a 'risk framework' developed with our consultant Arup, in conjunction with our resilience team. We identified a full range of risks and evaluated their applicability across the scenarios we needed to model. Care was taken to ensure this was comprehensive, so the full spectrum of financial risks were considered. Our framework included 34 shortlisted categories of risk types, within which a list of 114 subcategories were identified. (See resilience section for further details on the risk framework).

When determining what risks to assess, we also considered our existing risk analysis from PR14 and advice from our consultants. For each scenario we reached a view as to which risks were most relevant, and why. The following table summarises the most material risks by scenario (full details of risks modelled are contained in appendices and supporting reports).

Table 13a

Key risk types by scenario	
Scenario	Other committees
Revenue risk	Demand risk.
Totex risk	Efficiency under / outperformance; real price effects.
Retail cost risk	Economic uncertainty (bad debt); labour market uncertainty.
ODI risk	Performance risk.
WaterworCX	Performance risk / relative performance risk.
Financing	Risk of raising new debt above / below benchmark.

Step 2: Quantifying impacts of risks

Having identified a set of risks to analyse, our next step was to develop approaches to quantify them. Wherever data was available, we sought to combine the following methods:

- **Bottom-up quantification.** Under this method, we collected information and data to help inform:
 - the key drivers of the risk in question.
 - the likelihood of the risk occurring.
 - the cost consequences should it occur and then built a quantification up accordingly.
- **Top-down analysis.** Under this approach, we wanted to analyse the historical variation in the risk factor and then translate this into a financial impact for the scenario in question.
- **Historical analysis.** For purposes of assurance, where data was available, we examined the extent of historical variation in the risk scenario outcome of relevance this is, revenue, totex, retail costs. This was then used as a check on the risk impacts implied by our other analytical techniques.

Under both bottom-up and top-down approaches, we defined probability distributions for each individual risk factor within a scenario, this allowed us to estimate a distribution of its ultimate financial impacts.

Step 3: Monte Carlo modelling

We would not expect to be at the extremes for multiple risk factors, we applied Monte Carlo analysis to identify the relevant high and low case impacts. This involved the following steps:

- For each risk factor we began from a probability distribution, which estimated its financial impact (£ million) in isolation.
- We developed models to assess the risk of our plan, these were then used to iterate through large numbers of possible outcomes for each risk factor, drawing from those distributions.
- We then translated this into a distribution of overall financial impacts, positive and negative from which the P10 and P90 values were derived. By constructing the analysis in this way, we were able to capture appointee level risk.

Our Monte Carlo analysis was most sophisticated in relation to assessing the impact of ODI performance risk. We commissioned Economic Insight to develop an ODI Risk and Reward Scenario Model (ORRSM), which allowed us to calibrate our ODI risk in the wider context of our plan. This ensured that our finalised ODI package represented an appropriate balance of risk for our customers and investors. Details of Economic Insight's method and the ORRSM are set out in appendix 13b. ODI RoRE Risk Analysis: a report for Yorkshire Water.

Further details of how we implemented our method for totex risk and retail cost risk can be found in the following reports, also by Economic Insight:

- Appendix 13c – Estimating retail cost risk from economic and labour market performance.
- Appendix 13d – Estimating totex risk from efficiency savings and input price inflation.

Step 4: Risk mitigations and efficient management responses

We understand the importance of having appropriate risk mitigation plans in place and ensuring that our responses to risk are efficient. This makes sure that any adverse impacts on customers are minimised. We have ensured that all our RoRE risk analysis explicitly considers the most efficient management responses we can implement.

To ensure that mitigating actions were reflected in our various risk analyses, we undertook the following steps:

- For every scenario modelled, we identified the full set of mitigating actions.
- Determined what the impact of the mitigating action would be. We considered this in two distinct ways:
 - To reduce the size of financial impact, should the risk materialise. We ensured that the risk mitigation was incorporated within our assessment of potential cost impacts.
 - The likelihood of the impact reducing. We ensured that this was reflected in our selection of P10 and P90 values. When identifying relevant probability distributions, we would select a lower risk option post-mitigation.

Assurance

We have applied rigorous assurance to our analysis. This includes the following key steps:

- In the early stages of the development of our risk analysis approach, Economic Insight provided advice as to the frameworks and methodologies to be used. This included developing their own early guideline range for RoRE risk.
- Analysis followed our three levels of assurance process.
- Our estimated risk impacts for the high and low case scenarios were verified against alternative evidence sources wherever possible. Specifically, for scenarios where multiple methods/sources were available, our primary approach was validated by the alternative approaches.
- Our finalised risk impacts were compared to Ofwat's guideline ranges.

Managing uncertainty

We are not proposing any items to be covered by uncertainty mechanisms.

In summary

We have demonstrated that there is an overall balance between risk and return mechanisms. The resultant RoRE analysis indicates a range of +4.4% to -4.8%, against a mid-point of 4.0% consistent with the return on equity within the assessed cost of capital.

We have applied a rigorous analysis to identify the risks within our plan linking to our industry leading assessment of resilience.

We include a proposal to protect customers if actual rewards are higher than those within the expected RoRE range.

We include in section 3 Board statements:

- Explaining how they have identified risks associated with delivering plan.
- Confirming that the plan will deliver operational, financial and corporate resilience over the 2020-25 period.

Other financial matters

Our approach to corporation tax

Within the business plan the following assumptions have been made with respect to the calculation of tax, which are in accordance with the approach outlined within the PR19 methodology:

- Yorkshire Water Services is treated as a “standalone” company.
- Corporation tax and capital allowance rates have been assumed to be either at current levels or reflective of announced revisions, for example the corporation tax rate is assumed to be 17%.
- Interest costs have been calculated based on our actual gearing, as this is higher than the notional gearing of 60%, ensuring our customers benefit from the tax implications of our financial structure.
- Opening capital allowances pools have been calculated based on our anticipated actual pool values, these are higher than the equivalent notional pool values. This ensures our customers benefit from the tax implications of our financial structure.
- Additions to the separate capital allowance pools have been based on an analysis of the capital schemes in the 2020-25 period.
- Tax adjustments in relation to operating costs have been based upon historical adjustments made by us. These have been revised to reflect the level of operating costs forecast in the 2020-25 period.
- Other tax adjustments have been calculated for particular features of our tax calculations, for example, taxable gains that will crystallise in the 2020-25 period and deductions available for historical refinancing.

Our approach to pensions deficit payments

We have followed the guidance set out at PR09 and reiterated in Information Note 13-17 as to the amount to be included within prices for funding of the pension deficit until 2022. This allowed for 50% of the deficit existing at the time of PR09 to be passed to customers.

The remaining amount, and amounts after 2022 if needed, will not be paid for by our customers, we will provide the funding.

Financeability and financial resilience

Securing finance

To continue to improve drinking water quality, raise environmental standards and deliver the service improvements that our customers and stakeholders have told us they expect, we will borrow an additional £1.6 billion from investors. To do this efficiently for our customers we will need continued access to low cost finance, which we have through our current investment grade ratings.

We plan to maintain our investment grade ratings across the three principal ratings agencies Moody's, Standard & Poor's and Fitch. The table below shows our current rating across each of the agencies and the number of rating levels of headroom to the minimum rating level required to achieve investment grade.

Table 13b

Current debt ratings			
Rating agency	Standard & Poor's	Fitch	Moody's
Yorkshire Water's rating	BBB (stable)	BBB+ (stable)	BAA2 (negative)
Headroom - rating levels above investment grade	One	Two	One

Approach to assessing financeability

We have assessed our financeability on both a notional and actual basis. We have undertaken a thorough assessment to ensure financeability at an overall company level, while also ensuring each price control is financeable on a stand-alone basis.

To ensure that we are financeable and can maintain our investment grade ratings with all three of the ratings agencies throughout the 2020-25 period, we have considered the full range of financial ratios prescribed within the PR19 plan methodology, together with our own specific ratios applicable to our existing debt portfolio.

We have primarily assessed our financeability by ensuring we meet the target levels for each of the key ratios as illustrated in the tables 13c and 13e.

When assessing our notional financeability, we have considered our financial ratios against the targets required to achieve a rating between A and BBB grade, as these are the ratings used within the PR19 plan methodology to determine the notional cost of debt. Based on ratings guidance provided by Moody's and Standard & Poor's (S&P), we have set a target for adjusted interest cover ratio of 1.50 times and funds from operations (FFO) to debt of 9.0%.

When assessing our actual financeability, we have considered our financial ratios against the targets required to safely maintain our current rating. For the principal adjusted interest cover ratio this equates to a target of 1.30 times and for fund for operations to debt this equates to a target of 6.0%.

Table 13c

Notional and actual interest cover ratios (appointee level)				
Financeability summary analysis	Notional target	Notional ratio	Actual target	Actual ratio
Gearing %	-	62.9	-	78.3
ICR (Ofwat basis)	1.50	2.25	1.30	2.03
FFO:Debt (Ofwat basis) %	9.0	10.04	6.0	7.79
ICR (Moody's)	1.50	1.58	1.30	1.42
FFO:Debt (S&P basis) %	9.0	9.21	6.0	6.16
ICR (YW covenanted)	n/a	n/a	1.20	1.42

The ratios above include a base dividend. The target ratios are met for the both the notional balance sheet and the actual balance sheet. We conclude that the plan is financeable on both the notional and actual balance sheets.

Full detail and annual profile of the financial ratios are contained in Appendix 13e.

Financeability by price control

We have assessed financeability primarily at the appointee level. Allocating the existing debt and associated interest charge across the individual price controls is a key issue when assessing financeability.

We can, however, take some assurance that the individual price controls can stand alone as each control has revenue designed to cover:

- Overall totex for wholesale and cost to serve for retail.
- On-going day-to-day expenditure, fast money through the pay-as-you-go (PAYG) rate.
- Longer term expenditure, slow money through RCV run-off.
- A consistent cost of capital applied across each control with separate margins for retail.

This building block method, consistent with the PR19 methodology and Ofwat's financial model, and run in parallel with our own internal model, gives us assurance that each price control has the correct revenue requirement to cover its day-to-day expenditure, longer term expenditure needs and the return needed to cover past and future borrowing requirements.

We have included a suite of financial ratios for each of the wholesale price controls in Appendix 13f, which show that each price control is financeable.

Financial resilience analysis

The sensitivity analysis we carried out has looked at the impact of the following scenarios on our available cash, key financial ratios and ability to maintain our investment grade rating:

- Reverse stress testing – assessing how much headroom is inherent in our key financial ratios.
- Scenarios prescribed by Ofwat in the April 2018 consultation.
- Scenarios conducted as part of our long-term viability analysis conducted for our 2018 annual report.

Approach to financial resilience

With regard to financial planning and maintaining financial resilience we use the following key tools:

It is our policy to maintain sufficient headroom within the financial ratios to not only cover day-to-day shocks, but also severe but plausible scenarios. The aim is to have headroom of at least 10 basis points above target levels for our covenanted ratios, which equates to annual opex increases of up to £20 million per annum or capital expenditure in the region of £500 million. It is also important to recognise that target levels themselves are not necessarily minimum levels as described above.

A dividend policy and practice that explicitly states distributions will be made only after the appropriate financial resilience analysis has been undertaken, both in the immediate and into the foreseeable future. Prioritising financial resilience above the payment of dividends means that there is a further cash reserve of up to £250 million.

Reverse stress testing

We have tested the amount of headroom within the key financial ratios to a number of different levels.

- **Headroom to target levels.** Reaching these levels in themselves does not lead to an impact on our credit rating, such as the Ratings Agency's subjective view on the stability and predictability of the regulatory environment, cost and investment recovery and the level of revenue risk.
- **Default levels contained within our covenants.** These levels are more absolute in terms of consequences, although they are lower levels than the target ratios.

We measure the amount of headroom by converting the excess over the target into an earnings before interest, tax, depreciation and amortization (EBITDA), revenue or cost impact and a debt/interest impact, caused by the need to fund capex that we can stand.

For example, a 10 basis points headroom in interest coverage ratio (ICR) equates to approximately a £20 million impact on EBITDA or additional debt (capex) of approximately £500 million, that is £500 million x 4% = £20 million.

The benefit of reverse stress testing is that it provides an excellent indication of the amount of resilience in the plan, irrespective of the risks identified. In other words, whether risks are identified through detailed bottom up analysis, historical precedent, or expert opinion and judgement, the ability to cope with shocks is explicit and quantified.

Table 13d illustrates the results of our reverse stress testing to both target levels and covenant default levels on an actual gearing basis.

Table 13d

Reverse stress testing: headroom levels		
Reverse stress testing EBITDA headroom levels (£m)	Notional headroom £m	Actual headroom £m
Adjusted ICR (Ofwat basis)	110.5	117.8
FFO:Debt (Ofwat basis)	35.2	95.2
Adjusted ICR (Rating Agency methodology)	13.1	23.0
FFO:Debt (Rating Agency methodology)	7.7	10.2
Adjusted ICR (YW senior covenanted)	n/a	38.6
Adjusted Class ICR (YW class A covenanted – default level)	n/a	100.2

The analysis above shows that we have for the actual balance sheet:

- Headroom of £39 million (£19 million above £20 million targeted headroom) against covenanted ratios.
- Headroom of £23 million and £10 million against key Ratings Agency metrics.
- Over £100 million of EBITDA headroom per annum against the default level on our covenanted ratios and against the notional balance sheet we have:
- Significant headroom of £111 million and £35 million against Ofwat's two key metrics.

Forward stress testing

This is a more traditional method that identifies the underlying risks and then tests against our base.

We have identified the key parameters based on our risk analysis, which is consistent with the analysis undertaken within the long-term viability (LTV) statement included in our statutory accounts.

A summary of the impact of our LTV for a severe but plausible scenario against our base case is shown in the table below:

Table 13e

Notional and standalone interest cover ratios for severe but plausible scenario				
LTV - Severe but plausible scenario key ration analysis	Notional target	Notional ratio	Actual target	Actual ratio
Gearing %	n/a	65.3	n/a	80.2
Adjusted ICR (Ofwat basis)	1.50	2.13	1.30	1.92
FFO:Debt (Ofwat basis) %	9.0	9.40	6.0	7.37
Adjusted ICR (Rating Agency methodology)	1.50	1.44	1.30	1.30
FFO:Debt (Rating Agency methodology) %	9.0	8.48	6.0	5.69
Adjusted ICR (YW senior covenanted)	-	n/a	1.20	1.30
Adjusted Class ICR (YW class A covenanted - default)	-	n/a	1.00	1.43

Most ratios are above target levels for both the notional and actual balance sheet. The results above are before remedial measures, such as withholding the payment of dividends. If we were to retain the dividends as per our proposed dividend policy the ratios would be improved taking them all above our target levels, except for Rating Agency's FFO to debt on the actual basis.

Our sensitivity analysis indicates that Ratings Agency ratios might fall below target levels for both the notional and actual balance sheet. If this scenario occurred, it would be difficult to say with certainty what the impact would be on credit ratings as the levels are trigger levels and not default levels. Other factors would come into the assessment such as: trend, reason for cost shock, management response, mitigation put in place, exceptional nature of shock.

Ofwat defined parameters and combined scenarios

We have performed the sensitives as required in Ofwat's PR19 methodology to enable industry comparisons. A summary of the results indicates:

- Impact on actual covenanted ratios: there is sufficient headroom within our covenanted ratio default levels to fund the additional expenditure required under any of the prescribed scenarios.
- Impact on ratings agency ratios: for both the notional and actual balance sheets the target levels are breached on some of the scenarios.

If these scenarios were to materialise it is difficult to say with certainty what the impact would be on credit ratings as the levels are trigger levels and not default levels.

Other factors would come into the assessment such as: trend, reason for cost shock, management response, mitigation put in place, exceptional nature of shock.

The full results of the scenario analysis are contained within appendix 13g. This includes a discussion on which elements of the scenario we consider less likely to occur, mitigating factors we would take should such events arise, including assumptions regarding dividends and the impact of other group companies on our assessment.

Long term financial resilience

In addition to assessing our financeability against our plan, we have also carried out sensitivity analysis across the ten-year period through to 2030 to ensure our long term financial resilience.

To assess financial resilience across the 2020-30 period we have assumed that most of conditions will be consistent to those assumed within our plan for the period 2020-25 further details are provided in Appendix 13g.

We have modelled through to 2030 sensitivities derived from our LTV severe but plausible analysis. A summary of the results is shown below.

Table 13f

Sensitivity analysis 2025-30						
Sensitivity analysis 2025-30	Notional target	Notional base	Notional sensitivity	Actual target	Actual base	Actual sensitivity
Gearing %	n/a	62.6	64.6	n/a	80.6	81.8
Adjusted ICR (Ofwat basis)	1.50	2.25	2.10	1.30	2.10	1.96
FFO to debt (Ofwat basis) %	9.0	10.08	9.40	6.0	7.85	7.36
Adjusted ICR (Rating Agency methodology)	1.50	1.57	1.44	1.30	1.47	1.35
FFO to debt (Rating Agency methodology)	9.0	9.15	8.47	6.0	6.16	5.71
Adjusted ICR (YW senior covenanted)	n/a	n/a	n/a	1.20	1.47	1.35
Adjusted Class ICR (YW class A covenanted - default)	n/a	n/a	n/a	1.00	1.74	1.63

In summary

Based on the above analysis we conclude that our plan is financeable and financially resilient through to 2030.

Target ratios have been achieved for both the notional and actual balance sheets. We operate a policy of headroom, aiming to be 10 basis points above target levels. As a leading company we would reasonably expect this to be enhanced by the rewards available for providing upper quartile service and for upper quartile efficiency. We have additional headroom above covenanted default ICR's.

Our dividend policy explicitly states dividends will only be paid after financial resilience testing has been undertaken. This provides for a further cash reserve in the region of £250 million. We have a mature and robust approach to risk management and resilience as evidenced in other sections.

We include in section 3 Board statements confirming:

- The plan is financeable on both a notional and actual basis.
- We are financially resilient.

Sharing outperformance with customers

This section explains how we will meet the new requirements from Ofwat to share benefits arising from the way in which we are financed. Full details, including worked examples can be found in appendix 13h.

The new sharing mechanism will cover the following areas:

- The amount of debt that we carry as a proportion of our overall value, our gearing. Ofwat has stated that companies with a higher level of gearing must share the benefits of that gearing with its customers. To do this we have followed the mechanism that Ofwat proposed in its position statement published on 31 July 2018.
- We are adopting an additional voluntary mechanism to share outperformance if we achieve an actual cost of embedded debt below the notional cost of debt set by Ofwat.
- Recognition of where we have already shared with customers through investment of money saved through being efficient on costs or the direct benefits for customer who find themselves in vulnerable circumstances which are already included in our PR19 plan.
- The way in which we will work with the Forum to agree how best the various benefits should be shared with customers.

Our approach includes an element to meet Ofwat’s requirement for a mechanism to protect customers, if ODI payments turn out to be much higher than expected. We are confident that this mechanism meets the requirements set out by Ofwat. You can see more detail of how this mechanism works alongside a worked example in appendix 13h. We have shared this approach with the Forum who are supportive of the approach.

Element 1 – calculation of the deemed financial outperformance associated with higher gearing

We will have gearing above the 70% trigger level set by Ofwat. The benefit to be shared will be calculated as the difference between our actual gearing and 65% multiplied by the difference between our actual cost of debt and the cost of equity required by Ofwat as part of the PR19 methodology.

As suggested by Ofwat, the position for this mechanism will be assessed at the end of 2024-25 period. Element 4 below explains how any resulting sum will be reinvested to maximise the benefit for customers.

Element 2 – voluntary mechanism to share outperformance on the cost of debt

If the cost of embedded debt achieved during the five-year period is less than that allowed by Ofwat as part of the PR19 methodology, the net benefit will be calculated and 50% of the net benefit will be reinvested for the maximum benefit of customers via the mechanism set out in element 4.

Element 3 – recognition of the sharing of outperformance already included in the PR19 plan

In November 2017 we developed a plan to dramatically improve performance in key performance areas; leakage, internal sewer flooding, pollution and interruptions to supply. To fund these improvements we used money saved through outperformance. This was agreed by the Forum and our shareholders. The total new investment was £260 million, shareholders agreed to share £130 million of outperformance to deliver improved performance for customers. We propose to view the sharing that has already taken place as an offset to the deemed benefits that are accrued under element 1.

We are proposing to provide direct funding of £1 million per year to the Watersupport social tariff, we are one of a small number of companies who do this. It will support 6,000 customers each year. We propose to view this funding as a second offset. Our customers and the Forum are fully supportive of this approach to recognise the sharing of outperformance already included in the PR19 plan.

Element 4 – mechanism to reinvest any benefits

Where there is benefit to be shared with customers across elements 1, 2 and 3, we will consult with the Forum and our online customer panel to decide how best to reinvested to benefit for our customers. We will develop options focused on improving customer service and developing new capabilities that will be necessary to meet future challenges. These may include for example, further customer service enhancements, additional support to customers at risk of becoming vulnerable, additional measures to encourage reductions in water consumption or increases in water recycling, schemes to promote customer participation or schemes to promote the further development of new markets or partnership working. An equivalent bill reduction will also be one of the options offered. The options will be presented to our online panel for their comment and preference ranking. The feedback from the online panel will be discussed with the Forum to identify the options to be implemented.

Element 5 – backstop mechanism to protect customers against unexpectedly high ODI payments

At the end of each year, we will check how we have performed against our targets and submit our assessment to Ofwat for their determination. If the total is more than a certain level, 1.25% of RoRE, we will not claim this as an immediate uplift on customer bills. The excess will be held in a notional pot used to smooth bills in the period 2020-25.

Dividend policy

We have undertaken a review of our dividend policy to ensure it aligns with our overall strategic aims, in particular our approach to financial resilience, and also that it reflects current practice.

Dividend payments for the 2020-25 period.

We have paid a level of dividend during the 2015-20 period significantly below the notional dividends assumed at PR14.

Table 13g

Dividend payments						
	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	5 yr. total
FD14 notional dividend (£m)	88	93	97	102	107	487
Actual dividend (£m)	20	70	29	33	33	185

Review of dividend policy

We have reviewed our dividend policy which we published in our annual performance report (APR) 2017-18.

On review this does not fully reflect the strategic aims of the company nor does it align with tests included in the Initial Assessment of Plans (IAP) regarding dividend policy. The following policy has subsequently been agreed by the Board.

The company's current dividend policy is to:

Deliver real growth in dividends recognising the management of economic risks, the continuing need for investment of profits in the business and to pay additional dividends which reflect efficiency improvement, and particularly improvements beyond those assumed in the determination of price limits.

To pay dividends in respect of the non-regulated business reflecting the profitability of those activities.

Where it is foreseeable we will have sufficient profits available for distribution to continue to pay annual dividends consistent with this policy. We can also pay special dividends as part of any capital reorganisation which our Board concludes to be in our best interests and complies with our obligations under our licence.

The company's future dividend policy is to:

Deliver a base dividend recognising the management of economic risks and capital employed.

Adjust the base dividend to reflect and recognise: company performance and benefit sharing from service and efficiency performance, particularly performance beyond or below that assumed in the determination of price limits; the continuing need for investment of profits in the business and the funding of employee interests.

Be transparent in the payment of dividends and to clearly justify the payment in relation to the factors outlined above.

Where it is foreseeable we will have sufficient profits available for distribution and subject to appropriate financial resilience testing, to continue to pay dividends consistent with this policy.

Putting the policy into practice

We have devised a base dividend using a stepped approach and a methodology that is familiar to regulators and the CMA, is set out below:

Table 13h

Stepped approach to dividend payment	
Step 1	A base yield consistent with the assumed cost of equity and/or below the pay-out ratio as assessed by Ofwat, predicated on delivering performance and costs in line with the Final Determination. This indicates a base yield of 4% to 5%.
Step 2	The yield is amended for our actual capital structure that is, actual equity compared to the notional equity.
Step 3	The dividend to consider our performance and the sharing of the benefits of our performance. Can be under/over performance in both service performance and cost performance.
Step 4	Take account of employee interests for example, pension contributions.
Step 5	All of the above to be underpinned by the appropriate financial and financeability testing, which covers the availability of distributable reserves, retention of profit for reinvestment and credit rating.

Deriving the base dividend

In order to determine the base dividend, we have used the method established by regulators and the CMA. We set out in full the calculation for the base dividend below.

In the interests of transparency, we show the dividend that is to be paid from Yorkshire Water to Kelda Group, the costs at the Kelda Group level that have first call on the dividend and the resulting distribution to be paid to Kelda investors. The resulting distribution equates to a yield on equity of approx. 2.8%.

Table 13i

Our base dividends over the period 2020-25 (outturn prices)							
Base dividend (actual)		2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	5 Year total
Adjusted opening RCV (£m)	6,886						
Actual equity	22.8%						
Regulated equity (actual gearing)	1,570						
Initial yield	5.0%						
Annual growth		0.0%	0.0%	0.0%	0.0%	0.0%	
CPIH		2.0%	2.0%	2.0%	2.0%	2.0%	
YW Base dividend (£m)	78.5	80.1	81.7	83.3	85.0	86.7	416.6
Kelda interest (£m)		(25.6)	(25.7)	(28.7)	(26.8)	(27.5)	(134.2)
Kelda Group costs (£m)		(8.8)	(9.0)	(9.3)	(9.5)	(9.8)	(46.4)
Kelda net dividend (£m)		45.7	47.0	45.3	48.7	49.4	236.0

Wholesale cost recovery

We have considered the balance of costs recovered from customers in the short and long term through PAYG rates and regulatory capital value (RCV) run-off. The starting point for recovering costs has been to do so at our natural rates, which we explain below. Where we deviate from the natural recovery rates we explain clearly the reason for doing so and why it is in the interest of customers and the level of support obtained.

Natural rates

When recovering costs, we consider that the natural rate is the most appropriate starting point. This ensures that fast money is recovered as it is being expensed and slow money is recovered in line with the economic use of those assets. For PAYG we have recovered opex and infrastructure renewals expenditure (IRE) as fast money. For the run-off rate we have used an analysis of current depreciation rates as the starting point. We consider that this is the fair starting point for customers from an intergenerational point of view. We consider that deviation from these rates should only be done where there is a compelling reason to do so that is in the interest of customers. At all points in the decision making process we have considered the impact on customer bills.

PAYG rates

The following table illustrates the level of fast money, or PAYG rate, we have used for recovering wholesale costs:

Table 13j

Our chosen PAYG rates over the period 2020-25 versus the natural rate						
Wholesale price controls	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	Total
Operating costs (£m)	418.4	416.8	408.3	418.4	429.9	2,091.9
IRE (£m)	132.1	105.1	97.5	99.7	98.9	533.4
Capex (£m)	570.8	602.2	518.2	373.0	227.1	2,291.3
Totex (£m)	1,121.3	1,124.1	1,024.0	891.1	756.0	4,916.6
Natural rate (%)	49.1	46.4	49.4	58.1	70.0	53.4
Chosen rate (%)	47.1	46.1	50.4	58.7	71.5	53.4
Variation / (slowing down) adjustment	-2.0	-0.3	1.0	0.5	1.5	0.0

Further detail by price control can be found in appendix 13i.

Overall for the 2020-25 period we have recovered fast money in line with how we expected that is we have not slowed down nor accelerated cost recovery into the 2025-30 period, as we have not found a compelling reason to do so.

We have reprofiled the IRE for the 2020-25 period for cost recovery in order to achieve a smoother bill profile over the period. This is in effect recovering the IRE as a smoothed charge, an infrastructure renewals charge has been common practice at previous reviews.

Without doing so would have caused bill volatility of up to £6 in some years. Customers have consistently told us of the importance of bill stability rather than volatility or bill shock from year to year, therefore we have adjusted PAYG rates (within the 2020-25 period only) to ensure a smooth increase in customer bills across the five year period

Run-off rates

We have derived the run-off rate from an analysis of current rates within the Annual Report and Financial Statements and APR financial statements. The assessment determines separate run off rates for each of the four wholesale price controls.

The results of this analysis are shown in the table below:

Table 13k

Our chosen run-off rates by price control over the period 2020-25						
Wholesale price controls	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	Average
Water Network Plus (%)	3.5	3.5	3.5	3.5	3.5	3.5
Water Resource (%)	2.5	2.5	2.5	2.5	2.5	2.5
Wastewater Network Plus (%)	3.75	3.7	3.7	3.7	3.7	3.7
Bioresource (%)	9.4	9.4	9.4	9.4	9.4	9.4

A consolidated view at the appointee level of the run-off rates is included below, comparing our assessed natural rate with the chosen rate. As can be seen, we have not advanced or delayed the run-off rate.

Table 13l

Our assessed run-off rates over the period 2020-25 versus the natural rate for wholesale						
Wholesale price controls	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	Average
Natural rate %	3.8	3.8	3.8	3.8	3.8	3.8
Chosen rate %	3.8	3.8	3.8	3.8	3.8	3.8
Speeding up / (slowing down) adjustment %	0.0	0.0	0.0	0.0	0.0	0.0

This equates to an overall asset life of 26.3 years (water 29.7, wastewater 24.2 years). We have checked the results against the industry rates used at FD14. These indicate a range of 20 to 32 years for the water services with an average of 26 years; and 18 to 44 years for the wastewater services with an average of 25 years. We have used the same run-off rates for assets existing at 31 March 2020 and for new assets as we do not have compelling evidence that they are different.

Consideration of the longer-term impact of our decisions

The primary concern has been the impact of our decision on the 2020-25 period. The decision to start with natural rates of recovery is the fairest method when considering intergenerational issues. We would consider moving away from this position should there be obvious benefits to customers with regard to:

- Maintaining financeability and financial resilience. The notional balance sheets achieve target ratios with current cost recovery and revenue streams.
- Adverse customer reaction to proposed bill movements. Results of customer acceptability testing show a high level of acceptability for our proposed bill movement and profile.

When considering the 2025-30 period and beyond we do not find evidence that either of the above factors are concerning. There is no compelling evidence to adjust the method and rates we are proposing in this plan.

Allowed revenues

Revenue movements over the period will vary by price control, which reflects, the different expenditure profiles and financing requirements of each price control.

Table 13m shows the breakdown of company revenue between each price control.

Table 13m

Our business plan allowed revenues by price control over the period 2020-25 (revenues shown in 2017-18 price base)					
Price controls	Real 2017-18 prices (£m)				
	2021	2022	2023	2024	2025
Wholesale Water Resources	67	66	66	66	68
Wholesale Water Network Plus	404	399	400	403	412
Wholesale Wastewater Network Plus	453	475	493	511	521
Wholesale Bioresources	80	82	84	84	83
Residential Retail	58	57	55	53	52
Business Retail	2	2	3	4	3
	1,063	1,081	1,101	1,120	1,139

Impact on customer bills

We are proposing that residential customers' bills will be £393 by 2025, which equates to a £14 increase over the 2020-25 period. Without the WINEP programme the bill in 2025 would have been £370 a £9 decrease despite the commitment for a significant improvement to upper quartile service.

The bill movement, both pre WINEP and post WINEP has been subject to rigorous acceptability testing. The response has been overwhelmingly favourable with 86% customer acceptability. Further analysis of bill movements is provided below.

Household bill profile (with and without WINEP)

The figure 13d below shows the annual profile of the household bill, with and without the WINEP costs of £860 million. If WINEP costs are excluded the graph shows bills would have decreased, with a reduction of £9 from 2020 levels; the additional expenditure required for the WINEP programme will result in a bill increase across the period, resulting in a £14 increase by 2025.

Household bill per price control

The graph and table below show the annual profile of the household bill, split between the price controls:

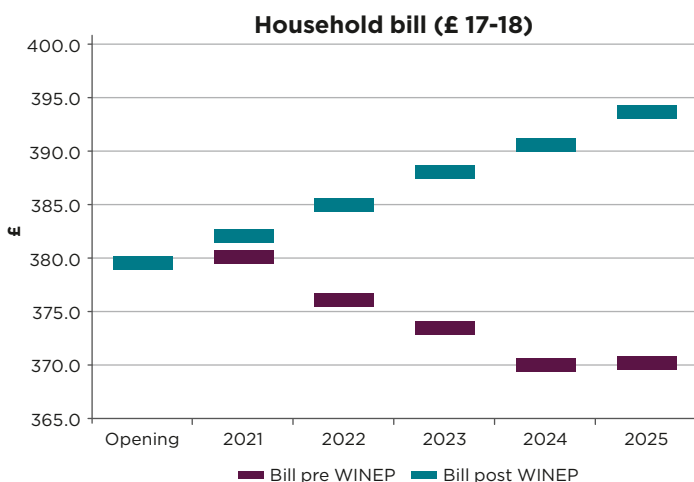


Figure 13d - Average residential bill (17-18 prices) per annum, with and without WINEP costs.

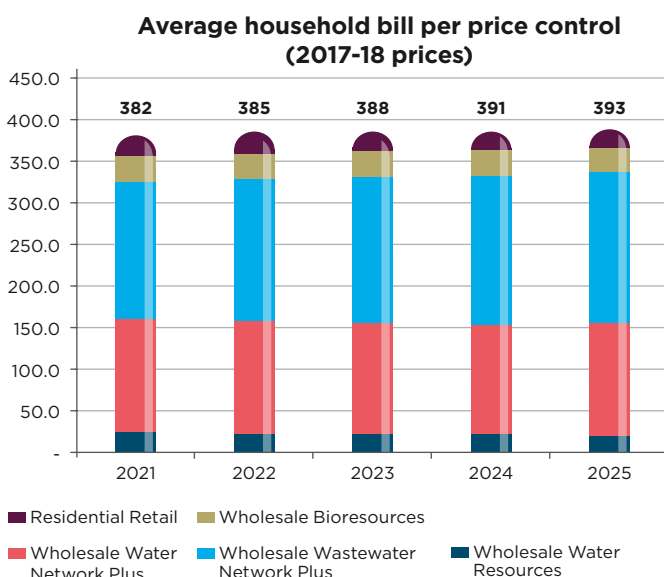


Figure 13e - Average residential bill (17-18 prices) per price control.

Table 13n

Household bill split between price controls					
Bills (£)	Real 2017-18 prices				
	2021	2022	2023	2024	2025
Wholesale Water Resources	24	23	23	23	23
Wholesale Water Network Plus	140	137	136	136	138
Wholesale Wastewater Network Plus	162	169	174	178	180
Wholesale Bioresources	29	30	30	30	29
Residential Retail	27	26	25	24	23
	382	385	388	391	393

The average residential bill is broadly consistent across four of the price controls, with the overall increase of £14 predominantly being due to increases within the wastewater network element of the bill.

Household bill movement

The graph below shows the annual variation within the household bill in real 2017-18 prices from 2020-25.

The graph below shows the annual variation within the household bill in nominal prices from 2020-25.

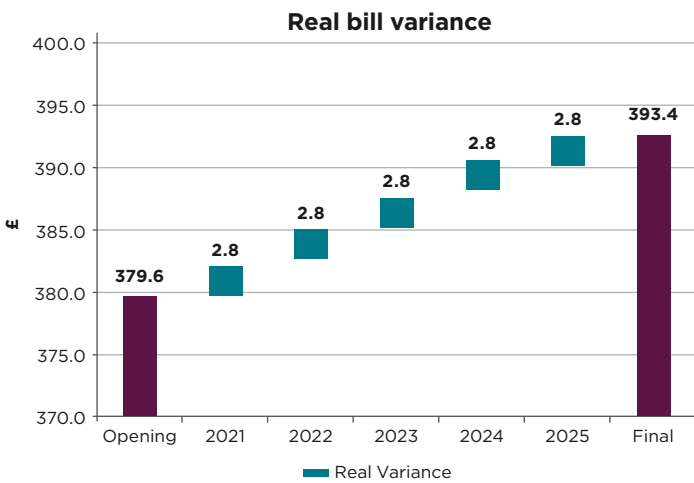


Figure 13f - Real bill variance 2017-18 and 2020-25.

There is a £14 bill increase across the period which is predominantly due to the £860 million WINEP expenditure requirement.

[Annual bill increases have been smoothed in accordance with our customer's preferences]

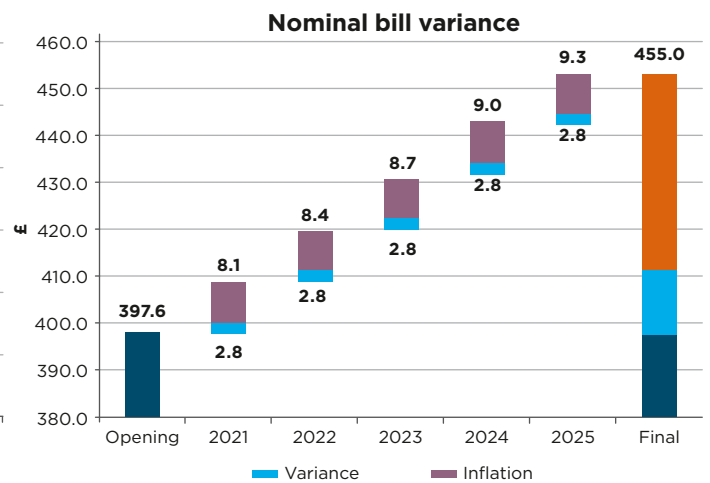


Figure 13g - Nominal bill variance 2017-18 and 2020-25.

The graph above shows that in addition to the real increase in bills of £14, when Consumer Prices Index including owner occupiers' housing costs (CPIH) inflation of 2.0% is applied, a further increase of £44 due to inflation will be incurred, resulting in an overall increase in nominal bills of £57 across the period.

Path of customer bills through to 2030

As part of our work on financial resilience we have made a preliminary assessment of our potential performance in the 2025-30 period, which includes an analysis of the potential customer bill profile through to 2030.

This analysis has been conducted on the assumption that there are no changes to the key assumptions in the 2025-30 period from those included within the 2020-25 period. Further details can be found in the Financial Resource Appendix 13g.

The graph below shows this early view of the potential annual bill profile through to 2030, both with and without bill smoothing through cost recovery rates.

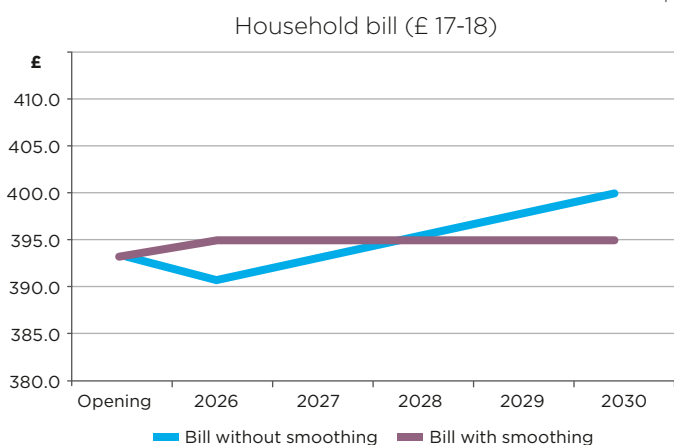


Figure 13h – Potential annual bill profile.

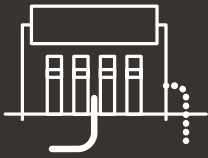
The graph above shows that with natural cost recovery rates, there could potentially be a small initial reduction in bills, followed by an increase in bills. Overall there would be a slight increase in bills of about £7 from 2025-30.

Alternatively, if we were to smooth customer bills, this could give an alternative profile of an initial bill increase of about £2 in 2026 followed by no further bill increases through to 2030.

In summary

In this section we have shown that our business plan:

- Has the right balance of risk and reward between company and customers, including a proposed dividend policy that rewards investors appropriately.
- Is financeable and financially resilient into 2020-25 and beyond.
- Results in affordable bills for customers with a high level of customer acceptability.



Water Network Plus price control

Objective

We will always provide you with enough safe water, we will not waste water and always protect the environment.

Investment (total over 5 years)

Investment	£m
Totex	1797.61*
Efficiency	308.02

*net of grants and contributions

Detailed definitions of the enhancement element of the totex value can be found in the Enhancement Cost Appendices

Benefit realisation (total over 5 years)

 Financial	£144.44m	 Social	£507.78m
 Manufactured		 Human	£7,700.99m
 Natural	£4.73m	 Intellectual	Reflected under social and human capitals

Performance commitments

Primary	Secondary
<ul style="list-style-type: none"> • Drinking water quality. • Water supply interruptions. • Leakage. • Unplanned outage. • Mains repairs. • Drinking water contacts. • Significant water supply events. • Low pressure. • Repairing or replacing customer owned pipes. 	<ul style="list-style-type: none"> • Carbon. • Education. • Creating value from waste. • Water recycling. • D-MeX. • Per capita consumption. • Treatment works compliance. • Surface water management. • Risk of severe restrictions in a drought.

Above shows the total amount of investment we will be making in this price control (totex). We have shown the amount of benefit this expenditure will create through each of the six capitals.

This is demonstrably good for customers where the sum of all the six capitals benefits is greater than the totex.

In this price control we can see that **£4.66** of benefit is returned for every £1 invested.

Resilience

- Water demand management eg. leakage and working with customers.
- Protecting critical assets.
- SMART networks.

Cost adjustment claims

- None.

Innovation

- Flushing methodology.
- Asset deterioration modelling using six capitals decision making.
- Leakage approach / methodology.

Appendices

- Cost appendices.
- Draft water resources management plan.
- Performance commitments.
- Drinking Water Inspectorate (DWI) submission.

Figure 14a - Price control overview.

Our PR19 plan has customers at its heart. It is set firmly within the context of our long-term strategy and informed by our growing understanding of our impact on the people, environment and economy of Yorkshire. In this section we show how our Water Network Plus price control contributes to delivering our 5 Big Goals and moves us towards managing demand, making the most of the resources we have already to ensure that we are resilient, and to ensure that people do not have to worry about paying their bill.

The secure supply of safe drinking water remains a top priority for our customers. One of the key challenges we face is reliably delivering this service at an affordable price, while investing in ageing infrastructure. To remain resistant we must also waste less water and consider consumption levels to combat the dual effects of climate change and population growth on water supply and demand.

Our strategic water distribution grid gives us the ability to move drinking water around Yorkshire. This allows us to supply customers from the most cost efficient sources, mitigate for raw water quality variations and ensure a sustainable, resilient and continuous supply to customers.

We will continue to provide the service our customers expect, while minimising the impact of service disruptions through partnership led catchment management and industry leading responses to supply interruptions. We will innovate to reduce demand for water maintaining our absolute focus on water quality.

Our PR19 plan is founded on our most extensive programme of customer engagement to date. We have explored, tested and evaluated Ofwat's key PR19 themes of great customer service, affordable bills, resilience in the round and innovation from multiple perspectives across our diverse customer and stakeholder base. We have developed a much better understanding of our diverse range of customers and will continue to deepen this understanding through ongoing engagement.

One group that has played a significant role is the Yorkshire Forum for Water Customers (the Forum) and the Forum's environment sub group, we would like to thank the Forum and the sub group for their valued contribution. This price control has been subject to considerable focus by the sub group and it has helped us ensure that our plan reflects the needs of customers and the environment. The sub group has challenged and built upon key aspects of this plan such as its detailed work on our DWI submission.

This chapter describes our long-term ambition for Water Network Plus and explains our plan for 2020-25. We discuss the impact this will have on customer bills and demonstrate how we will deliver excellent service in the most cost efficient way.

Executive summary

Water is a precious resource and our customers consistently tell us a reliable and sustainable supply of high quality drinking water is their top priority. We make sure we are efficient in our approach to treating and distributing water and we do not waste water.

Big Goal: Water Supply

We will always provide you with enough safe water, we will not waste water and always protect the environment

We want to always have enough water in Yorkshire but the ability to maintain the supply and demand balance is a long-term challenge, mainly as a result of climate change and population growth.

Our Water Supply Big Goal has been developed through extensive customer engagement and seeks to meet the needs of the growing population without taking more from the environment.

Water is essential not just for drinking and washing. It is also essential for producing food, generating energy and creating products such as cars and computers. It is needed for our hospitals, our schools and for the companies that create Yorkshire's vibrant economy.

Our 25-year ambition

Our long term strategy and PR19 plan centres on a demand led approach to meet the long and short term needs and expectations of our customers. Our plan improves service, protects the environment and enhances resilience, while keeping bills low. The key features of our approach in the Water Network Plus price control are to:

- Meet the demands of a growing population without increasing our existing abstractions.
- Substantially reduce reliance on water imports as a result of reduced leakage and demand.
- Take a catchment based approach to minimise extra investment in water treatment works (WTW) by managing our land and influencing others to ensure that water captured is the best quality.
- Deliver an enhanced asset management and maintenance programme at our strategic treatment assets and trunk main network.
- Have one of the lowest supply interruptions rates in the industry.
- Improve water quality and acceptability.
- Use technology to intervene proactively and to improve our customer service.

Our 5 year plan

From our ongoing and innovative conversations with our customers we know that the impact on interrupting water supplies can be very different depending on lifestyle and circumstance. We also know that to meet our customer expectations and to remain resilient, affordable and sustainable into the long term we need to reduce water wasted through leakage. We have set ourselves challenging service targets, to deliver these efficiently we have provided a summary below of our activities and investment over the next five years.

Reducing leakage and demand

Our customers are disappointed with our leakage performance, especially when compared to other water suppliers, and they want us to improve. Customers tell us we waste unacceptable amounts of water through leakage in our network. We have listened and are reducing leakage from 297.1 Ml/d to 175 Ml/d by 2025. An ambitious reduction of 40% will make us more resilient and will mean we have one of the lowest leakage levels and per capita consumption figures in the UK. Our success will be measured through our leakage, per capita consumption and our repairing or replacing customer owned pipes performance commitments.

Water recycling and reducing demand for potable water

We know, and customers tell us how important it is not to waste water and we are committed to reducing the water we waste through our water treatment processes. Not all raw water entering our WTW is processed into high quality drinking water, a proportion is used in the treatment process as 'wash-water' and is often discharged via sewer to our wastewater treatment works (WwTW). Our commitment is to increase the volume of water recycled at our treatment works by 5.54 M/d, returning water to the beginning of the process to be re-used. By doing this, we reduce the amount of water we take from the environment, lower energy costs and reduce the demand on our wastewater network and treatment sites. Our success will be measured through our water recycling performance commitment.

Case Study: Water recycling at Irton water treatment works

Installing a water recycling system at Irton means we will be more efficient with the water we have abstracted, which means we will reduce the volume we take from the river by up to 1.3 million litres a day. This scheme will also reduce the volume of water we send to the sewer network, reducing the risk of sewer flooding and pressure on Whitby and Seamer WwTW this will also impact on future investment needs at these sites. Water recycling will allow us to carry out essential maintenance works at the Irton WTW ensuring future resilience of water supply in the local area.

In our long term strategy, we identify the need to use more demand management solutions, making the most of the resources we already have. We are also working with industry to reduce demand for potable water through the use of non-potable water. This initiative in combination with treatment works recycling will off

set 0.5% of current demand, creating enough extra drinking water to supply 18,000 new houses without abstracting any more water from the environment. We will be measured through our water recycling performance commitment.

Catchment based approach to water quality

We are taking a catchment first approach to reduce the need for less sustainable end of pipe treatment solutions. We have led the industry on peatland restoration to improve water quality, establishing a government strategy for this work nationwide. We are mitigating raw water quality deterioration by introducing catchment management initiatives on our land and land owned by others. Through the delivery of over 40 schemes at a value of over £26 million, primarily in our Water Resources price control, we aim to improve the quality of our raw water and address water quality concerns such as metaldehyde, high levels of colour and nitrates.

Water quality: raw water and treatment

Having a reliable source of clean, safe water is a top priority for our customers, and there are multiple external factors, natural and human that contribute to the deterioration in quality of raw water. In response to this we are looking to manage hazards at source, taking a catchment based approach. Where there is insufficient time, or it is not appropriate to take this approach, we will implement new treatment processes. These will be selected, considering carbon impact and asset life. In December 2017, we submitted our PR19 water quality submission to the DWI, which outlined our overall plans for water quality. In May 2018, we received letters of support from the DWI for all named schemes. Our drinking water quality performance commitment will measure the success of our schemes.

Water quality and acceptability: storage and distribution

We are continuing our plans to remove lead from connections to customers' homes and businesses by targeting lead pipes. During the 2020-25 period we are removing lead water quality risk on supplies to nurseries and schools across Yorkshire. Working with stakeholders, such as the government, local and health authorities and building owners, we are developing a long-term strategy to establish techniques to eradicate the health risk posed by lead in the water supply. Our success will be measured through our drinking water quality performance commitment.

We will continue to improve water acceptability in line with customer and regulatory expectations. This will be delivered through a balanced mix of mains flushing, lining and replacement, measured through our drinking water contacts performance commitment.

As well as measuring our drinking water quality performance against the DWI Compliance Risk Index (CRI), we will measure ourselves against the DWI Events Risk Index (ERI) as an internal performance indicator.

Integrated asset management: delivering resilience and reliability

In the current period we developed and established a business wide approach to asset management, accredited to the international standard ISO55001, and it is assured annually. It covers the full asset management cycle of strategic planning, engineering, reliability and operations, and is already delivering enhanced levels of resilience for customers as evidenced in the hard winter of 2017-18 and dry summer of 2018 when we faced big climatic challenges.

We continue to proactively invest in capital and operational maintenance across our assets with activity focused on our asset management systems and processes. The expenditure to maintain service to customers in 2020-25 is estimated at £1,360 million.

Through our enhanced maintenance strategy, we will improve the performance of our assets, drive down the amount of time any equipment is out of service (known as outages), and increase our operational resilience. Outage improvement will be on a planned dynamic and predictive approach to maintenance of assets, which will also provide a safer working environment for our people. We will use the asset health indicators (unplanned outage and mains repairs) to guide our performance.

Frontier performance for interruptions to supply

Through our in depth conversations we now better understand the varying impact of interrupting water supplies. To tackle this, we are going to significantly reduce supply interruptions over the next three years to become a leader in this area. Our average interruptions will reduce from 9.47 minutes in 2017, to 2 minutes by 2025, and will be measured through our water supply interruptions and significant water supply events performance commitments.

Innovative network management

We are using technology and innovation, such as SMART networks, to find ways to improve resilience, reduce leakage, prevent failure and boost customer satisfaction. We will implement new systems and processes, so we can intervene early and proactively mitigate problems, such as leaks or bursts, minimising their impact on our customers.

Resilience

We have a clear focus to ensure we can always produce enough water to supply our customers and have the connectivity to deliver it to them. To achieve this, we have developed a water treatment resilience dashboard which informs our future decision making and allows us to measure and target investment to enhance resilience.

Case Study: SMART networks in Leeds

An innovative approach to network management is helping us to meet the increasing demand for water across Leeds. Expansion across the city centre and new leisure and retail openings has resulted in us taking a 21st century approach to managing the water network in 'real time'. We have installed specialist sensors across the water network which are capable of remotely communicating to key values which open and close to meet changes in the demand for water. This 'real time' SMART network approach means that customer demand is met, the risk of bursts through pressure spikes is reduced, and our energy consumption and costs are minimised.

Performance commitments

In this section we look in more detail at the performance commitments that sit within the Water Network Plus price control, all of which contribute to our Water Supply Big Goal. These performance commitments are a combination of regulatory requirements and measures developed with our customers and stakeholders to ensure delivery against their priorities and our Water Supply Big Goal.

For further information regarding our performance commitments, including the basis for our targets and incentives, please see appendix 19c.

The Forum has scrutinised our approach to creating the performance commitments. We would like to thank the Forum for the challenge and builds to both the performance commitments and the customer research that has informed the process. They have also been discussed and challenged by our Board and in a joint meeting between the Board and the Forum.

Drinking water quality

In summary

This performance commitment is a measure designed to illustrate the risk arising from treated water compliance failures. The CRI score will be calculated by the DWI annually based on the number and severity of our compliance failures within the year.

Aligned to our long-term aspiration to achieve a CRI score of zero, we are proposing a zero target for the 2020-25 period. In the 2017-25 period we forecast an improvement of 46% in our performance, from 4.61 to 2.47. This is an ambitious improvement set in the context of our long-term strategy to achieve zero.

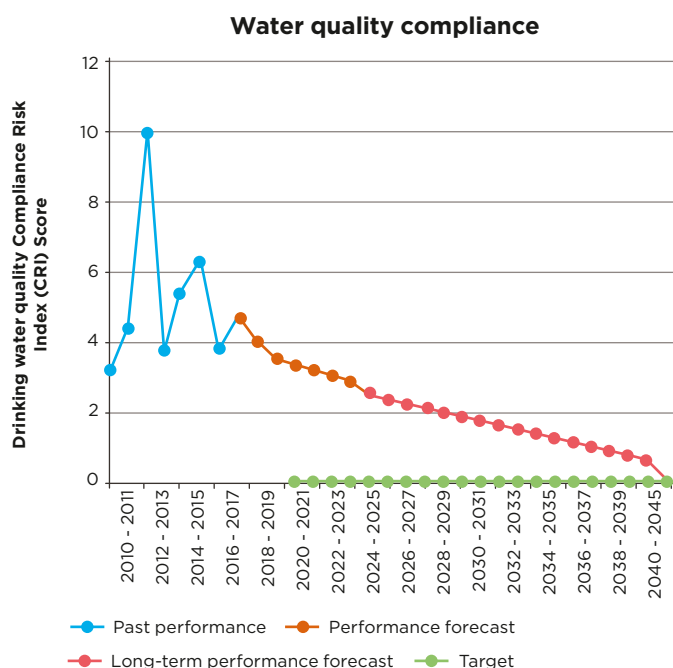


Figure 14b - Water quality compliance.

Water quality is independently measured by the DWI to provide reassurance that water supplies are safe and drinking water quality is acceptable to consumers. The DWI will use the provisions of the Water Industry Act 1991 to assess our compliance failures and calculate our score using the following principles:

- Significance of the parameter failing the standards in the regulations (the parameter score).
- Cause of the failure, the manner of the investigation of the failure by the company, and any mitigation put in place by the company (the assessment score).
- Location of the failure within the supply system, considering the proportion of the company's consumers affected (the impact score).

This is a common performance commitment, meaning customers will be able to compare our performance with other water companies annually.

The performance commitment is a new measure for the 2020-25 period, replacing Drinking Water Quality (Mean Zonal Compliance Index). It has a proposed underperformance payment to be recognised annually, in-period.

Engagement

Our customers demonstrate very high support for this performance commitment. With a majority rating it very important.

Our customers expect to see improvement from us, and testing revealed this it is one of the five performance commitments our customers most want to see improvement against, both in the immediate and long term.

Customers want assurance that their water is always safe to drink, and this is of paramount importance to them, showing above average support for paying more to see our performance improve.

A critical part of our catchment first approach to water quality has been stakeholder engagement, which has taken a number of forms over the years and continues into 2020-25. We have engaged with a wide variety of stakeholders to demonstrate the problems we face and learn how we might best address these collaboratively. By engaging with a wide range of stakeholders we have been able to examine and understand the effectiveness and cost of a wide variety of different approaches, using this to guide our future plans. Areas where collaborative working has proven successful will be developed further during the 2020-25 period and include groundwater nitrate protection, metaldehyde control (used in agriculture as a slug control product) and wider upland catchment management. This approach involves engaging with key stakeholders such as the National Farmers Union, Natural England, local farmers, food producers, local MPs, Local Enterprise Partnerships (LEP), The Rivers Trusts, Environment Agency, Forestry Commission, academia, and agricultural technology specialists.

Our performance to date

Using the published methodology, we have analysed the last eight years of our sample records to understand our historical performance. As can be seen in figure 14b, we identified two abnormal increases in the data, in 2012 and 2015. The spike in 2012 was due to a major increase in the level of metaldehyde present, which can be explained by the level of rainfall in the year. The higher score during 2015 was due to a calculation anomaly while the methodology was still under development by DWI. We now inform DWI of the affected population for any failure and provide the evidence to support our position.

Analysis of our performance over the last eight years shows our CRI impacted water quality sample failures across 29 parameters. Between 2014-17 the largest single contribution to non-compliance has been metaldehyde, which occurs at our large river derived sources. Other significant contributors have been:

- Total coliform bacteria, often due to the condition of customers' taps.
- Iron, due to the presence of unlined cast iron in our network.
- Taste and odour, due to a range of causes, for example, algae.

We have improved our drinking water quality performance against the existing measures in the current period, and we know there is more to do. We have achieved improvement to date through stakeholder engagement, targeted schemes and the placement of additional operational controls on our catchments, treatment facilities, water storage and pipe networks.

Our plans to deliver this commitment

To deliver our stretching performance improvement targets while remaining cost efficient, we will target improvement against our region's biggest CRI impacting parameters. These are each discussed below.

Raw water deterioration: treatment solutions

Our plans to manage raw water deterioration are set out in our submission to the DWI for the 2020-25 plan see appendix 14a. Our Drinking Water Safety Plans and their underlying data are at the heart of the development of our PR19 plan. An approach like this results in the identification of specific hazards and risks that could result in a risk to drinking water quality or acceptability over a short, medium or long-term period.

We have assessed and projected raw water deterioration in Yorkshire, estimating a date when this would lead to a risk to drinking water quality standards. To address these raw water deterioration risks, catchment management remains our primary strategic approach, our first choice intervention and the most cost efficient approach for our customers. By understanding the timescale to impact, we can determine whether catchment based approaches; treatment or a combination of both provide the most appropriate solution. While we prefer to deal with water quality issues at source to ensure our customers always receive safe water it is essential we invest significantly in our WTW assets in the period 2020-25. In May 2018 we received formal letters of support from the DWI for schemes in our DWI submission (December 2017).

We have no previous exceedances in CRI performance for disinfection byproducts (DBPs), for example, trihalomethanes (THMs) where the standard is 100 µg/l and around which most of this programme is focused. This is due to the imperative need to keep these compounds 'as low as possible', as laid out in regulation 26 of water supply (water quality) regulations, 2016. In the case of DBPs we are going to address the risk of compliance becoming a future issue. There will be an immediate benefit in our CRI performance through a reduction in WTW coliform failures.

Our catchment first approach

Taking a catchment first approach, we are reducing the need for costly treatment solutions to mitigate raw water deterioration. Our catchment programme covers a range of risks to water quality, including colour arising from peat degradation, pesticides, nitrate and saline intrusion on reservoir, river and groundwater sources. We are investing £11 million in catchment activity to address colour from upland peatland deterioration in the period 2020-25, along with £5.4 million to reduce the risk of metaldehyde entering our rivers. We will continue to work collaboratively with landowners and other stakeholders to manage the risk at source.

Our proposed approach includes:

- Provision of resource through Natural England to provide catchment sensitive farming officers.
- Influencing farming practice.
- Promoting metaldehyde free approaches amongst the supply chain for arable products.
- Developing a system for the loan of equipment to small farms to provide access to new farming technology.

Raw water optimisation

To achieve our stretching CRI targets we will optimise the way we use raw water. By maximising WTW availability and using our grid infrastructure better with enhanced data capability, we will select the best raw water for treatment, minimising water quality failure risks.

Water main flushing programme

Our flushing and trunk main conditioning work, which primarily serves to reduce our risk of discolouration contacts, will reduce iron failures. For further information on how our innovative modelling approach is helping to increase the efficiency and effectiveness of our flushing and conditioning work, see our drinking water contacts performance commitment.

Base maintenance

Maintaining healthy assets is essential to water quality performance. To ensure we do this in a way that is affordable to our customers, we are optimising our investment. Using our Decision Making Framework asset deterioration models, we will model our capital maintenance needs to produce capital and operational solutions. These solutions will be optimised using financial and service constraints to create an affordable plan. This process is described in chapter 10, Decision efficiency.

To deliver our stretching performance forecast cost efficiently, we are focusing our investment in asset maintenance and catchment management. Our enhanced maintenance strategy is helping to minimise base maintenance cost through targeted action. Our catchment management expenditure will be accounted for in our Water Resources price control. In line with our catchment first approach, we are increasing our investment to allow for significant metaldehyde catchment management to minimise costly treatment solutions.

Our incentive to deliver

The drinking water quality performance commitment is financially incentivised through an underperformance payment. The incentive type is a continuation of the PR14 measure, where only penalties apply. Drinking water quality is of very high importance to our customers. Our customers are extremely supportive of the use of underperformance payments, with incentive rates derived from customer valuation research, as compensation for under delivery of the performance commitment.

The ODI follows the prescribed formula for calculating incentive rates, using marginal benefits and marginal costs calibrated for the forecast totex sharing rate.

The standard underperformance payment rate is £2.35m per point score.

As the performance commitment is subject to the DWI requirement to avoid all failures of drinking water quality, the performance commitment target is set at zero. To account for the variability in performance, and the recent change in measurement to the CRI, a deadband has been included.

The deadband ranges from a score of 3.38 to 2.47 over the 5-year period. The underperformance payment will only apply beyond the deadband range.

The ODI payments will be recovered in the Water Network Plus price control.

Water supply interruptions

Table 14a

Annual performance targets - Water supply interruptions					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Average minutes per property	3:36	3:12	2:48	2:24	2:00

In summary

This performance commitment relates to the amount of time our customers go without a continuous supply of water. The commitment measures the minutes lost due to water supply interruptions for three hours or more, per property served. Interruptions include planned, unplanned and those caused by a third party.

Through further customer engagement we understand in more detail how a water supply interruption that would not inconvenience one person very much, can impact badly on somebody in different circumstances.

Case Study: Lifestyle needs

Young families: Having to use bottled water if supplies are interrupted causes problems for families with young children in relation to making up baby formula and bathing.

Manual workers: Customers who have more manual occupations have told us it is important for them to be able to shower.

Carers: If a customer is caring for someone, an interruption to the water supply can cause real problems with administering medication, cleaning and washing. Providing bottled water in these situations does not solve the problem.

Understanding specific needs: For some customers the worst aspect of an unplanned interruption is the psychological and emotional impact it causes.

Religious communities: Getting to know our communities better has helped us understand the impact we can have on cultural and religious activities and celebrations.

We want to achieve industry frontier performance, with a proposed target average supply interruption of 2 minutes in 2024-25. As you can see from figure 14c, this ambitious target represents a step change in performance, with a 70% improvement forecast in the period 2017-25.

Water supply interruptions

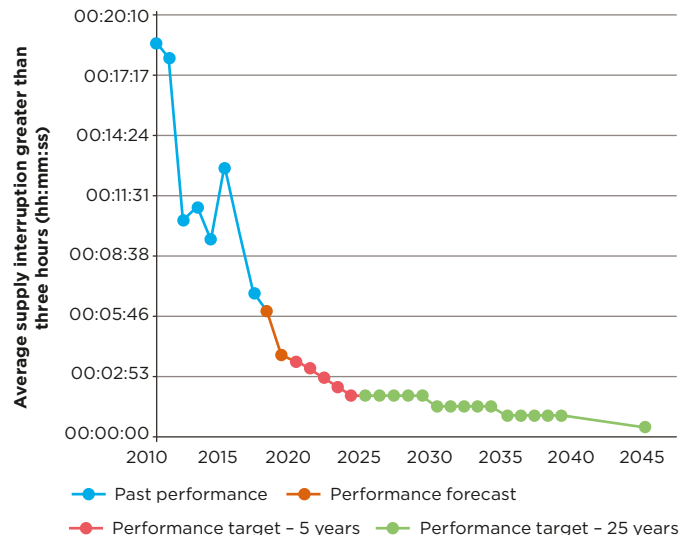


Figure 14c - Water supply interruptions.

Our commitment to a significant improvement in performance for supply interruptions is key to providing our customers with the service they expect, now and in the future. This is measured as customer minutes lost. A reduction in customer minutes lost is crucial to ensuring our customers trust and have confidence in the vital services we provide.

This is a common performance commitment, meaning customers will be able to compare our performance with other water companies annually. We expect our proposed performance to ensure we are at the frontier for achieving a continuous and uninterrupted supply of water for all our customers.

This performance commitment is an existing measure, reported in the current period. It has a financial ODI with proposed under and out performance payments, to be recognised annually in-period.

Engagement

Our customers demonstrate good support for this performance commitment, with a majority rating it as important. Our customers typically want to see consistent improvement in our performance against this commitment over the short and long term.

Our testing revealed the prevention of interruptions to water supply is important to customers. Many customers accept interruptions to supply are inevitable but place significance on the length of time interruptions last.

Our target to achieve frontier performance is in response to our customers' needs, we recognise excellent performance in minimising supply interruptions is vital to building customer trust and confidence in the day-to-day services we provide.

Our performance to date

Our performance since 2014 has been significantly better than the industry average and we achieved an average minutes loss of 06:58 against a target of 12:00 in 2017-18. To date our performance against this commitment has focused on improving our response to reactive asset failures, ensuring we operate in an effective manner, limiting the duration and impact of planned and non planned interruptions to supply.

To achieve what our customers want and expect, we know an excellent operational response to all events is crucial. It is our response time that can determine the overall scale and duration of the interruption to supply. We have undertaken a major review of significant water supply interruption incidents so that we can undertake a wider operational and capital approach to reducing or eliminating all interruption events in size and duration, ensuring all aspects of resilience are considered.

To achieve frontier performance and to significantly reduce our impact on customers we have not waited until we start to deliver our PR19 plan in 2020. We are using additional stretch targets to ensure we improve over the next two years. The Forum has supported this move. A 6-minute internal (shadow) convergence methodology target has been introduced for 2018-19, reducing to 4 minutes in 2019-20, and 2 minutes in 2020-21. The regulatory target remains 12 minutes for the 2015-20 period.

Our performance since 2010-11 is illustrated in figure 14c and shows how we have improved in this performance commitment over the last six years. This improvement has been achieved through a number of operational initiatives which will be developed further as part of our plan to deliver this commitment.

These include:

- Enhanced review and reporting.
- Improved accuracy of asset records.
- 24/7 engineering support.
- Improving people capability.
- Zero planned interruptions >3 hours.

Our plans to deliver this commitment

To continue to be an industry leader in water supply interruptions, we need to consider all aspects of resilience (resistance, reliability, redundancy, response, recovery and review). Although mains renewal, pumping station refurbishment and service reservoirs rebuild and refurbishment are important activities to maintain supplies to customers, we need to consider other options. We will continue our risk-based approach to effective network management and identifying where additional resilience is required across the network. Cross connections and valve management will continue to increase our network flexibility ensuring we fully understand the impact on customers and solutions are developed to address the risks associated with large

populations supplied from a single source. To improve in this measure and achieve the change in performance we are proposing a plan that provides innovative and cost effective solutions to maintain supplies to customers. The highlights of our plan are as follows:

Enhanced digital asset records

Accurate asset records are crucial to managing customer interruptions and ensuring the most appropriate responses are taken. Analysis carried out to date shows how inaccurate records and out of date schematics has impacted our efforts to restore supplies on many occasions in recent years. By embracing digital technologies we will further develop our network schematic tools as part of our proposed network visibility strategy. This strategy ensures we adopt digital technology in ways to enable a sustainable improvement in performance across all water related performance commitments into the 2020-25 period and beyond.

24/7 operation engineering support

To achieve frontier performance, we know our response to incidents that cause a supply interruption needs to improve. The introduction of a 24/7 operational engineering resource into the control room to proactively manage events and provide engineering support to assist in decision-making, will improve our performance and ability to manage the network proactively. This 24/7 operation engineering support function will carry out root cause analysis on past incidents using key digital asset data, while also ensuring lessons are learnt and embedded within improvement plans.

This engineering service will also provide real time modelling support during an incident to make sure our decisions are robust and well informed. The role of this new function will be enhanced by providing access to accurate digital asset records as well as embracing advances in modelling techniques and technologies.

Enhanced people capability

Enhancing our field operations capability with hydraulic training will improve incident response and recovery. The course is also designed to increase understanding of how individual action relates to performance in the context of customer service, water supply interruptions, leakage and water quality.

Zero planned interruptions >3 hours

Our planned interruptions to supply, which are required to facilitate critical network activities, have traditionally impacted on customer minutes lost by approximately 110 seconds each year. Through better planning of outages and the availability of tools to support repair and maintenance activities, such as mobile tankers, overland feed facilities and enhanced line stop capabilities, we will maximise our ability to maintain supplies for the duration of a planned outage.

Enhanced resilience

We know we need a resilient water network to provide the level of service our customers expect and to meet the future demands of population growth and climate change. Our development of a water network resilience policy is central to our long term plans. This policy focuses on significant interruptions to supply and how we mitigate low probability, high severity events. Across the water network we will continue to collect mains failure data and by using predictive models, optimise our interventions. We will enhance our visualisation of the entire water network to improve our response and recovery and continue with our operational programme of 'calm networks', which involves activities such as value operator training, transient analysis, pressure management and optimal mains replacement.

Our plan to deliver frontier performance in a cost effective way uses a combination of embracing new technology, operational excellence, and optimal asset investment. We are going to improve resilience and focus on the proactive management of the water network. Our approach will minimise the number of incidents and events occurring on the water network. Should events occur we will ensure quick recovery supported by new technologies such as the advances seen through the development of the 'Internet of Things'.

Our incentive to deliver

The water supply interruptions performance commitment is financially incentivised through under and out performance payments. The incentive type is a continuation of the PR14 measure, where rewards and penalties apply. Water supply interruption is of high importance to our customers. Our customers are also extremely supportive of a large underperformance and out performance payments for the performance commitment with the incentive rates drawn directly from customer valuation research.

The ODI follows the prescribed formula for calculating incentive rates, using marginal benefits and marginal costs calibrated for the forecast totex sharing rate.

- The standard underperformance payment rate is -£4.5 million per minute.
- The standard outperformance payment rate is £4.5 million per minute.

We have introduced a penalty deadband at the forecast industry upper quartile level of 6 minutes. This ensures we will not incur an underperformance payment if we miss our target, but are still providing a comparative good level of service compared to the rest of the industry.

As the performance commitment is a comparative measure, enhanced under and outperformance payment have also been calculated to apply where performance exceeds frontier levels, or drops below the lower quartile projections. Through our acceptability research, customers have demonstrated support for the enhanced incentives.

The enhanced incentive rates are based on a re-adjusted weighting of the customer valuation methods, placing more emphasis on the non traditional techniques such

as revealed preference and behavioural experiments to provide an enhanced rate.

The enhanced underperformance payment rate is -£12.86 million per minute and applies above 9 minutes.

The enhanced outperformance payment rate is £8.68 million per minute and applies below 1.5 minutes.

The ODI payments will be recovered in the Water Network Plus price control.

Leakage

Table 14b

Annual performance targets - Leakage					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Megalitres per day	205.0	198.3	190.5	182.8	175.0

In summary

This performance commitment relates to the amount of water lost from our water network between the water treatment works and customers' homes and businesses. The commitment measures the volume of water lost in mega litres per day (MI/d). Leakage includes water lost from trunk mains, service reservoirs, distribution mains, communication pipes and customers' supply pipes. It includes real (leakage from the assets) and apparent losses, such as meter inaccuracies or water taken but not accounted for.

We will reduce our leakage by 40% to 175 MI/d by 2025.

A significant reduction in leakage is a key component of our draft WRMP, as population growth will create additional demand on our water resources. Paired with the effects of climate change, our future supply-demand balance will be in deficit without mitigating action. Reducing leakage from our current levels offers the most cost effective and environmentally beneficial method for meeting this forecast future deficit by the mid-2030s without mitigating action. We also know we must radically reduce our own water wastage before we can credibly work with customers to reduce their demand.

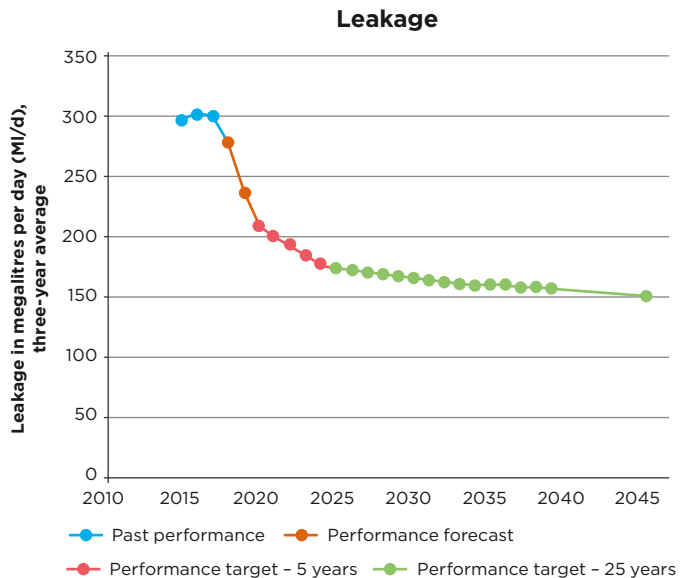


Figure 14d - Leakage.

This is a common performance commitment, meaning customers will be able to compare our performance with other water companies annually and we expect our performance to be at the frontier for achieving sustainable leakage reductions.

This performance commitment is an existing measure, reported in the current period. It has a financial ODI with proposed under and out performance payments, to be recognised annually in period.

Engagement

Our customers demonstrate very high support for this performance commitment, with a majority rating it very important. Our customers expect to see improvement from us, and testing revealed this is one of the five performance commitments our customers most want to see improvement against, both in the immediate and long-term.

Our research revealed that ensuring there is enough water to meet demand now and in the future is very important to customers, who support paying more to see our performance improve.

We are addressing customer concerns over leakage, as they have expressed they find our current levels of leakage unacceptable, particularly when compared to the rest of water industry.

“Look at where they rank as well. 18th out of 20¹ for leakage as litres per property per day. It makes you wonder where it all goes and what are they doing about it?”

- Residential customer, Hull

“Almost a quarter of the water is wasted? That’s too much”

- Residential customer, Bradford

The recently published Environment Agency report “The State of the Environment: Water Resources” highlights leakage from water companies as one of the main issues to be tackled to protect the water environment. Resilient ecosystems are fundamental to the long-term provision of water and wastewater services. We know we need to play our part by ensuring our regional natural capital is protected and that we can help other regions to do the same through an integrated national approach.

Our performance to date

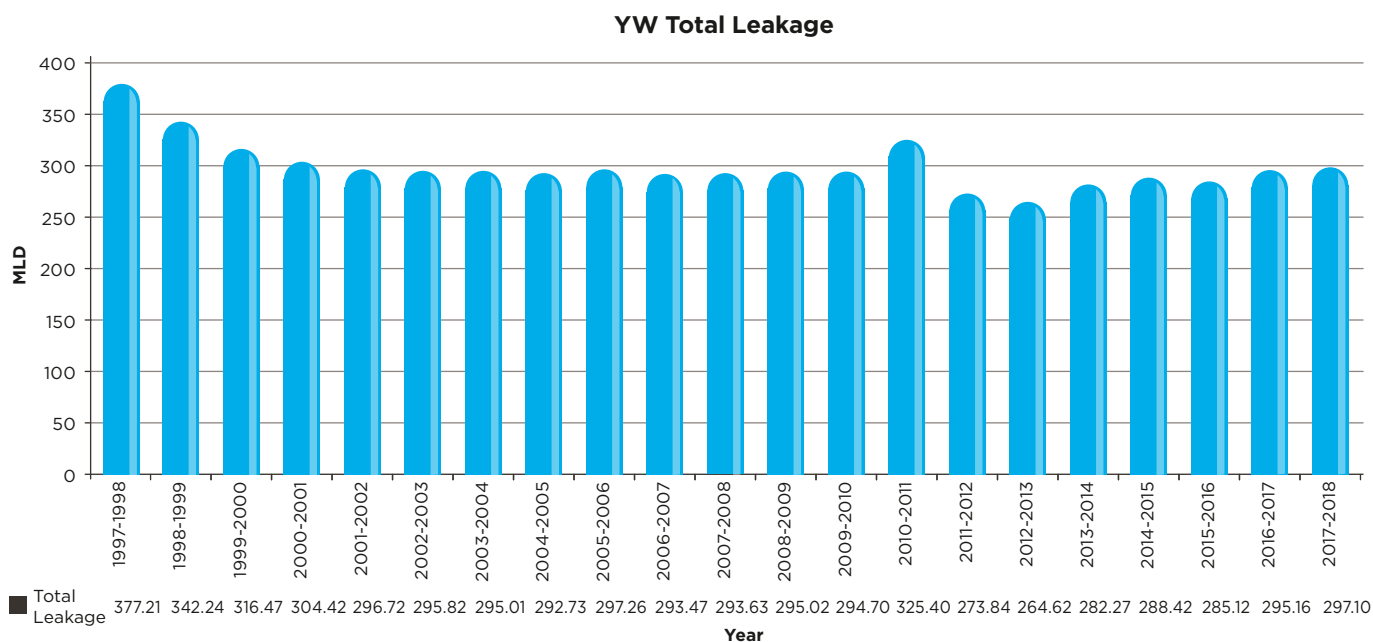


Figure 14e – Total leakage per year²

As can be seen in Figure 14e, our leakage performance has steadily improved since 1997-98. We had severe winters in 2009-10 and 2010-11 which caused us to fail our leakage target for both years. More recently the effects of the harsh winter in 2017-18 caused us to fail our 2017-18 leakage target by 1%.

Over the last 10 years, the average volume of water lost has ranged been 22% and 23.1% of that put into supply. We have not had any supply restrictions since 1995,

so leakage reduction has been a lower priority for our customers and us. Our water resource resilience and record of meeting leakage targets has meant investment has been prioritised elsewhere. In our draft WRMP, we are not forecasting a supply demand deficit until mid 2030s. We are looking to act early to manage demand and mitigate the need for costly supply solutions in the future. (see table 14c for details of the interventions we plan to take).

¹ This piece of customer research was completed using 2016-17 comparative data.

² Based on PR14 definitions not shadow reporting figures.

We will be delivering approximately half of the 40% reduction in the current period, at no extra cost to customers. Around £65 million will be needed each year to complete the step change in 2020-25, and our customers support this plan. We are using innovations from elsewhere in the industry and outside of it to deliver the improvement as efficiently as possible.

Our plans to deliver this commitment

To reach our lowest ever leakage levels, we are taking significant action to reduce leakage and sustain the reduced levels. We will apply innovative techniques alongside the tried and tested 'find and fix' methods which we have used successfully for 40 years. Beyond managing our own pipework, we are applying more resource to detect leakage from pipework owned by our customers.

To inform our leakage reduction plan and to achieve our commitment we are currently undertaking extensive trials which focus upon achieving a 40% reduction in the most sustainable and economically viable way. These trials include the review of structural lining as an option to reduce the cost of infrastructure renewals. We are assessing these benefits in relation to reducing background leakage, decreasing the natural rate of rise in leakage, and the costs associated with deploying active leakage control methods. These trials will inform whether or not we use structural lining extensively throughout 2020-25 and beyond.

We will use innovative technologies to assist in tracking and managing leakage across our approximately 32,000km of water mains, embracing novel and cost-effective approaches such as the satellite imagery used to look for water on other planets. This approach uses unique algorithms to identify precious treated water across our vast array of buried pipes. We are also leveraging other, out of industry innovations such as our working partnership with 'TeamUAV'. TeamUAV carry out unmanned aerial vehicle (UAV), drone inspections and drone survey services. We are currently trialing this service to identify leakage on our large diameter 'grid mains'.

We have developed and are fully committed to delivering our 7-year plan to reduce leakage by 40%, which we believe will match the upper quartile performance in the industry. From 2018-20 we will be making significant reinvestment of £119 million from outperformance to ensure we end 2015-20 in the best position possible.

In the face of the recent hard winter, we were able to respond to the increased levels of leakage, however, we recognise the future resilience of our supplies needs enhancing given the increasing severity and frequency of such events. The achievement of our leakage reduction plans is crucial in improving our resilience to future shocks and stresses.

Our plan will secure a 62.5 MI/d reduction in leakage over the remainder of the 2015-20 period and a further 60 MI/d over the course of 2020-25, by providing new leakage management infrastructure including:

- Enhanced distribution management area (DMA) and trunk mains monitoring.
- Deployment and evaluation of new innovative technologies.
- A SMART networks strategy.
- Additional resources.

To achieve our performance commitment, we will need to eliminate leakage across all areas of our infrastructure, including those occurring on our customers' pipework. This involves a new approach to:

- Leakage from pipes we do not own (customer-side and leakage).
- Trunk main leakage.
- Increasing the speed of leakage detection beyond that which current techniques and resource levels allow.
- Increasing precision and accuracy in differentiating customer usage from leakage.

Table 14c provides a summary of the key initiatives we are delivering as part of our upper quartile plan and their expected contribution to the overall targets we have set. These represent a mixture of traditional and non-traditional solutions to deliver improved service levels for customers.

Table 14c - Leakage upper quartile initiatives broken down to what percentage each initiative is going to deliver

Percentage delivery of leakage reduction by percentage	
Increased find and fix	33%
Data improvement	6%
Trunk main metering	4%
Service pipe renewal	5%
DMA engineering & PM	23%
Acoustic logging	8%
Satellite technology	3%
Customerside	3%
Reforecast customerside	2%
SMART networks	13%
Total	100%

Our incentive to deliver

The leakage performance commitment is financially incentivised through under and out performance payments. The incentive type is a continuation of the PR14 measure, where rewards and penalties apply. Leakage is of very high importance to our customers, who are extremely supportive of a large financial underperformance and outperformance payments for the performance commitment, with the incentive rates drawn directly from customer valuation research.

The ODI follows the prescribed formula for calculating incentive rates, using marginal benefits and marginal costs calibrated for the forecast totex sharing rate.

- The standard underperformance payment rate is -£79,888 per MI.
- The standard outperformance payment rate is £79,888 per MI.

We have introduced a penalty deadband at the forecast industry upper quartile level of 197MI/d (in 2025). This ensures we will not incur an underperformance payment if we miss our target, but are still providing a comparative good level of service compared to the rest of the industry.

As the performance commitment is a comparative measure, enhanced under and outperformance payment have also been calculated to apply where performance exceeds frontier levels, or drops below the lower quartile projections. Through our acceptability research, customers have demonstrated support for the enhanced incentives.

The enhanced incentive rates are based on the benefits of industry frontier leakage reduction for national customers, beyond our region.

- The enhanced underperformance payment rate is -£1.41 million per MI.
- The enhanced outperformance payment rate is £2.740112 million per MI.

The enhanced outperformance payment applies below 150MI and the enhanced underperformance payments applies above 300MI.

The ODI payments will be recovered from the Water Network Plus price control.

Mains repairs

Table 14d

Annual performance targets – Mains repairs					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Number per 1,000km	263.89	249.45	235.08	220.83	220.09

In summary

This performance commitment relates to the condition of our water mains. The commitment measures the number of mains bursts we are required to repair due to damage or deterioration per 1,000km of mains we own. Mains bursts include all physical repair work to mains from which water is lost.

When a water main bursts, it can have a major impact on water supply and local communities, not just in terms of water service impact but through consequential damage and disruption resulting from the repair.

Our proposed target for 2025 is 220 mains burst repairs per 1,000km. While an improvement on our 2020 target, this represents performance deterioration from our 2015-20 regulatory target of 190. Our strategy for radically reducing leakage results in increased mains burst repairs in the short term. We are proposing relaxed targets for mains burst repairs throughout the 2020-25 period only, to allow for long term leakage initiatives to realise benefit. We have set frontier targets for water supply interruptions, the customer service output of water mains condition, which means customers will receive improving rather than declining service.

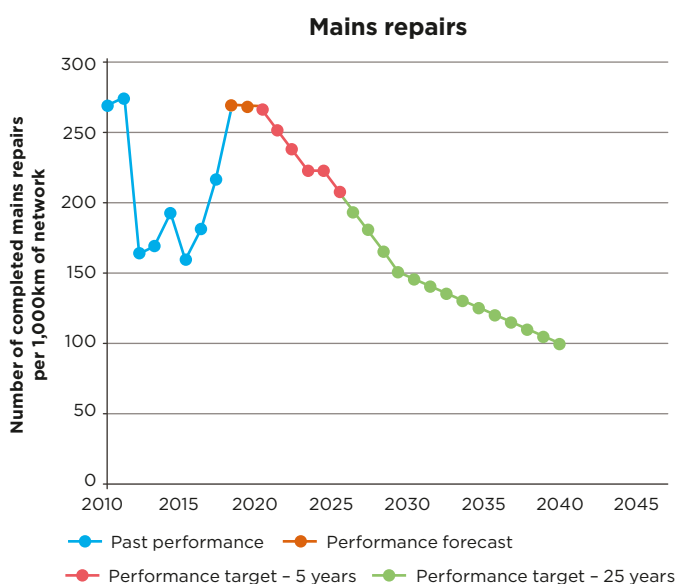


Figure 14f - Mains repairs.

The number of mains burst repairs is indicative of the underlying asset condition or resilience. However, the recent rise in bursts is a result of active leakage control 'find and fix' activity, not symptomatic of a sudden deterioration of our asset base. We have a legal duty to maintain and manage our water supply assets, as well as improve and extend them. This measure demonstrates our commitment to provide a good level of service to customers now and in the future.

This is a common performance commitment, meaning customers will be able to compare our performance with other water companies annually.

Engagement

Our customers demonstrate good support for this performance commitment, with a majority rating it as important. Our customers typically want to see consistent improvement in our performance against this commitment over the short and long term.

Many customers consider this positive, understanding that it helps drive our efforts to ensure pipes are fit for purpose and in good health. Testing revealed that preventing water wastage is very important to customers, particularly considering future challenges.

Our performance to date

Over the last 30 years we have made significant progress in maintaining and improving our distribution network. Through continuous improvement in our collection and analysis of performance and condition information, we have developed a significant understanding of the network.

Improved data collection and monitoring has helped develop asset records and contributed to the development of hydraulic network models, which enable us to better understand how our network operates and performs. Our infrastructure asset deterioration model allows us to understand areas, pipe attributes, and external factors that contribute to the failure of our assets.

Our performance steadily deteriorated from 2006-07 to 2011-12, partly driven by harsh winters in 2009-10 and 2010-11 and our efforts to improve leakage performance following failed targets increased the number of mains repairs. Performance issues early in the 2010-15 period led to our water infrastructure serviceability being classed as marginal. To address this, we invested heavily in leakage, mains bursts and water supply interruptions, resulting in performance improvement and reclassification of water infrastructure serviceability as stable.

Our performance since has remained stable, however we face a challenging future due to our ageing network. Maintaining a stable burst rate in the future requires increasing asset repair and replacement.

When compared to the rest of the industry, we have a higher than average burst rate. Contributing factors include the average age of the water network (it is older than many UK water companies) and Yorkshire's topography, where greater pressure variances occur in the hilly regions.

We are forecasting performance against this measure to decline in the remainder of the 2015-20 period as our leakage reduction activity will result in an increased number of mains repairs. We currently use Active Leakage Control (ALC) as our primary means of managing leakage and will continue to manage leakage in this way. ALC in 2017-18 and 2018-19 resulted in an increased number of mains repairs, and our customers have not seen any deterioration in service as a result.

Our plans to deliver this commitment

To maintain stable performance throughout 2020-25 and beyond, we are implementing a targeted structural mains replacement programme coupled with normal operational mitigation measures, such as pressure management and network optimisation.

We continue to look for low cost solutions to maintain the mains repair number at stable levels. Our 'calm network' training, aimed at achieving operational best practice through the management of pressure fluctuations, focuses on avoiding bursts which can occur as a result of valve operations. We are still validating the tangible benefit of 'calm network' training in relation to the reduction of bursts, however the relationship between the reduction in bursts and 'calm' valve operations is well established across the industry.

During 2020-25 we will continue to optimise our network through pressure management which reduces leakage levels and causes less stress on the network, reducing the number of bursts that require repair.

ALC continues to be our principal intervention for securing leakage reduction through 2020-25, so performance against this measure will remain weaker than present despite improved service. Our longer-term leakage initiatives will begin to realise benefit later in the period and beyond, so we forecast improvement against this measure after this time.

As part of our ongoing capital investment programme, we will continue the renewal of mains that have breached our mains replacement policy. This renewal is based on the performance of the asset. Mains qualify for renewal when there have been five or more bursts within a 5-year period over a 1km length, or between valves.

Our incentive to deliver

The mains repairs performance commitment is financially incentivised through under and outperformance payments. The incentive type is a continuation of the PR14 measure, where rewards and penalties apply. Mains repairs is of high importance to our customers. Our customers are also extremely supportive of a large underperformance and outperformance payments for the performance commitment, with the incentives derived from marginal costs.

The ODI follows the prescribed formula for calculating incentive rates, using marginal benefits and marginal costs calibrated for the forecast totex sharing rate.

- The standard underperformance payment rate is -£588,418 per unit.
- The standard outperformance payment rate is £588,418 per unit.

We have introduced a penalty deadband at the forecast industry upper quartile level of 197MI/d (in 2025). This ensures we will not incur an underperformance payment if we miss our target, but are still providing a comparative good level of service compared to the rest of the industry.

The ODI payments will be recovered from the Water Network Plus price control.

Unplanned outage

Table 14e

Annual performance targets – Unplanned outage					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Percentage (%)	7.89	7.78	7.65	7.46	7.25

In summary

This performance commitment relates to the ability of our water production assets to process the volume of water they are designed to produce. Unplanned outage is the temporary loss of peak week water production capacity. In the period 2020-25 we are planning to deliver a unplanned outage from 8% to 7.25%.

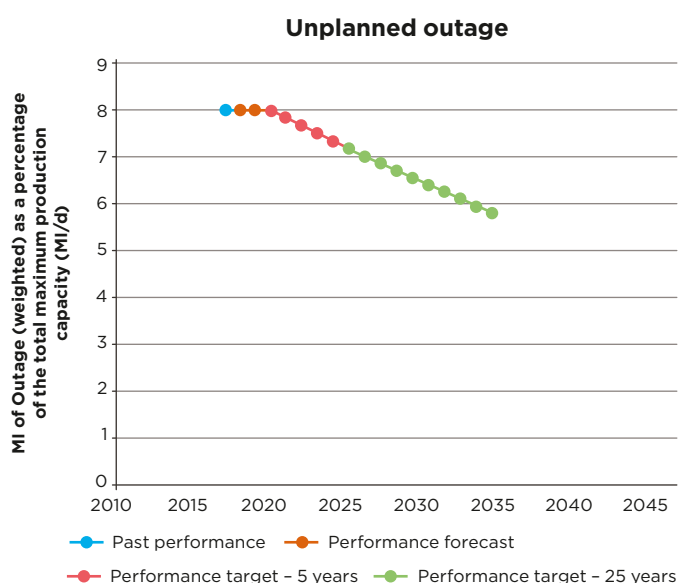


Figure 14g - Unplanned outage.

This performance commitment is a measure of our resilience. Having stable and healthy assets means we can be sure of our ability to deliver a continuous supply of safe drinking water to our customers. Securing maximum availability of production capacity allows us to optimise our water production to ensure a resilient and cost-effective supply. Using our distribution grid, we can select the most suitable raw water sources, minimising the risk of water quality failure while optimising production costs.

This is a common performance commitment, meaning customers will be able to compare our performance with other water companies annually.

The performance commitment is a new measure for 2020-25. Alongside water quality compliance (CRI) it replaces our current water quality serviceability measure. The commitment has a non-financial incentive. It will be measured and reported annually throughout 2020-25.

Engagement

Our customers demonstrate good support for this performance commitment, with a majority rating it as important.

Many customers struggle to understand this commitment, but those who understand typically express desire to ensure we maintain capacity.

Research reveals customers want us to focus on this into the future to ensure we have appropriate plans and resources to mitigate for population growth, extreme weather and climate change.

Our performance to date

Unplanned outage is not something we have measured previously, so while we have a very good understanding of our historical production volumes, we cannot retrospectively categorise the unplanned outage volumes at the level of detail required by this performance commitment. Using the best data available to us we have had to estimate our forecast performance in the period 2020-25. Once we have completed two years of shadow reporting of the measure, we will have a much better understanding of our current performance and may have to review these targets retrospectively.

Historically we have delivered largely stable investment in our water production assets, maintaining reliability and service through proactive capital and operational maintenance. We have been able to manage outages at source works through the resilience provided by our grid system. It has not always been efficient and in the best interest of customers to resolve all (non-impacting) outages immediately.

Our plans to deliver this commitment

In the period 2020-25 we are planning to deliver a unplanned outage from 8% to 7.25%.

To deliver our unplanned outage targets we will manage asset deterioration in clean water production through continued capital base maintenance; targeting areas we know impact on unplanned outages. The following planned areas of investment and initiatives will allow us to deliver our unplanned outage improvement:

Treatment schemes

We are experiencing a significant level of raw water quality deterioration from a number of our upland catchments associated with increased colour. To manage this deterioration, we are going to deliver ambitious plans across five treatment works to install additional processes. These schemes are listed under the CRI performance commitment narrative and are detailed in our DWI submission and the cost appendix for water quality enhancement, appendix 8f. These schemes are more resilient to changes in raw water quality and less prone to unplanned outages.

These schemes, along with our catchment management programmes to manage raw water deterioration, reduce the likelihood of unplanned outage caused by raw water or treatment process failures, meaning we can always provide our customers with safe drinking water throughout 2020-25 and beyond.

Run to waste

Being able to manage WTW treatment failures efficiently is essential to reducing our levels of unplanned outage. Run to waste facilities are a key component of this capability, designed to allow a safe restart of the works following a raw water or treatment process failure event. In the period 2020-25 we will complete installation of these schemes at Chellow Heights WTW, Embsay WTW and Oldfield WTW.

Resilience work

We carried out an innovative piece of work to understand the resilience of our water supply systems. We identified solutions to mitigate interruptions to customers' supply in the event of an extended outage and identified opportunities to reduce the risk of outages at water treatment works. As part of this work we have ranked our works in respect to criticality and vulnerability and identified principal threats to production (flooding, power outage, transmission, process failure) in line with the Cabinet Office best practice approach to identifying vulnerabilities. We have taken the outputs of this study and created a WTW resilience dashboard which allows us to select delivery schemes by providing a comprehensive and quantifiable assessment of principal risks to our water supply. We have used the output to inform site interventions in our PR19 plan and will be carrying out further investigation throughout 2020-25 to understand our wider resilience position relating to water supply.

Enhanced maintenance strategy

We will drive outage improvement through a planned, dynamic, predictive and preventative approach to the maintenance of assets based on the principles of reliability centred maintenance. To reach this position, we are working hard to achieve a truly 'fix-on-fail' maintenance status as a baseline to work from. We will focus our attention on safety and process critical equipment which will protect our customers from outages. Our enhanced maintenance strategy will allow us to anticipate and pre-empt potential outage events and respond to events in a timely manner, reducing unplanned outages.

Base maintenance

Maintaining healthy and optimised assets is essential to reduce unplanned outage. Investment must be optimised, as plans cannot impact on the affordability of our customers' bills.

To optimise this investment, we have modelled our capital maintenance requirements using our DMF and asset deterioration models, specifically the

non-infrastructure totex risk model (NITRO). The model takes the current age, condition and performance data of the asset and deteriorates them through a series of life cycle curves. These life cycle curves have key indicators in them such as typical expected asset life and shape. The model triggers capital solutions in the form of asset replacement and refurbishment and opex solutions in the form of reactive and proactive repairs. These are then optimised to form the basis of a programme of maintenance and improvement.

We are aware our asset base is ageing, as illustrated in figure 14h. A significant reduction in the age of the asset base would lead to a large improvement to the levels of unplanned outage we experience, however it would not be at a cost acceptable to customers.

We plan to maintain capital base maintenance investment levels in line with the levels submitted for the PR14 across the assets and operational areas impacting unplanned outage. We will drive improvement through more proactive maintenance of our existing assets and by strategically targeting our investment using tools such as our resilience dashboards and the DMF.

Our incentive to deliver

The unplanned outage performance commitment is a common performance commitment set by Ofwat. Our customers consider unplanned outage to be of moderate importance and would strongly support a financial incentive. However as reporting of the measure is not sufficiently mature, a non-financial incentive has been applied.

We are committed to ensuring information on our performance is easily accessible to all. We will be promoting our annual performance against non-financial incentives, as well as other key measures which are not regulatory, through a wide range of media channels, focused customer campaigns and our Executive pay and incentive scheme.

WTW asset age bands over time

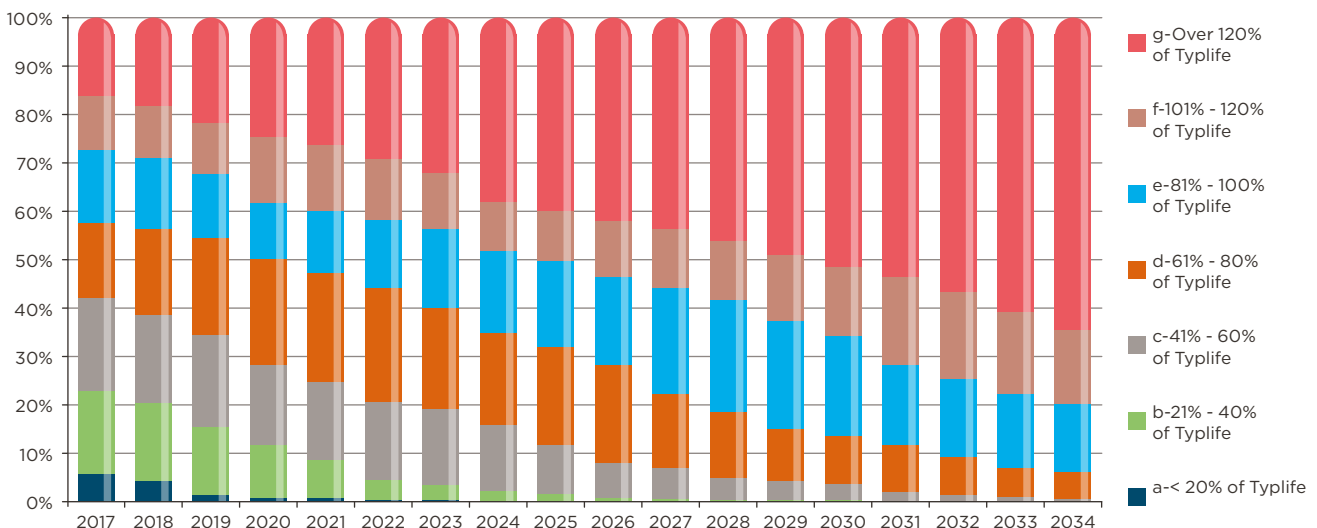


Figure 14h - Asset age bands over time.

Low pressure

Table 14f

Annual performance targets – Low pressure					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Number of properties	14	13	12	12	12

In summary

This performance commitment relates to the water pressure supplied to our customers' homes and businesses. The commitment measures the number of properties where the water pressure in the communication pipe is below the minimum standard of 7 metres static head (0.7 bar). Water pressure is fundamental to great water service, so it is vital we seek to minimise the number of customers who suffer from water pressure problems.

We propose a target of 14 properties in 2020-21, improving to 12 by the end of the period. This represents a modest improvement from our already high-performance level of 15 in 2017-18.

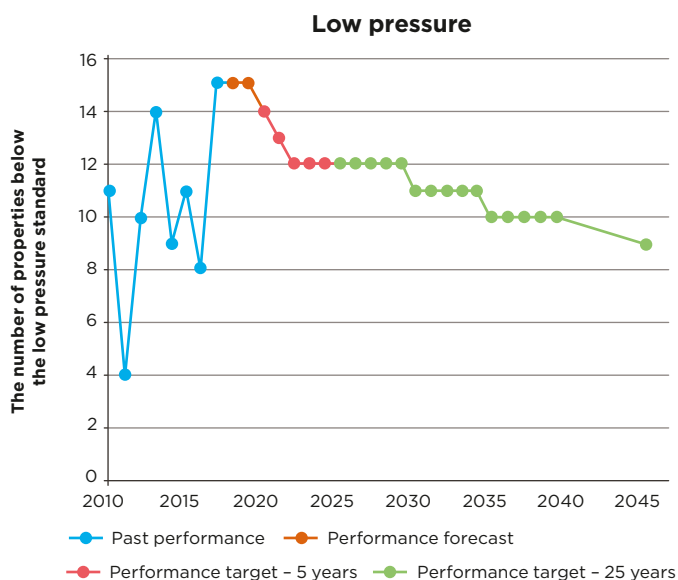


Figure 14i - Low pressure.

Our low pressure measure is a continuation of DG2, one of the original operational performance assessment measures prescribed by Ofwat.

This is a bespoke performance commitment, meaning we have developed and agreed it with our customers and stakeholders based on their priorities.

This performance commitment is an existing measure, currently reported as the stability and reliability performance commitment sub measure low pressure. It has a financial ODI with proposed under and out performance payments, to be recognised annually in-period.

Engagement

Our customers demonstrate good support for this performance commitment, with a majority rating it as important.

The provision of good and constant water pressure is a priority for customers. While not as important as the safe provision of drinking water or preventing leakage, it is noted as having a tangible day-to-day impact on customers.

Our performance to date

Since privatisation, we have drastically reduced the number of customers receiving unacceptable flow and pressure from 500 to 15 (2017-18). Against a 2015-20 period reference level of 15 properties, this level of performance is already industry leading.

Low pressure historic performance

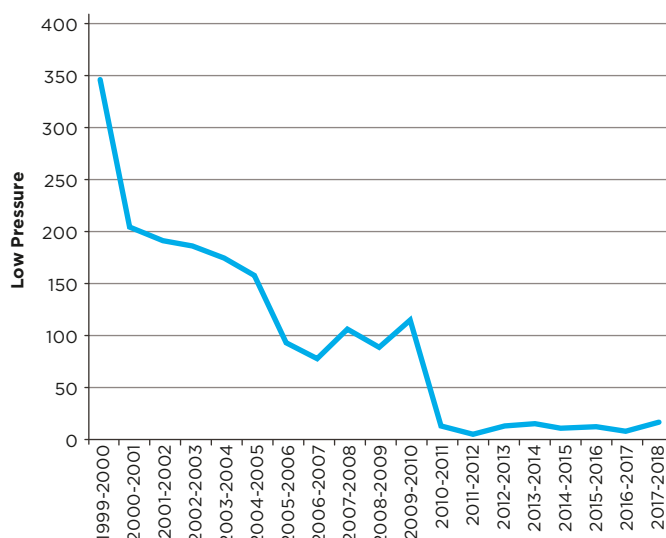


Figure 14j - Low Pressure past performance.

Figure 14j illustrates our great performance in relation to customers suffering from low pressure. We have delivered this considerable improvement through targeted investment and undertaking root cause analysis. This approach ensures that we have delivered the improvement required for the least cost, which often involves operation interventions such as rezones, rather than the investment in new assets.

Our plans to deliver this commitment

By choosing to retain this measure as a performance commitment, we are ensuring it remains an area of focus. Our performance is already at the industry frontier and we will continue to deliver our performance using tried and trusted methods. It is important to us that we maintain our performance in the most cost effective manner, so operational interventions will be considered as a first priority.

Our incentive to deliver

The low pressure performance commitment is financially incentivised through under and outperformance payments. The incentive type is a continuation of the PR14 measure, where rewards and penalties apply. Our customers consider low pressure to be of medium importance and support underperformance and outperformance payments for the performance commitment, with the incentive rates drawn directly from customer valuation research.

The ODI follows the prescribed formula for calculating incentive rates, using marginal benefits and marginal costs calibrated for the forecast totex sharing rate.

- The standard underperformance payment rate is -£139,214 per property.
- The standard outperformance payment rate is £139,214 per property.

There is no deadband for this performance commitment; standard under and outperformance payments occur above or below the target level.

The ODI payments will be recovered from the Water Network Plus price control.

Significant water supply events

Table 14g

Annual performance targets – Significant water supply events					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Number of events	14	13	12	12	12

In summary

This performance commitment relates to long lasting water supply interruptions. The commitment measures the number of events where one or more properties has an interruption to supply lasting 12 hours or longer. Interruptions include planned, unplanned and those caused by a third party.

We will achieve a target of no more than 14 events in 2020-21, improving to 12 by the end of the period. This represents improvement from our recent performance history as illustrated in figure 14k.

Water Supply Interruptions (12 hours or longer)

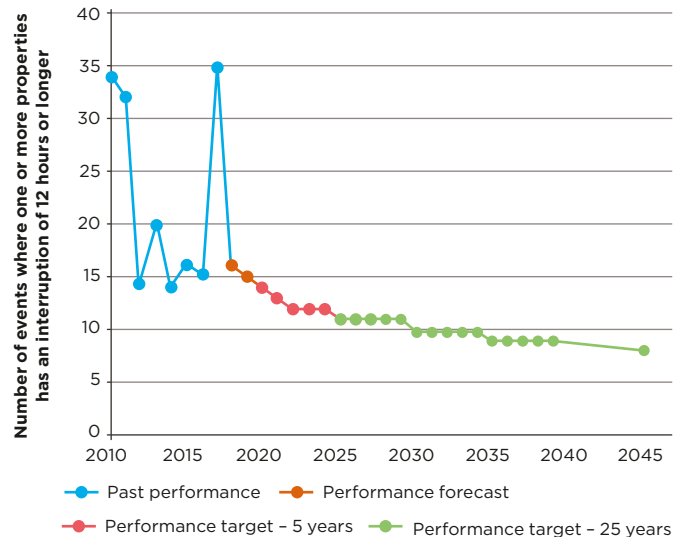


Figure 14k - Water Supply Interruptions (12 hours or longer).

The performance commitment reflects the resilience of our assets and our operational response to supply interruption events. Our commitment to this area of performance reflects our understanding of the significant inconvenience interruptions to supply can cause our customers, especially if an interruption is prolonged. We will measure the number of events that occur for a period greater than 12 hours to ensure our performance improvement is focused on the number of events, rather than just the number of customers interrupted. This reflects our commitment to reduce the inconvenience caused to any of our customers through supply interruptions and meets customers' need for a reliable supply of safe water.

This is a bespoke performance commitment, meaning we have developed and agreed it with our customers and stakeholders based on their priorities.

This is a new performance commitment and replaces the current stability and reliability performance commitment sub-measure, Interruptions >12 hours (properties). We have changed the definition to events rather than properties for the following reasons:

- We know a supply interruption of 12 hours or longer can have health implications, cause significant anguish and is a major inconvenience for any customer, therefore it is important to reflect this as a performance commitment. By counting events rather than properties, we make sure there is appropriate focus on all significant supply interruptions, regardless of the scale of the incident.
- Measuring properties would result in double counting, as the total number of properties impacted by a supply interruption is captured in the common performance commitment, water supply interruptions.

This performance commitment is an existing measure, reported in the current period. It has a financial ODI with proposed under and out performance payments, to be recognised annually in-period.

Engagement

Our customers demonstrate high support for this performance commitment, with a majority rating it very important. Our customers typically want to see consistent improvement in our performance against this commitment over the short and long-term.

Many customers recognise this measure accounts for the significance of long lasting supply interruptions.

“What’s the difference? If my water’s off for 3 hours that’s annoying... if it’s off for 12 hours or more that’s not really acceptable”

- Business customer

Our performance to date

The number of water supply events lasting 12 hours or longer each year can be volatile and unpredictable. Although the clear majority of interruptions are caused by burst mains (approximately 74%), there are other causes such as pumping station failure, third party damage and a small number of issues with planned capital work.

Our worst performing year was 2010-11, when we experienced a particularly severe winter. We also experienced a peak in interruptions lasting 12 hours or more in 2017-18. Again, this was because of a hard winter.

Our plans to deliver this commitment

We will deliver this commitment through the same means as those described in our water supply interruptions performance commitment. Our focus on improving resilience and proactive management of the water network will minimise the number of incidents and events. Where events occur, we will be more prepared and able to respond quicker and more effectively.

Our incentive to deliver

The significant water supply events performance commitment is financially incentivised through under and outperformance payments. The incentive type is a continuation of the PR14 measure, where rewards and penalties are applied. Our customers consider water supply interruptions over 12 hours to be of very high importance and strongly support underperformance and outperformance payments for the performance commitment, with the incentive rates drawn directly from customer valuation research.

The ODI follows the prescribed formula for calculating incentive rates, using marginal benefits and marginal costs calibrated for the forecast totex sharing rate.

- The standard underperformance payment rate is -£265,407 per event.
- The standard outperformance payment rate is £265,407 per event.

There is no deadband for this performance commitment; standard under and outperformance payments occur above or below the target level.

The ODI payments will be recovered from the Water Network Plus price control.

Repairing or replacing customer owned pipes

Table 14h

Annual performance targets – Repairing or replacing customer owned pipes					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Number	6,882	7,109	7,386	7,687	8,013

In summary

This performance commitment relates to the condition of customer owned pipes and their effect on the quality, pressure and flow of the water and reliability of the service provided. The commitment measures the total number of residential supply pipe repairs and renewals we carry out each year.

We will undertake 6,882 repairs and renewals in 2020-21, rising to 8,013 by the end of the period. This is an increase from our current rate of repairs and renewals which totalled 4,144 in 2016-17.

The supply pipe transports water from our stop tap at the property boundary to an internal tap inside the customer’s property. It is the legal responsibility of the property owners to repair any supply pipe leak in a timely manner, at their own cost. However, to help to maintain excellent water quality, reduce customer side leakage, provide adequate water pressure and flow and reduce the risk of supply interruptions, we are offering a free of charge repair service for leaking pipes. This is available for all residential properties that receive a domestic bill from us.

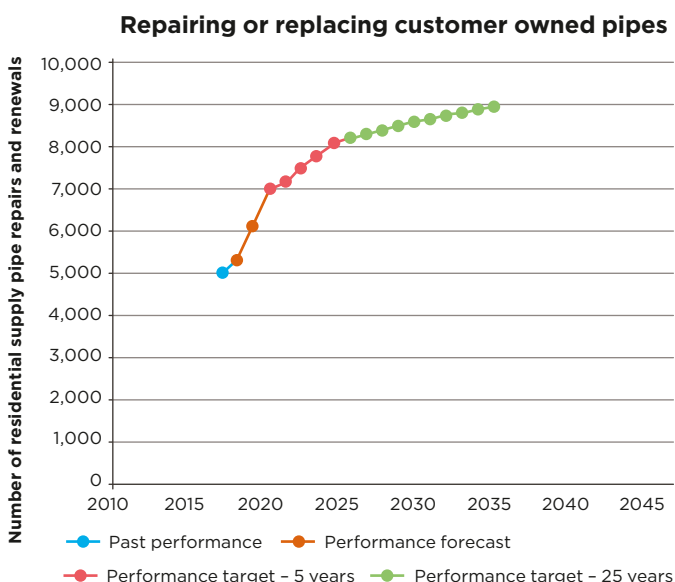


Figure 14I - Repairing or replacing customer owned pipes.

This is a bespoke performance commitment, meaning we have developed and agreed it with our customers and stakeholders based on their priorities.

This performance commitment is new measure for 2020-25. It has a financial incentive with proposed under and over performance payments, to be recognised annually in-period.

Engagement

Our customers demonstrate high support for this performance commitment, with a majority rating it very important. Our customers typically want to see consistent improvement in our performance against this commitment over the short and long term.

Customers express support for the measure but are often keen to better understand how it will work in practice.

Our performance to date

As this performance commitment is a new measure, a retrospective view of what would have been our performance shows an increased trend over the years. Prior to our new free supply pipe repair policy released in February 2018, a policy of a free repair once every 2 years was in place for over the last two reporting periods. A spike in 2011-12 is due to higher promotion of the policy following the severe winter of 2010-11. The need to reduce leakage on the customers' assets is essential in realising our Water Supply Big Goal.

Our plans to deliver this commitment

When replacing customer owned pipes, we focus on delivering in the least intrusive and most efficient way possible. Throughout the current period we trialled numerous methods, but our preferred approach is the 'kobus pipe puller'.

Case Study: Kobus pipe puller

During the 2020-25 period we will deploy the 'kobus pipe puller' technique to meet our commitment targets. This technique extracts the old pipe from the ground and pulls the new pipe through the same bore hole, minimising interruption to service, minimising damage to customers' properties, virtually eliminating the problem of striking other utility assets. Among its other benefits are reduced traffic disruption, environmental impact and noise pollution. The solution speeds up the process of replacing pipes, and reduces labour cost, which is a significant proportion of total cost. The 'kobus pipe puller' will enable us to deliver a greater number of supply pipe repairs and renewals during the 2020-25 period with the minimum amount of disruption to our customers and in a cost-effective way.

Our incentive to deliver

The repairing or replacing of customer owned pipes performance commitment is financially incentivised through under and outperformance payments. The performance commitment is a new measure for PR19. Repairing or replacing customer owned pipes is of high importance to our customers. Our customers are also extremely supportive of financial underperformance and outperformance payments for the performance commitment, with the incentive rates based on the market value for repairing or replacing pipes.

The ODI follows the prescribed formula for calculating incentive rates, using marginal benefits and marginal costs calibrated for the forecast totex sharing rate.

- The standard underperformance payment rate is -£449 per repair.
- The standard outperformance payment rate is £449 per repair.

There is no deadband for this performance commitment; standard under and outperformance payments occur above or below the target level.

The ODI payments will be recovered from the Water Network Plus price control.

Drinking water contacts

Table 14i

Annual performance targets - Drinking water contacts					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Number per 10,000 population	11.3	11.3	11.3	11.3	11.3

In summary

This performance commitment relates to the quality of the water we supply to our customers, measuring the number of customer contacts we receive per 10,000 population relating to the colour, taste or smell of the water we supply.

We will significantly improve our performance in this area, achieving no more than 11.3 contacts per 10,000 population served. This is significant improvement when compared with the 14.2 contacts per 10,000 population served, which we experienced in 2017-18.

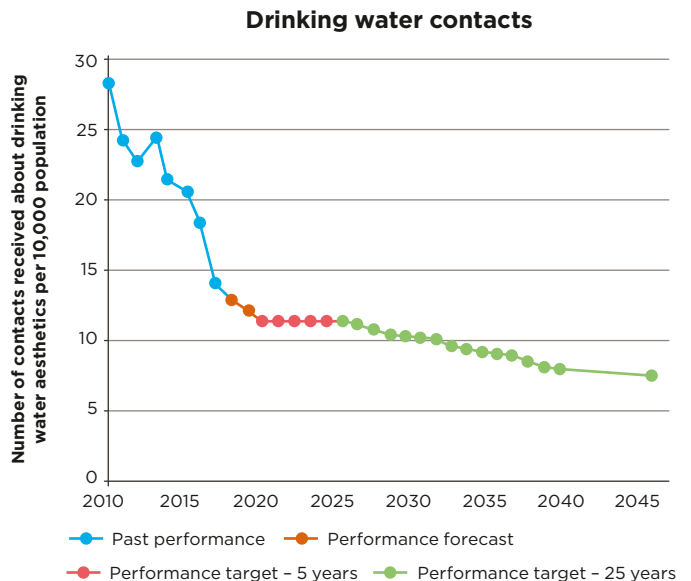


Figure 14m - Drinking water contacts.

One of our main priorities is to ensure the water coming from our customers' taps is of the highest possible quality and meets stringent regulations.

This is a bespoke performance commitment, meaning we have developed and agreed it with our customers and stakeholders based on their priorities. This performance commitment is a revision to an existing measure, drinking water contacts, reported in the current period. The measure has been revised, so it no longer includes contacts that relate to illness.

It has a financial ODI with proposed under and out performance payments, to be recognised annually in-period.

Engagement

Our customers demonstrate very high support for this performance commitment, with a majority rating it very important. Our customers expect to see improvement from us, and testing revealed this is one of the five performance commitments our customers most want to see improvement against, both in the immediate and long term.

“Even though it probably doesn’t do you any harm, you like to think [Yorkshire Water are] looking at it.”

– Business customer, York

Our performance to date

During the 2015-20 period our approach to water quality contacts changed from focusing on the traditional capital activity of mains renewal and rehabilitation to the use of more innovative and novel ways for resolving these customer contacts. We carried out an intensive systematic district meter area (DMA) flushing programme, which is delivering benefits to customers and ensuring compliance. Although the principle of flushing is not particularly innovative, the ability to be able to calculate sediment depth from a scientific end-to-end process allows us to model and then predict, based on risk, which DMAs are likely to cause discolouration in the event of a future flow increase.

Our approach to reducing customer complaints through flushing received praise in the DWI Chief Inspector’s Report 2017:

“Yorkshire Water were able to demonstrate that flushing programmes in its Hull West and Airedale supply zones have had an effect in reducing consumer complaints mid-way through 2017. The company has put a considerable effort into reducing consumer complaints and now has 24 flushing teams to target poor performing areas and is an excellent example of tackling long-standing and historical problems.”

Our plans to deliver this commitment

Unidirectional flushing

During this investment period and from 2020-25 our plan to deliver this performance commitment will be a combination of smaller capital activity, complemented by a large uniform DMA flushing programme. We are also introducing an innovative approach towards trunk main conditioning. The benefits of flushing DMAs and conditioning trunk mains is that both approaches prevent the significant re-accumulation of discolouration material, lowering the risk of causing quality issues across the water network. This reduces the need for capital activity for water quality reasons and has shown immediate performance improvements; this investment must be maintained to minimise the future risks.

Our 2020-25 unidirectional flushing programme, accompanied by smaller scale discolouration capital investment, will be based on risk of discolouration rather than customer contacts. This will drive our discolouration performance down to lower levels, without the need for large scale capital expenditure.

Trunk main conditioning

During the 2020-25 period, our approach to risk of discolouration from our large diameter mains will be to carry out trunk main conditioning, and where it is appropriate, to automate this process to minimise the ongoing risk and costs. We have trialled this approach in the current period and aim to roll it out on a larger scale throughout 2020-25. Our approach stops large scale ‘one off’ incidents’ and decrease the amount of sediment transferred from our trunk main system into the DMAs, reducing the potential for adverse customer impact.

Case Study: Ewden 36" main remote conditioning

Issue: 8.6km of cast iron cement mortar line mains had been the cause of two DWI reportable incidents due to discoloured water events.

Solution: The future risk of discolouration is managed remotely through the periodic change in flows to ensure any unforeseen or planned increases in supply do not result in sediment remobilisation, which can result in customer contacts due to a discolouration of water supplies.

Benefits: Reduced risk of water quality issues due to discolouration which can be undertaken remotely ensuring that the long-term risk is minimised, as well as reducing cost and customer inconvenience.

Taste and odour contacts

The areas relating to water quality where we receive the most contacts from customers are taste and odour. Because of our ability to transport water around the region, the change in water sources can often cause customers to contact us about a different taste to their water supply.

To address issues associated with taste and odour contacts, our approach is to ensure our water treatment works are operating as effectively as possible so there are no increases in complaints from current levels. We plan to upgrade Tophill Low water treatment works to address issues associated with taste and odour, and we have an active programme of chlorine optimisation aiming to maintain stable low levels of chlorine throughout the network. In areas where water chemistry, for example high bromide ground waters, results in a higher risk of the chlorine interacting with plastic fittings in the customers taps, we condition the water using chloramination. We are investigating where we can extend the coverage of this approach during 2020-25 and beyond, without constraining the flexibility of the supply system. Mixing water treated through a chloramination process with water that has been through other processes can cause further taste issues.

Our incentive to deliver

The drinking water contacts performance commitment is financially incentivised through under and out performance payments. The incentive type is a continuation of the PR14 measure, where rewards and penalties apply. Drinking water contacts is of very high importance to our customers, who are also extremely supportive of the underperformance and outperformance payments for the performance commitment, with the incentive rates drawn directly from customer valuation research.

The ODI follows the prescribed formula for calculating incentive rates, using marginal benefits and marginal costs calibrated for the forecast totex sharing rate.

- The standard underperformance payment rate is -£9,339 per unit.
- The standard outperformance payment rate is £5,923 per unit.

There is no deadband for this performance commitment; standard under and outperformance payments occur above or below the target level.

The ODI payments will be recovered from the Water Network Plus price control.

Per capita consumption (PCC)

In summary

Table 14j

Annual performance targets – Per capita consumption					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Litres per head per day	123.3	122.1	121.1	120.1	119.3

This performance commitment relates to the amount of water our customers use. The commitment measures the average amount of water used by each customer living in a household property per day.

We are already close to the industry frontier position on PCC. We are aiming to reduce by a further 10% by 2025 from our position in 2020. Our 2020-25 targets align with the forecast PCC in our draft WRMP, which considers revised estimates of household occupancy and population. The PCC values presented in our WRMP are for a dry year annual average scenario, estimating water use by customers in a dry year. Our target for 2020-25 is for customers to stay under this PCC value in any year, whether normal or dry.

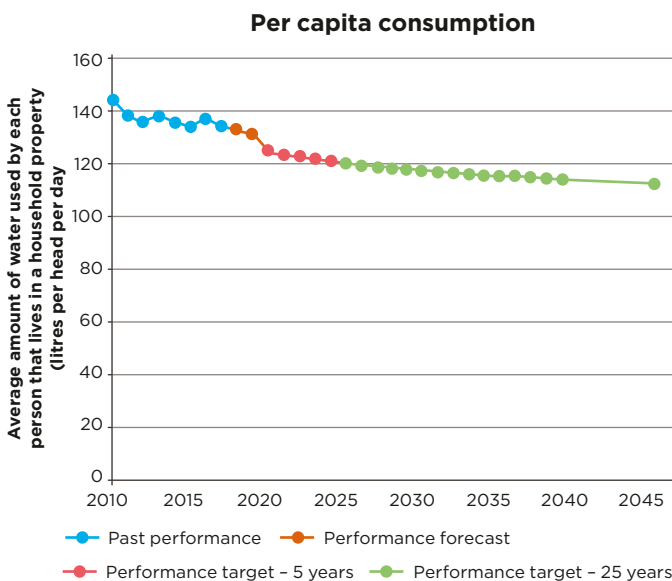


Figure 14n - Per capita consumption.

This is a key performance commitment for us as demand management is critical to mitigating the effects of population growth and climate change. Our twin-track approach to demand management seeks to reduce customers' water use, through metering and encouraging water efficiency, and reducing waste through leakage in our own distribution system. Lowering PCC reduces the amount of natural resource we take from the environment, creating headroom in our supply-demand balance and increasing resilience to drought. Further, reducing our abstraction means we require less infrastructure, power and chemicals for treatment, all of which contribute to lower bills and protect the environment.

This is a common performance commitment, meaning customers will be able to compare our performance with other water companies annually.

This performance commitment is an existing measure, reported in the current period. It has a financial ODI with proposed under and outperformance payments, to be recognised annually in-period.

Engagement

Our customers demonstrate good support for this performance commitment, with a majority rating it as important.

The majority of our customers seek improvement in our performance against this commitment over the short and long term.

The performance commitment proves particularly divisive for customers. Some believe it is important to educate customers to consider their water use, others think this is too intrusive. However, while customers often take the supply of their water service for granted, they are mostly conscious of their water use, especially if metered.

Research reveals customers recognise they need influencing to reduce water consumption to protect the future water supply. They are typically concerned by the long-term effects of population growth and are supportive of initiatives to reduce business and customer water consumption. They recognise behaviour change takes time, so understand we need to make changes now to meet future pressures.

Given the typically low appreciation of water, customers consider education essential to making the necessary changes.

Our performance to date

Our strategy for managing customers' water use in the current period has focused on promoting domestic metering and water efficiency. Currently we have 50% metered households, and this number is increasing each year due to meter optants and new developments. The forecast is for a slight increase in measured household PCC driven by households that use more water by switching to a measured supply; and the increasing number of low occupancy households (proportionally higher water use per person due to use of appliances, such as washing machines and dishwashers). Unmeasured household PCC is forecast to decline due to increasing water efficient behaviour and ownership of water efficient appliances.

Domestic metering

Water savings are typically seen after meter installation, due to the increased financial incentive to use less water. These savings are a major contribution to water efficiency. We promote domestic meters when we communicate with customers through billing and on our website, however demand to switch to a meter has slowed in recent years. This is due to several factors:

- There is a strong correlation between the value of unmetered customers' bills and the number of new meters requested each year. When unmetered bills increase, there is a corresponding increase in customers opting for a metered supply. In the last few years, increases in unmetered bill values have been relatively small, resulting in fewer customer meter requests and installations.
- Historically we have promoted a new metered supply to customers with affordability issues as a means of managing their water charges. In recent years, there has been a decrease in customers choosing to switch to a metered supply. Instead they elect to join one of our customer support schemes which help customers on low income or with bill arrears to manage their water charges.

We have piloted several meter promotion approaches to understand the best ways to encourage customers to opt to a metered supply. This included the use of customer segmentation information, and changes to our customer call centre processes to make our meter application process quicker and easier for customers. Because of these changes we have seen a recent increase in meter optants. We continue to identify new approaches to promote and facilitate metering to our household customers.

Case Study: Applying customer insight to ensure customers are on the best tariff

We are reviewing the accounts of up to 100,000 customers who we think could save money by having a water meter. As part of the initiative, we are offering customers who we believe would benefit a two year meter trial. During the trial period, we will assess whether the customers have saved money. If they have not, we will switch them back to the unmetered rate.

This potentially money saving offer is based on extensive feedback from customers, who increasingly ask if we can offer the same arrangement as the energy sector, where suppliers are obliged to ensure that their customers are on the best possible tariff.

We have identified 100,000 customers in properties with a high rateable value and a small number of occupants. Therefore, their bills are likely to be higher than they would be if they were billed according to the amount of water they consume. This initiative is a further step to increasing the proportion of our customers on a metered supply and importantly demonstrates our commitment to providing value to our customers in a transparent manner.

Water efficiency

In recent years, we have focused our household customer water saving activity on the provision of free water saving packs that customers self fit. This has been successful in our region, with free pack giveaways of 30,000 to 40,000 per year.

Recent studies, including a project in the Huddersfield area, have concluded that the free packs do not achieve the savings originally anticipated and assigned to them in the annual reporting assumptions provided by Ofwat in the 2010-15 period. Our project concluded that savings were no more than five litres per property per day (l/p/d), compared to around 50 l/p/d previously assumed. This can, in part, be attributed to the fact that customers ordering free packs do not necessarily fit the products.

In the 2017-20 period we are delivering a trial project where we offer to visit customers' properties and fit water saving devices free of charge. If successful we will continue to offer this service from 2020 onwards. We will continue to offer the free self-fit packs, but at a lower promotional level, assuming that customers who actively seek out the free packs are more likely to fit them and achieve savings.

Our plans to deliver this commitment

Domestic metering

Currently around 53% of our household customers have a metered supply and demand for meters is declining. A meter penetration forecast has been developed to reflect the decreasing number of unmetered households that are available to request a new meter and would benefit financially from doing so.

Table 14k

Forecast customer metering					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Domestic meter optants	32,965	31,884	29,206	26,753	24,505

We are investing £23 million on Domestic Meter Optants (DMOs) in the 2020-25 period, which represents a decline on the current period. Our overall DMO programme will reduce, however we still expect to see a reduction in PCC due to our historical work continuing to provide to deliver benefits and our wide water efficiency planning.

Water efficiency

For household customers, we continue to promote behavioural change in water use and to provide water saving devices through free packs and home audits. The water saving from this activity, in combination with increasing ownership of water efficient appliances, will drive the downward trend in PCC presented in our household demand forecast.

We are taking a new approach to our behaviour change campaigns to make sure we are reaching the right customers with the right messages, at the right time. We will use our customer insight to identify how different segments of customers use water in different ways, and what messages and incentives are likely to change their behaviour and attitude to water and the amount they use.

In the past, we have delivered broad awareness campaigns across the whole region to encourage customers to use less water and to promote our free water saving packs. We are now moving to a "micro" approach, talking different communities in the right way, at the right time. We hope to see a real change in behaviour and to promote positive attitudes at a household and community level. Better insights into our customers differing social and economic demographics mean we can target customers using channels that will appeal to them. We will also update campaign messages to suit each demographic, with different packs, giveaways and offers based on understanding our customers needs.

Our incentive to deliver

The per capita consumption performance commitment is financially incentivised through under and outperformance payments. The incentive type is a continuation of the PR14 measure, where rewards and penalties apply. Our customers consider PCC to be of moderate importance but strongly support underperformance and outperformance payments for the performance commitment, with the incentive derived from wider benefit valuations.

The ODI follows the prescribed formula for calculating incentive rates, using marginal benefits and marginal costs calibrated for the forecast totex sharing rate.

- The standard underperformance payment rate is -£10,287 per unit.
- The standard outperformance payment rate is £10,287 per unit.

There is no deadband for this performance commitment; standard under and outperformance payments occur above or below the target level.

As the performance commitment has reliable comparative information, enhanced under and out performance payments have been calculated to apply where performance exceeds frontier levels, or drops below the lower quartile projections. The enhanced incentive rates capture the wider social and environmental benefits for the Yorkshire region and beyond. Through our acceptability research on the business plan, customers have demonstrated support for the enhanced incentives.

- The enhanced underperformance payment rate is -£1.5 million per l/p/d.
- The enhanced outperformance payment rate is £1.5 million per l/p/d.

The enhanced outperformance payment rates applies below 115 l/p/d and the enhanced under performance payments applies beyond 145 l/p./d. We have also applied an enhanced outperformance payment cap at 90 l/p/d, to limit the maximum outperformance payment that could be earned on the performance commitment.

The ODI payments will be recovered from the Water Network Plus price control.

Cost efficiency

We continually strive to deliver an efficient and effective service to our customers, both in the planning, and in the delivery of our activities and enabling expenditure programme. This has been the case in construction of the expenditure programme supporting the PR19 submission, where we have fully engaged with our Board to identify the challenges we face and the level of risk we are willing to accept. The level of efficiency identified requires transformational change, this has been acknowledged and plans are already being developed to ensure we are in a good position for commencing the 2020-25 period.

Through support and challenge by the Forum and our Board assurance process, we have identified £308 million of efficiencies which we have deducted from our expenditure requirements to make sure that we remain efficient.

Through working with experts in the business and consultants working in an advisory capacity, the following broad themes were identified;

- Asset management.
- Service delivery.

Each of these themes are explained briefly below to give an indication of the type of activity we will be undertaking in the 2020-25 period to deliver the efficiency. We know this level of efficiency, coupled with performance commitment targets, clearly demonstrates the level of 'stretch' to which we are committed to deliver excellent service to our customers.

Asset Management

We have already put in place foundations to enhance our strategic planning capability, to both rationalise and optimise our asset base in the 2015-20 period. One example of this is the investment made in our DMF, which includes people, process, systems and governance. This facilitates continued maturity and integration of the risk based planning approach we have developed over the last 15 years.

The following headings highlight the types of activity we will be undertaking in the 2020-25 period to deliver the transformational efficiencies identified.

SMART networks

Our SMART clean water network will improve the efficiency, longevity, and reliability of our clean water network assets through enhanced measurement, data collection, data management and analytics. This holistic approach to the management of the asset life cycle will enable us to have visibility of how the network is performing and provide the insight to choose when to intervene before it impacts our customers. This will also enable us to move from reactive to proactive water network management.

The SMART network will enable us to deliver our water network strategy and enhance our operational performance by focusing upon:

- Asset reliability.
- Leakage.
- Water quality.
- Interruptions to supply.
- Resilience.

This will include a 'source to tap' optimisation review of the water distribution network system across our region. The objective for this review is to drive down infrastructure failure and leakage.

Deliver innovative integrated catchment solutions

Maximising insights from existing unstructured multiple data sources and using data analytics forms a key part of our enhanced approach to holistic catchment understanding. This is building experience obtained through our strategic partner in other parts of the world. This involves overlaying multiple unconnected data sources to enable a different visualisation of the catchments and create the connectivity of previously unconnected data sets.

Building on the success of working with others, we intend to drive this concept further in the 2020-15 period, to include:

- A mains rehabilitation programme to be shared with gas, broadband and electricity providers to synergise delivery programme.
- Using the planning process as the vehicle to further reiterate and if possible make mandatory the requirements (particularly for new builds) to install water efficiency and water run-off measures.

Commercially aligned arrangements

Commercial engineering challenges all aspects of projects and programmes to ensure they deliver the maximum benefits. We are enhancing the innovation our supply chain can bring from company trials, and knowledge gained from other sectors worldwide.

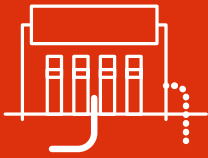
We will also ensure full deployment of the totex hierarchy whereby maximum efficiency is gained at the planning stage, rather than dependency on outperformance upon award of contract. Our strategic planning partner is already appointed on a long term contract ensuring a strong partnership in deliver an efficient quality service to our customers.

Support services underpin all activities we undertake as a business and form a substantial part of both our workforce and operational spend. A full review will be undertaken of how we can rationalise areas such as suppliers, licencing, automation and process improvement.

Service delivery

Maintenance planning

Enhancing our asset condition based monitoring programme will be an area of focus, to ensure we are maximising the available life of our assets. This will involve a review of our maintenance plans, progressing proactive maintenance to reduce critical asset failures, ensure asset availability and a reduction in the volume of reactive jobs. As well as delivering efficiency, this will facilitate a more resilient asset base and supports our health and safety improvement plan.



Wastewater Network Plus price control

Objective

We will remove surface water from our sewers and recycle all waste water, protecting the environment from sewer flooding and pollution.

Investment (total over 5 years)

Investment	£m
Totex	2512.29*

Efficiency 402.90

* net of grants and contributions

Detailed definitions of the enhancement element of the totex value can be found in the Enhancement Cost Appendices

Benefit realisation (total over 5 years)

 Financial	£999.34m	 Social	£5,094.44m
 Manufactured		 Human	£1,417.27m
 Natural	£524.37m	 Intellectual	Reflected under Social and Human capitals

Performance Commitments

Primary	Secondary
<ul style="list-style-type: none"> Length of river improved. Water recycling. D-MeX. Pollution incidents. Internal sewer flooding. Treatment works compliance. Sewer collapses. Risk of sewer flooding in a storm. External sewer flooding. Bathing water quality. Surface water management. 	<ul style="list-style-type: none"> Working with others. Land conserved and enhanced. Integrated catchment management. Carbon. Education. Creating value from waste.

Above shows the total amount of investment we will be making in this price control (totex). We have shown the amount of benefit this expenditure will create through each of the 6 capitals.

This is demonstrably good for customers where the sum of all the 6 capital benefit are greater than the totex.

In this price control we can see that **£3.20** of benefit is returned for every £1 invested.

Resilience

- Resilience maturity assessment for collection and treatment.
- SMART networks.
- Hull and Haltemprice long term strategy and partnership.

Cost adjustment claims

- Cellared properties.
- Wastewater growth.

Innovation

- Living with Water partnership.
- Asset deterioration modelling using the six capitals.
- Demand side interventions to manage future growth.

Appendices

- Network escapes enhancement.
- Hull and Haltemprice enhancement.
- Cost adjustment claims.
- Performance commitments.
- WINEP.

Figure 15a - Price control overview.

Our customers tell us that continuing to provide a high quality wastewater service in the context of a growing population and extreme weather events is important to them. It is also important we ensure their bills are as low as possible, in line with our Environment and Bills Big Goals.

We have built up our Wastewater Network Plus plan working closely with key stakeholders and regulators. We have a joint management group (JMG) with the Environment Agency and Natural England that has worked collaboratively to build this plan in line with extensive guidance. One group that has played a significant role is the Yorkshire Forum for Water Customers (the Forum) and the Forum's environment sub group. We would like to thank the Forum and the sub group for their valued contribution. This price control has been subject to considerable focus by the sub group and it has helped us ensure that our plan reflects the needs of customers and the environment. The sub group has challenged and built upon key aspects of this plan, such as its detailed work on the Water Industry National Environment Programme (WINEP).

Over the past five years, we have increased focus on strategic planning through the creation of lifecycle asset management. We manage our environmental systems in accordance with the national drainage strategy framework and have created drainage area plans to support our understanding of system hydraulics and associated service failures, and the best means of solving them. By better understanding the impact of service failures on our customers, we can prioritise our investment into the areas that impact on our customers the most.

Our planning shows the current network has limited capacity for growth, however by working to remove storm water and identify hydraulic restrictions we can improve overall sewer headroom. This means we are delivering the most cost-effective solution for our customers, keeping bills low. Alongside this, our ambitious plans to reduce pollution and internal sewer flooding will provide customers far greater service levels.

Our ambition to reduce pollution and internal sewer flooding - when sewage enters someone's property - has already started. We took immediate action to reduce internal sewer flooding incidents by 52% by 2019-20 at no extra costs to customers. In our PR19 plan we will reduce incidents by a further 18% by 2025, a 70% reduction overall.

We are also reducing our impact on the environment by reducing the number of pollution incidents that occur. This is where sewage escapes from our pipes and equipment and enters the land or water environment. Between now and 2019-20 we will reduce pollution incidents by 23%. In our PR19 plan we will reduce pollution incidents by a further 26% by 2025, an overall reduction of 49%. This reduction will also be funded through finding efficiency savings in our business.

Our performance is underpinned by our focus on integrated catchment management, promotion of SMART networks and new market engagement and leadership.

Our catchment management approach is mature and multi-faceted. It is core to our plans to manage sewer capacity and prevent flooding. Our ground breaking 'Living with Water' partnership in Hull, is recognised as a global leader in city water resilience and enhances environmental improvement with place and community values to benefit our customers. We believe catchment management can be more efficient than investing in new sewers or end-of-pipe solutions for wastewater treatment. It reduces costs for customers, while helping us to build strong, sustainable partnerships across Yorkshire with local authorities, the Environment Agency, landowners, farmers and environmental NGOs.

We are enhancing operations and service in 2020-25 through continued development of SMART water and wastewater networks. The SMART network principles on both clean and waste assets will move us to a more proactive managed environment predicting risk of failure.

Executive summary

Our Environment Big Goal sets the ambition for the Wastewater Network Plus price control. Our extensive customer research tells us that customers expect us to prevent sewage escapes damaging their homes and the environment. They are supportive of any extra spend to improve Yorkshire's rivers, and they expect us to keep bills affordable. Our environmental system must be fit for the next generation. Climate change brings uncertainty over future weather patterns and a growing population in Yorkshire will put additional pressure on our sewer systems. To deal with this, we are making significant changes to the way we plan and manage our network, using demand management to make the most of what we already have, and will continue to reduce the risk of flooding from sewers and minimise the impact of sewage overflowing into our rivers and streams.

Big Goal: Environment

We will remove surface water from our sewers and recycle all wastewater, protecting the environment from sewer flooding and pollution.

Our 25-year ambition

We will focus on what our customers expect and need from us, improving our performance in areas such as internal sewer flooding and pollution. We will continue to protect and enhance the ecology of Yorkshire's rivers, improving river quality water beyond the requirements of our regulators.

With the challenges we face, we have implemented a structured, longer-term approach to ensure our wastewater networks are sufficiently flexible and resilient to future pressures. This approach is customer centric with an ambition to achieve positive outcomes through improving wastewater asset health and eliminating sewer flooding and pollution.

We have a unique opportunity to manage wastewater across the region in a way that considers the diversity of our customers' needs and the importance of water to sustain the health of our natural environment. Continuing solely with an approach of maintaining and enhancing our wastewater networks is not sustainable. We will develop an integrated resource economy where our land, water, waste and energy are more closely interwoven. This will ensure that our wastewater network is managed efficiently, effectively and sustainably. With foresight and planning, we will deliver more reliable services and substantive improvements to preserve and enhance our environment. This will be managed not by building more, larger assets but by managing our existing assets differently. By optimising water management within catchments, we will minimise pollutant load at source, reduce storm water entering our sewers and decrease customer consumption, keeping bills affordable in the long term.

To achieve this, we will recycle all the wastewater we collect to the highest environmental standards without polluting or flooding. We will also recover the greatest value from the byproducts of our treatment processes, taking responsibility for the water environment in line with our company vision.

Tighter quality standards have traditionally been met with more energy and chemical intensive processes. The increasing cost and the impact this has on our customers, along with our drive for lower carbon emissions, means this is no longer a sustainable option. We will look at wastewater recycling differently to deliver lower energy solutions in a safe, consistent, resilient and affordable way.

Through collaboration and partnership working we will encourage local use and management of rainwater and opportunities for recycling of storm and grey water, such as rainwater harvesting, green roofs and water conservation initiatives.

We will continue to raise awareness to help all our customers know the impact of disposing inappropriate materials to the wastewater network, such as fats, oils and greases (FOG), wet wipes and food waste. We know that customer participative solutions, supported by targeted and innovative communications can be really effective.

We will work with local industry to recycle non-potable water. This is good for the environment as it reduces abstraction and the demand on our clean water production and network assets, helping us meet future demand whilst keeping bills low.

To maintain continuous improvement, transformation and long-term economic growth, we will look to the markets for new technologies and specialist services to drive efficiency.

Our 5-year plan

We played a significant role in the transformation of the natural environment over the past 30 years, not least for Yorkshire's rivers, many of which were left 'dead' in the 1970s. In order to continue this improvement and protect the rivers and streams, our wastewater treatment works (WwTW) must meet tighter environmental standards, in accordance with Urban Wastewater Treatment Directive (UWWTD) and Water Framework Directive (WFD). We are also making significant investment through our national environment programme. Our enhanced catchment approaches will ensure compliance and significantly improve river ecology. We are also working with Defra and the Environment Agency on innovative approaches in partnership with local environmental charities such as the Rivers Trust.

In 2015-20 we developed and established a business-wide approach to asset management. This has been accredited to the International Standard ISO55001 and is assured annually. It covers the full asset management cycle and supports our ambitious plans to significantly improve service performance in this period. We will continue to improve performance over a range of asset health performance measures in 2020-25 including sewer collapses, pollution, sewer flooding and performance at our sewage treatment works.

We are supporting new innovations in our plan and for the first time we are measuring our final effluent recycling activities and removal of surface water from our sewerage network. All this will ensure we enhance the environment, remain compliant while operating efficiently and safely.

Clear and visible plans

We want people and communities to have sight of the current and future challenges we face, how and when we intend to solve them, and the associated costs. At the heart of making our networks visible will be a set of plans which, at increasing levels of detail, show the challenges we face, the options considered to resolve those challenges, including the preferred solution, and in what order we are proposing to resolve them. They will also detail the partners who we are working with, and will make clear the resilience, sustainability and affordability of the solutions identified. Table 15a shows the tiered set of plans and a brief description for each.

Table 15a

Our tiered set of plans		
Area	Artefact	Description
Region	Drainage and wastewater management plan.	An overview of where either the sewerage network or associated treatment works is under pressure and plans to address these. Published annually from 2020.
River catchment or city	Strategic planning area.	Detailed technical information beyond the DWMP which we use to work with local authorities and other key partners to both identify and progress areas of joint concern. Strategic plans prepared or well underway for Hull, Sheffield, Leeds and the Upper Aire valley.
Treatment works (or group in rural area)	Tactical planning unit.	Detailed interactions between the wastewater network, the receiving treatment works, and the environment. This tactical level will generally be the catchment draining to a sewage works or, in rural areas, several small networks and associated treatment works.

Wastewater treatment

Expenditure relating to wastewater treatment is 67% of the totex in this price control, equating to £1,677 million. The five-year expenditure plan for 2020-25 is dominated by the requirements of the Water Industry National Environmental Programme (WINEP). The total cost for WINEP is £910.7m, which equates to 36% of the total expenditure for the control. In WINEP there are 84 individual new consents to be delivered, mainly phosphorus removal through the proposed sensitive area (eutrophication) designations, under UWWTD and schemes calculated to be cost beneficial through the Water Framework Directive. Several other drivers exist in WINEP and these are detailed in full in the WINEP appendices. Working closely with the Environment Agency, we continue to design alternative, innovative ways to deliver quality improvements to Yorkshire's rivers, whilst keeping bills low for our customers.

In addition to WINEP, we propose to improve wastewater treatment compliance to four failing works by the end of 2020-25 and the upper quartile position of one failing works by the end of 2025-30. The performance commitment treatment works compliance is a cross price control commitment and our strategy assumes zero failing water treatment works by the end of 2020-25.

We have a mixture of incremental growth schemes, driven through dry weather flow compliance in several catchments and 'exceptional growth' in four specific local government areas, (Leeds, Harrogate, Richmondshire and York) these require specific investment in new infrastructure. The costs associated with these are part of a cost adjustment claim for wastewater growth. We have looked at innovation in many areas to provide the best value to our customers, which includes:

- Market analysis for alternative ways of delivering outcomes particularly in the areas of growth and new environmental requirements. We have carried out high-level scenario modelling with new appointment and variations (NAVs) to explore alternative market options.
- Working with developers to implement grey water systems and reduce infiltration.
- Build water recycling schemes at some of our water treatment works.

Wastewater networks

Our wastewater networks span over 52,000km and include approximately 21,500km that became public in 2011, when many small diameter sewers were transferred into public ownership.

The system experiences several challenges that can impact the high levels of service customers expect such as:

- Lack of available hydraulic capacity, including a transient loss of available capacity during storms.
- System operation and maintenance including misuse by the public and industrial consumers.
- Ingress to system and surface water overloading.

Expenditure relating to sewerage collection is 33% of the totex in this price control, equating to £835 million. Our customers want us to improve our service in key areas so one of our top priorities for the wastewater network is upper quartile industry performance in internal sewer flooding and pollution, areas that have the greatest impact on Yorkshire's people and environment. The cost of this improvement is more than offset by the ambitious efficiencies that we have identified.

We now have a much better understanding of our impact on Yorkshire's people and environment. The relationship between investment in our network and the service received by our customers and the environment is complex, as demonstrated in the following diagram, figure 15b.

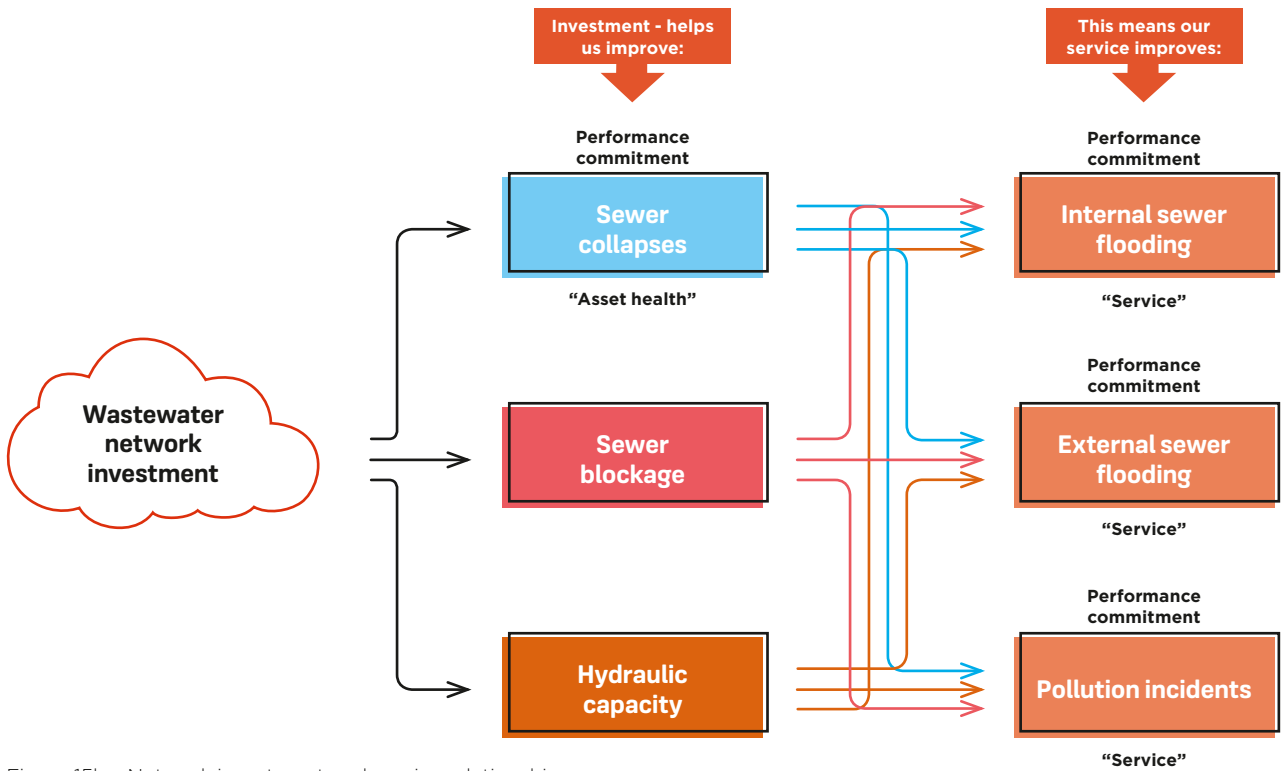


Figure 15b - Network investment and service relationship.

Most of our customers cannot choose their water company and therefore, rightly, have high expectations of us. To improve and maintain the wastewater services we provide to our customers, we carry out proactive and reactive activities. They range from long-term investment in network capacity improvements through to managing asset health and talking to our customers about how they can help avoid sewer blockages. The investment decisions are informed by network data and risk understanding to ensure investment decisions are appropriate and targeted, which means service is cost efficient for our customers and our activities benefit the environment.

Figure 15c illustrates the different types of totex interventions made on our wastewater network. To ensure that we remain resilient and cost efficient for our customers, our PR19 plan has been built with the optimal mix of these interventions to deliver the best possible service.

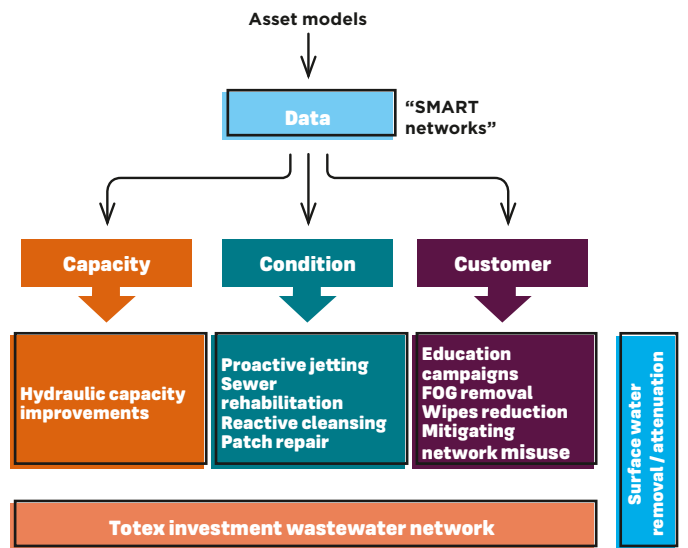


Figure 15c - Totex interventions on the wastewater network.

Integrated catchment management

We have a new bespoke performance commitment in 2020-25 for surface water removal and attenuation. This supports our commitment to deliver innovative, cost efficient solutions for our customers through collaborative blue-green Infrastructure solutions. We have committed to £28.7 million of capital investment in Hull to work in partnership to mitigate flood risk.



Living with Water - local engagement

The Living with Water (LWW) partnership identified a number of projects to ensure that communities and our customers feel a benefit to our revised and inclusive approach to flood resilience. For the LWW partnership, resilience is not just about grey or blue-green infrastructure projects, it is about helping our customers understand how they can help themselves and be part of a more inclusive solution.

The normal routes of engagement in Hull have not always proved successful. Sign up to flood warnings is at 4% - one of the lowest rates in the country - in what is the second most flood prone area outside of the Thames region. There is a need to test innovative approaches and think differently in the way we engage. Our present vehicle to engage with as many customers as possible is 'the Hull-timate Challenge'. An urban obstacle course that will take in many of the sights of Hull. An inclusive 3-day event with an anticipated 10,000 people attending. Some of the obstacles will be made from flood related materials to prompt discussion and knowledge sharing.

To reach out as many communities and customers with the resilience message, we have set up a number of community fun days, called 'Humbrella Days', before the main event. We are attending local community events to promote the LWW mission and how resilience can start at an individual level and are running a series of master classes for 200 Hull City of Culture volunteers to teach them the basics around flooding, the LWW project and what they can do to help educate communities around flood resilience. The lead up events cover a diverse range of community groups, some of which have rarely been engaged with previously. One event alone in August 2018 saw 8,000 attendees who had the opportunity to engage with LWW.

At the lead up events, the LWW partnership is promoting Personal Resilience - Healthy Choices, Money Matters, Really Safe Homes and Loving Life, Community Resilience - Unshakeable Communities, Building a Future, Environmental awareness and All Doing our Bit.

The LWW Partnership is committed to working with communities and our customers long term, the Hull-Timate Challenge is a great way to start to forge those lasting links, whilst having a fun event to share some serious messages. Some examples of where we have started to have a positive impact already:

- Working with the National Citizen Service, attending 4 sessions with their Youth projects over this summer and reaching out to over 600 youths to promote the LWW partnership and opportunities to help in the community.
- We are working with stakeholders to promote an opportunity we have identified to get flooding and resilience into the curriculum for primary school children. This work continues to gather momentum and we are working with Jigsaw - Hull City Council's curriculum provider, Headstart and Hull City Council to identify how this can be achieved.
- Working with the Police and Crime Commissioner's Office, we have secured funding to add to an existing grant to promote 'Rooted in Hull', a garden and vegetable patch on derelict land for use by ex-offenders and addicts.



Living with Water - global engagement

The Living with Water Partnership has been successful in its bid to be part of the City Water Resilience Framework (CWRF) project. This is a pilot run by the Rockefeller Foundation with support from the World Bank, University of Massachusetts and Stockholm International Water Institute. Hull is the only chosen city in Europe and one of five globally working on this pioneering project.

As part of the CWRF, we are partnering with Stockholm International Water Institute to focus on the governance elements of the framework. The objective is threefold: to develop a concept of what we mean by resilient water governance, establish a methodology by which the CWRF can be practically implemented within existing governance structures and processes, and develop a web tool that supports key players in the water cycle to mobilise and drive collective action for improving resilience.

To achieve these outcomes, the team has drawn on the knowledge and experiences of partner cities (Mexico City, Miami, Amman, and Cape Town). Together we will:

- Develop a concept of what constitutes resilient water governance and how it can be relevant to the city.
- Understand how the CWRF can be a process that helps the city to improve water resilience.

In June and early July, the LWW partnership hosted events that brought in experts and members of the community to feed into the project. Around 150 individuals were consulted from across business, utilities, central and local government, academia, not for profit and regulation in the following ways:

- 14 one-to-one interviews.
- 11 focus groups and site visits with 66 participants.
- 1 large multi-sector workshop with over 60 attendees.
- 1 executive-level governance workshop with around 10 attendees.

Importantly, this work will feed into a three day Global Knowledge Exchange event that will be used to create an action plan with Hull. The LWW General Manager has been invited by Ofwat to speak at the World Water Convention in Japan in September to share some of the Living with Water experience and success so far.

Further working in partnership

Flooding is something that our customers worry about and we are spending £41.4 million on hydraulic flood risk and will deliver an increased number of flood risk mitigation schemes in partnership in 2020-25. We know that working with others creates better overall solutions, so we are committing £4 million in partnership feasibility studies in 2020-25 to strengthen our proactive approach to developing sustainable solutions. This will include our customers and Lead Local Flood Authorities (LLFAs). We have worked collaboratively with the Environment Agency and other LLFAs to identify 86 opportunities to develop solutions in partnership, governed through the Yorkshire Water flood partnership steering group.

SMART wastewater networks

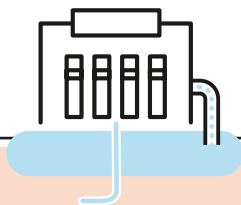
We will improve service in a sustainable way in our PR19 plan by using SMART water and wastewater networks. The SMART network principles on both clean and waste assets will move us to a more proactive managed environment predicting risk of failure and therefore mitigating the risk of failures impacting on our customers and the environment.



[See the full video here](#)

Our SMART wastewater network approach will improve system reliability through:

- A proactive approach, for example, we will monitor weather patterns and their impact on the sewer network, its performance and the outcome for the environment and customers.
- Real time monitoring of our assets.
- Maximising the use of data. Management of the wastewater network data will allow the business to make informed choices on investment and manage activity on the network.



SMART wastewater network

Our SMART wastewater network will enable us to have visibility of how the network performs and provide the insight to choose when to intervene before issues impact our customers or for unavoidable events, enable us to pre-emptively and effectively respond.

Developing a SMART wastewater network is a journey with tasks overlapping and fuzzy boundaries as pilots turn into targeted roll out and finally, enterprise level distribution. Generations are used to describe these boundaries and they align with those previously developed, but with two timelines. The first indicates an enterprise level position. The second indicates the acceleration around our flooding and pollution performance commitments, which will see earlier implementation in part. SMART will cut across various business functions.

The outline of the generations below indicates key steps on the journey:

Generation Zero (pre-2020) - understand the data (acceleration: maximise data use and gain visibility, Apr 18 to Dec 18).

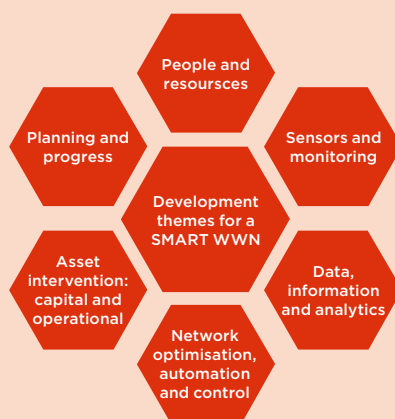
- The exploitation of data analytics with existing known and hidden data to enable the entire “source to sea” network to be understood to a far greater extent than previously experienced. Greater understanding and management of customer behaviour, weather patterns, environmental changes, power availability, resource needs and system performance will enable us to develop totex based plans to meet current and predicted service challenges.

Generation One - manage the data (acceleration: evaluate data and deploy, Sep 18 to Jun 19).

- Deployment of SMART network assets to drive further efficiency, longevity and reliability of our networks. This will be used in all phases of the asset management process, from strategic planning through to real-time monitoring, automation, maintenance and operational readiness.

Generation Two - exploit the data (acceleration: enable control, Feb 19 to Apr 21).

- Utilising a fully integrated set of products, processes, solutions and systems to actively monitor and diagnose intelligence and trends from a large number of data feeds to understand performance deviations throughout our asset base. This will provide opportunity to pre-emptively prioritise and manage operational activity and remotely control and optimise the network using data.



There are various components that form a SMART network. Monitoring, analytics and controls form the underpinning basis for having visibility and managing and operating the network. Figure 15d below outlines the concept. The scale of deployment and implementation programme necessary is dependent upon our wider digital, analytics and procurement strategies.

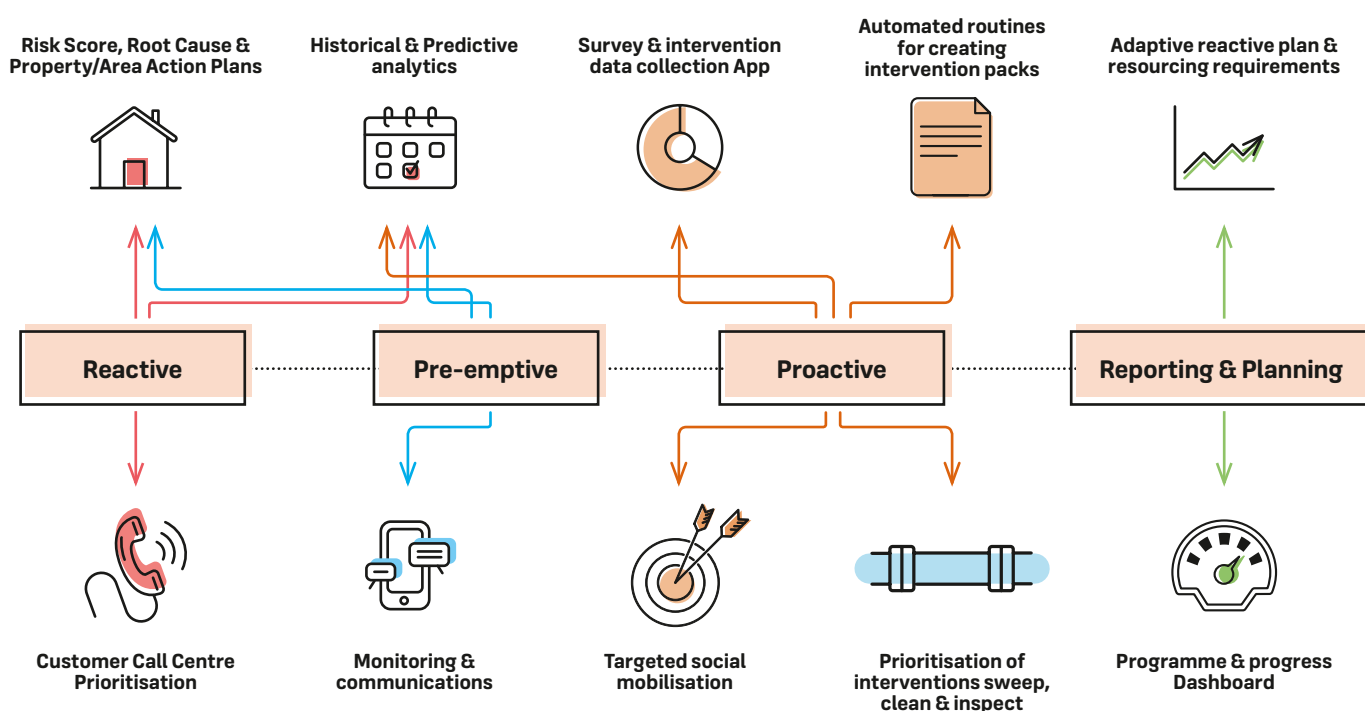


Figure 15d - Example of how components of a SMART network interact and drive interventions to improve customer service and reduce flooding.

WINEP – Summary of our approach

In 2020-25 we will deliver the largest environment programme for over 20 years. The expenditure requirement is to comply with new quality obligations agreed with the Environment Agency to meet new and tighter clean and wastewater quality standards, specified against treatment sites and catchments in the region. These become statutory obligations that we must deliver within the stipulated timeframe.

We received the final version of WINEP, WINEP3, in late-March 2018. As required, our plan is designed to address all measures within the requirements that are at amber or green status (the level of certainty). This creates a total of circa 1,000 individual obligations to address, the majority by 2025.

There are a range of requirements associated with obligations within WINEP3. Broadly these split into 4 categories:

1. Measures to physically remove biological and chemical parameters (including phosphorus) within final effluent as it passes through the treatment process specifically around sanitary and nutrient parameters.
2. Measures to measure or provide additional storage capacity both on continuous discharge sites and on line intermittent storage to stop uncontrolled spills into the environment.
3. Measures to proactively intervene in the water environment to improve the biodiversity and water quality, for example, installation of fish passages on heavily modified water bodies or catchment management interventions to retain and control flow of raw water to improve water quality (these costs are mainly in the Water Network Plus price control).
4. Investigations into a wide range of environmental issues to support the need for future proactive interventions, ensuring that activities are targeted and effective.

Following detailed analysis of the individual obligations and consideration of the available solutions to meet the required timescales, our assessment is that the WINEP3 programme will require totex of circa £1,020 million across three price controls (including enhancement and enabling base maintenance activities). This is after the application of a number of efficiency challenges to reduce the projected costs.

Table 15b

Total number of WINEP3 obligations in period 2020-25						
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
No. of obligations by compliance date	52	267	178	311	261	1069

Obligations with early compliance dates have driven a need for transition expenditure to ensure efficient and effective delivery.

There are 80 individual phosphorus consents in the WINEP programme. When costing the programme, we were mindful the programme size was likely to be unprecedented and larger than anything we had delivered historically. Outputs from our phosphorus removal process selection tool drove a cost in excess of an affordable plan. We have therefore implemented a number of key efficiency measures to ensure we challenge ourselves hard to find innovation in scope and delivery, to protect customers and ensure we are comparatively efficient with our phosphorus costs compared to the industry. The measures taken were:

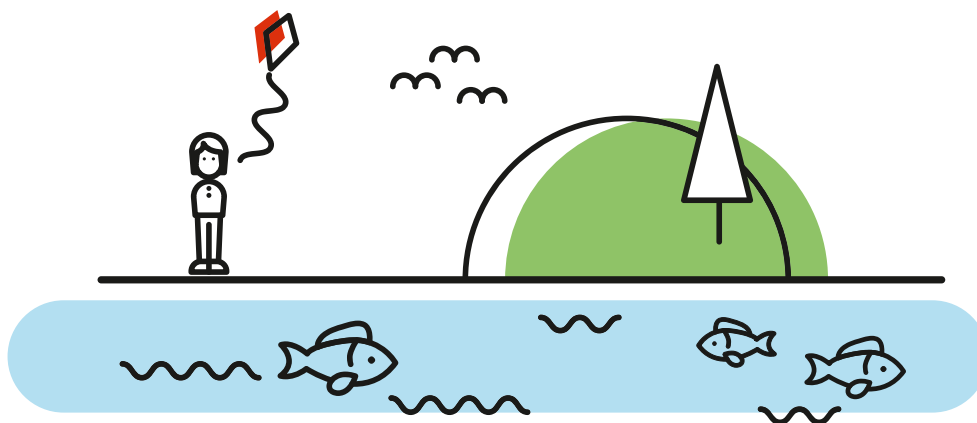
- Challenging the most appropriate delivery process and associated overhead costs.
- Challenging the scope of the scheme.
- Challenging the least whole life cost approach and technology selection.
- Challenging the requirements for future growth.

The total cost efficiency reduction applied to the whole WINEP3 programme is £47.3 million.

We are aware through the provision of previous cost information to the Environment Agency, a view has been taken that our costs associated with this programme of activity were too high by a factor of 2.4. We would highlight the previous costs provided to the Environment Agency were deemed 'full cost' and not just those costs associated with enhancement investment. Through the challenges identified above, we believe our enhancement expenditure requirements to meet the WINEP3 phosphorus requirements are efficient.

The level of expenditure requirement in WINEP is heavily weighted towards activity in the Wastewater Network Plus price control, amounting to around 75% of the total requirement. Within this, the majority of the programme (67%) is to address 80 individual new consents for phosphorus removal in final effluent. These are driven by either statutory tertiary treatment obligations in Urban Waste Water Treatment Directive Sensitive Area Designations, or cost beneficial schemes under the Pathway to Good Ecological Status objectives in the Water Framework Directive.

As required, we have submitted a compliant plan to deliver all of the green and amber measures. However, the scale and timing of the final programme is still somewhat uncertain. Final decisions on designation of waters to be improved and the timings to be followed will be taken by the end of 2019. In line with Ofwat's methodology requirements, for each of the amber measures we have submitted a companion unit cost adjustment mechanism. This means in the event that the scale of the programme is reduced, we will immediately apply the necessary adjustments to make sure that our customers pay no more than necessary. More detail of the programme and the adjustment mechanisms can be found in chapter 19, under the length of river improved performance commitment, and the WINEP Technical Appendix, appendix 8g.



Despite the substantial cost, our customers recognise the benefit that they derive from environmental improvements, and so are supportive of the potential bill impacts. 86% of customers are supportive of our final business plan including WINEP.

Our investment plan has 84 individual treatment consents in total (including the 80 phosphorus consents), the largest number of new consents in a single period we have ever had to deliver. For phosphorus removal, we have identified several possible technical solutions in the plan to deliver within the required timescales:

- Phosphorus removal through chemical precipitation – 87% of the total cost.
- Phosphorus removal through enhanced biological processes – 12% of the total cost.
- Phosphorus removal by transferring the discharge to another location – 1% of the total cost.

We believe our plan is lean and cost efficient. However, there will still be a significant capital investment and resulting operational cost impact after delivery, with the level of base operating costs increasing by over 70% as a result of the compliant solutions we have put forward.

In order to mitigate high costs in the short and long term, we have explored with Defra and the Environment Agency, alternative ways to deliver Water Framework Directive objectives. These alternatives are based on innovative ecological measures rather than traditional ‘in river chemistry’ approaches but would not be possible within the current timescales and would take a longer period of time, beyond 2025, to realise the benefits. The details of this approach are outlined in the Catchment Sense section below.

WINEP – Catchment sense, an alternative solution

Yorkshire’s rivers have seen huge improvements in the last 30 years through major investment in wastewater treatment to improve river water quality. The Aire and Don, once biologically dead along many stretches, now host iconic species in former industrial areas. People are connecting with their rivers once again.

Our challenge and opportunity is to find the most cost-effective way to continue and expand that improvement, broadening our focus to the whole catchment ecosystem and the health, wellbeing and resilience of communities. While our current WINEP will deliver some environmental benefits, it will not equally deliver significant community benefits.

Due to checks and balances within the Water Framework Directive, traditional approaches to river improvements in our region will stall at the end of the forthcoming cycle of River Basin Planning. Our alternative plan – based on detailed supporting evidence and analysis – will both deliver more improvements, and will continue delivering beyond the next cycle of River Basin Planning.

We know that our approach is new and ambitious. To plan and deliver this programme, we will need to be innovative and work with others, building capacity and support through constructive long-term partnerships. Having examined the alternatives, we believe that this is the right approach. Right for the environment, right for customers and communities, and right for Yorkshire.

Our approach focuses on achieving improved river ecology by a balance of targeted phosphorus removal, either at wastewater treatment works, or in-river, coupled with ambitious catchment-based interventions. We will work in partnership and demonstrate impact through evidence-based management. We will fund and drive the proposed interventions, delivering some ourselves, some through support of strong established partnerships and others by acting as a catalyst for new and innovative partnership approaches.

We want to deliver in ambitious yet cost-effective ways that move us towards our long-term vision for Yorkshire. Our alternative proposal will do just that; balancing the needs of the water environment with the aspirations of customers, delivery partners and communities, and reconnecting people with their rivers.

WINEP – Catchment sense, an alternative solution

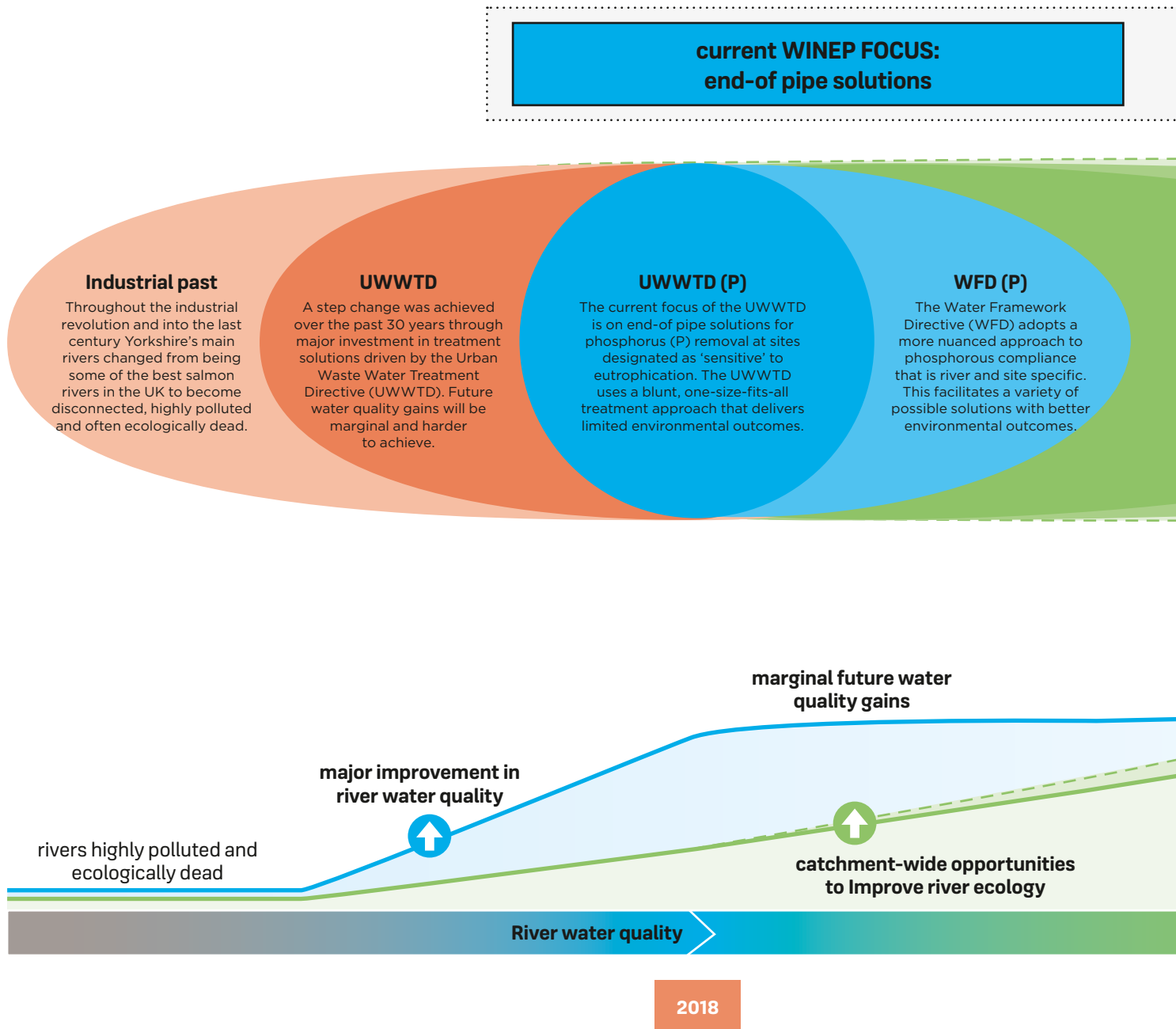
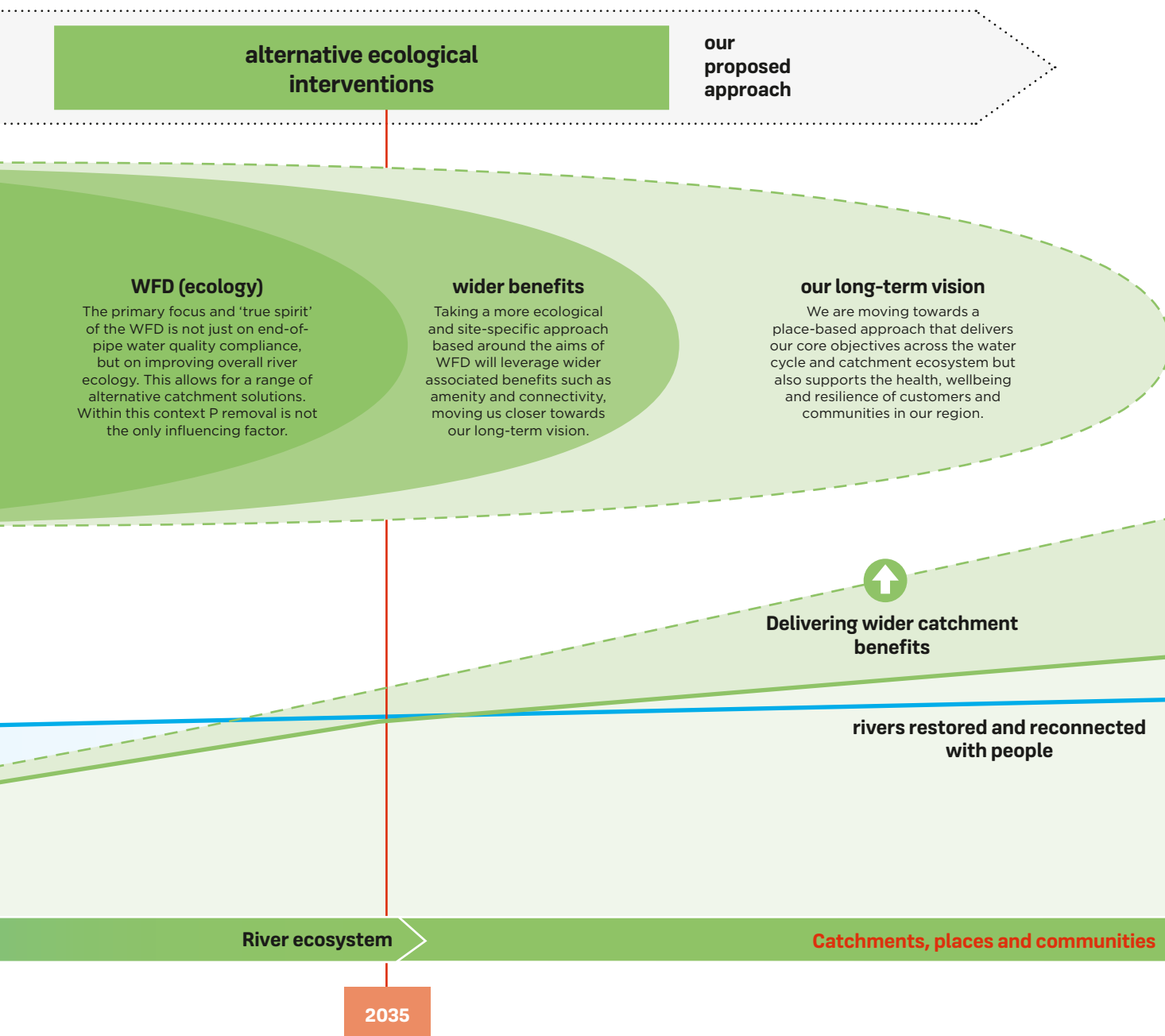


Figure 15e - Catchment sense approach

There is huge ambition contained within the WINEP in our plan and it will deliver extensive environmental outcomes by 2025 by using efficient unit costs, which is supported by our customers. Our submission sets out to be fully compliant with all existing legislation, achieved by traditional civil engineering means.

We are aware however, that the associated primary legislation is currently being reviewed by Europe, and that this may allow a greater use of alternative solutions that, will result in both more environmental improvement and greater benefits to our customers, communities and the region. We are also keenly aware that if as a society we do not change our approach to river improvements from civil engineering led to catchment led, within the next cycle of the Water Framework Directive, further improvements will no longer be possible.



Our innovative alternative approach, which we will be submitting formally to Defra at the end of 2018, is a multi-faceted approach to environmental improvement, called 'Catchment Sense', and is capable of delivering the ambitions of the government's 25-year environment plan. It still contains elements of traditional civil engineering, but also involves alternative in-river approaches to phosphorus removal, and a series of ecological-based interventions, designed to improve ecology directly.

A key benefit of our alternative proposal is that it enables customers, communities and the region to gain greater benefit from the improvements being made. These include improved access and a range of partnership and engagement opportunities, from development of direction to growing the capability and capacity of voluntary organisations to support the delivery of improvements.

Performance commitments

In this section we describe our performance commitments that sit within the Wastewater Network Plus price control, all of which contribute to our Environment Big Goal.

These performance commitments are a combination of requirements prescribed by our regulators and measures we have developed with our customers and stakeholders. For further information regarding our performance commitments, including the basis for our targets and incentives, please see appendix 19c.

The Yorkshire Forum for Water Customers (the Forum) has scrutinised our approach to creating the performance commitments. We would like to thank the Forum for the challenge and builds to both the performance commitments themselves and the customer research that has informed the process. They have also been discussed and challenged by our Board and in a joint meeting between the Board and the Forum.

Pollution incidents

Table 15c

Annual performance targets - Pollution incidents					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Number of incidents	129	125	122	119	116

In summary

This performance commitment relates to the total number of category 1-3 pollution incidents as reported to the Environment Agency. We have a responsibility to protect the region's watercourses, and we know that asset failure can have a significant impact on the ecology of the watercourse. We take our responsibility seriously and the graph below demonstrates our commitment to tackling all forms of pollution.

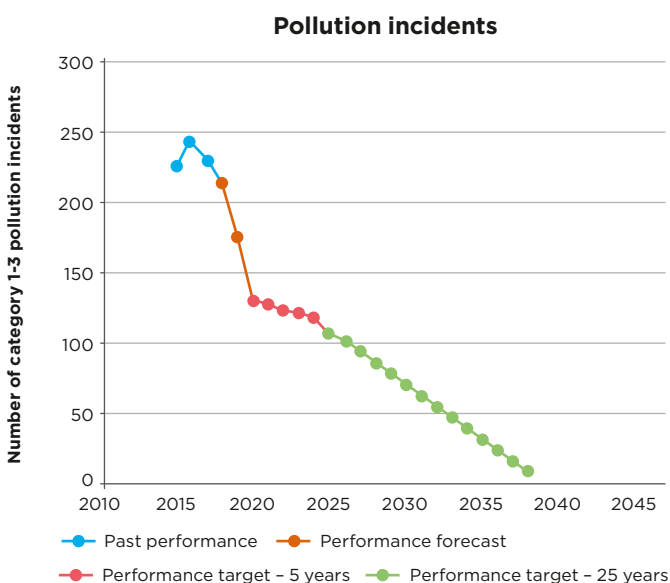


Figure 15f - Pollution incidents.

This performance commitment is an existing measure for the 2015-20 period, however the definition has been modified to align with Ofwat's PR19 methodology.

As can be seen from the graph, we have made significant progress in 2015-20 tackling pollution that will result in a radical change in our performance over the next two years and into 2020-25.

This performance commitment provides evidence to the stability and reliability of our wastewater network. The measure is defined by the Environment Agency and includes all wastewater assets including pumping stations, outfalls, treatment works and the wastewater network.

The incidents are graded based on the severity of ecological impact. We will report category 1, 2 and 3 incidents, where category 1 incidents have the greatest ecological impact. This is a calendar year measure and the number of incidents is reported by the Environment Agency in its annual performance report.

This is a common performance commitment, meaning customers will be able to compare our performance with other water companies annually. It has a financial outcome delivery incentive (ODI) with proposed under and out performance payments, to be recognised annually in-period.

Engagement

Our customers demonstrate high support for this performance commitment, with a majority rating it very important. Our customers typically want to see consistent improvement in our performance against this commitment over the short and long-term.

Our testing has revealed that ensuring we prevent accidental pollution from our pipes and assets is of high importance to customers.

"I'd want quite a significant improvement there"
- Residential customer, Doncaster

We have a close working relationship with the Environment Agency and, as one of the companies with the highest levels of self-reporting across the industry, ensure that we are open and transparent in the ways in which we have developed this target. We strive to significantly improve our service to the environment.

Our performance to date

We have a key role in protecting the environment and in 2015-20 we focused on proactive network maintenance, targeting hotspots, customer awareness and improving our response times and service. The overall trend since 2010 is reducing and 2014-15 was a particularly good year for pollution performance. This year's performance is an improvement from 2016-17 and we are achieving our performance commitment. We have developed a number of upper quartile initiatives in collaboration with our suppliers, these will be embedded in our 2020-25 procurement plans.

There has been a focus on pollution performance throughout the year with a company risk management team that meets three times a week and a dedicated pollution escalation team. During the year a stretch target was introduced to improve performance as part of the drive for achieving PR19 upper quartile performance. We consistently achieve the industry's highest level of self-reporting to the Environment Agency and continue

to do so to reduce pollution to the environment.

Our plans to deliver this commitment

As part of our 2015-20 drive towards upper quartile performance, several initiatives have been put in place to significantly improve pollution performance through smarter ways of working, increased monitoring and control, better data analytics and getting the job done right the first time. These initiatives include:

- Additional 250 network monitoring locations and feasibility work to determine the scope of full Sewage Pumping Station (SPS) reach out and WWTW capacity.
- Joint incident management training for level two standby with Environment Agency.
- Improved pollution process using lean consulting.
- Innovation led design 'sprint' and 'data hack' completed in May 2018 focused on predictive monitoring in the sewer network.
- Recruitment of additional network protection engineers.
- Targeted customer communications campaign, as an example we delivered circa 14,000 leaflets in hotspot area in Leeds.

Network visibility to reduce pollution

Delivery of an improved wastewater visibility programme will provide a benefit of up to 10% reduction in pollution events. Additional telemetry and predictive system improvements on wastewater assets ensure that we are able to stop a pollution event before it occurs.

Reducing the number of repeat incidents

8% of our pollution incidents are repeat incidents. To reduce this number, we are:

- Applying pollution process diagnostics, using business process mapping and lean consulting to make our processes effective.
- As part of our wastewater process, pumping and customer field services we are creating additional engineering roles specialising in pollution resolution.
- Developing a new application and reporting system for pollution incidents, to improve reporting and resolution.

Asset refurbishment

Increasing the number of core proactive asset improvement activities has begun to deliver a reduction in pollution incidents. These activities include, rising main replacement and sewer hotspot rehabilitation.

Wastewater asset deterioration modelling

We have recently rebuilt our Wastewater Network Asset Model. It allows us to predict future asset performance and better quantify customer service impact through enhanced consequence mapping, as well as optimising investment for different service scenarios. The model maps benefit against the six capitals which allows us to enhance our decision-making process and robustly consider the impact of pollution and the benefits to the

environment from its reduction. The model includes options for proactive sewer replacement or reactive patch repair, which allows replacement decisions to be made based on the incident (blockage/collapse). An innovative rising main simulation gives us a better view of future investment needs for this high-risk asset group.

DMF Waste Water Network Asset Deterioration Model

NITRO (Non-Infrastructure Totex Risk Optimiser) is our above ground model. In principle it works in the same way as the infrastructure model described above, however it generates risk and intervention data for above ground assets including pumping stations as well as treatment works and other above ground assets. We refer to the output that goes to the optimiser as 'modelled output'. The model maps benefit against the six capitals which allows us to enhance our decision-making process and robustly consider the impact of pollution from above ground assets and the benefits to the environment from its reduction. The model includes options such as asset replacement and refurbishment (capital interventions) and repairs, operational mitigations and proactive maintenance (operational interventions). The interventions are pre-optimised at site level into cohorts and then sent to EDAP for programme optimisation. For further information regarding our Decision Making Framework and the six capitals, please see chapters 9 and 10.

Frequently spilling sewer overflows

We are already taking action to reduce the environmental impact of pollution from combined sewer overflows (CSOs). Technological advances in sensing and control enable better ways to prioritise action. We are harnessing the power of CSO data and new technology to understand spill frequency. The process being developed will consider the impact of the overflow operation on the environment and wider society and place a value on reducing the impact against the cost.

2020-25 Strategic planning partner

A new initiative is our engagement with a strategic planning partner (SPP) for 2020-25, who will embed themselves in our asset management business. The SPP will help deliver innovation and cost efficiency for our customer, providing their expertise in:

- Knowledge of sustainable approaches to reduce asset failures gained from national and international experience in wastewater.
- Network optimisation to improve resilience with active flow modelling.
- Enhanced visualisation, management, processing and analysis of data for proactive interventions.

The DMF asset deterioration model provides the optimal level of investment in the wastewater network to manage network escapes as a result of blockage and collapse to deliver the best possible level of service to our customers.

The majority of investment into the reduction of pollution is within Sewer Rehabilitation and SPS refurbishment as summarised by the table below.

Table 15d

Pollution investment summary	
Investment	Capex £(m)
Sewer rehabilitation	181
SPS refurbishment	36
Upper quartile pollution*	23

* Enhancement expenditure.

Our incentive to deliver

The pollution incidents performance commitment is financially incentivised through under and out performance payments. The incentive rate is a continuation of the PR14 measure, where rewards and penalties apply. Our customers consider pollution incidents to have a very high importance and would support a larger underperformance and outperformance payments for the performance commitment, with the incentive rates drawn directly from customer valuation research.

The ODI follows the prescribed formula for calculating incentive rates, using marginal benefits and marginal costs calibrated for the forecast totex sharing rate.

- The standard underperformance payment rate is -£166,125 per incident.
- The standard out performance payment rate is £83,452 per incident.

There is no deadband for this performance commitment; standard under and out performance payments occur above or below the target level.

As the performance commitment is a comparative measure, enhanced under and out performance payment have also been calculated to apply where performance exceeds frontier levels, or drops below the lower quartile projections. Through our acceptability research on the business plan, customers have demonstrated support for the enhanced incentives.

The enhanced incentive rates are based on a readjusted weighting of the customer valuation methods, placing more emphasis on the non-traditional techniques such as revealed preference and behavioural experiments to provide an enhanced rate.

- The enhanced underperformance payment rate is -£228,742 per incident.
- The enhanced outperformance payment rate is £114,761 per incident.

The enhanced outperformance payment applies below 95 incidents and the enhanced under performance payments applies beyond 152 incidents.

The ODI payments will be recovered in the Wastewater Network Plus price control.

Internal sewer flooding

Table 15e

Annual performance targets - Internal sewer flooding					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Number of incidents	401	386	372	358	345

In summary

This performance commitment relates to the number of internal flooding incidents that occur as a result of overloaded sewers, other causes and severe weather events. A flong incident is defined as the number of properties flooded when water escapes from the sewerage system. Internal sewer flooding is one of the most serious service failures that customers can experience. We also have a regulatory requirement to ensure our area is, and remains, effectively drained.

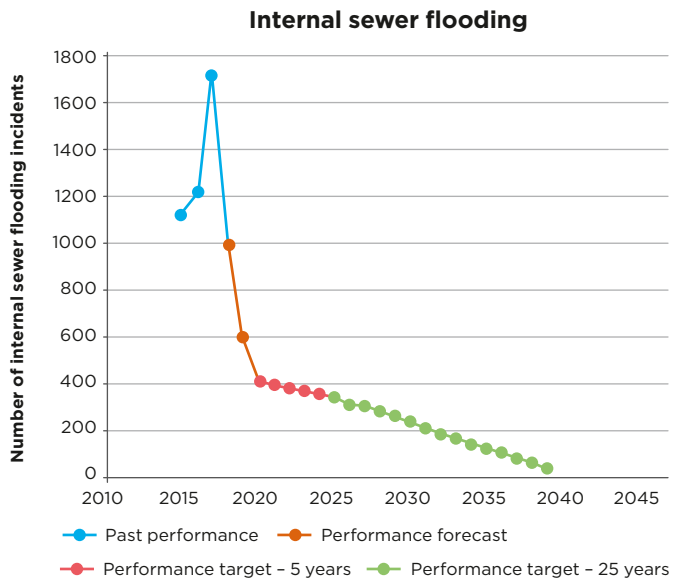


Figure 15g - Internal sewer flooding.

We have committed to achieving a 70% reduction in internal sewer flooding, reducing the number of incidents to no more than 401 by the end of 2020-21. This performance commitment is an existing measure for the current 2015-20 period, modified to align with Ofwat's PR19 methodology.

This is a common performance commitment, meaning customers will be able to compare our performance with other water companies annually. It has a financial ODI with proposed under and out performance payments, to be recognised annually in-period.

The measure is as agreed with Water UK and Ofwat for reporting sewer flooding. It includes repeat incidents and those due to third parties and network misuse. It includes the impact of high river levels preventing discharge from the sewer network, and in some years this will materially impact performance. The impact of blockages in receiving watercourses is included but is not expected to have a material impact.

Increasing volumes of storm water entering our sewers contributes to hydraulic incapacity. Changing lifestyle and customer behaviour has led to increased disposal to our sewers of fats, oils and grease food waste and inappropriate flushable products such as wet wipes and even nappies. Of the number of properties that flood each year, a significantly high number (69%) have cellars. In Yorkshire we have a higher proportion of cellared properties (4.6 times as many) when compared with the national average. These factors combined mean that the costs of achieving a comparable upper quartile level of service is higher than for companies with lower numbers of cellared properties in their operating areas. For this reason we are submitting a cost adjustment claim for cellared properties. Further information regarding this claim is available in our cellared properties cost adjustment claim appendix document, appendix 8k.

Engagement

Customers

Our customers demonstrate very high support for this performance commitment, ranking this performance commitment as one of the five most important. Our customers typically want to see consistent improvement in our performance against this commitment over the short and long-term. Our customers show above average support for paying more to see our performance improve. Customers are particularly keen to see immediate and significant performance when presented with our comparative rank.

“I can’t get past that they rank 8th out of 10¹. They need to improve a lot.”

- Business customer, Huddersfield

“It’s the last thing you want to happen to you, really. It would be horrible, and I wouldn’t know what to do. It should be as low as possible the number of incidents.” - Residential customer, Hull

Stakeholders

Internal and external sewer flooding are key metrics identified by Ofwat and internal sewer flooding is one of the common performance commitments for the next regulatory reporting period. Work has been done across the industry to provide guidance to ensure that both these measures will be reported to common definitions to allow comparison on companies’ performance.

Along with the Environment Agency, we established a joint Flood and Coastal Risk Management Group specifically to:

- Identify investment opportunities to deliver flood risk projects (studies and capital schemes) as part of PR19.
- Align joint investment opportunities to create benefit to both organisations and Risk Management Authorities in further protecting the communities in Yorkshire from flood risk.

In addition, it explores the challenges and positives this new approach has brought for both organisations.

This group has been a great success and was built on the foundation of existing relationships between Yorkshire Water, the Environment Agency and LLFAs. We will continue to work with our stakeholders in this way to improve flood risk to customers.

Our performance to date

We have compared our performance to other water companies and analysis shows we have 5.3 properties flooding per 10,000 properties, compared with Wessex Water, Anglian Water and Welsh Water where the rate is below two flooding properties per 10,000 properties.

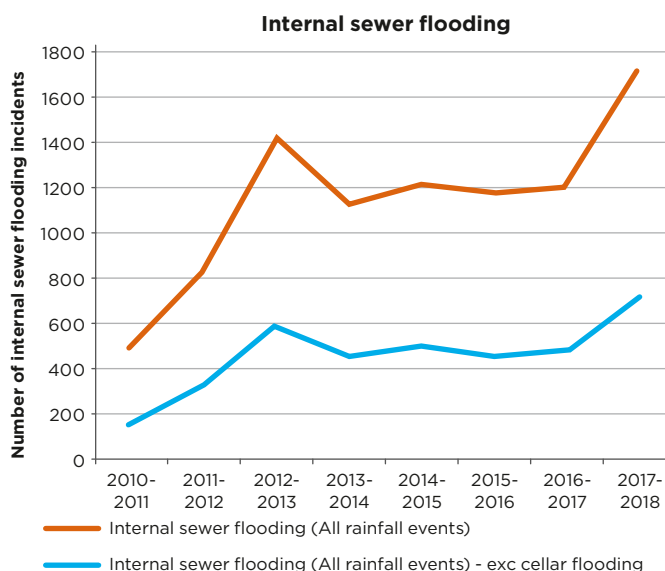


Figure 15h - Internal sewer flooding comparison.

Following the increase of incidents due to the adoption of private sewers in 2011, our service has stabilised. Data shows a shift in the cause of flooding incidents. Flooding incidents due to blockages has increased, while flooding due to collapses has decreased. This has changed our approach to include proactive jetting of high risk drainage area zones associated with blockages.



Tadcaster Bridge.

Kirkstall Road - Leeds.

We have also very recent experience of managing extreme weather events. On Boxing Day in 2015 Yorkshire experienced exceptional weather which resulted in flooding to much of our region.

11,458 properties flooded, 8,168 of those were residential. We experienced 2000 additional calls to our call centre and received an additional 1500 jetting jobs once the waters began to recede.

¹ This piece of customer research was completed using 2016-17 comparative data.

Our emergency response was immediate, 1,000 colleagues worked alongside staff from other water companies, the police, the Environment Agency and local authorities to minimise the impact as much as possible to our customers. One focus was getting enough staff into the call centre, and out to priority sites to assess the damage.

Our response to these events is a clear demonstration that we have measures in place to ensure we are resilient and able to respond and recover with great effect.

The following quotes are taken from the West Yorkshire Combined Authority Leeds City Region Flood Review Report, 2016.

“The actions of the local communities affected was inspiring, helping support the evacuation of the elderly and most vulnerable, erect emergency flood barriers and help in the rapid clean up after the flood waters subsided. The dedication and commitment shown by elected members and help from a broad range of organisations was also invaluable including support from water companies across the UK and in places the Army; for example, Yorkshire Water pulled in 1,000 staff and accessed every water pump they could from across the country to deal with the incident.”

“Regional utility companies including Yorkshire Water, Northern Powergrid and Northern Gas Networks played an important role both during and in the immediate aftermath of the floods by helping to manage the incident and mobilising staff to restore or maintain essential services including power and drinking water supply; and were in the process of trying to secure further equipment from mainland Europe.”

Our plans to deliver this commitment

Although internal sewer flooding has decreased, we are investing in a programme of work to improve performance and we are continuing to maintain and operate our sewers to eliminate sewer flooding.

Risk based approach to flooding

During 2015-20, we adopted a risk-based approach to flooding which means we no longer remove properties from a register but try to reduce the number of flooding incidents a customer may experience. It means previously unaffordable solutions can be redesigned to improve the level of service a customer will receive. This is especially effective when these solutions are designed in partnership with customers and stakeholders.

Tactical investment to reduce sewer flooding is prioritised on frequency and severity of incidents, maximising the benefits to the greatest number of customers experiencing significant service failures. Asset data is tracked and ranked against our main flooding factors to identify assets at highest risk in terms of specific failures and also failures relating to relevant asset types. This data is analysed to identify packages of proactive work where the numbers or trends in asset deficiencies indicate benefits.

A new feature of our DMF is a hydraulic risk model which helps us optimise wastewater hydraulic investment across the region. This model uses our drainage area planning outputs to predict future hydraulic performance in line with our wastewater asset deterioration model. Specific investment in hydraulic risks is prioritised by headline rates of incidents per year, and the delivery of drainage area plan development. We have quantified all of our hydraulic risk as well as blockage and collapse risk in terms of incident numbers. Incident numbers determine the frequency of event, whether it is a storm return interval or predicted asset deterioration.

The DMF quantifies this risk and service impact and we use cost-benefit to promote the schemes which resolve the biggest number of incidents in a cost-efficient way. Our hydraulic investment programme contains traditional and non-traditional solutions and is the most cost efficient in terms of service.

Smarter ways of working

As part of the 2015-20 drive toward upper quartile performance, we are significantly improving internal sewer flooding performance through smarter ways of working, increased monitoring control as well as better data analytics get the job done right first time.

Proactive sweep jetting programme

As part of the upper quartile plan to drive down internal flooding incidents, areas with the highest number of incidents of internal sewer flooding due to blockages are being targeted. CCTV surveys of the sewer network help us rank incidents, and areas are identified for sweep jetting to take place. Blockages are jetted and removed, defects recorded and data sent back for further analysis.

Working in partnership

Working in partnership we are trialling innovative techniques, different options, and delivering improved resilience to our customers and the environment. We are testing different approaches such as blue-green infrastructure and sustainable drainage systems (SuDS). We are gaining access to specialist expertise and leveraging additional funding through Flood Defence Grant-in-Aid (FDGIA) or cost sharing with other beneficiaries. In many cases, long standing internal flooding issues can only be solved by working in partnership, for example surface water management schemes with local authorities, or catchment management schemes with multiple landowners that were previously unaffordable or outside our regulatory functions. In 2020-25 we are building on the knowledge and relationships developed, while continuing to trial new techniques such as river restoration, engaging local communities in managing some of our assets, and working with new stakeholders such as global food supply chain companies.

We continue to use our working with others delivery assurance group and the flood steering group to prioritise and progress suitable partnership schemes to address internal sewer flooding risk. Cost-benefit assessments and a funding approval process is applied to all partnership schemes. The Forum will review partnership schemes.

2020-25 strategic planning partner (internal sewer flooding)

We are working with Stantec as a Strategic Planning Partner (SPP) for 2020-25. Key benefits of the SPP are detailed in the pollution incidents performance commitment. Stantec's work with communities nationally and internationally will compliment and challenge our approach to reducing surface water, FOG and solids through the sewer system. Stantec's embedded University connections (visiting professors) will create the links and bring leading edge knowledge to our educational engagement approaches helping us re-consider how we can create social mobilization and behavioural change.

We have committed to reinvesting over £40 million across years four and five of 2015-20. Our target, based on revised flooding definitions and shadow reporting for the end of 2015-20, is to have less than 583 incidents per year, regardless of whether the cause is due to hydraulic overload or other causes.

Our commitment overall is to achieve a 70% reduction in the number of flooding incidents (1,201 that occurred in 2016-17) to 350 by year 1 in 2020-25. We are taking a proactive approach to reduce the number of repeat incidents occurring and the likelihood of cellared properties flooding. To achieve a long term and continuous change in performance requires increased efficient investment. This will reduce and maintain a lower number of incidents, achieving improved levels of service for our customers.

The majority of investment into the reduction of internal sewer flooding is within sewer rehabilitation and enhancement expenditure to reduce flood risk for properties as summarised by the table below.

Table 15f

Internal sewer flooding investment summary	
Investment	Capex £(m)
Sewer Rehabilitation	181
Sewer flooding due to other causes	57
Reduce flooding risk for properties*	41
Upper quartile flooding*	10

* Enhancement expenditure.

Our incentive to deliver

The internal sewer flooding performance commitment is financially incentivised through under and out performance payments. The incentive type is a continuation of the PR14 measure, where rewards and penalties apply. Our customers consider internal sewer flooding to have a very high importance and support underperformance and outperformance payments for the performance commitment, with the incentive rates drawn directly from customer valuation research.

The ODI follows the prescribed formula for calculating incentive rates, using marginal benefits and marginal costs calibrated for the forecast totex sharing rate.

- The standard underperformance payment rate is -£36,219 per flooding incident.
- The standard out performance payment rate is £36,219 per flooding incident.

There is no deadband for this performance commitment; standard under and out performance payments occur above or below the target level.

As the performance commitment is a comparative measure, enhanced under and out performance payment have been calculated to apply where performance exceeds frontier levels, or drops below the lower quartile projections. Through our acceptability research on the business plan, customers have demonstrated support for the enhanced incentives.

The enhanced incentive rates are based on a readjusted weighting of the customer valuation methods, placing more emphasis on the non-traditional techniques such as revealed preference and behavioural experiments to provide an enhanced rate.

- The enhanced underperformance payment rate is -£91,506 per flooding incident and applies above 603.
- The enhanced outperformance payment rate is £63,862 per flooding incident and applies below 284.

The ODI payments will be recovered in the Wastewater Network Plus price control.

Treatment works compliance

Table 15g

Annual performance targets – treatment works compliance					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Percentage	98.4	98.4	98.72	98.72	98.72

In summary

This performance commitment measures the percentage of our water and wastewater treatment assets that comply with their discharge permits. We own and operate 610 wastewater treatment works (WwTW), for which 293 discharges are numerically consented, with a further 21 water treatment works discharges also consented. Expenditure related to water treatment works is included in the Water Network Plus price control. When an asset fails its discharge permit, it can result in a significant impact on the receiving watercourse. We are committed to returning clean water to the environment.

The Environment Agency assesses performance annually (from January to December) and issues an environmental performance assessment (EPA). It measures failures of the quality elements of permits on water and wastewater treatment works. The Environment Agency may modify the measure of failure used in 2015-20. If this is the case, we will ensure we comply with all reporting guidelines.

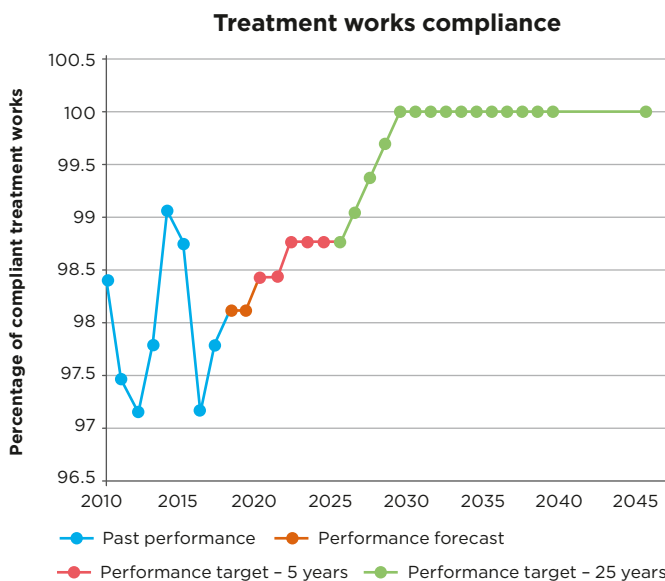


Figure 15i - Treatment works compliance.

This is a common performance commitment, meaning customers will be able to compare our performance with other water companies annually. It has a financial ODI with proposed under and out performance payments, to be recognised annually in-period.

This performance commitment replaces the stability and reliability performance commitment from 2015-20. Our customers and the Environment Agency want us to improve and we are committed to moving to an upper quartile position (or green on the EPA) over the next 10 years. We have assessed improvement costs against service and impact on customer bills in the wider context of the price control.

We are investing over £300 million capex and over £90 million operational costs per year into our WwTWs, ensuring investment drives the required improvement, mitigates future risk of failures from population growth and climate change, and allocates an appropriate amount of capital maintenance to deliver the environment programme. We will implement demand-side measures to gain more benefits and reduce hard engineering costs, such as at Seamer and Melton WwTWs. We are also exploring alternative ways to procure our requirements through NAVs.

Engagement

Customers place many of our environmental commitments lower down on the priority list than water use and sustainability, and rated treatment works compliance as having moderate importance.

Our performance to date

Performance is based on the Environment Agency's EPA measure and ranges between 97% and 99% compliance. We operate in the lower quartile segment of performance in England and Wales¹, however over the last 20 years, there has been significant improvement. With the implementation of our robust compliance and triggers process in 2006 we have achieved a significant improvement in our performance.

Following improvements implemented in 2016, performance has begun to improve. In 2017 we had 7 failing works. We believe 2018 will out turn at a lower value than 2017 as our new dynamic maintenance strategy takes effect.

Data and projections from our asset deterioration model show there are an increasing number of assets moving beyond their estimated typical life. While this is not a strong indicator of serviceability on its own, it does show historical investment is not enough to maintain an average age without deterioration. We must focus on maintaining serviceability without investment. One of the reasons for our efficiency in the past has been implementation of strategies to extend asset life.

¹Our position relative to other companies has been between 5th and 9th of 9 in the past 5 years.

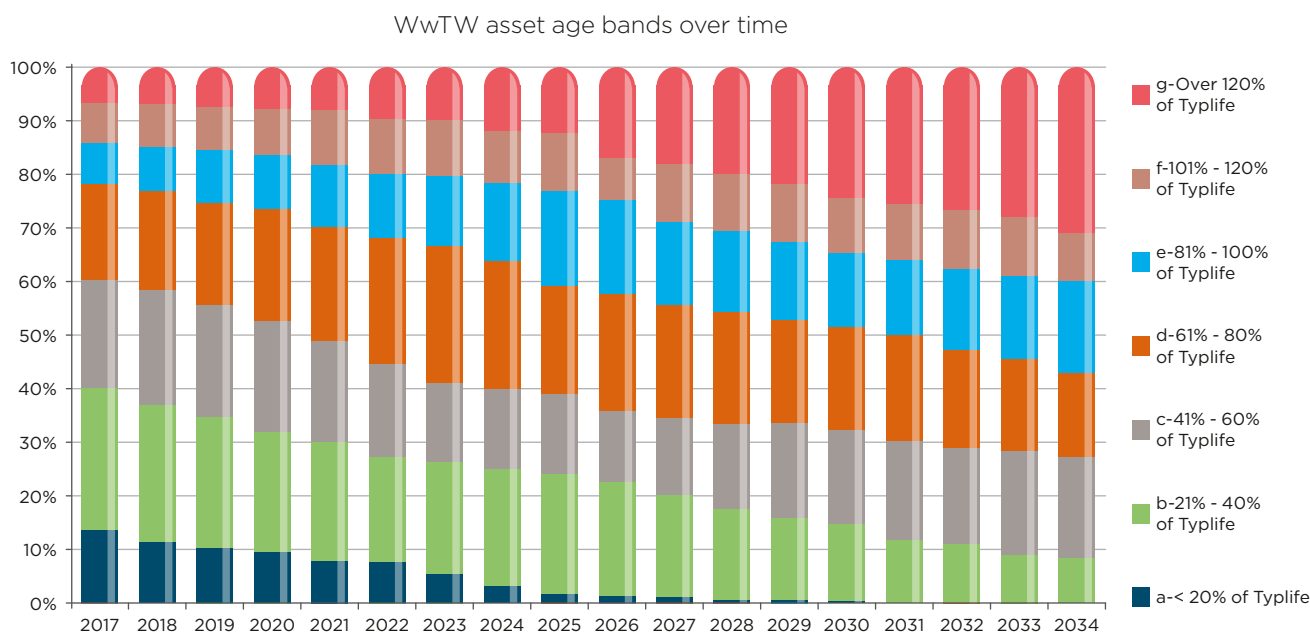


Fig 15j - WwTW asset age bands over time.

Our plans to deliver this commitment

In our intervention decision-making, using the totex hierarchy where we can, optimisation of operations are always the priority and only where operations are optimised do we implement efficient, cost effective capital expenditure. The costs for improving treatment works compliance in the Wastewater Network Plus price control are split across two investment purpose areas, maintenance and growth.

Maintenance

The capital maintenance programme is an optimised output of modelled and non modelled risks and interventions.

Within this programme there is:

- Significant investment in serviceability on WwTW, for example Keighley Marley.
- Relocation of Withernsea WwTW due to risk of a cliff failure.
- Major investment in our Huddersfield complex to overcome significant process risks.
- Significant investment in a planned, dynamic maintenance strategy.
- Significant quality, base allocation. This is capital maintenance required on the sites with a new quality consent.

We have modelled our capital maintenance requirements in our DMF asset deterioration models, specifically the non-infrastructure totex risk model (NITRO). This uses age, condition and performance data to model asset deterioration through a series of life cycle curves.

The model triggers capital solutions in the form of asset replacement and refurbishment, and opex solutions in the form of reactive and proactive repairs. These are optimised and take into account compliance. Our asset planning team develops a programme of maintenance or improvement, applying financial and service constraints to create our plan to deliver the required performance.

We are also investing in a new maintenance strategy based on the principles of reliability-centred maintenance (RCM). This is fully aligned with the SAP Blueprint programme².

The maintenance plan is designed to generate and provide accurate asset data and compliance with statutory requirements together with condition-based assessment of performance and repair/replacement information generated through failure codes. This will enable whole life cost predictions based on service, spares and maintenance labour costs which will form an important asset health input to the DMF. It is anticipated that implementation of the plan will mitigate capital investment need by £50 million in 2020-25 and will save over £10 million opex per annum.

Resilience

Ensuring our wastewater assets are resilient to unplanned events is fundamental to the overall resilience of our wastewater services and how we protect the environment. Our plan for resilience in our WwTW focuses on building new interventions to events beyond our control, while ensuring the existing asset base can deal with temporary shocks.

²The SAP Blueprint is a detailed description of a company's business processes and system requirements.

Table 15h

Our resilience approach uses solutions in five areas	
Area	Description
Resistance (against a hazard)	Considering flood protection and cold weather protection, interventions will form part of our capital maintenance plans prioritised using a risk-based approach. While most of the cost risk is recoverable, unplanned outage from flood inundation and severe cold weather can have serious consequences for costs and services to the environment. Where economic to do so, we will implement adaptive measures to mitigate the risk of outage arising from flood and cold weather events, at our highest risk assets.
Reliability (operate in a range of conditions)	As above.
Redundancy (designed capacity)	Maintain duty-standby arrangements for critical assets. New or increased capacity to address climate change and increasing demand.
Response and recovery (fast and effective response)	Deployment of demountable defences where required and we have mapped all our assets to the Environment Agency's early flood defence warning system. We will open up a new strategic spares depot to deploy critical spares quickly to maintain effective and reliable services.
Reflection (learning from past experience)	Build our understanding about where our greatest resilience risks are. We work closely with our insurance partners to manage financial risks and the Environment Agency to find collaborative ways of providing flood resilience. In 2019, we will submit a joint flood defence grant in aid bid to provide mutually beneficial flood defences for assets and customer properties.
	Using the totex hierarchy, we are investing in our dynamic maintenance strategy to optimise our operations and target capital expenditure to ensure reliable, resilient service. Develop our understanding of what resilience means for our people. The introduction of many new phosphorus consents throughout the 2020-25 period will mean we need to invest in more highly skilled operators who understand how to optimise plants to avoid failures.

Growth

Our investment needs to take account of future anticipated population growth and climate change. We have obtained catchment-based growth figures, based on the 2011 census and have planned where we need to invest to manage this. The growth programme for treatment assets (£67.6 million) in Wastewater Network Plus is split into three parts:

- Investment to comply with dry weather flow.
- Investment to build new infrastructure for new centres of population.
- Investment allocated from the WINEP – (further detail is available in our length of river improved performance commitment).

Investment to comply with dry weather flow (DWF)

DWF is being tightened in the 2020-25 period and we have responded to this by analysing the level of risk associated with compliance, looking at historical, current and future issues.

Table 15i shows how many works have failed DWF based on 90th percentile flow data, how many times they failed in a 5-year rolling period, and the predicted position by 2025.

The majority of these risks will be addressed by providing new efficient capacity on the sites built into our plan. At Melton WwTW and Seamer WwTW we will implement alternative methods that reduce flow into the works and deliver the required improvement more efficiently.

Table 15i

DWF compliance failures		
Fail position to 2012 - 2016	Number of sites	Sites
5 in 5	1	Wentworth.
4 in 5	2	Ripponden, Holme on Spalding Moor.
3 in 5	2	Hebden, Mexborough Swinton.
2 in 5 (7 to '3 in 5' by 2025)	7	Ackworth, Askrigg, Bellerby, Darley, Stapleton Park, Staveley, Whitby.
1 in 5 (6 to '3 in 5' by 2025)	9	Hambleton, Hemingbrough, Hull, Normanton, Sandall, Seamer, (Colburn, Hetton, Lealholm).
0 in 5 (4 to '3 in 5 by 2025)	270	Bolsover, Carleton, Ingbirchworth, Melton (266 sites predicted to meet the requirements).

At Melton our investigations have determined that the reason for failure is infiltration. We concluded that home retrofitting would be the best intervention to mitigate against this. The costed alternatives show a significant saving against the standard solution of WwTW upgrade.

At Seamer our investigations have concluded that the best intervention to mitigate this risk is to build a water recycling plant at nearby Irton WTW.

New infrastructure to support exceptional growth

New infrastructure, including new local WwTW is needed to serve new communities ensuring customer levels of service and discharge consent compliance are met. A total of 21,553 new properties in these areas are

anticipated by 2040, with an estimated total of 9,634 to be built by 2025. This growth is over and above that normally expected³ and is more localised, meaning it is not viable to use existing infrastructure and treatment capacity.

The four areas included in the preferred solution and expected costs are shown in Table 15j. A proportion of these costs are mapped to network growth in table WWS2

The best whole-life cost (WLC) option for each area is presented in the final business plan and form part of a cost adjustment claim. The options assessed are shown in appendix 8i.

Table 15j

Areas of expected growth, preferred solutions and costs.						
Location	Growth	Preferred solution	Cost £m	Opex £m	WLC £m	Comments
York	10,000 built in various locations by 2030.	1a - flows to local works	34.3	0.593	35.98	Lowest WLC.
Parlington	5,000 houses.	Temporary package plant	3.49	0.069	3.74	Selected temporary package plant. Full scale treatment deferred to 2025-30.
Green Hammerton	859 properties by 2025. 2,809 by 2035-40.	2a New works - Activated Sludge Plant (ASP)	10.35	0.183	11.13	Conventional option - uncertainty regarding lagoon sizing and operations. Only marginal cost difference.
Catterick	4,800 people (2,900 military personnel plus 1,900 civilian dependents by 2025-31. The number is dependent on MoD policy and could increase (or decrease). Richmondshire District Council planning to build 1,000 new homes by 2028 (dependent on MOD land release).	2b Colburn ASP expansion B	5.14	0.423	12.45	Lowest WLC.

New appointment and variations

We are working with NAVs to explore alternative solutions for customers. Our analysis suggests a self-service NAV would deliver benefit to our existing customers, if appointed to the site contracted by the developer to lay and connect the on-site infrastructure. The role of the NAV would be to build and operate water and wastewater treatment assets to independently provide services to the site.

Water treatment elements

In order to fully mitigate the water treatment discharge permit failure risks, we are investing in water treatment at two sites:

1. Oldfield – installation of an innovative MIEX process to mitigate a discolouration risk.
2. Huby – installation of a new washwater and discharge system.

³Normal region wide incremental growth in connections has historically averaged between 10,000 to 12,000 new connections per annum.

Our incentive to deliver

The treatment works compliance performance commitment is financially incentivised through under and out performance payments. The performance commitment is a new measure for PR19. Our customers consider treatment works compliance to be of moderate importance and support underperformance and outperformance payments, with the incentive rates based on marginal costs.

The ODI follows the prescribed formula for calculating incentive rates, using marginal benefits and marginal costs calibrated for the forecast totex sharing rate.

The standard underperformance payment rate is -£420,749 per percent. The standard outperformance payment rate is £420,749 per percent.

There is no deadband for this performance commitment; standard under and out performance payments occur above or below the target level.

The ODI payments will be recovered from the Wastewater Network Plus and Water Network Plus price controls.

Sewer collapses

Table 15k

Annual performance targets – Sewer collapses					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Number of sewer collapses	25.31	25.24	25.18	25.11	25.04

In summary

The performance commitment relates to the number of sewer collapses per 1,000km of sewer impacting on customer service or the environment. A collapse is a structural failure to the sewer pipe that has an impact on the service to the customer. This results in the flow from the pipe escaping, or impacts on the environment resulting in the need to repair or replace the sewer. It includes all rising main bursts and leaks, all sewer network assets. Where a pollution or flooding incident has occurred as a result of a collapse, the collapse should also be reported. In order for a fair comparison to be made across wastewater companies a scaling factor is applied by Ofwat and the number of collapses is normalised by the total network of the region.

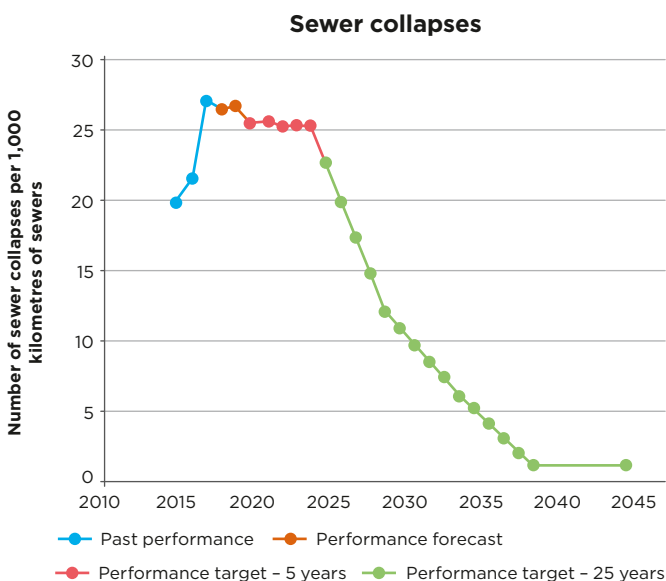


Figure 15k – Sewer collapses.

We are stretching our performance in 2020-25 to reduce our number of sewer collapses by 5% and have committed to investing £238 million into sewer rehabilitation to improve our wastewater network asset health.

Table 15l

Historical sewer replacement rates				
AMP	2005-2010	2010-2015	2015-2020	2020-2025
Average Replacement rate %	0.7%	0.11%	0.08%	0.09%

This is a common performance commitment, meaning customers will be able to compare our performance with other water companies annually. It has a financial ODI with proposed under and out performance payments, to be recognised annually in-period.

Engagement

Our customers demonstrate good support for this performance commitment, with a majority rating it important. Our customers typically want to see consistent improvement in our performance against this commitment over the short and long-term. Our testing has revealed that ensuring we prevent accidental pollution from our pipes and assets is of high importance to customers.

Research reveals that customers consider we should focus our efforts on this activity into the future to ensure we have appropriate plans and resources to mitigate for population growth, extreme weather and climate change.

Stakeholders

Asset health is central to the delivery of resilient water and waste water services. Sewer collapses are key asset health metrics and sewer collapses have been identified as one of the common performance commitments for the next regulatory reporting period. We have worked closely with the rest of the industry to provide guidance to ensure that this measures will be reported to common definitions to allow comparison on companies' performance.

Our performance to date

Based on the current sewer collapse definition, we have seen improvement, mainly due to a proactive focus on collapses for the internal sewer flooding targets, see graph below. Sewer replacement rates in the current and previous reporting periods have been low compared to the rest of the UK industry as we previously took a reactive approach to sewer collapse, primarily driven by cost efficiency. The table below shows our historical percentage replacement rates. Over the past 10 years the UK replacement rates have been 0.2% per annum for sewers. Our implied renewal rate at PRO9 and PR14 for sewers was 0.05%. The 2010-15 actual renewal rate was closer to 0.11%. We will increase its investment in sewer replacement and rehabilitation over the remainder of 2015-20 and through the course of 2020-25 to maintain service.

Our plans to deliver this commitment

Collapses have historically been identified by reactive network inspection relating to customer reported problems which result in a customer or environmental impact. We have moved to a programme of proactive network inspections where defective pipework identified is resolved through a combination of operational maintenance or capital sewer rehabilitation.

We are developing a better understanding of the relationship between the condition of our sewerage systems, and how reliable and effective they are in delivering the service our customers expect. Identifying the current state of our sewerage infrastructure, the anticipated rate of deterioration of assets and their performance will lead to an understanding of the underlying resilience of the network to present and future pressures. Our ability to anticipate failure will enable us to predict future investment needs with increased certainty, making it possible to plan work across a number of years, maximising the benefits of expenditure and minimising the impact on customer bills.

Wastewater asset deterioration model

To ensure that the most appropriate solutions are applied to deliver this performance commitment, we use our asset deterioration model, the principles of which we have detailed in the pollution section above.

Innovative construction techniques

As part of our drive for upper quartile performance in 2015-20 we are adopting a proactive approach. Initiatives include CCTV of the sewers to identify defects. A proactive 'on the spot' repair is carried out to prevent future service failure and, if the defect is complex, the solution to rectify it is promoted through a capital delivery process. This is a cost effective solution for customers and prevents future service failure.

We have been testing spray-lining techniques on high risk rising mains. This technique has traditionally been used to rehabilitate water mains, but it has been successfully trialled to prevent wastewater rising main bursts. We adopt a risk based approach, targeting rising mains with a high burst history and where a traditional solution (such as complete rising main relay) is too expensive. We have seen a cost saving of up to 50% using this technique when compared to a traditional replacement solution.

Investment in sewer collapses has normally been made to prevent or mitigate a network escape which would normally result in a service impact. The DMF asset deterioration model provides the optimal level of investment in the wastewater network to manage network escapes as a result of blockage and collapse and deliver the best possible level of service to our customers. We have committed additional investment specifically to improve the asset health of our wastewater network to proactively reduce the number of collapses.

The majority of investment into the reduction of sewer collapses is within sewer rehabilitation and summarised by the table below.

Table 15m

Sewer collapses investment summary	
Investment	Capex £(m)
Sewer rehabilitation	238

Our incentive to deliver

The sewer collapses performance commitment is financially incentivised through under and out performance payments. The incentive type is a continuation of the PR14 measure, where reputational incentives previously applied. Our customers consider sewer collapses to be of high importance and support underperformance and outperformance payments for the performance commitment, with the incentive rates based on marginal costs.

The ODI follows the prescribed formula for calculating incentive rates, using marginal benefits and marginal costs calibrated for the forecast totex sharing rate.

- The standard underperformance payment rate is -£104,420 per normalised unit of collapse.
- The standard outperformance payment rate is £104,420 per normalised unit collapse.

We have introduced an outperformance deadband at 12 collapses per 1,000km of sewers, the current industry average level of performance. By applying the deadband, we are ensuring that outperformance payments are only earned for performance better than the industry average. The ODI payments will be recovered from the Wastewater Network Plus price control.

Risk of sewer flooding in a storm

Table 15n

Annual performance targets - Risk of sewer flooding in a storm					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Population equivalent	26.4	26.6	26.8	27.0	27.2

In summary

This performance commitment relates to the percentage population equivalent susceptible to sewer flooding in a 1 in 50-year storm event.

In the coming years flood-prone areas are expected to increase in number, magnitude, frequency and severity. Our drainage systems are dynamic, with complex interactions with other drainage systems. Some of our drainage infrastructure dates back to 19th century. The combined sewer systems built before the 1960s need more maintenance as they age to manage future pressure.

Long-term wastewater network resilience is very complex. The sheer number of stakeholders and regulatory interactions around drainage is significant often making it extremely difficult to fully understand who can and who does what. Increasingly this calls for multi-stakeholder solutions to achieve best value for customers.

Our target for 2020-25 is to better understand the development and application of the methodology to predict the percentage population equivalent susceptible to sewer flooding in a 1 in 50-year storm event.

Risk of sewer flooding in a storm

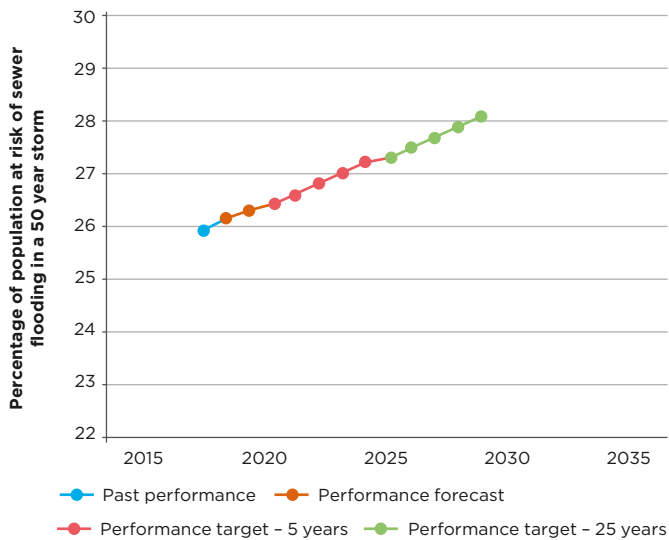


Figure 151 – Risk of sewer flooding in a storm.

We will continue to develop and refine this methodology with the rest of the industry to ensure it provides a meaningful assessment of regional flood risk and therefore drives forward investment and behaviours which deliver resilience to our customers against flooding.

We understand our long term role in this complex landscape and see the further development of the wastewater resilience performance commitment, together with longer term drainage and wastewater management planning (DWMP) and capacity mapping as a critical step and catalyst to foster the right type of behaviour and collaboration between all stakeholders and customers.

It is important for this metric to closely link with the longer-term drainage and wastewater management plans as well as capacity mapping. We propose a mid-period review to understand how companies have applied the methodology and assess how effective it could be to deliver a better, more resilient service to customers.

We anticipate that beyond 2025, through the successful implementation of long-term drainage and waste management plans and partnership working, we will be able to mitigate the impacts of climate change. This is reflected in our targeted future service improvement.

This is a common performance commitment, meaning customers will be able to compare our performance with other water companies annually. It is a new measure and has a non-financial incentive. It will be measured and reported annually throughout 2020-25.

Engagement

Our customers demonstrate good support for this performance commitment, with a majority rating it as important.

Our testing has revealed that providing appropriate sewer and pumping capabilities to cope with flood events is of high importance to customers. Our customers show above average support for paying more to see our performance improve. Our research reveals customers consider flood management and defence an important issue for the future and want us to focus our efforts on this the future to ensure we have appropriate plans and resources to mitigate for population growth, extreme weather and climate change. Customers are typically content with our performance against this measure but their appetite for improvement increases sharply when our comparative performance rank is presented.

“We all saw the horrendous floods and we’re talking about saving millions and all the trauma people suffered too” – Residential customer

We participated in the 21st century drainage resilience workstream to develop a resilience metric for wastewater networks. We also supported Water UK with the appointment of Atkins to develop the metric after the draft Ofwat methodology for PR19 was released. Our active participation in the 21st century drainage programme, as leaders and contributors, has helped shape the way we have interpreted the risk of sewer flooding in a storm performance commitment and how we plan to incorporate it into our business processes, but also more broadly, how it has influenced our long-term planning goals and objectives.

Our performance to date

This is a new measure so no historic data exists to assess our performance. The Drainage Area Plan (DAP) programme has allowed us to improve the data accuracy and, as the coverage of this programme continues to grow, so will our accuracy in reporting.

However, we are already considering innovative solutions to tackle vulnerable catchments such as:

- Hull and Haltemprice, Living with Water Partnership.
- Development of similar strategic partnerships with Sheffield City Council.
- Natural Flood Risk Management schemes including Gorpley led by us and the National Trust.
- Established relationships with LLFAs.
- Established and embedded Flood Partnership Steering Group.
- Industry leading work to include the impact of climate change in our sewer models.
- Exercising and improving our operational response with the Police and other emergency services.
- Procurement of temporary defences for critical assets as well as high deployable capacity pumps.

Our plans to deliver this commitment

We continue to work in partnership with our customers, the Environment Agency and other LLFA's to develop long-term solutions to extreme flooding. Our approach will be dynamic and centre around demand-led collective solutions, innovative customer and stakeholder participation and collaboration. This will change the risk landscape, reduce our exposure to risk and allow good risk and investment management decisions to be made. We will partner with other organisations in new ways to pool resources and experience, better manage risk, build capability, drive innovation and deliver integrated solutions to the benefit of customers and to achieve infrastructure service requirements.

Recognising growing community expectations, we will engage communities earlier, more openly and with a focus on outcomes rather than assets, working with LLFA's to develop plans that reduce flooding risk.

We are analysing more to understand flood risk for our region. Our drainage area plans help us understand the performance of our network, now and in the future, and the root causes of complex issues. This upfront detailed knowledge makes sure we can develop the right cost effective interventions considering the holistic performance of the network, rather than dealing with the symptoms of problem. By modelling, we learn the impact we have on stakeholder's assets and vice-versa, providing us with the ability to work in partnership to get it right first time.

The models produced are essential to our understanding of the resilience risk. Further investment in the programme will allow models of greater detail to be produced, increasing our coverage and understanding of resilience across the region. This, along with our improved analysis of 2D flood routes, will help generate improved intervention plans through the drainage area plan and DWMP outputs.

Our incentive to deliver

The risk of sewer flooding in a storm performance commitment is a common performance commitment set by Ofwat. Our customers consider risk of sewer flooding in a storm to be of high importance. Although there is strong support for a financial incentive, as the reporting of the measure is not sufficiently mature, a non-financial incentive has been applied for this reporting period.

We are committed to ensuring information on our performance is easily accessible to all. We will be promoting our annual performance against non-financial incentives, as well as other key measures which are not regulatory, through a wide range of media channels, customer campaigns and our executive pay and incentive scheme. As the measure relates to our long-term sustainability and resilience, to strengthen the incentive, it will be directly linked to our executive pay incentives.

External sewer flooding

Table 15o

Annual performance targets - External sewer flooding					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Number of incidents	7500	7219	7008	6850	6375

In summary

This performance commitment relates to the number incidents of external sewer flooding that result from the failure of one of our assets. Sewer flooding into an outside space, such as gardens, roads or public parks is known as "external or area flooding". As with internal flooding, it is a consequence of an escape from a public sewer caused by the capacity of the sewer being exceeded or a defect or blockage in the public sewer. While increasing volumes of storm water entering our sewers contributes to hydraulic incapacity, sewer misuse is a significant contributor.

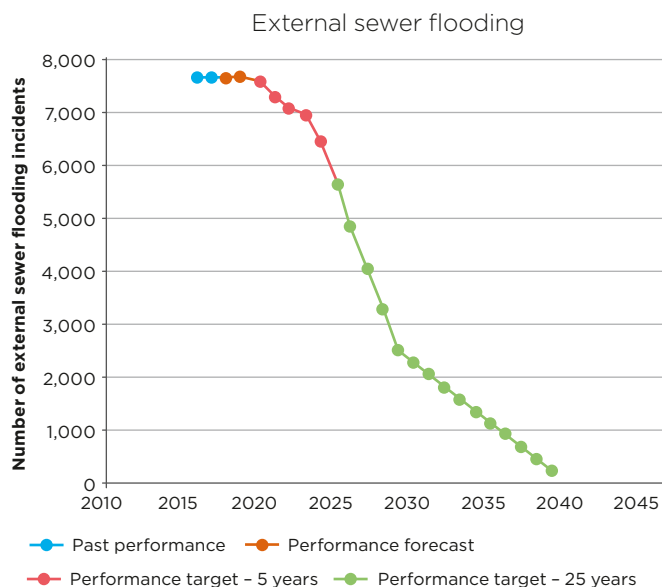


Figure 15m - External sewer flooding.

External sewer flooding was a bespoke performance commitment for PR14 with a non-financial incentive. We see the value in retaining this as a performance commitment in 2020-25 as it is often a good indicator of wastewater network capacity issues. Our customers see this as a high priority as often external flooding results in significant societal disruption, for example extended traffic delays.

It has a financial ODI with proposed under and out performance payments, to be recognised annually in-period.

As with internal sewer flooding and pollution, we are investing in a programme of sewer rehabilitation to improve hydraulic capacity which will further improve performance.

Engagement

Customers

Our customers demonstrate high support for this performance commitment, with a majority rating it very important. Our customers typically want to see consistent improvement in our performance against this commitment over the short and long-term. Our customers show above average support for paying more to make sure we protect gardens and public spaces from being affected by sewer flooding.

“External sewer flooding can cause all kinds of other problems, so it’s important to focus on that.” – Future residential customer, Harrogate

Stakeholders

Flooding is one of the most top-of-mind issues for our stakeholders, who recognise our challenge with ageing infrastructure. To improve partnership working in 2020-25 we established a joint Flood and Coastal Risk Management Group with the Environment Agency specifically to:

- Identify investment opportunities to deliver flood risk projects (studies and capital schemes) as part of 2020-25.
- Align joint investment opportunities to create benefit to both organisations and RMAs in further protecting the communities in Yorkshire from flood risk.

In addition it explore the challenges and positives this new approach has brought for both organisations.

This group has been a great success and was built on the foundation of existing relationships between us, the Environment Agency and LLFAs. We will continue to work with our stakeholders in this way to improve flood risk to customers.

Internal and external sewer flooding are metrics and whilst internal sewer flooding has been identified as one of the common performance commitments for the next regulatory reporting period a common definition for external sewer flooding has been developed and reported. We have worked with the industry to provide guidance to ensure that both these measures will be reported to common definitions to allow comparison on companies’ performance.

Our performance to date

There is an increasing trend in external flooding incidents, mainly due to transferred private sewers. Our customers are also becoming less accepting of external sewer flooding and are more likely to report instances of external flooding than they would have in the past. We do not believe that the increase is due to an underlying decrease in asset performance. We expect the reported number to increase over time as customer awareness increases and more contacts are referred to us. The number of incidents is, as can be seen from Figure 15n, approximately 50% of sewer flooding incidents arise from our legacy network, and 50% from Section 105 adoptions.

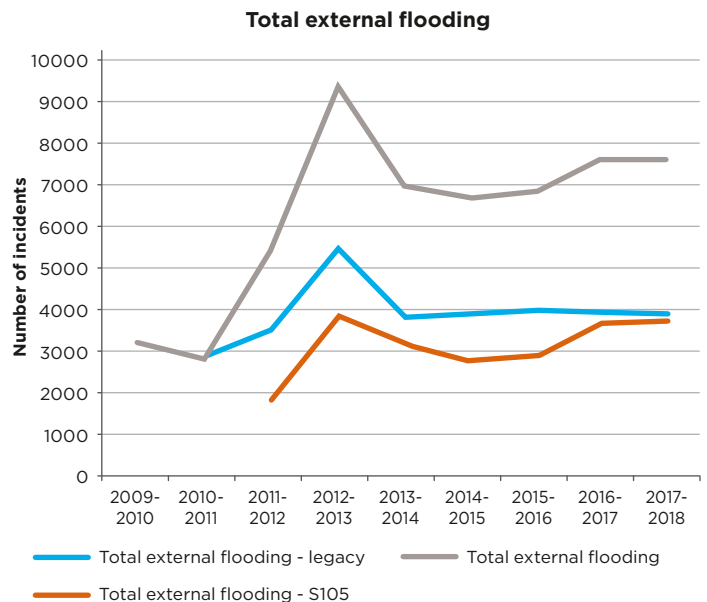


Figure 15n – Total external flooding.

Our plans to deliver this commitment

To ensure that the most appropriate solutions are applied to deliver this performance commitment, we have used our asset deterioration model, the principles of which we have been detailed in the pollution section above.

Many partnership opportunities identified through working with Environment Agency for 2020-25 relate to external sewer flooding. These opportunities will be further developed to maximise service improvements to customers wherever possible and deliver multiple benefits.

Traditionally we have not invested in external sewer flooding unless related to ongoing customer impact. Whilst our customers have told us this is a higher priority, we will continue to focus on the significant reduction in internal sewer flooding in 2020-25. This will have a subsequent benefit of reducing external sewer flooding, and this is reflected in our 2020-25 target. We feel that in the short term this is the best use of customer money to deliver as well as delivering an improvement in service.

Our incentive to deliver

The external sewer flooding performance commitment is financially incentivised through under and out performance payments. The incentive type is a revision of the PR14 measure, where reputational incentives previously applied. Our customers consider external sewer flooding to be of high importance and strongly support underperformance and outperformance payments for the performance commitment, with the incentive rates drawn directly from customer valuation research.

The ODI follows the prescribed formula for calculating incentive rates, using marginal benefits and marginal costs calibrated for the forecast totex sharing rate.

- The standard underperformance payment rate is -£20,764 per external flooding incident.
- The standard outperformance payment rate is £20,764 per external flooding incident.

We have introduced an outperformance deadband at 4,538 external sewer flooding incidents, the current industry average level of performance. By applying the deadband, we are ensuring that outperformance payments are only earned for performance better than the industry average. The ODI payments will be recovered from the Wastewater Network Plus price control.

Bathing water quality

Table 15p

Annual performance targets – Bathing water quality					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Number of incidents	18	18	18	18	18

In summary

This performance commitment relates to the number of designated bathing waters where we exceed European Union bathing water directive requirements. Our customers prioritise bathing water quality as the highest environmental performance commitment. This is a long-standing customer priority and reflects our significant efforts and recent investment. Yorkshire has some of the most beautiful and dramatic coastlines in the country and some of the busiest seaside towns. We know that thriving coastal resorts rely on clean bathing water and that the quality of beaches in the region supports the local economy.

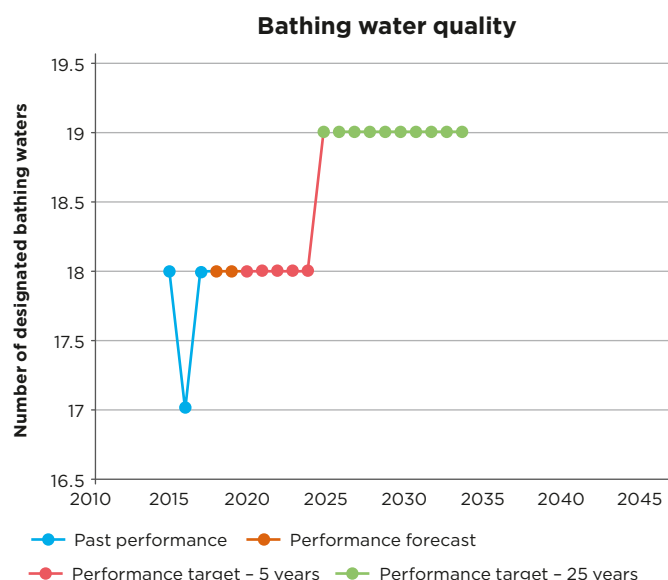


Figure 15o – Bathing water quality.

We have 19 bathing water beaches and we exceed the required standards at 18 of them. The performance commitment is reported by bathing season in the following year. For example, the 2020 bathing season will be reported in the calendar year of 2021 (January to December).

This is a bespoke performance commitment, meaning that we have developed and agreed it with our customers and stakeholders based on their priorities. The performance commitment is not a new measure and was measured and reported on in 2015-20. It has a proposed outperformance payment and underperformance payment, to be recognised annually in-period.

The measure is in line with the existing Environment Agency reporting requirements. It measures the number of bathing waters where the samples taken (by the Environment Agency) in a bathing water season prove the water quality is good or excellent.

For designated bathing waters in England, the Environment Agency monitors Escherichia coli (E.coli) and intestinal Enterococci in the water, throughout the bathing season. Values vary depending on a number of factors including but not limited to, weather, pollution from agricultural and urban sources and storm water overflows. Readings taken over the last four bathing seasons determine the annual classification for that water. The classifications are:

- Excellent, the highest, cleanest class.
- Good, generally good water quality.
- Sufficient, the water quality meets the minimum standard.
- Poor, the water quality has not met the minimum standard.

Engagement

Customers

Our customers demonstrate high support for this performance commitment, with a majority rating it very important. Our customers typically want to see our performance against this commitment increase over time and are often surprised to hear about our role in ensuring the quality of Yorkshire's bathing waters, but are keen to see us helping to protect the environment. Customers show above average support for paying more to make sure we recycle sewage back into the sea in a way that protects bathing beaches.

Stakeholders

We have long standing relationships with our coastal stakeholders and their collaboration is essential to delivering our committed performance. These are further described below in the section describing our plans to deliver this commitment.

Our performance to date

Significant investment was made in 2010-15 of £102 million to improve our sewage treatment works and outfalls along the coast to ensure our assets were able to achieve and surpass the new tighter consents introduced by the EU Bathing Water Directive.

We have continued to make improvements in 2015-20 to ensure we maintain this high standard. We invested £10 million to replace the sea outfall at Wheatcroft and improve the outfall at Scalby, Scarborough. We also extended our overflow monitoring and prediction system, developed to assist beach managers to inform the public about bathing water quality.

18 of our 19 beaches are routinely assessed as good or excellent. However, we have one beach (Staithes) that achieves an assessment of poor. We understand the issues associated with Staithes bathing beach and we continue to work to improve its bathing water quality. In 2020-25 we will prioritise less capital-intensive investments and, through partnership working, will solve issues by engaging with other stakeholders.

Our plans to deliver this commitment

We have made significant investment in our coastal assets to improve the impact our discharges and overflows have on the receiving environment. The most efficient and effective way forward is to take a broader catchment approach and focus on partnership working as way of improving our bathing water quality. We will work in partnership with our stakeholders in the following ways:

- Provision of additional beach wardens (local authorities).
- Improved harbour waste disposal facilities/activities (local authorities).
- Support a seagull control campaign (local authorities).
- Promote catchment sensitive farming (Environment Agency).

Our base maintenance investment will be prioritised on protecting coastal assets with ongoing operation and maintenance of the assets to comply with permit conditions.

Our incentive to deliver

The bathing water quality performance commitment is financially incentivised through under and out performance payments. The incentive type is a revision of the PR14 measure, where reputational incentives previously applied. Our customers consider bathing water quality to be of very high importance and strongly support underperformance and outperformance payments for the performance, with the incentive rates drawn directly from customer valuation research.

The ODI follows the prescribed formula for calculating incentive rates, using marginal benefits and marginal costs calibrated for the forecast totex sharing rate.

- The standard underperformance payment rate is -£1.235436 million per bathing water.
- The standard outperformance payment rate is £0.635718 million per bathing water.

There is no deadband for this performance commitment; standard under and out performance payments occur above or below the target level.

The payments will be recovered from the wastewater network plus price control.

Surface water management

Table 15q

Annual performance targets - Surface water management					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Hectares	1	4	5	10	20

In summary

This performance commitment relates to the area of surface water run-off removed or reduced from the public sewer network because of blue-green infrastructure or surface water disconnection implemented by us. The effective management and control of storm water enables us to minimise sewer flooding and improve environmental performance. This is achieved through a reduction in concentration, duration or frequency of operation of CSOs, which reduces pumping and energy costs and improves sludge quality. Secondary benefits include enhancements to aesthetic value, biodiversity, health, wellbeing and recreation.

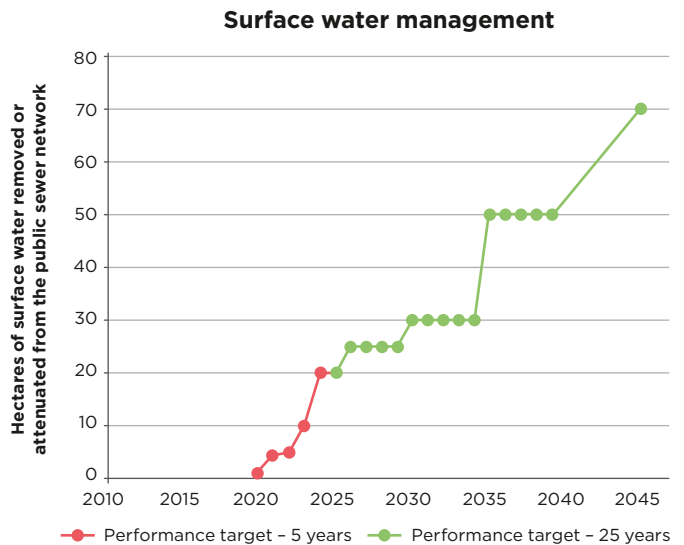


Fig 15p - Surface water management.

This is a bespoke performance commitment, meaning that we have developed and agreed it with our customers and stakeholders based on their priorities. The performance commitment has a proposed outperformance payment and underperformance payment, to be recognised annually in-period.

Our surface water management performance commitment provides us with an opportunity to drive innovation and incentivise the right and sustainable behaviours in our business. It also promotes assets with greater social and environmental amenity compared to our traditional solutions.

Storm water places demand on our sewer systems and is the dominant cause of hydraulic incapacity within the sewer network critically affecting performance, standards of service to customers and the environment through flooding and pollution. Storm water reuse will enable a greater proportion of water to be reused than is possible through current non-potable uses. Fit-for-purpose water sourcing will foster innovative recycling and dynamic efficiency with the capture and re-use storm water reducing demand on potable water sources.

We will use a number of strategies to achieve a reduction in storm water:

- Divert rain away from sewers through smarter, blue-green infrastructure solutions.
- Undertake a downspout disconnection program.
- Implement a programme of retrofitting rain gardens.
- Reduce connected impermeable surfaces and disconnecting impervious road and roof surfaces.

This performance commitment aims to increase social capital by creating better places to live. The performance commitment refers to three measurements:

- Blue-green infrastructure solutions to mimics the natural water cycle.
- Disconnection using underground pipes to take surface water straight to source.
- Blue-green infrastructure to slow the flow of surface water into our network to maximise the capacity of our network during storms.

This will capture any infrastructure or surface water disconnection solutions which result in an area of surface water being removed or reduced from the public sewer, whether delivered in isolation by us or in partnership with our customers and stakeholders. We will measure the area removed or reduced once the scheme has been delivered and has reached practical completion. It will be signed off in consultation with our flood partnership steering group.

Engagement

Customers

Our customers demonstrate good support for this performance commitment, with a majority rating it as important. Our testing has revealed that providing appropriate sewer capacity to cope with flood events is of high importance to customers and they show above average support for paying more to see our performance

improve. Research reveals that customers consider flood management and defence an important issue for the future and want us to focus our efforts on this activity into the future to ensure we have appropriate plans and resources to mitigate for population growth, extreme weather and climate change.

Customers support initiatives to remove surface water from the system. The idea of re-using surface water and reducing the amount of water going into sewers is universally appealing. Customers are keen to see us further our resilience to flooding events.

Stakeholders

We have previously mentioned our Hull and Haltemprice Living with Water Partnership, as part of the Drainage and Waste Management Planning process we will continue to develop strategic partnerships with other LLFAs and our customers. For example, we have also begun to develop a strategic relationship with Sheffield City Council and have identified several surface water management opportunities. The partnership with Sheffield City Council also fits more broadly with other mutual priorities in the area especially with regard to land management.

Our performance to date

This is a new performance commitment and we have no historical data to track our performance against. However, we have already delivered several schemes in partnership which remove or attenuate surface water.

Working in partnership to reduce flood risk

We have delivered two SuDS storage schemes in Hull contributing to the AquaGreen project, the first located at the Barbara Robson Playing Fields. This scheme uses existing playing fields to store surface water and mitigate downstream flood risk.



The second at Howdale Road, Bransholme which is a surface water removal scheme with additional Water Framework Directive Benefits. This was also delivered in partnership with Hull City Council and Yorkshire Wildlife Trust. There has been no flooding since completion despite similar rainfall events.

Our plans to deliver this commitment

The principal aim of this initiative is to reduce flooding and pollution by transforming impermeable surfaces draining to our sewer network into functional green space. This includes creating rain gardens and natural drainage areas allowing rainwater to filter through and soak away into the ground or enter the sewer network slower. These activities will protect and enhance our capacity to facilitate future growth and will provide resilience for the network. We have identified opportunities to remove or attenuate up to 20 hectares of surface water through our work with the Living with Water partnership as well as other strategic catchment investigation studies.

During 2015-20 we commissioned work with our consultant partners to develop several proposals for catchment solutions. We worked with Hull and Sheffield City Councils during this project and identified suitable areas for investment. We also used a catchment based approach to assess potential solutions for flooding issues within the Calder Valley. These were designed with blue-green infrastructure solutions where it was feasible and suitable to do so. These have been developed as solutions modelled in our DMF for consideration for 2020-25 investment, and have helped set the ambitions of this performance measure. Surface water removal and attenuation also supports our aspirations for partnership working to reduce flood and pollution risk to our customers.

Where appropriate blue-green infrastructure or SuDS solutions provide much better value for money as well as improving natural and social capital. Our recent work in Hull and Haltemprice has clearly demonstrated this as illustrated in the table below.

Table 15r

Hull and Haltemprice - strategic assessment of solutions for priority areas.			
Blue green infrastructure capex	£ per hectare attenuated	Traditional capex	£ per hectare attenuated
£120m	2.4m	£170m	3.5m

Our incentive to deliver

The surface water management performance commitment is financially incentivised through under and out performance payments. The performance commitment is a new measure for PR19. Our customers consider surface water removed to be of moderate importance and support the use of underperformance and outperformance payments for the PC. The incentive rate is based on our customer benefits valuations for the improvement to wetlands and green spaces which will be created as a result of surface water management activities.

The ODI follows the prescribed formula for calculating incentive rates, using marginal benefits and marginal costs calibrated for the forecast totex sharing rate.

- The standard underperformance payment rate is -£4,865 per ha.
- The standard outperformance payment rate is £4,865 per ha.

There is no deadband for this performance commitment; standard under and out performance payments occur above or below the target level.

The ODI payments will be recovered in the Wastewater Network Plus and Water Network Plus price controls.

Cost efficiency

We continually strive to deliver an efficient and effective service to our customers, both in the planning, and in the delivery of our activities and enabling expenditure programme. This has been the case in the construction of the expenditure programme supporting the PR19 submission, where we have fully engaged with our Board to identify the challenges we face and the level of risk we are willing to accept. The level of efficiency identified requires transformational change, this has been acknowledged and plans are already being developed to ensure we are in a good position for commencing the 2020-25 period.

Through the Board assurance process, we have identified £403 million of efficiencies which we have deducted from our expenditure requirements.

By working with experts in the business and consultants working in an advisory capacity, the following broad themes were identified;

- Asset management.
- Service delivery.

Each of these themes are explained briefly below to give an indication of the type of activity we will be undertaking in the 2020-25 period to deliver the efficiency. We know this level of efficiency, coupled with performance commitment targets, clearly demonstrates the level of 'stretch' to which we are committed, to deliver excellent service to our customers.

Asset Management

We have already put in place foundations to enhance our strategic planning capability, to both rationalise and optimise our asset base in the 2015-20 period. One example of this is the investment made in our Decision-Making Framework (DMF), which includes people, process, systems, governance and is detailed further in chapter 9. This facilitates continued maturity and integration of the risk based planning approach developed at Yorkshire Water over the last 15 years.

The following headings highlight the types of activity we will be undertaking in the 2020-25 period to deliver the transformational efficiencies identified.

SMART Networks

Our SMART wastewater network Plus will improve the visibility, longevity, and reliability of our wastewater network assets through enhanced measurement, data collection, data management and analytics. This holistic approach to the management of the asset life cycle will enable us to have visibility of how the network is performing and provide the insight to choose when to intervene before it impacts our customers and enable us to move from reactive to proactive wastewater network management.

The SMART network will enable us to deliver our wastewater network upper quartile plans and enhance our operational performance by focusing upon:

- Network visibility.
- Data analytics.
- Proactive and targeted response.
- Resilience.

Use of markets

We have referred in the document to potential use of markets to secure the services of specialist suppliers and use of NAVs. We recognise that we have significant efficiency challenges in this price review and we will be looking into alternative ways to procure and deliver our services to meet this challenge.

Demand side measures

We are committed to looking at alternative ways to mitigate the risks we have without needing to implement heavy concrete solutions. Using the totex hierarchy we will investigate and where possible implement demand side measures in order to save costs and gain better value for money. Examples of this summarised previously are the dry weather flow Interventions for Seamer and Melton WwTws.

Commercially aligned arrangements

Commercial engineering challenges all aspects of projects and programmes to ensure they deliver the maximum benefits. We are enhancing the innovation our supply chain can bring from company trials, and knowledge gained from other sectors worldwide. Examples include rolling out vacuum excavation techniques, enhanced use of modular building systems and offsite production and more innovative exploration of sewer lining systems.

We will also ensure full deployment of the totex hierarchy whereby maximum efficiency is gained at the planning stage, rather than dependency on outperformance upon award of contract. Our SPP, Stantec, is already appointed on a long-term contract ensuring a strong partnership in deliver an efficient quality service to our customers.

Support services underpin all activities we undertake as a business, and form a substantial part of both our workforce and operational spend. A full review will be undertaken of how we can rationalise such areas as suppliers, licensing, automation and process improvement.

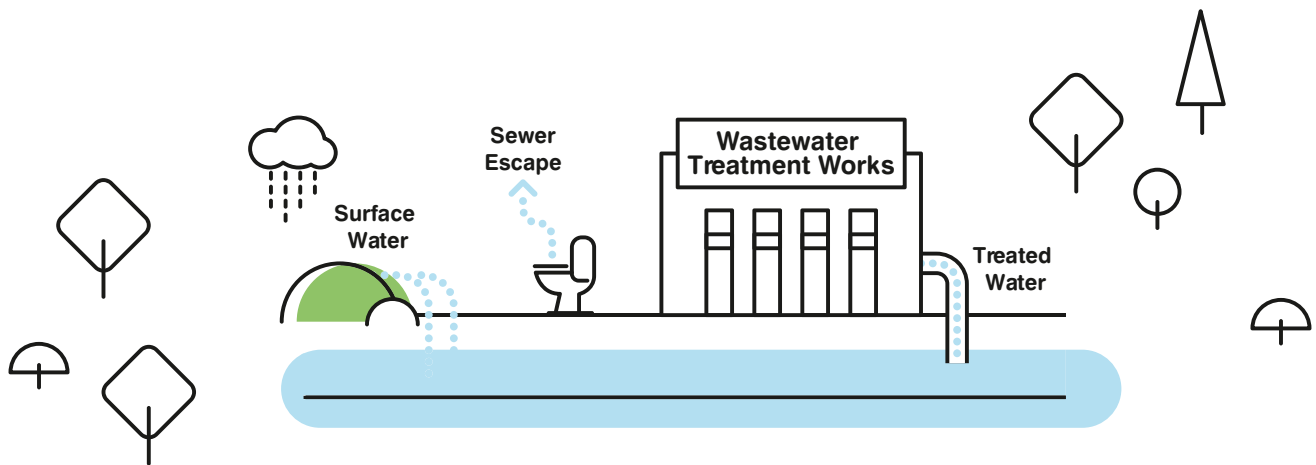
Service delivery

Maintenance planning

Enhancing our asset condition based monitoring programme will be an area of focus, to ensure we are maximising the available life of our assets. This will involve a review of our maintenance plans, progressing proactive maintenance to reduce critical asset failures, ensure asset availability and a reduction in the volume of reactive jobs. As well as delivering efficiency, this will facilitate a more resilient asset base and supports our health and safety improvement plan.

Digital innovation

As well as innovating our digital capability and service offering to customers, we are also driving digital innovation in the way we operate our assets. Taking the concept of Water Resource Allocation Planning (WRAP) and enhancing its digital planning capability, then applying this concept to wastewater, will allow us to create greater connectivity of our asset base. The use of sensors and enhanced use of data analytics will make this easier.



Cost adjustment claims

We have submitted two cost adjustment claims as part of our Wastewater Network Plus plan. The claims are required to ensure our plan is not adversely impacted by circumstances within the Yorkshire region that would not be accounted for in the assessment of our investment plan.

Further information on how we have approached cost adjustment claims is provided in appendix 8h ('Approach to cost adjustment claims').

Cellared Properties (Reference: YKY WWN+01)

Claim type: Regional operating circumstances.

Claim Value: £105.93 million.

Specific Appendix 8k: 'YKY WWN+01 - Cellared Properties'.

There is evidence that we have a significantly higher proportion of properties with cellars in our region compared to the national average. The risk of internal sewer flooding incidents occurring at these properties is greater than at non-cellared properties and the cost of mitigating these incidents is higher.

We have committed to achieving a significant reduction in internal sewer flooding, reducing the number of incidents we incur to no more than 350 by the end of the next period. This cost adjustment claim relates to the additional expenditure required by us to achieve this level of service due to the number and proportion of cellared properties we have within our region.

Wastewater Growth (Reference: YKY WWN+04)

Claim type: Atypically large expenditure.

Claim Value: £55.31 million.

Specific Appendix 8l: 'YKY WWN+04 - Wastewater Growth'.

It is anticipated that commencing in the period 2020-25 that four new settlements/urban extensions will be developed in our region. This is additional to our 'normal' growth expectations and as such means we have an 'atypically large investment' required to manage our growth in the next period.

Approximately 22,000 new properties in the four areas are anticipated by 2040, with an estimated 10,000 to be built by 2025. This growth is over and above that normally expected and is more localised. It is therefore different in nature to normal region wide growth in connected properties, which historically has averaged between 12,000 to 14,000 new connections per annum. To ensure that we are not claiming more than needed, the claim relates to the investment required to manage the unusually concentrated growth for these four areas only.



Water resources price control

Objective

We will always provide you with enough safe water, we will not waste water and we will always protect the environment.

Investment (total over 5 years)

Investment	£m
Totex	226.4
Efficiency	17.61

Detailed definitions of the enhancement element of the totex value can be found in the enhancement cost appendices"

Benefit realisation (total over 5 years)

 Financial	£37.66m	 Social	£238.44m
 Manufactured		 Human	£120.85m
 Natural	£517.70m	 Intellectual	Reflected under Social and Human capitals

Performance commitments

Primary	Secondary
<ul style="list-style-type: none"> Working with others. Land conserved and enhanced. Integrated catchment management. Per capita consumption. Drought risk. Abstraction incentive mechanism. 	<ul style="list-style-type: none"> Length of river improved. Biosecurity implementation. Carbon. Education. Unplanned outage.

Above shows the total amount of investment we will be making in this price control (totex). We have shown the amount of benefit this expenditure will create through each of the six capitals.

This is demonstrably good for customers where the sum of all the six capitals benefit is greater than the totex.

In this price control we can see that **£4.04** of benefit is returned for every £1 invested.

Resilience

- Catchment management to protect water quality.
- Partnership working to deliver multiple benefits.
- Per capita consumption reduction.

Cost adjustment claims

- None.

Innovation

- Water Resources North – inter water and sewerage companies (WASC) collaboration.

Appendices

- Water Industry National Environmental Programme (WINEP3).
- Water Resources RCV allocation.
- Water Resources Management Plan.

Figure 16a – Water resources price control overview.

Our customers' top priority is a safe, affordable and reliable supply of water. Our water resources face many growing pressures and by ensuring we make the most of the water we already have. We will meet these without increasing our impact on the environment or putting pressure on water bills. Climate change brings uncertainty over future water supply. Coupled with this, by 2045 the population in our region is set to grow by 1 million people, which will further increase demand. We need to ensure we meet these pressures in an affordable, sustainable and resilient way.

We have one of the most resilient water resource systems in the country. We take water from a balanced mix of reservoirs, rivers and groundwater sources. We are not dependent on a single source-type, this increases flexibility and resilience. We treat raw water, turning it into high quality drinking water. Importantly, we can move drinking water around the county through our strategic water distribution grid which covers the supply for 99% of Yorkshire's population. By balancing supply and demand in this way, we ensure a resilient water supply across Yorkshire. We offer industry leading resilience to drought, with our customers only experiencing risk of severe supply restrictions during a 1 in 500-year drought.

We will manage the increasing demand for water by maintaining the high levels of resilience in our system by first addressing our own water wastage through an ambitious leakage reduction programme. This is important as it allows us to talk to our customers about water efficiency, recycling and encouraging markets to enhance services and efficiency. We have a number of plans to safeguard existing supplies and ensure our customers continue to receive high quality supplies without interruption. We will focus on integrated catchment management, promoting water recycling to off-set potable water demand, the use of new markets and leading Water Resources North, an inter water and sewerage company collaboration.

Our PR19 plan is founded on our most extensive programme of customer engagement to date. We have explored, tested and evaluated Ofwat's key PR19 themes of great customer service, affordable bills, resilience in the round and innovation from multiple perspectives across our diverse customer and stakeholder base. We have developed a much better understanding of our customers' lifestyles and will continue to deepen this understanding through ongoing engagement.

In developing our draft WRMP19 and PR19 strategic business plan we believe that we have shown significant alignment to the resilient water supplies requirements established by Defra, the Environment Agency, the Drinking Water Inspectorate and Ofwat in their letter dated 9 August 2018.

This is clearly demonstrated in our ambitious plans for a 40% reduction in leakage by 2025, reducing leakage from 297MI/d to 175MI/d over the next 7 years.

As part of Water Resources North, we will continue to investigate potential options to optimise water resources beyond water company boundaries, enhancing regional and national water supply resilience. Within this context we will continue to explore the role of water markets for strategic water resource solutions.

We welcome plans set out in this letter for clear direction from government and regulators and a regulatory framework to support and facilitate future water supply resilience planning and delivery.

One group that has played a significant role is the Yorkshire Forum for Water Customers (the Forum) and the Forum's environment sub group. This price control has been subject to in depth scrutiny and engagement by the sub group and it has helped us ensure that our plan reflects the needs of customers and the environment. The sub group has challenged and built upon key submissions that have shaped this plan such as its detailed work on the draft Water Resource Management Plan.

This chapter describes our long-term ambition for Water Resources and explains how our PR19 plan is set in a long-term context through a thorough understanding of the pressures we face. It explains how our PR19 plan helps us meet our Water Supply Big Goal and our long-term strategy. We discuss the impact this will have on customer bills and demonstrate how we will deliver excellent service in the most cost-efficient way, including the expanding use and development of markets.

Executive summary

Our Water Supply Big Goal sets our ambition for the Water Resources price control. Water remains a precious resource and our customers have consistently told us that a reliable and sustainable supply of high quality drinking water, at an affordable price, is their first priority. We will be efficient in our use of it, and work with other companies and stakeholders to support broader national resilience.

Big Goal: Water Supply

We will always provide you with enough safe water, we will not waste water and always protect the environment

Our Water Supply Big Goal has been developed through extensive customer engagement. Read more about our 5 Big Goals in our long term strategy.

Water is essential for public health. It is used domestically for drinking and washing, and is essential for Yorkshire's economy, underpinning large and small businesses. Our reservoirs provide leisure and amenity value for customers and tourists to the region. Reservoirs also provide a source of compensation flow to maintain the ecological health of our rivers that might otherwise run dry during prolonged dry weather.

Our 25-year ambition

Our 25-year strategy for Water Resources is informed by our draft Water Resources Management Plan (WRMP) 2019, available here www.yorkshirewater.com/resources. Our draft WRMP identifies the risk of a supply-demand deficit during dry years by the mid-2030s, if we continue with the current suite of mitigating actions to manage demand or increase supply. A deficit like this is caused by a decrease in the available supply due to climate change, and an increase in demand due to population growth. We also anticipate future reduction in water available for abstraction, should climate change impact the broader environment or the quality of our raw water deteriorate from current levels.

By proactively addressing our deficit risk early, we are protecting the resilience of Yorkshire's existing water supplies. To address the risk, we have set an ambitious target to reduce leakage by 40% by 2025, 10 years ahead of our modelled deficit timeline. This means that we are enacting a key concept of our long-term strategy by moving to demand management solutions. Put simply, this means making the most of the water resources we already have. This starts by addressing where water is lost before it reaches our customers.

Case Study: River restoration

We have changed the flows from our reservoirs at many sites across Yorkshire. This involves striking the balance between maintaining vital drinking water supplies for our customers and improving the ecology of our rivers.

At some sites the loss of water to achieve the ideal river flow is too great, so we have modified the river channel to improve habitats and make the most of the available flow. On the River Washburn, downstream of Swinsty reservoir, we delivered a scheme based on detailed hydromorphological mapping and using a range of river restoration techniques. Monitoring of fish and other ecological components was undertaken to demonstrate the benefits. Future schemes will benefit from what we have learned. We will maximise environmental influence and minimise our impact on water resources.

We are frontier in our per capita consumption (PCC), this is the amount of water on average used by people in Yorkshire each day. We will use innovative and targeted communication and other techniques to work with our customers to further reduce PCC, ensuring we maximise the beneficial use of the water we abstract.

An early reduction in demand creates additional benefits, including the opportunity for Yorkshire to play a greater part in the wider national water resources plan. For example, we could reduce the amount that we import from Severn Trent Water, or increase our exports to others, for example Anglian Water. Our long-term strategy for water resources includes working closely with other water companies and the wider water resources market to understand the opportunities out there.

Over the next 25 years we are enhancing our approach to integrated catchment management to improve water quality naturally, building resilience into our resources, making them sustainable and affordable for future generations.

Sustainable landscapes programme

The ground breaking sustainable landscapes programme is a Yorkshire based initiative launched in July 2018. Working with arable farmers interested in exploring sustainable practices, the programme will benefit soil health and improve water quality in specific river catchments. The programme will trial new ways to improve soil physical structure and biological health, using novel technologies that optimise production while lowering inputs, a combination that will also help to improve the long-term financial resilience of those farming businesses involved. The Sustainable Landscapes programme plans to help improve water quality by reducing the volume of soil erosion and the levels of nutrients and pesticides within the watercourses.

Conceived and delivered by Future Food Solutions and sponsored by us, the project has evolved out of the Sustainable Futures programme, which has been running for 3 years and now involves more than 200 Yorkshire farmers. We are keen to find a way to work more collaboratively with farmers and through improved relationships develop a partnership approach to tackling some of the key issues they face around water quality. The programme was inspired by the success of the Upland Land Management programme, which focused on improving the quality of blanket bog, where we worked together with landowners, farmers and gamekeepers to deliver mutual benefits for all. The sustainable landscapes programme will adopt some of the partnering methods trialled in this model and the learnings from Sustainable Futures, which has delivered process change in the lowland arable areas of Yorkshire.

We have identified that one way to improve water condition, is by looking back within the value chain and recognising the close correlation that water tested downstream has with local area soil health. The programme will work with farmers to improve soil organic matter, using a range of different approaches, depending on soil type and cropping. Soil with a high organic matter content, can hold more water following rain and prevent surface run off that leads to soil erosion and valuable nutrients entering the waterways. Also soil with higher organic matter levels is more resilient to drought, helping to maintain crop yields in dry seasons. Sustainable landscapes will support the increased use of cover crops, new cultivation ideas and precision farming techniques that will increase and conserve soil organic matter.

“Being involved with this Sustainable Landscapes Project, has made me think again about how I manage slugs on my farm. I had not looked at any other option than increasing the levels of Metaldehyde.

I am farming differently now since joining the project.

After talking with other farmers in the Pilot, I have now started stubble raking for the first time. This will be the first year that Ferric Phosphate will be used on the farm... had we not signed up to the pilot, we would still be using Metaldehyde”

- Farmer and programme participant

Our 5-year plan

Customers: delivering excellent service at an affordable price

We know that a constant, affordable supply of high quality water is our customers' top priority. They also expect us to be efficient and resilient. When it comes to our water resource, we are resilient as we can transfer water around Yorkshire to mitigate risk. We also have very few sites where existing abstractions are causing an environmental concern. However, we are not complacent and our PR19 plan is about reinforcing our resilience, with a focus on enhancing water quality through our integrated catchment management approach.

We are continuing our investment in our water resource systems to maintain resilience in supplies and to deal with any deterioration in raw water quality. Innovative approaches ensure efficient, resilient and sustainable outcomes without putting pressure on customers' bills.

Our performance will be measured through our risk of severe restrictions in a drought and integrated catchment management performance commitments.

Solutions: water quality, catchment and cost

Our catchment programme covers a range of risks to water quality, including colour arising from peat degradation, increasing levels of pesticides and diffuse nitrate pollution, and saline intrusion on reservoir, river and groundwater sources. We plan to invest £11 million in catchment management activities to address discolouration from upland peatland sources in the period 2020-25, along with a further £5.4 million to reduce the risk of metaldehyde (which is used in agriculture to control slugs) entering our rivers. Our catchment interventions will be delivered collaboratively, measured through our solutions delivered by working with others performance commitment.

We are also investing significantly to upgrade five existing water treatment works in Yorkshire, three of which will include new 'MIEX' process streams to remove colour and organic compounds. These materials arise from peat running off the degraded uplands and provides an immediate solution until the catchment approaches take effect over the next two decades. The cost of this quality programme in the Water Network Plus price control is around £61 million for the new plant with further investment needed to integrate it into the existing process. More detail can be found in our DWI submission.

Integrated asset management: delivering resilience and reliability

Our water resource assets are key to ensuring a safe and reliable supply of water to our customers. Our assets include aqueducts, boreholes, impounding reservoirs, dams and pipelines. The range is extensive and of varied age and condition. The increasing age and cost of our asset base is a stretching challenge for us.

In the current period we developed and established a businesswide approach to asset management, accredited to the international standard ISO55001, which is assured annually. It covers the full asset management cycle of strategic planning, engineering, reliability and operations. It is already delivering enhanced levels of resilience for customers as evidenced in the hard winter and dry summer of 2018, when customers continued to experience normal levels of service across Yorkshire despite these climatic challenges.

We continue to proactively invest in capital and operational maintenance across our assets with activity focused on our asset management systems and processes. The expenditure to maintain service to customers in 2020-25 is estimated at £200 million.

We have a statutory obligation under the Reservoirs Act 1975 to maintain our reservoirs in the interest of public safety. During the 2020-25 period we plan to invest 52 million to meet this obligation.

Markets - making the most of water resources

We know that making the most of markets can deliver innovations, resilience and cost efficiency, helping us meet our customers' expectations. We are developing a functioning water bidding market to support our water resources strategy, and plan to stimulate the bidding market through early engagement with potential participants via a new markets portal.

We only pursue trades where they make us more efficient or resilient, and plan to promote and test the development of the water resources market. Within our region we are focusing on understanding other available water resources and liberating opportunities. To support this, we are working with a specialist licence trading consultant. We plan to help bolster and protect national resilience in the longer term by understanding the need for and approach to transporting water around our country.

Our water markets approach supports the delivery of a resilient and efficient resource that meets the needs of our customers, stakeholders and the environment. Our approach improves regional and national resilience, drives down waste and supports innovation through the market initiatives.

Pursue increased trading

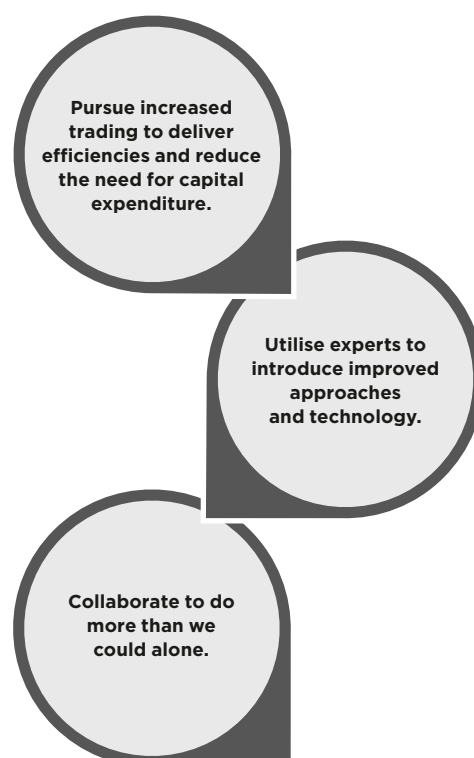


Figure 16b – Yorkshire Water's market initiatives.

Right now, we do not need to import additional water. However, we know there are broader benefits for northern and national resilience if future trading options develop. We are therefore exploring opportunities for trades to support market development and enhance our understanding of how they can work. Specific developments include:

- Exploring alternative resources to build resilience across the region. For example, replacing part or all our imports from Severn Trent Water with third-party supplies, which may be more cost effective for our customers and could contribute to Severn Trent Water’s resilience.
- Identifying opportunities with neighbouring companies to trade bordering abstraction rights, particularly where the ability to abstract at neighbouring sites has been reduced.

Through Water Resources North, a consortium of northern water companies and regulators charged with coordinating water resources in the North of England and beyond, we plan to investigate the potential for greater inter-company trading, and how this could impact on national water resource resilience.

Working with experts to reduce costs and improve service

We want to be sure that we are finding all possible innovations to help us improve our service and resilience, and drive down costs. Experts introduce and provide new technology and services to enhance or replace our traditional delivery methods. These can be direct (provide additional water resources) or indirect (reduce demand) in respect of water resources.

Examples of direct working to provide additional water resources include:

We are working with large industrial companies that currently use a lot of drinking water for cleaning and cooling processes to use more sustainable water resources where drinking quality water is not needed. By doing this, we will be able to provide potable water for 18,000 new homes without building more treatment works or abstracting more from our natural environment.

Case study: water recycling

At Saltend Chemicals Park in Hull, we are supplying BP and Air Products with final effluent for their processes, reducing demand by 19.5 Ml/d.

Further, we are running two projects as proof of concept of final effluent re-use:

1. A trial at our Old Whittington wastewater treatment works to make this site 100% “non-potable for process use, is saving around 70,000m³ of treated water a year.
2. Working with Tarmac, based near our Knostrop WwTW, to trial final effluent re-use in their concrete manufacturing process. An initial test case of concrete (700m³) was made with final effluent in August 2018 and used to develop ten concrete pads at our Esholt site.

Initial indications suggest we can target 20,000m³ water savings a year on the household development alone, by using water efficiency measures including re-use.

We are improving water quality through shared ambition. Through our integrated catchment management plans, we are working with a range of stakeholders to mitigate risks to water quality and protect the environment, utilising the natural capital operator model. For more detail see our integrated catchment management performance commitment.

Examples of indirect working to reduce demand are detailed in our Water Network Plus price control chapter include:

- Technology and resources to help us meet our ambitious target to reduce leakage. In our PR19 plan we will reduce leakage by 25%, this is on top of the 21% reduction we will deliver between 2018 and 2020. We have more than doubled the uptake of our traditional detection and repair contracts and initiated a programme to install 30,000 acoustic loggers as well as deploying satellite technology along with detection algorithms. We are inviting machine learning specialists to analyse our existing data streams. As part of our open by default programme we are sharing network monitoring data to help us find new ways of reducing leakage. These events, called “hackathons” are already helping us find new and innovative ways to use data to help us solve the pressures we face.

We know the traditional approach of distributing free water saver kits for customer to fit themselves can have limitations. So, we have selected a specialist partner to visit customers to fit water saving devices. We are using marketing data from Experian to identify customer types and to target groups with specific water efficiency messages.

Targeting water efficiency incentives to customer demographics

We are taking a new approach to our behavioural change campaigns, to make sure we are reaching the right customers with the right water efficiency messages and incentives. Our extensive customer research allows us to identify the needs of our varied customer base across Yorkshire.

We have identified nine different customer types. Each type has a different characteristic, attitude, income, and location. We are using these customer types to identify the right channels to communicate to different customers and to discover what messages may interest them the most.

Using this insight, we can target:

- High population areas.
- Communications channels that appeal to each customer type.
- The different motives for saving water for each type, and campaigns that would appeal to them.
- Different water efficiency giveaways and offers for each customer type.

By targeting our water efficiency messages, we hope to be able to incentivise customers to adapt their behaviour and attitude to water and the amount they use.

Collaborate to do more for customers

Our work with local councils and developers is leading us to lower water consumption within new developments. We are currently assessing the four large growth schemes planned in our region to reduce demand, including considerations for water recycling.

We are considering alternative uses for final effluent, such as a replacement for treated water, lessening the need for additional treatment capacity in the future. We have commissioned work to determine the water quality needed for safe use of non-potable water to make concrete, use as cooling and process water, and for agricultural use.

Water Resources market strategy

We want to make sure we are doing all we can to support the development of the market. Our Water Resources market strategy seeks to achieve three aims:

- Greater choice – select sources in response to external constraints.
- Lower cost – to reduce distribution, operational or treatment costs.
- Enhanced resilience – making water available through bulk trades.

Case study: collaborating to build a low consumption village

As part of our plans to push the frontier on per capita consumption, we are working with specialist providers to design a low water-use housing development for our Esholt site to reduce demand on our resources. The options we are collaboratively considering include:

- Final effluent supply.
- Household rainwater capture and reuse.
- Community level storm water capture and reuse.
- Smart metering.
- Smart networks to aid leakage control.
- Highly efficient appliances.

By working collaboratively to design the water infrastructure in advance of planning and construction, we are supporting the developer to gain planning permission in an area that would otherwise prove challenging to meet water demand, while reducing per capita consumption; in line with our long-term strategy.

The Yorkshire Water markets portal

To make the water trading market efficient it must be agile, able to quickly exchange information and respond to changing demands. This allows the market to meet challenges, such as the introduction of a water bilateral market, where commodity companies can trade water through our pipes.

We are developing the Yorkshire Water Markets Portal, where all opportunities for the water management market will be listed, including water resources, demand management and leakage services.

By 2020 this portal will allow us to share trade opportunities quicker than using the published Market Information Requirements, as the portal will enable:

- Communication between us and other water companies or third parties, including the ability to submit bids.
- Engagement with the market when we want to understand potential solutions before starting procurement (market testing).
- A route for the market to submit prospective solutions unrelated to a specified requirement.

The markets portal will be supported by our Trading and Procurement Code, Bid Assessment Framework (available in appendix 11b), and a proportional procurement process. We are currently investigating any perceived barriers to entry.

Separately, we are exploring the development of a country-wide Bioresources Trading Hub to host information from all water companies in a single place. While this is aimed at enabling sludge trading, if successful it could be expanded to water resources.

Developing the market

We are reaching out to participants to stimulate interest, and our published market information is the first step in this process. We have also asked third parties to tell us what other market information they need to help us drive resilience, innovation and efficiency into water resources. All market participants will be able to review and comment on our approach and systems before implementation.

Testing the market

To test the marketplace and enhance our own resilience and efficiency, we are exploring several opportunities.

Testing the developing bidding market through abstraction licence pilots

We have an existing import agreement with Severn Trent Water to bring raw water into Sheffield from the Derwent Valley Ladybower System. We have committed (in our WRMPs) to work together to investigate options for varying the existing Derwent Valley import in the wider context of the Water Resources North Group.

As part of our initiative to explore the water resources market, we have developed a geographic information system (GIS) tool which shows all third-party and our own abstraction points in Yorkshire. This tool makes potential trades more visible and helps us to identify locations where we may be able to optimise the use of existing third-party water abstraction licences. For example, we have used this tool to identify a small number of potential trades near our Rivelin Water Treatment Works, which treats the water we import from Severn Trent Water.

Case study: increasing resilience in Malton

Using our GIS tool we have created a graphic information system with the licences that we have in the Yorkshire region. We have identified a potential to trade 2020-25 licence applications for additional resilience at Catterick and Malton are rejected by the Environment Agency. The trades we have identified so far require new infrastructure to deliver to existing treatment works and are therefore likely to be more costly than a licence increase at our existing sites. Consultation with licensing and markets experts has identified a trading opportunity at a closed power station (Eggborough). We are investigating the potential for utilising the groundwater licence in our Grid Surface Water Zone as an option in our WRMP 2024, before deciding on whether we pursue the trade.

Exploring national trade opportunities

During the development of our draft WRMP we engaged with our neighbouring water companies, Northumbrian Water, United Utilities, Severn Trent Water and Anglian Water to discuss water trading opportunities. In the short-term we believe there may be opportunities to trade abstraction rights on the borders of our companies. Through the Water Resources North group, we intend to develop a number of feasibility studies to explore this.

Bilateral trading market

To support the opening of the bilateral market in 2020-25, we are developing access pricing arrangements to allow the treatment of raw water and distribution to customers by others. The Yorkshire Water Market Portal will be adaptable to future market needs, meaning we can incorporate requirements of a future water bilateral market as needed.

Case study: Water trading incentive reconciliation model

We have completed the necessary preparations to facilitate any additional trades including the Bid Assessment Framework, Trading and Procurement Code and publication of the new Market Information.

At this time our focus in water resources has been on reducing leakage. As a result, we do not have any new appointee to appointee trades to report, and hence a “nil return” on the water trading incentive reconciliation model.

Our WRMP includes a number of initiatives designed to encourage in-area trading, but such trading is not eligible for the new trading incentive.

Performance commitments

In this section we describe our performance commitments that sit within the Water Resources price control. We have developed these performance commitments with our customers and stakeholders to ensure delivery against their priorities and our Water Supply Big Goal.

For further information regarding our performance commitments, including the basis for our targets and incentives, please see appendix 19c.

The Forum has scrutinised our approach to creating the performance commitments. We would like to thank the Forum for the challenge and builds to both the performance commitments and the customer research

that has informed the process. They have also been discussed and challenged by our Board and in a joint meeting between the Board and the Forum.

Our Water Resources price control performance commitments seek to maintain our high level of water resource resilience while ensuring our water abstractions do not impact the environment. Our strong performance against these commitments is complemented by our other priorities for the Water Resources price control, namely catchment management to enhance water quality, and a commitment to facilitate development of a water resources market in the region.

Table 16a

Annual performance targets - risk of severe restrictions in a drought

Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Percentage (%)	0	0	0	0	0

Risk of severe restrictions in a drought

In summary

The performance commitment relates to our resilience to drought. The commitment measures the percentage of customers at risk of severe restrictions to water use, such as standpipes or rota cuts, in a 1 in 200-year drought. This assessment is made at a water resource zone level, as by definition a water resource zone is an area within which all customers receive the same level of service for restrictions. In Yorkshire, our level of service for severe restrictions is 1 in 500 years on average. No customers in Yorkshire are at risk of severe restrictions in a 1 in 200-year drought, and our approach to water resources management will ensure this remains the case, keeping us at the forefront of the industry.

Climate change brings uncertainty over future water supply and consistency of rainfall patterns. The growing population, predicted to grow by a further 1 million people by 2045 across our region, will further increase demand for water. It is therefore imperative that we plan to maintain our resilience to drought.

This is a common performance commitment meaning customers will be able to compare our performance with other water companies annually.

The performance commitment is a new measure for 2020-25 and has a non-financial incentive. It will be measured and reported annually throughout 2020-25.

Engagement

Our customers demonstrate good support for this performance commitment, with a majority rating it important.

Testing has revealed that ensuring there is enough water to meet demand now and in the future, is of very high importance to customers. While typically averse to paying more for improvements, our customers show above average support for paying more to see our performance improve.

Customers want us to focus on this into the future to ensure we have appropriate plans and resources to mitigate for population growth, extreme weather and climate change.

The level of importance placed on this measure is often reflective of customers' own experiences of drought.

“In 1976 it would have been desperately important.”

– Residential customer, York

We have support for our draft water resource management plan and our drought management plans from a number of our stakeholders, they have told us:

“We welcome the draft water resources management plan from Yorkshire Water and are pleased that the company is in a generally good water resources position and resilient to a 1 in 500-year drought.”

– Environment Agency

“Hull City Council welcomes Yorkshire Water’s Water Resources and Drought Management Plan for safeguarding water resources for the Yorkshire area. The plans approach to protecting and securing water supplies for the City of Hull through to 2040 is comprehensive and provides the city with confidence over its future water provision.”

– Hull City Council

Our performance to date

We already have one of the most resilient water supply systems in the country; founded on multiple sources and with an integrated distribution water grid.

We have two water resource zones: The grid surface water zone, which covers 99% of Yorkshire’s population, and the East surface water zone, which covers the remaining population (around the Whitby area in North Yorkshire). Both zones have levels of service better than the 1 in 200-year threshold set out in Ofwat’s methodology, therefore 0% of Yorkshire’s population is at risk of severe restrictions during a 1 in 200-year drought.

Customers tell us how important a constant supply of water is to them. We do not want any of our customers to experience severe supply restrictions in a 1 in 200-year drought event. We ensure sufficient resilience to only require severe restrictions in a 1 in 500-year drought. This level of resilience has been reflected in our water resources management and drought planning since 2001. It is reflective of the investments we have made since 1995/96 in creating and reinforcing our grid system. The 1995/96 drought in Yorkshire had a return period of greater than 1 in 200. Even if an event as extreme as the 1995/96 drought were to occur again, our current resilience would mean we would only require level 3 restrictions (ordinary drought orders).

The Water Resources Long Term Planning Framework (Water UK, 2016) confirms we already plan to a much higher level of resilience than most other water companies.



Our plans to deliver this commitment

We are committed to maintaining our existing high levels of resilience to drought, and our 2019 draft WRMP demonstrates how we do this (see appendix 16a). Our plan describes how we ensure we have sufficient water to supply our customers in the face of future challenges such as climate change, population growth and environmental pressures for the next 40 years.

We are not forecasting a deficit in our supply demand balance until the mid-2030s. We have planned activity and investment to address the forecast deficit and ensure we continue to provide a resilient water resource plan. Our ambitious 40% leakage reduction target reduces demand and creates further supply headroom in our plan. We will also achieve continued resilience through our asset management processes to maintain current sources and will specifically enhance treatment processes at six water treatment works, as detailed in our PR19 Drinking Water Quality submission to the Drinking Water Inspectorate. We are investing in two borehole supplies during 2020-25 to enhance our resilience to risks associated with headroom and outage.

Our Water Network Plus price control provides further examples of actions we are taking to ensure the resilience of our water supply. Read more in chapter 14.

Our incentive to deliver

The drought risk performance commitment is a common performance commitment set by Ofwat. Our customers consider drought risk to be of low importance. Although there is strong support for a financial incentive, we are not proposing a change on the performance target, so have applied a non-financial incentive for the reporting period.

We are committed to ensuring that information on our performance is easily accessible to all. We will be promoting our annual performance against non-financial incentives, as well as other key measures which are not regulatory, through a wide range of media channels, customer campaigns and our Executive pay and incentive scheme.

Abstraction incentive mechanism (AIM)

In summary

This is a common performance commitment to incentivise a reduction in the environmental impact that water abstraction has at sensitive sites during periods of low surface water flows. It measures the volume of water abstracted in mega litres (MI) and is designed to complement existing tools to reduce abstraction from sensitive sites, such as licence changes and licence conditions which stop abstraction at low flows.

Many environmentally damaging abstractions have already been addressed through the Environment Agency's Restoring Sustainable Abstraction (RSA) programme. The AIM allows environmental protection of sites where the RSA programme has not yet been implemented or where the cost benefit analysis excluded sites from the RSA programme.

At PR14, the outstanding RSA requirements in Yorkshire were minor, relating only to two small sources and to addressing the Water Framework Directive (WFD) Heavily Modified Water Body (HMWB) Good Ecological Potential (GEP).

Our 2015-20 plan includes work to meet GEP and addresses the resulting minor water resources deficit to ensure we continue to maintain a strong and resilient water resource management plan. All this work falls within the scope of the 2015-20 Water Industry National Environment Programme (WINEP), there is no requirement for inclusion of these sites in AIM.

We are working with local environmental stakeholders to identify potential sites not identified in WINEP, but which may benefit from reduced abstraction at low flows. If any sites are identified, we will apply the appropriate screening processes to determine suitability for future inclusion in the AIM.

We are not currently proposing any AIM sites in the 2020-25 period. However, We will continue to work closely with the Environment Agency and will continue to review this in the best interests of the environment in Yorkshire.

Engagement

Research reveals customers consider we should focus on this into the future to ensure we have appropriate plans and resources to mitigate for population growth, extreme weather and climate change.

Our performance to date

We are committed to ensuring our abstractions do not cause environmental damage. We work closely with the Environment Agency to understand our abstractions, investigate their environmental effects and mitigate those effects where they are detrimental.

We have worked with the Environment Agency and Natural England since 1999 to investigate potentially damaging licences identified through the RSA process to confirm impacts and define the scope and extent of solutions.

At the time of the PR14 business plan submission, two licences were potentially suitable for inclusion in AIM: Hazel Head Springs and the River Laver Intakes. These sites were subsequently investigated by the Environment Agency, and in both cases the Environment Agency recommended the sites be removed from AIM. This conclusion was supported by the Forum and was reported in our Annual Performance Report for 2017/18, available on our website: www.yorkshirewater.com/reports.

Our plans to deliver this commitment

We recognise Ofwat's requirement for companies to consider the AIM at PR19 and have reviewed our abstractions to determine whether any are suitable for inclusion, considering sites in the PR19 WINEP, as well as other sites not included in WINEP, a total of 27 locations were identified for consideration.

We have looked at each of these sites in more detail, applying filters to screen out inappropriate sites in accordance with Ofwat's guidance for AIM. From this we concluded that at the start of 2020-25, there were no appropriate sites for the AIM in our region. This was discussed with the Forum and its environment sub-group, who agreed with our proposed approach. We have also discussed and gained support from the Environment Agency for our approach.

We may introduce AIM sites part way through 2020-25, should subsequent investigations identify that we have sites where our abstraction is causing an adverse environmental impact. In those locations, it may be appropriate to introduce AIM for the remainder of the period while we work with the Environment Agency and other stakeholders to make permanent changes, for example through alterations to abstraction licences, or through capital investment.



Our incentive to deliver

In readiness for the potential inclusion of any qualifying AIM site, the AIM performance commitment is financially incentivised through under and out performance payments.

The incentive type is a new measure for PR19. Our customers consider AIM to be of moderate importance and support the use of underperformance and outperformance payments for the performance commitment, with the incentive derived from wider benefit valuations.

The ODI follows the prescribed formula for calculating incentive rates, with the benefit values drawn directly from customer valuation research and calibrated for the forecast totex sharing rate.

- The standard underperformance payment rate is -£12 per Ml.
- The standard outperformance payment rate is £12 per Ml.

There is no deadband for this performance commitment; standard under and outperformance payments occur above or below the target level.

The ODI payments will be recovered in the Water Resources price control.

Cost efficiency

Affordability now and into the future is a key concern for our customers. Most cannot choose another water company so they rightly expect us to provide a sustainable, resilient supply of high quality water at an affordable price. We continually strive to deliver an efficient and effective service to our customers, both in the planning, and in the delivery of our activities and enabling expenditure programme. This has been the case in construction of the expenditure programme supporting the PR19 plan, where we have fully engaged with the Forum and our Board to identify the challenges we face and the level of risk we are willing to accept. The level of efficiency identified requires transformational change, this has been acknowledged and plans are already being developed to ensure we are in a good position for starting the 2020-25 period.

Through support and challenge by the Forum and our Board, we have identified £18 million of efficiencies which we have deducted from our expenditure requirements to make sure we remain efficient.

To facilitate this efficiency, we intend to undertake activities in the following areas:

- Reducing water abstracted from the environment through the Water Recycling performance commitment
- Actively installing water saving devices in customers' properties, and offering water saving advice. While on site we will take opportunities to identify customer side leaks and advise on how to solve the problem.



Bioresources price control

Objective

Our customers tell us that continuing to provide high quality sewage services in the context of a growing population and extreme weather events is important to them. It is also important that we ensure their bills are as low as possible.

Investment (total over 5 years)

Investment	£m
Totex	380.27
Efficiency	113.88

Detailed definitions of the enhancement element of the totex value can be found in the Enhancement Cost Appendices.

Benefit realisation (total over 5 years)

 Financial	£4.81m	 Social	£547.85m
 Manufactured		 Human	£1,174.14m
 Natural	£77.00m	 Intellectual	Reflected under social and human capitals

Performance commitments

Primary	Secondary
<ul style="list-style-type: none"> Quality agricultural products. Renewable energy generation. 	<ul style="list-style-type: none"> Carbon. Creating value from waste.

Above shows the total amount of investment we will be making in this price control (totex). We have shown the amount of benefit this expenditure will create through each of the six capitals.

This is demonstrably good for customers where the sum of all the six capitals benefit is greater than the totex.

In this price control we can see that **£4.74** of benefit is returned for every £1 invested.

Resilience

- Utilising markets to improve performance.
- Providing headroom in our treatment capacity to deal with shocks and stresses.
- Maximising energy generation.

Cost adjustment claims

- Bioresources Water Industry National Environmental Programme enhancement expenditure.

Innovation

- Procurement of services through our outcome-based market approach.
- Implementation of SAP plan to manufacture.
- Functionality separate business unit with full control of all costs.

Appendices

- Bioresources technical appendix.
- Cost appendices.
- Cost adjustment claim appendices.
- Performance commitments.
- Bioresources RCV allocation (revised).

Figure 17a - Price control overview.

Our customers tell us that continuing to provide a high-quality wastewater service is important to them, particularly with the uncertainty that climate change and population growth brings. Typically, Bioresources is an area customers find a little more complicated to understand than other areas of the business. However, we know that being an effective Bioresources business is critical to cost effective, resilient, sustainable and operationally efficient wastewater services. Our customers value these services and rely on us to maintain them.

Our Bioresources service in 2020 will have 14 treatment centres, 13 of which will be Anaerobic Digestion (AD) sites and one will be an advanced digestion facility. There are a larger number of dewatering and thickening facilities across the region which prepare sludges for transport to the treatment centres. A full account of our Bioresources assets can be found in our Regulated Capital Value (RCV) submission, available on www.yorkshirewater.com/Bioresources. We have re-calculated our hypothetical RCV and full details of this can be found in Bioresources RCV appendix 17a.

We recognise the need to make significant changes to the way we deliver Bioresources, so our service is more efficient and resilient and allows us to make greater environmental contributions while reducing the cost to our customers. The 2015 Boxing day floods impacted badly on many communities in our region, and we also lost 50% of our sludge treatment capacity. Our exposure to this event dramatically increased our cost, as we relied on third-parties to provide emergency treatment capacity. Everything learned from this experience has been built into our PR19 plan.

We plan to make significant savings in our Bioresources business. Our plans for 2020-25 and beyond are very different from the way we have delivered sludge services previously. We have created a separate Bioresources business with greater autonomy, which is helping us operate commercially making sure our customers receive a better service at lower cost.

Using a market based approach we will transform our efficiency and resilience. Our ambitious plan will help us rise to become as efficient as possible by the 2020-25 period, with the aim of delivering upper quartile efficiency whilst delivering an improved service to our customers.

One group that has played a significant role is the Yorkshire Forum for Water Customers (the Forum) and its environment sub group, we would like to thank the Forum and the sub group for their valued contribution. This price control has been subject to scrutiny and challenge by the sub group and it has helped us ensure that our plan reflects the needs of customers and the environment.

In the period 2020-25 we are delivering our largest environmental programme ever, dominated by 80 individual phosphorus removal schemes on our wastewater treatment works, generating large amounts of ferric concentrated sludge. Not only will we have to deal with different sludge qualities from some of our sites but we are also predicting 24,500 tonnes of dry solid

(tds) growth in sludge production, 79% of this will be generated from the phosphorus programme. In line with our long-term strategy, we are delivering this capacity growth differently, achieving much greater efficiency and enhancing our resilience through market-based solutions.

We have developed our PR19 plan for Bioresources keeping in mind the challenges and opportunities of the past, present and future. We have intensively modelled our plans to ensure we can continue to deliver 'whatever-the-weather'. Superior modelling ensures we are building resilience into our plans at a price that customers find affordable.

This chapter describes our long-term ambition for Bioresources and explains our plan for 2020-25. We discuss the impact on customer bills and demonstrate how we are going to deliver an efficient and excellent service by expanding and developing our use of markets.

Executive summary

Our Bioresources business is responsible for the transport, treatment and disposal of sewage sludge. Our market-based PR19 plan for Bioresources will drastically improve our efficiency and resilience. We will continue to focus on sludge recycling rather than disposal, in line with our customers' priorities.

Big Goal: Environment

We will remove surface water from our sewers and recycle all wastewater, protecting the environment from sewer flooding and pollution

Our Environment Big Goal sets our ambition for the Bioresources price control and has been developed through extensive customer engagement. Customers tell us that continuing to provide high quality wastewater services in the context of a growing population and extreme weather events is important to them. It is also important that we ensure their bills are as low as possible. Our research shows that while Bioresources is not always fully understood, recycling waste is the right thing to do and fully supported by customers.

Our 25-year ambition

We have set out a long-term adaptive and resilient plan and will continue to deliver excellent efficiency and service beyond 2025. We are delivering this through innovative use of markets. This will be challenging, and we need to look to experts in and outside our business for help. The markets will help us source new technology and specialist services to drive efficiency and quality in procurement and operations. Extensive modelling of our region has projected the future growth and resilience needs. Our plan seeks to centralise and rationalise capacity further while looking to trade sludge at our boundaries. We believe this is in the best interests of our customers as it is a resilient and cost-efficient approach.

Nutrient and mineral recovery is becoming increasingly viable and the phosphorus removal programme for 2020-25 opens up a number of new opportunities. We are deploying nutrient and mineral recovery processes and are continuing to develop our understanding in other areas of byproduct recovery, such as enzymes and bio-polymers. This approach creates a future revenue stream to help keep customer bills down and protect the environment through the recovery of energy and finite resources.

Thinking about the future

We have thought about how Bioresources might change over the next 25 years in key market areas:

- **Agricultural recycling and availability of land** – the majority of sewage sludge in England and Wales is recycled to agricultural land and sludge disposal is a key cost factor in the management of sewage sludge.

- **Bioresources market development** – the treatment of sewage sludge and other organic wastes are becoming increasingly competitive activities with opportunities to develop more cross-over within sectors.
- **Resource recovery** – extracting valuable resources such as phosphorus or organic fatty acids from sewage sludge could become an important revenue stream for Bioresources.
- **Energy** – renewable power, heat and gas are established products of sewage sludge treatment, but their economic basis is driven by external energy market factors.

Considering the changes that could take place in these market areas, it is possible to envisage a very different Bioresources market in 2045. We outline some of the scenarios we have evaluated based on what could take place in the market, and how the Bioresources market might respond and what technology would be deployed to deal with this:

Table 17a

Evaluated scenarios	Response scenario	Response technology
1 - Agricultural recycling and availability of land.	<ul style="list-style-type: none"> • Other method of disposal required. Digestion still carried out to recover energy and other products. • Destruction of remaining sludges required. • Possible ash use as raw material for third parties. 	Thermal destruction. Basic incineration, but more probably gasification, pyrolysis or super critical water oxidation. Twinned with digestion if compatible, and resource recovery.
1a - Public acceptability and/or non-legislative pressure.		
1b - Microplastics or other new determinants e.g. pharmaceuticals and personal care products (PPCP), endocrine disruptors, other organics, or substances of very high concern (SVHC).		
1c - Creep from other EU countries (e.g. nutrient recovery at source plus recycling ban from Germany seen as best practice).		
2 - Cost of energy or carbon massively increases.	<ul style="list-style-type: none"> • Invest to fully utilise all the energy we produce. Minimise flaring. Maximise value through gas to grid. • Destruction of remaining sludges required. • Possible ash use as raw material for third parties. 	Could include technology such as digestion with gas clean up and grid injection or gasification, use of dewatering other than centrifuge. It would need a comprehensive review of technologies and comparison of their effects on energy and carbon.

Preparing for the future

We do not know how these markets might develop in the future, but we can prepare ourselves for the eventualities that may occur. We will use our innovation programme to do some of this, but in areas where there are economic opportunities available we will direct investment to explore these areas further. For example, we are continuing our AD research programme with York University to ensure we get the best value from sewage sludge and we will test different objectives of that process to forecast future scenarios.

We are continuing to explore more efficient destruction technologies, following our 2015-20 investment in Advanced Thermal Conversion (ATC), which may prove

vital if agricultural recycling routes disappear in the future, or if we want to maximise energy generation from sludge treatment in local settings.

We will explore development of biogas-to-grid and biogas-to-fuel solutions. Utilising market expertise we will explore growing markets for alternative uses of this product, meeting demand with supply.

Our plans to separate our Bioresources business and our market strategy prepare us for any subsequent changes to the market that might happen, so we are well positioned to capitalise on opportunities and mitigate risks.

Our 5-year plan

Our PR19 plan sets out bold changes for the way we deliver Bioresources. Now is the right time to implement these changes and we believe they will deliver significant improvements to the efficiency, resilience, service and the innovation our business offers.

In 2016-17 our Bioresources business was the least efficient in England and Wales. Much of our cost was driven by exceptional measures implemented in response to the 2015 Boxing day floods. Further efficiency is needed to reach our ambition to deliver the most cost-efficient service we can for our customers. The market for Bioresources is growing and we are aligning ourselves with the market to make the most of it. We aim to deliver upper quartile efficiency in the 2020-25 period.

Table 17b shows the total value of the programme and how much of our programme is based on market tested costs. Market solutions form the majority of our plan and deliver most of our 2020-25 efficiency forecast.

Table 17b

Summary of costs by key cost categories in the Bioresources price control			
	Total cost (£m)	Market based costs (%)	Non market based - Yorkshire Water unit cost development
Capex	£172	74	26
Opex	£208	25	75
Totex	£380	50	50

Our PR19 plan for Bioresources is founded on the following changes:

- We will transform the business to becoming efficient by 2020-25, reducing our base totex from £555 million to £314 million based on a bottom up built plan.
- Three-quarters of spend will be procured in non-standard commercial arrangements via the market, with new outcome based contracts stemming from significant market testing of solutions for our Bioresources service.
- Solutions for efficient treatment capacity, innovative biogas usage, dewatering and thickening solutions and Bioresources transport will be procured differently.
- We will create an autonomous Bioresources business unit with full totex accountability. Bioresources will be financially separated from wastewater network plus, changing the dynamics and focus of the business unit to operating with the rest of our business on a more commercial, service-based footing.
- As a company, we are facing our biggest ever Water Industry National Environment Programme (WINEP) and have submitted a Bioresources price control cost adjustment claim for an additional £60.36 million of expenditure to specifically deal with the new capacity requirements for the WINEP. There is an additional £5.73 million enhancement expenditure associated to regulatory compliance (non-WINEP).

These changes are underpinned by 10 strategic Bioresources objectives to achieve over the next seven years to 2025. In doing so we are ensuring our operations are resilient, safe and delivering for our customers and the environment:

1. Quality agricultural products: all our recycled sludge will meet the standards of the Biosolids Assurance Scheme.
2. Biogas generation: we will maximise sludge renewable energy generation.
3. Treatment service: 100% of the sewage sludge from our wastewater treatment works will be accepted by our Bioresources business and we will ensure enough capacity to deliver this using internal and external sources.
4. The most efficient Bioresources business: by 2025 we aim to be a frontier company in the Bioresources sector by finding even further efficiency and outperformance.
5. Resource recovery: we will monitor the market closely and work with partners to ensure we are using technology to generate the best value from our Bioresources.
6. Regional contribution: we will work with local partners and stakeholders to implement regional schemes that match local ambitions in the circular economy.
7. Intelligent operations: we will monitor, model and optimise our activity every day to ensure our customers have the most efficient and resilient service.
8. Sensitive operations: we will minimise the impact our site activities or agricultural operations have on our customers.
9. Resilient capacity: we will guarantee our treatment capacity is resilient to a range of quantified events.
10. Safe operations: we will keep our colleagues and customers safe from harm.

We have built our plan ensuring the fundamental building blocks of a Bioresources service – transport, treatment and disposal to satisfy our objectives.

Table 17c shows how we have incorporated the 10 strategic Bioresources objectives in our PR19 plan:

Table 17c

Big goal	Performance commitment	Activity	Category	Sub-category	Bioresources objectives										
					Quality agricultural products	Biogas generation	Treatment service	Most efficient	Resource recovery	Regional contribution	Intelligent operations	Sensitive operations	Resilient capacity	Safe operations	
We will remove surface water from our sewers and recycle all waste water, protecting the environment from sewer flooding and pollution.	Treatment Service Managing sludge for Yorkshire's wastewater treatment works.	Transport	Bioresources Transport	Bioresources Transport			✓	✓			✓		✓	✓	
		Treatment	Capacity	New Capacity	✓	✓	✓	✓			✓	✓	✓	✓	
				Maintain Capacity	✓	✓	✓	✓			✓	✓	✓	✓	
				Other	✓	✓	✓	✓				✓	✓	✓	
		Dewatering & Thickening	New Capacity			✓	✓				✓	✓	✓	✓	
			Maintain Assets												
			Other												
		Disposal	Biosolids recycling	Regulatory Compliance				✓					✓		✓
				Regulatory Operations	✓			✓				✓	✓		✓
		Innovation	Resilience	Recycling Infrastructure	✓			✓					✓	✓	✓
						✓	✓	✓	✓	✓			✓		
	Renewable Generation Getting the best value out of our biogas product.	Treatment	Biogas Usage	Biogas Usage		✓		✓	✓	✓	✓		✓	✓	
			Regulatory Compliance	Regulatory Compliance		✓		✓					✓	✓	
			Innovation	Innovation		✓		✓	✓	✓					
Quality Agricultural Products Ensuring the quality of our agricultural biosolids products.	Disposal	Recycling Compliance	Recycling Compliance	✓			✓			✓	✓	✓			

Markets – making the most of Bioresources

Our primary objective is to achieve at least industry upper quartile efficiency. We will use a market-based approach to reassess the way we deliver our services and deliver substantial efficiencies. For our PR19 plan we will have market tested 80% of the total expenditure of the Bioresources business.

Over the next five years we will improve our performance and achieve these efficiencies by delivering our services differently, considering what alternative solutions exist in the wider market. We plan to use advances in technology to help avoid waste, increase renewable energy generation and produce a better-quality product to agriculture and industry. We are creating a resilient treatment service, expanding renewable energy generation, ensuring all our biosolids sent to land achieve the Biosolids Assurance Scheme (BAS) accreditation. We will measure this through our quality agricultural products and renewable energy generation performance commitments and our publicly reported treatment service measure.

While pursuing a range of immediate market opportunities, we are establishing our long-term role to develop the market and its ability to respond to future challenges. We plan to become a market enabler, incentivising market development in areas that align with our Bioresources strategy, becoming more agile to react to evolving technologies and approaches.

Our new market-focused approach to delivering Bioresources services has been aligned to customers' feedback, who tell us that two of our biggest priorities should be looking after the environment and keeping bills as low as possible. Our Bioresources markets approach has been designed to improve resilience, protect the environment and to achieve this at the best possible price by minimising development of new capital solutions and promoting innovation.

Through a large-scale market testing exercise, we have identified significant savings can be delivered through market delivered solutions, contributing significantly towards keeping customer bills low and our aim to achieve upper quartile efficiency.

Increased trading will improve our resilience, limiting the need for further capital investment, and the use of specialist suppliers will help grow the volume and method of renewable energy generation, benefiting both customers and the environment. We plan to stimulate market development and increasingly collaborate to support resilience, cost and performance over the longer term, allowing us and our future suppliers to adapt to varying challenges as they emerge.

Markets will play an integral role in achieving our Bioresources strategy. In line with our overall approach to markets, we plan to deliver this through our market initiatives.



Pursue increased trading

We are pursuing and promoting sludge trading to increase the efficiency and resilience of Bioresources in line with our publicly reported treatment service measure. Sludge trading provides significant opportunities, now and in the long-term:

- Flexible, unlimited agreements which can be called on reactively.
- Fixed, longer term agreements with guaranteed capacity.

These agreements will provide increased resilience for us and the Bioresources industry, by offering a wider range of pre-agreed treatment options to call upon, either on a regular basis or in response to incidents and outages.

Our in-depth modelling has helped us understand where to target immediate efficiencies through trading, by considering the efficiency of treating sludge at each of our works and transport costs to the relevant sludge treatment facility (STF). We have identified sites around the edges of our boundary where exporting our sludge, or importing other companies' sludge, could be economically beneficial.

As a result, we have already set up a number of short-term reactive trade agreements with neighbouring water companies and know there is an opportunity for more of these flexible agreements. Our experience of sludge trading suggests a more effective market could be realised through greater liquidity, with more accessible information for everyone. We are proposing development of a nationwide sludge trading hub to support evolution of this market.

Long-term and fixed trade agreements can deliver efficiencies either by treating sludge at more conveniently located or more efficient sites, or by making use of existing capacity as an alternative to building new works, we have made this a key feature of our PR19 plans.

Working with experts to enhance our capabilities

A substantial element of our approach to achieving our targeted efficiency is to work with a wider range of companies from both within the sector and new entrants, to help us think differently about how we provide Bioresources services. We recognise we cannot be experts in all things Bioresources, so we are working with companies that do hold the expertise to design an outcome based PR19 programme.

In January 2018 we went to the market to engage on nine packages of work, which made up over 80% of our original Bioresources capital programme. We reached out to over 90 companies to understand how they would approach the delivery of the packages of work. Following a review of the initial findings, packages were re-developed, this included combining some and removing others, and notably including operation and maintenance with the refurbishment of assets. We then went back out to the market to provide us with a range of potential solutions, some of were much more efficient than our originally costed solutions, these have been incorporated into our plan. The results of this revolutionary piece of work have shaped our approach to providing Bioresources services during 2020-25, identifying potential savings of around £100 million compared to our originally costed solutions. This includes outsourcing of thickening and dewatering across all our transfer sites, biogas management at a number of priority sites and pursuing market delivery of sludge treatment capacity.

We are currently working with the experts to further define these packages of work.

Table 17d

Current period market delivered packages	
Identified market lots	Indicative value
Thickening and dewatering	£45m
Efficient sludge treatment capacity	£80m
Use of biogas	£20m

Collaborating to deliver more for our customers

In our efforts to drive efficiency, boost resilience and deliver further innovation, we have carried out a series of activities with the market to understand how we can make the most from Bioresources.

Planned projects within Bioresources continue this collaborative theme. Our push to develop a nationwide trading hub to enable an agile and reactive sludge trading market is being developed in collaboration with Open Data Leeds.

Case Study: Nationwide sludge trading hub

Working alongside Open Data Leeds we are making information about our business more readily available, such as our STF capacity and data. We are providing the market with the opportunity to help us identify areas for improvement and efficiency. We are encouraging other water companies to do the same.

We believe hosting dynamic Bioresources market information from all water companies will provide a clearer picture of nationwide capacity, streamline the trading process and enable an agile cross-country sludge trading market.

Working alongside a partner and with funding from the Department for Energy and Climate Change, we have successfully demonstrated a commercial and technical model for the destruction of sewage sludge using gasification. We are currently exploring innovative ways to commercialise the technology, so our customers do not pay for the capital infrastructure, while benefiting from the lower cost to treat.

By collaborating with the market to define our Bioresources approach and the way in which we procure it, we believe we will be able to deliver a truly transformational service delivering benefits for customers, the environment and the suppliers who work with us.

For more information on our markets approach, see the Bioresources technical appendix 17b.

Bioresources service

In this section of the plan we describe our publicly reported treatment service measure. Performance against this measure is fundamental to the resilience and efficiency of our Bioresources business, and the environmental and operational performance of our wastewater treatment works.

Treatment service

Table 17e

Annual performance targets - Sewage sludge removed					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Percentage	100	100	100	100	100

In summary

This service measure relates to the service our Bioresources business provides our wastewater network plus price control area of the business. It measures the percentage of sewage sludge removed from our wastewater treatment works that is accepted and processed by our Bioresources business using internal and external capacity. Treatment service will be measured using internal service level agreements between the Wastewater Network Plus price control area of the business and Bioresources business.

Our target is to achieve 100% treatment service. This represents a significant improvement from the current period, where we have faced reliability, flooding and safety challenges.

The primary function of the Bioresources business is to safely and efficiently collect sewage sludge from our wastewater treatment works. Our treatment service measure is at the core of our Bioresources operation. By providing resilient and efficient capacity we drive overall performance.

This service directly impacts the ability of our wastewater treatment works to return clean water to the environment, measured through our treatment works compliance performance commitment, and reduces the energy required to carry out wastewater treatment processes.

This is a new service measure for 2020-25. It is not a regulatory performance commitment, but aligned to our Transparency Big Goal, we will publicly report our performance in our annual performance report.

Engagement

Given the significance of this service measure to ensuring efficient and resilient Bioresources operations and how it affects the efficiency and environmental performance of our wastewater treatment works, we proposed this measure to customers as a performance commitment.

Customers typically struggled to engage with this measure. Many customers found it difficult to understand, while those who understood it often considered it to be less directly beneficial to them than other measures.

We have engaged with customers, the Environment Agency and the Forum, with a positive reception. In the 2018 environmental performance assessment, the Environment Agency gave us special praise for proactively engaging in our Bioresources planning and seek similar future engagement.

Our performance to date

During 2015-20 we have had downtime on our Bioresources assets, reducing treatment capacity. Most downtime was due to the severe weather events experienced in the Yorkshire region. We have learned from this experience and while we cannot protect all our assets from flooding all the time, we need to have a resilient and flexible system to cope with the most probable causes of capacity shortfall.

By 2020 we will stop using incineration as a form of sewage sludge treatment. We will use sludge conditioning and lime stabilisation as primary treatment routes and focus on mesophilic and advanced AD. These treatment technologies are more efficient at providing renewable generation from biogas generation.

The map shows the location and type of our treatment centres in 2020.

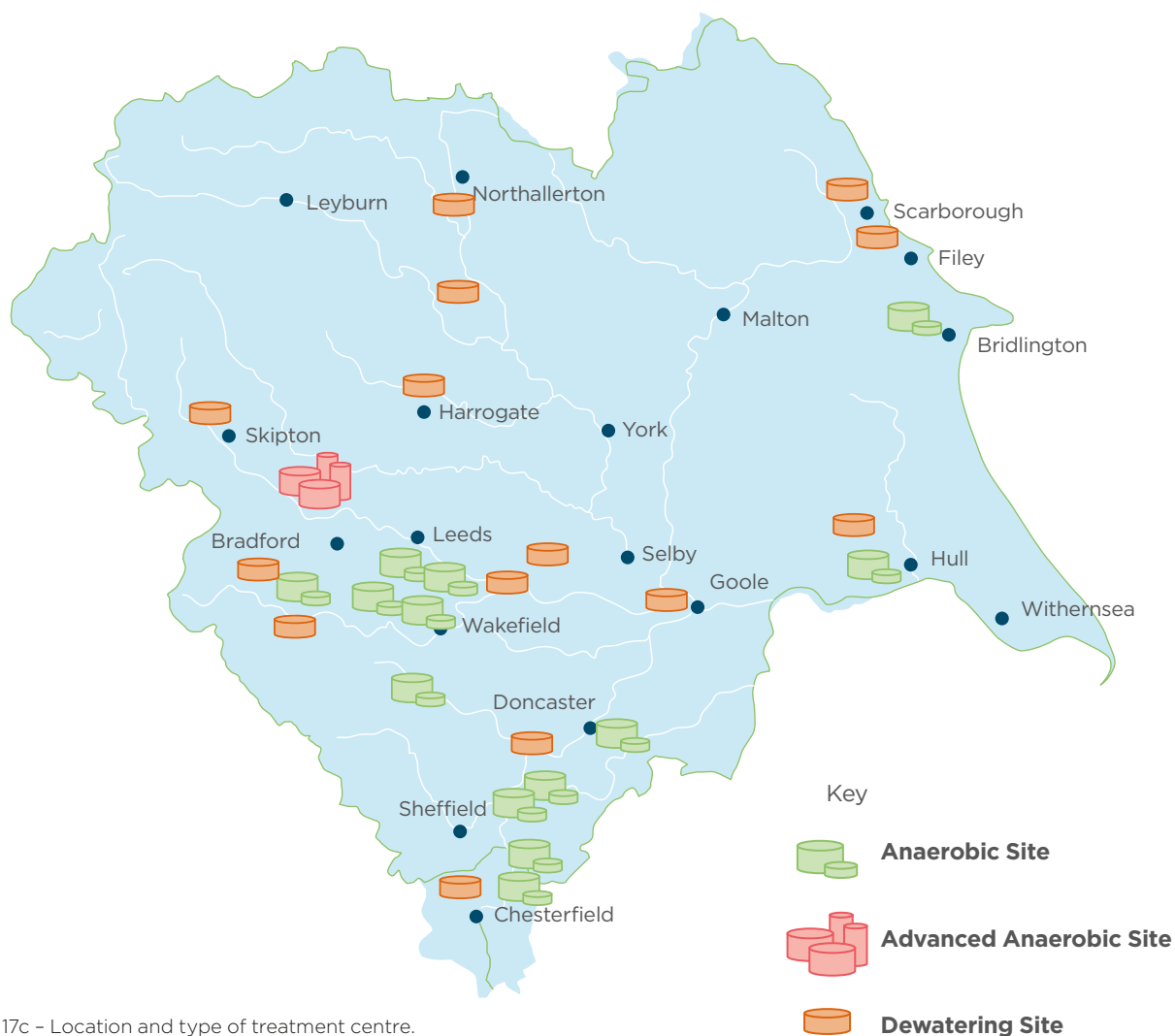


Figure 17c - Location and type of treatment centre.

Our plans to deliver this service

Our investment and expenditure plan for Bioresources looks at the whole system to ensure we provide 100% treatment service. For example, improving the performance and reliability of some of our connecting assets like sludge thickening.

This sub-section summarises the key components of our plan for treatment service. Further information is available in our Bioresources technical appendix 17b.

Transport

Our Bioresources transport service is vital to providing an excellent service to customers. Collecting sludge in a timely and effective manner from wastewater treatment works ensures environmental compliance, overall resilience and keeps processes optimised. The flexibility and adaptability of an intelligent, modelled transport service ensures that we can use capacity across our region when we lose capacity to planned and reactive shortfalls.

Assessing the best price from the market for this service ensures our customers' bills are kept low. Transport is an area where we think the market has value to offer based on similar activities in other industries. We will be going to market with a logistics contract opportunity for both our cake and liquid requirements.

Treatment

A methodical approach to treatment ensures we always provide the right capacity, being careful to avoid capacity redundancy as well as shortfall, and seek market prices to guarantee our efficiency. We summarise some of the key areas of our treatment programme on the next page.

The following table, extracted from submission table Bio1, shows the annual volumes of sludge we have forecasted to treat within the 2020-25 period. As discussed elsewhere, the key drivers for growth in sludge are:

- Population growth of - 4,245 tds.
- WINEP programme (covered in the Bioresources cost adjustment claim) of 19,538 tds.

Total growth is therefore 23,783 tds.

Table 17f

Total sewage sludge produced					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
ttds/yr	152.7	153.6	155.0	160.3	176.4

Investing for new capacity

We need to create new capacity for sewage sludge in 2020-25 due to growth in production. Building new digesters to provide treatment capacity will not always provide the most efficient solution. We are considering a number of ways to provide treatment capacity:

- Build new/additional mesophilic anaerobic capacity using existing capital delivery.
- Build new/additional mesophilic anaerobic capacity using market tested capital delivery frameworks.
- Create capacity at existing conventional digestion sites using advanced AD using existing frameworks or market tested frameworks.
- Procure an outsourced treatment contract for sludge (outsourced capacity) using market tested frameworks.
- Create flexibility in existing capacity with enhanced operations and maintenance approach or with minor capital investment to remove 'bottle-necks'.

Our assessment of market tested capacity options is demonstrated in our Bioresources technical appendix 17b, where we have considered various combinations of provision in order to cost benchmark and understand the most economic solution. We provide an example of our market tested approach to building new capacity.

Case Study: Achieving efficient treatment capacity

Our plan is to take a more innovative approach by creating additional capacity for our growing customer base and in response to WINEP. For 2020-25 we want to procure efficient sludge treatment capacity from the market, rather than proceed with the traditional solution of building capacity ourselves.

This could include long-term sludge trading with another water company or enhancing capacity at our existing sites. Our own capacity scenario modelling has given us a clear view of how to create this capacity in our own sites most cost effectively. To stimulate the development of better value solutions, we will present the cost of delivering this approach to the market.

We are going to offer outsourced delivery of at least 15,000 tds/annum of sludge treatment capacity to the market, which makes up 8% of our total sludge volumes. Our approach will be to remain technology agnostic, so long as the proposed solution meets our quality parameters and value aspirations, for instance Biosolids Assurance Scheme compliance and contributing to energy generation. The winning approach will be based on the most economically beneficial offer.

Maintaining capacity

We have 36 individual digesters and we operate a 10-year cycle of digester inspection and remediation work. This includes an assessment of existing ancillary plant items associated with the digestion process with a high probability of causing process failure, downtime or impact on health and safety. We have assessed the cost of digester refurbishments under a new delivery model where we take more control of the project management of the solution, delivering efficiency to our customers. This has reduced our projected capital cost by 20%.

Thickening and dewatering assets play an important role in our Bioresources business. These mechanical assets ensure we transport and process the minimum amount of water in our logistics fleet and keep our transport costs low and help to deliver our company commitment to reduce carbon emissions. They also keep our digester throughput high by ensuring the right level of sludge goes into treatment.

In 2020-25 we will need to significantly refurbish our dewatering assets to continue to optimise transport and treatment. Our testing with suppliers suggested that given the contract, they would deliver an opex focused approach, with more front-line maintenance activities to offset potential capital investment, utilising the totex hierarchy in decision-making. Using their approach and quoted prices as a benchmark, we have built a programme that delivers a 36% cost reduction against our traditional delivery model. This case study describes how we have engaged the market to seek new thickening and dewatering maintenance costs.

Case Study: Thickening and dewatering at transfer sites

As part of our market delivery plans we are looking to fully outsource thickening and dewatering services across our transfer sites.

Market testing has suggested that significant efficiencies can be achieved through third party delivery and by giving the supplier freedom over how they deliver the contract. In handing these key assets to specialists, we envisage benefits of increased resilience and improved performance. We are looking to run this as an outcome-based contract with minimum service standards and rewards for outperformance over the 15-year contract length.

Our plan is to split management of our 45 transfer sites into two packages based on geography, with bidders able to go for one or both packages. We will be drawing a red line around these assets, so the successful supplier will be responsible for designing, building, operating and maintaining all assets and any buildings as required, with financing as an option.

We held collaboration events to provide an opportunity to gather market preferences for structuring the package of work, including whether to split the 45 transfer sites, what data we would need to provide to run an efficient procurement process with preferred consumable supplies to deliver value.

Feedback will influence our detailed designs which are currently under development. We hope to be able to go to the market with our outsourced thickening and dewatering towards the end of 2018 in order to start delivering efficiencies prior to 2020.

Innovation in Bioresources

Our approach to innovation is designed to make sure our assets deliver efficiency and resilience now and into the future. Innovation is crucial in exploring opportunities and risks that do not currently present themselves but could do before 2045. By exploring

these now in a planned and managed way we can prepare for potential shocks. Innovation in Bioresources falls into three areas in line with a company-wide innovation strategy. These are discussed in more detail in our Bioresources technical appendix 17b.

Case Study: Using technology to reduce costs - SAP plan to manufacture (P2M)

We are implementing an innovative approach to the management of our Bioresources business. By thinking of our STF as lean manufacturing centres, we can deliver incremental efficiencies on our operational cost. Lean manufacturing organisations utilise SAP tools to do this and we are implementing the P2M workstream to model, plan and implement our Bioresources operations.

The key benefits of implementing the P2M workstream are:

- Planning assumptions and data for the medium term held in greater granularity.
- Daily data capture of larger data sets, such as sludge volumes, chemical consumption, electricity consumption and generation, capacity utilisation, to quickly identify opportunities for optimisation and resolve shortfalls, providing information for comparative performance of our sites.

- Optimised routing of sludge across all our sites.
- Identification of customer demand hotspots.
- Management and reporting on asset outages - a new system for managing planned and reactive outages.
- Easy production of reports, plans and reforecasts.

The results will be a more cost-effective approach, which optimises capacity and highlights sites with lower performance for investigation and improvement. We will be able to make real-time decisions and integrate production volumes with financial planning, procurement of chemicals and work scheduling.

Our customers will benefit from this increased operating efficiency as it will help to keep their bills low.

Resilience in Bioresources

The future is unpredictable and increasingly changing. Acute shocks such as extreme weather events and chronic stresses like ageing assets need to be modelled. Our resilience model examines and analyses the impact of potential events on our overall ability to provide a treatment service. For further information about our approach to company resilience please see chapter 12.

The resilience model examines the potential impact, allowing us to consider the variable opportunities for mitigation against these events. The most cost-effective solutions to provide resilient capacity can be modelled, analysed and optimised. Figure 17c, provides a snapshot of our resilience model.

Since the 2015 floods, we have been required to develop a market for significant sludge exports (out of region). Whilst driving an increase to our current operational costs this has led to more formal arrangements being in place. We are currently the largest volume trader of sludge across regional boundaries. Currently we have agreements in place with Northumbrian Water, Severn Trent Water and Anglian Water for the reception and treatment of exported sludge, and we are in discussions with United Utilities for a similar trading relationship.

This will mean that we will have an arrangement with every water and sewerage company (WaSC) that adjoins our boundary. Longer-term, this type of arrangement looks more attractive for minor boundary trades, where smaller production sites will export to a neighbouring facility. Our plan will continue to exploit these opportunities. This activity will further our resilience, for example, by helping manage capacity outage across companies for maintenance or in the event of emergencies. We will continue to develop these relationships to increase resilience whilst minimising the cost to our customers.

Our experience in the current period has shown us that a combination of events can severely impact treatment capacity and efficiency. We have faced reliability, flooding and safety challenges, so have placed renewed focus on building flexible, resilient and efficient capacity into our PR19 plan. Our approach to provide resilient capacity is explained in greater detail in our Bioresources technical appendix 17b.

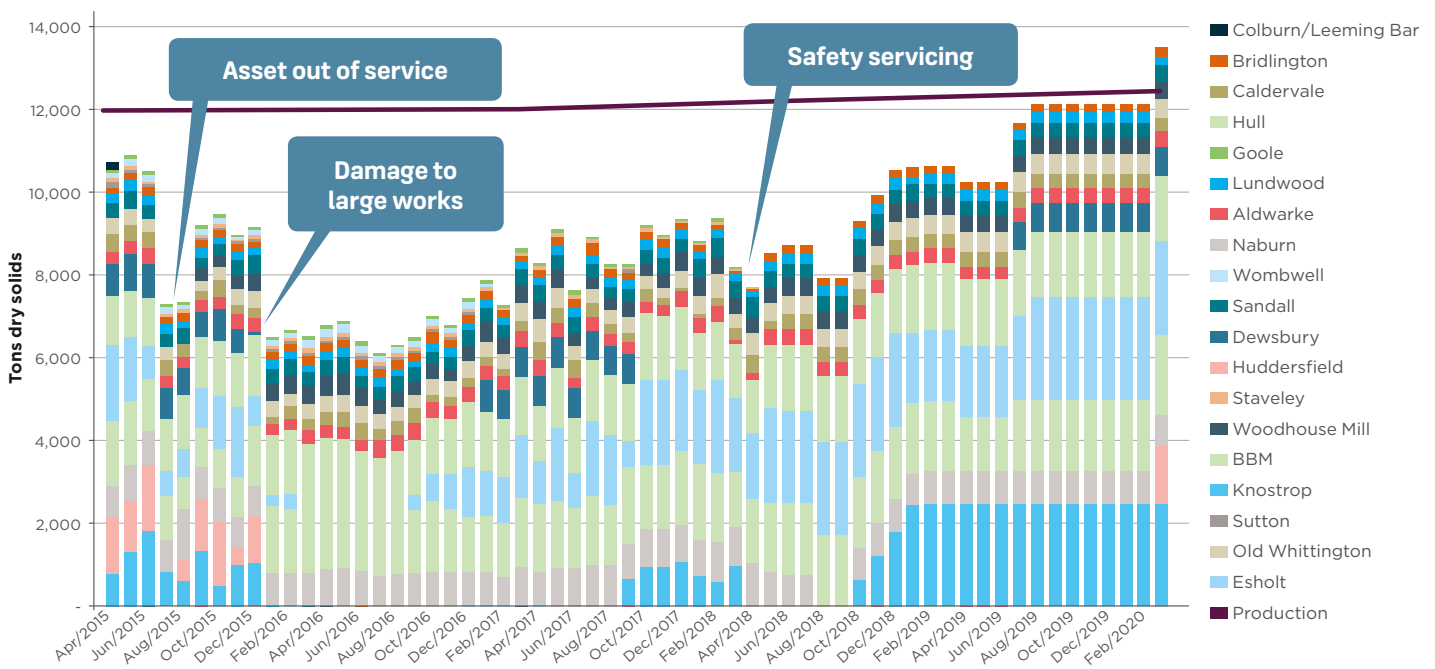


Figure 17d - Our treatment capacity vs production in the 2020-25 period.

Performance commitments

In this section we further describe our performance commitments that sit within the Bioresources price control. We have developed these performance commitments with our customers and stakeholders to ensure delivery against their priorities and our Environment Big Goal. For further information regarding our performance commitments, including the basis for our targets and incentives, please see appendix 19c.

Our Bioresources performance commitments seek to maximise the value we create through biogas and biosolids production. Our performance against these commitments will complement our publicly reported treatment service measure to ensure we have an efficient, resilient and environmentally sustainable Bioresources function that creates value for our customers.

The Forum has scrutinised our approach to creating the performance commitments. We would like to thank the Forum for the challenge and builds to both the performance commitments and the customer research that has informed the process. They have also been discussed and challenged by our Board and in a joint meeting between the Board and the Forum.

Renewable energy generation

Table 17g

Annual performance targets - Renewable energy generation					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Gigawatt hours	493	433	438	451	491

In summary

This performance commitment relates to the renewable energy we generate through processing sludge. The commitment measures the gigawatt hours (GWh) of energy generated from the biogas we produce. Biogas is a mixture of different gases produced by the breakdown of organic matter in the absence of oxygen.

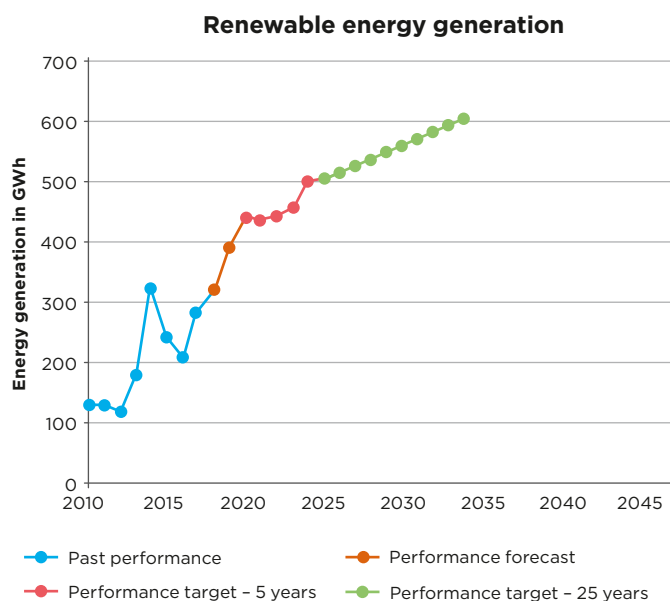


Figure 17e - Renewable energy generation.

In the period 2018-25 we are targeting a considerable performance improvement of over 75%, demonstrating our commitment to sustainability and the circular economy.

To produce biogas effectively and supply fuel helps the economic efficiency of the business and the environmental sustainability of the operation. We can improve the production of biogas by optimising the AD process.

This is a bespoke performance commitment, meaning we have developed and agreed it with our customers and stakeholders based on their priorities. This performance commitment is a revision to an existing measure, energy generation, reported in the current period. The measure has been revised to focus on renewable energy generation within the Bioresources area of the business. Additionally, the measurement change from electricity generation to energy generation will incentivise performance in more innovative uses of biogas.

The commitment has a non-financial incentive. It will be measured and reported annually throughout 2020-25.

Engagement

Our customers show high levels of support for this performance commitment, with a majority rating it very important. Our customers' appetite for performance improvement increases over time, with a majority of customers seeking long-term improvement.

Customers mostly consider renewable energy generation as obvious and common sense. Due to our direct relationship with the environment, customers want us to be leading the way to being carbon and energy neutral. This must be balanced against cost however. We have engaged with customers on the principles of the circular economy and they have shown high support for initiatives that seek to maximise the value we generate from resources and minimise waste. Customers see this as a necessity for future operations and central to efficient and environmentally responsible practice. We must give confidence, however, that the benefits outweigh the cost.

Our customers show above average support for paying more to treat sludge for renewable energy production, but not to the detriment of the price of their bills.

Our performance to date

Performance against our existing energy generation commitment, which measures the amount of electricity we generate through our renewable technology as a percentage of our total energy consumption, has been below target in the current period. The reliability, flooding and safety challenges already explained have resulted in asset downtime, limiting our ability to generate renewable energy from sludge, which forms the largest component of our renewable generation activity.

Our in-period performance to date has been 11% compared to our 12% target. We forecast considerable improvement in our performance with the completion of our Knostrop AD facility in Leeds during 2019 and further improvement when facilities at Huddersfield and Dewsbury become operational.

Our plans to deliver this commitment

We are able to improve the efficient supply of biogas fuel into beneficial use by optimising the reliability of our energy generation assets, such as Combined Heat and Power (CHP) engines and boilers and reducing the amount of biogas we flare to the atmosphere. Our PR19 planning approach has been to think more diversely about the way we use our biogas. This is reflected in the measure we are using and how we have approached the market.

During market testing, we asked suppliers what the optimal usage of biogas was at different sites. The results suggest our conventional approach of biogas conversion in CHP engines is not economically optimal. Suppliers have indicated we could look at biogas-to-grid and biogas-to-fuel opportunities to diversify and improve our efficiency.

Case Study: Innovative use of biogas

At Leeds, Hull and Sheffield, we are offering the market the opportunity to manage all biogas produced by our digesters; around 26.6 million m³ per year.

Our market engagement activities suggest there are considerable opportunities available around biogas management through technologies that are new to us, such as biogas-to-grid and biogas-to-fuel solutions. Working with specialised market providers offers us the chance for both creating greater value from our biogas, supporting our renewable energy performance commitment and contributing to required emissions reductions.

The outsourcing of biogas management will be based on solutions that provide technology ambivalence with those solutions selected being the best on a £/kWh basis. To this end the three sites will be offered individually, recognising that the same technology will not necessarily be best for each site. Bidders will be asked to offer us a price to buy the biogas and offered guaranteed parameters around volume and quality to ensure the best deal.

Some of the feedback from our Bioresources collaboration events suggested the market wanted us to go further and define the specific technology we wanted to procure as part of this process. We still consider that the market should decide, however, we recognise the need to remove some of the uncertainty and cost incurred with bidding and are working to gather more information before we start procurement. This involves commissioning detailed gas network studies and starting conversations around available planning consents on these sites.

There are regionally specific drivers that might make different uses of biogases more attractive on different sites and we will explore these throughout 2020-25:

- Regional development opportunities in association with local authorities.
- Emissions reduction drivers.
- Local power network export constraints.

We have always collaborated with universities, for example partnerships with Cranfield University, University of Leeds, University of Sheffield and Imperial College. However, our approach is now becoming much more focused.

Case Study: University of York partnership to deliver a step change in AD performance

In a UK first and supported by a £400,000 grant from the Royal Society, we have partnered with the University of York to deliver a radical change in the performance of AD of sewage sludge.

An academic with a background in genetics is jointly employed by us and the University and is developing and leading the research programme, working with specially delivered assets to the University and on our operational sites. The grant is to stimulate academic and industry relationships to deliver tangible, deployable solutions. The multi-million-pound target is to deliver radically higher methane gas yield, increasing renewable energy generation and throughput, so future increases in sludge production can be accommodated without the need for capital investment funded by customers, helping to keep bills low.

Investment to meet the needs of the Medium Combustion Plant Directive (MCPD)

The implementation of the MCPD, means sites need to meet tighter emissions limits around Nitrogen Oxide (NO_x). We have four sites in our plan that require significant investment to avoid the projected non-compliance of CHP installations by 2024. We have classed this expenditure as enhancement, as it is driven by new legislation.

Without reduction we could be spending £11.8 million on emissions abatement from our CHP assets. Our market-tested approach to this area will see us deliver alternative solutions utilising gas-to-grid and gas-to-fuel technologies. These renewable technologies, with limited on-site emissions, will allow us to offset MCPD investment and explore this area of the market. We estimate that totex benefit will be £3 million from our pre-challenge baseline.

Our incentive to deliver

The renewable energy generation performance commitment is a bespoke commitment and is a revision of a measure from PR14. Renewable energy generation is of high importance to our customers.

The renewable energy generation performance commitment is already incentivised through existing energy schemes, including feed-in-tariffs and renewable energy obligation certificates, so a non-financial incentive is appropriate to avoid double counting issues.

We are committed to ensuring that information on our performance is easily accessible to all. We will be promoting our annual performance against non-financial incentives, as well as other key measures which are not regulatory, through a wide range of media channels, customer campaigns and our Executive pay and incentive scheme.

Quality agricultural products

Table 17h

Annual performance targets - Quality agricultural products					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Percentage	100	100	100	100	100

In summary

This performance commitment relates to the quality of the biosolids we produce from sewage sludge. The commitment measures the percentage of our biosolids sent to land that meet the Biosolids Assurance Scheme (BAS) accreditation. Biosolids are the product of the AD process for sewage sludge and are spread to agricultural land as a source of organic material and a substitute for commercially available fertilisers.

Our target is for 100% of our biosolids sent to agricultural land to be BAS accredited for the 2020-25 period, which is a steep increase from our 2017/18 performance of 72%.

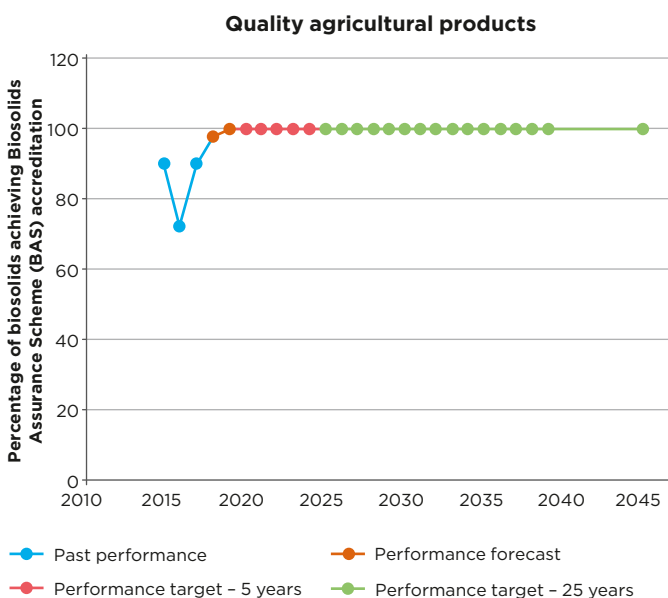


Figure 17f - Quality agricultural products.

Biosolids recycling is subject to legislation that seeks to protect the environment from pollution and protect the food chain from untreated sludge that could pass harmful pathogens further down the chain. While not a legislative requirement, assurance by BAS confirms industry best practice through audit of all aspects of sludge treatment and recycling. The scope of the scheme includes treatment of sludge (including source material controls), transport, storage and application to agricultural land. Maximising the quality of the biosolids we produce provides farmers with a valuable resource and protects public health.

The performance commitment is new for the 2020-25 period and has a financial incentive.

Engagement

We have engaged with customers on the principles of the circular economy, they have shown high levels of support for initiatives seeking to maximise the value we generate from resources and minimise waste. They see this as a necessity for future operations and central to efficient and environmentally responsible practice. We must give confidence, however, that the benefits outweigh the cost.

Our customers show above average support for paying more to treat sludge to an acceptable standard for fertiliser rather than disposal, but not to the detriment of the price of their bills.

We sought input and support from a range of key stakeholders for our plans, such as the National Farmers Union (NFU). Our plans were endorsed by those stakeholders we engaged with. We ran a collaborative workshop with the Environment Agency in February 2018, who welcomed our approach to improving resilience in sludge treatment. In this year's Environmental Performance Assessment, we received praise for being proactive in engaging in our Bioresources planning and a seek similar future engagement.

The Forum sub-group is satisfied with the direction, stating we have a good developing plan which needs implementation to match.

Our performance to date

We are already BAS accredited, having first achieved accreditation in December 2016 for the sludge we treat and dispose of ourselves. We have maintained compliance with the requirements since.

Our performance against this measure dipped in 2017 as we needed to use more third parties to support us with our disposal of sludges to agriculture. We are now working with third parties to achieve BAS accreditation in readiness for 2020-25.

We hold regular liaison meetings with our recycling partner and audit their performance to ensure they meet the required standards. When choosing to work with any third-party operator on sludge recycling, we have a robust and detailed duty of care assessment process. In addition, third-party suppliers of lime stabilisation are required to carry out treatment under environmental permitting regulations, which we audit them against. We only work with third parties who can demonstrate compliance to the relevant environmental permits.

Our recycling manager and dedicated team of recycling optimisers ensure compliance to all relevant regulations and quality schemes. Along with our dedicated team, we have a robust set of policies and procedures to ensure BAS compliance.

To assure our internal policies and procedures are sufficient, we have regular internal and external audits. The National Science Foundation audits us for BAS certification and the Environment Agency audits us annually against the sludge (use in agriculture) regulations.

Our plans to deliver this commitment

We are ensuring the delivery of this performance commitment by adhering to and improving our existing rigorous approach. It combines the application of robust policies and procedures by technically competent recycling optimisers, with regular and thorough independent internal and external audits. We are also investing in a new management tool, Gemini, to hold sludge and field data, ensuring recycling activities are compliant. Through these processes, our customers can be confident we consistently produce safe biosolids that create value and keep bills low.

Our incentive to deliver

The quality agricultural products performance commitment is financially incentivised through an underperformance payment. The performance commitment is new for PR19 and has had no previous incentive. Our customers consider the performance commitment to be of moderate importance, but do not consider a financial incentive important. We have incentivised this performance commitment through a cost-based underperformance payment only, as compensation for under delivery of the performance commitment.

The ODI follows the prescribed formula for calculating incentive rates, using marginal benefits and marginal costs calibrated for the forecast totex sharing rate.

As marginal benefits cannot be established for the service level changes, a cost-based incentive rate has been applied. Customers will be appropriately compensated for underperformance by having the costs of non-delivery returned to them, adjusted for any costs that will be returned to them through the totex sharing incentive.

The standard underperformance payment rate is -£250,000 per percentage receiving BAS accreditation.

The ODI payments will be recovered from the Bioresources price control.

Cost efficiency

One of our primary ambitions for Bioresources is to become significantly more efficient by 2025. When considering our core plan, excluding the elements subject to our Bioresources cost adjustment claim, we believe we will achieve this ambition.

Figure 17f highlights the key initiatives in our PR19 plan that will shift our performance to become more efficient by 2025.

Our modelling shows we are inefficient compared to the rest of the industry. Our PR19 plan addresses this by embracing an innovative, market-based approach to procuring key services and functionally separating out the Bioresources business from wastewater network plus.

Key efficiency initiatives

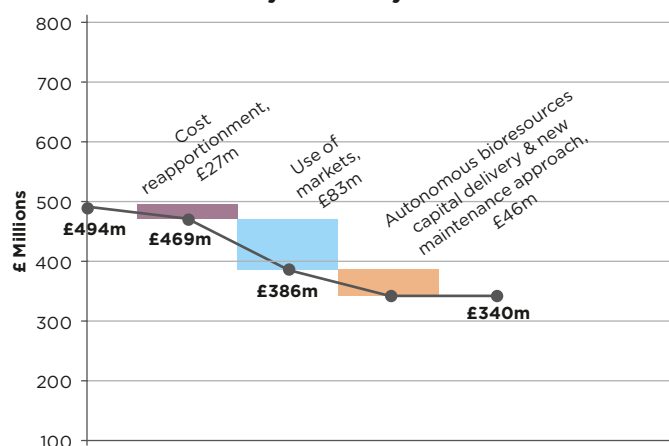


Figure 17g - Bioresources catch-up efficiencies.

Cost reappropriation

Our approach to overhead allocation is in line with industry accounting guidelines. The creation of a functionally separate Bioresources business is an opportunity to ensure overhead costs are efficient and reflect the service provided by the central business to Bioresources operations. Our Bioresources plan involves the creation of a set of Service Level Agreements between the Bioresources business and the central functions that levy a control overhead. We expect to deliver 10% efficiency in our control costs and are including this in our plan to customers.

Use of markets

For our PR19 plan we will have market tested 80% of the total expenditure of the Bioresources business. We have market tested over 80% of our Bioresources capital programme and are collaborating to develop a more efficient PR19 plan of activities. Through market testing, we have identified significant savings through market delivered solutions, which contribute significantly towards keeping customer bills low and achieving upper quartile efficiency.

In-depth modelling is helping us to understand where to target immediate efficiencies through trading. We are also considering the efficiency of treating sludge at each of our works and transport costs to the relevant STF. This has allowed us to identify sites where trading sludge could be economically beneficial.

Autonomous Bioresources capital delivery and new capital maintenance approach

As part of our PR19 investment plan we have considered the efficiencies we may be able to create through initiatives in operations and maintenance. These initiatives may provide stand-alone efficiency, by doing something different we will make operational cost more efficient or they may directly support efficient delivery of service in another area, for example maintaining assets differently so we can have a more resilient service. More detail on this plan is presented in our Bioresources technical appendix 17b.

Cost adjustment claims

We have submitted one cost adjustment claim as part of our Bioresources plan. The claim is required to ensure our plan is not adversely impacted by circumstances within the Yorkshire region that would not be accounted for in the assessment of our investment plan.

Further information on how we have approached cost adjustment claims is provided in appendix 8m ('Approach to cost adjustment claims').

Bioresources enhancement (Reference: YKY BIO01)

Claim type: A typically large expenditure

Claim Value: £60.36 million

Specific Appendix 8m: 'YKY BIO01 - Bioresources enhancement'

Due to the size and scale of our national environmental improvement programme (WINEP) there is a knock-on impact on the volumes that are forecast to be treated at our Bioresource facilities. The increase in volumes is due to the phosphorus removal requirements set out in our WINEP. Removing phosphorus increases the expected volumes of sludge.

Our cost adjustment claim only relates to the enhancement expenditure required to manage this increase in sludge volume due to the impact of the statutory obligations within the WINEP for phosphorus removal.



Residential retail price control

Objective

We will modernise our service, revolutionise the customer journey and keep bills low. We will tailor our services to always consider customers' individual circumstances, supporting them to be safe, well and free from worry.

Investment (total over 5 years)

Investment	£m
Totex	261.48
Efficiency	30.05

Benefit realisation (total over 5 years)

	£261.48m		
Financial		Social	
Manufactured		Human	
Natural		Intellectual	

Performance commitments

Primary	Secondary
<ul style="list-style-type: none"> • Priority services satisfaction. • Affordability of bills. • Direct support given to customers. • Cost of bad debt. • C-MeX. 	<ul style="list-style-type: none"> • Priority services awareness. • Inclusive customer service. • Voids verification. • Gap sites.

Above shows the total amount of investment we will be making in this price control (totex). We have shown the amount of benefit this expenditure will create through each of the six capitals.

Resilience

- Protecting customers from debt.
- Protecting customers from harm.
- Keeping bills low.
- Understanding customer needs through data.

Cost adjustment claims

- None.

Innovation

- Understanding of customers' lifestyles and our impact on their service preferences.
- Best Tariff for each customer circumstances.
- Broader role in society through strategic partnerships and safeguarding.

Appendices

- Performance commitments.
- Cost efficiency.

Figure 18a - Price control overview.

Most customers cannot choose their water company. This means that there are, rightly, high expectations of us. Customers expect to receive excellent service. Delivering it is essential for gaining the trust of our customers. We serve a diverse community in Yorkshire and we need to reflect the diversity of our customers' requirements of us. We know that at least 30% of our customers have individual, specific needs that we must meet.

Our Residential Retail performance is strong, and we are industry leading in our levels of customer satisfaction in relation to customer contacts on billing. We have upper quartile 'cost to serve' with low levels of debt compared to industry peers.

We have taken care to analyse and understand the rich and diverse community we serve by looking at how communities are made up now and how they will change in the future. Through our innovative and ongoing customer conversations we have a better understanding of what people value in their lives and the role water plays in it. We understand how customers with different lifestyles rely on water in a variety of ways, and how some people are much more dependent on their water and wastewater services for a range of lifestyle or medical reasons. We know people need to have trust in our ability to serve them now and into the future, whatever the conditions, and that they want to be able to trust in us.

One group that has played a significant role is the Yorkshire Forum for Water Customers (the Forum) and the Forum's affordability and vulnerability sub group. We would like to thank the Forum and the sub group for their valued contribution. This price control has been subject to considerable focus by the sub group and it has helped us ensure that our plan reflects the needs of our customers.

Our PR19 plan will build on our pioneering data sharing arrangements by giving us an even better understanding of the needs of our diverse population. Our services are being modernised and tailored to reach the right people in ways that they need, and we will protect customers in circumstances that make them vulnerable. All this will be achieved with consistently low bills due to our innovative solutions.

This chapter describes our long-term ambition for Residential Retail and explains our PR19 plan. We discuss the impact this will have upon customer bills and demonstrate how we will deliver excellent service in the most cost-efficient way. Our success will be measured through our performance commitments, however further detail concerning our approach to providing great, tailored customer service for all customers is available in our Customer service chapter 6 and Affordability and vulnerability chapter 7.

Executive summary

Our Customers and Bills Big Goals set our ambition for the Residential Retail price control. Our PR19 plan focuses on providing value for money, through efficient delivery of great service, and providing appropriate assistance to ensure all customers can access and benefit from our services in the way that suits them best, while not needing to worry about paying their bill.

Big Goal: Customers

We will develop the deepest possible understanding of our customers' needs and wants and ensure that we develop a service tailored and personalised to meet those needs.

We want to know the people living in Yorkshire better so that we can be sure we offer and deliver what is needed to provide a much more inclusive service, reaching more people who need our support.

Big Goal: Bills

We will use innovation to improve service, eradicate waste and reduce costs so no one need worry about paying our bill. We will not waste money.

We aim to deliver great customer service for all our customers at a price they can afford. It is vital that our customers consider they are getting value for money.

Our 25-year ambition

We will be open for business whenever and however customers want to contact us. Technology advances will result in much more control for customers. They will access services and pay through tariffs that best suit their circumstances and will have no need to worry.

Customers will always find us easy to deal with and have confidence we will resolve issues quickly. Conversations with our customers inform us of their specific needs and how we can tailor our services to meet them. These conversations will continue, as they make sure we never lose sight of what people want or need from us and remain aware of the impact we have on the people in Yorkshire.

Our 5-year plan

Our PR19 plan for Residential Retail is modernising our service, improving effectiveness for customers, revolutionising the customer journey and keeping bills low. We are tailoring our services to always consider customers' individual circumstances, supporting them to be safe, well and free from worry.

What do we know?

We work hard to understand what our customers want, need and expect from us. Our research, market testing and customer conversations tell us no two customers are the same. Each has specific needs and their own unique relationship with water. Our service needs to reflect this and deliver the best possible service at the best possible price regardless of economic, social or environmental challenges we face in the future¹. Our customers tell us they want to see improvements in service without big rises in bills. Customers tell us we need to support those who may find themselves in circumstances that make them vulnerable, and we need to place greater emphasis on treating customers fairly.

Unlike many service industries, we are a private company delivering a public service. We therefore owe it to customers to serve them well, earn their trust, be open and transparent, provide informative and easy to understand bills, ensure they are on the best tariffs for their circumstances and make sure they are aware of and can access all our services.

Our research has given us a deeper understanding of the diverse needs of customers², and by working with customer groups and stakeholders, we are improving our services. We know that:

- Customer expectations differ depending on circumstances.
- Improvement is needed to meet cultural differences.
- We need to protect people who find themselves in circumstances that make them vulnerable.

We have profiled our customers using lifestyle and debt risk data from credit reference agencies along with our own customer behaviour information. Identifying customers most at risk of incurring arrears allows us to target our advice effectively and efficiently and identify the best ways to meet customer expectations and support those with specific needs.

Our analysis shows income levels in Yorkshire currently lag national averages³ and maintaining our current levels of debt will be challenging. However, by embracing the use of data and debt prevention, we currently have industry leading bad debt levels, which we will maintain.

Our research tells us there are a number of unique factors in the Yorkshire region relating to debt, income, growth, and socio-economic make up. Disposable income in Yorkshire households is on average 12% less than other areas of the country. Yorkshire has a high proportion

of low-income elderly households and low-income families. These groups are affected most by rises to the cost of living.

What are we doing?

We are setting our sights on providing a frontier level of customer experience that is fair, flexible and accessible, further detailed in our Customer service chapter 6. We are already a leading company in efficiency and billing satisfaction, as measured by the service incentive mechanism, and for the last three years have been industry leading in the Institute of Customer Service's UK Customer Satisfaction Index. We are focusing on increasing our understanding of customers, so we can offer and tailor services in the best way to suit their individual needs and expectations. Our success will be measured through our C-MeX performance commitment.

Through our customer segmentation model, we have a better understanding of our customers' lifestyles and preferences⁴. Using demographics and data, we are tailoring services to ensure everyone can access them by offering a choice of communications channels and an 'always on' service. We are making sure our service meets the diverse needs of our community and are gaining an improved understanding of the impact we have on it. We are tailoring communications to make sure we are effective and efficient in what we do. For example, we created and released a bespoke pictorial leaflet in dual languages to residents in an area experiencing significant construction work. Our success will be measured through our inclusive customer service performance commitment.

We have also profiled typical customer personas, allowing us to develop customer journeys that make us easy to deal with, helpful and friendly, and ensuring we get it right first time. Our customer service offer is more automated, offering customers the opportunity to self-serve and allowing our teams to spend more time dealing with complex issues or customers who need a little extra help.

We are driving culture change to support all customers, including those in circumstances that make them vulnerable. Key to this culture change is the employment of our Safeguarding Officer; a first for the industry. Our inclusive customer service strategy sees us taking a broader role in society through strategic partnerships. We are already good at protecting those at risk of debt, but we want our customers to be physically safe too. Our Safeguarding Officer ensures all customers can access our services in ways they need and that our staff are equipped to identify and provide the right support. We are leading the way, showing how businesses can play their part to protect those in circumstances that make them most vulnerable. We are also significantly raising awareness levels of the Priority Service Register (PSR) and recording customer needs in greater detail to improve the services we offer. Our success will be measured through our inclusive customer service, priority services satisfaction and priority services awareness performance commitments.

¹ For further information, please see appendix 18a DJS Service Level Assessment.

² For further information, please see appendix 7m Understanding Vulnerable Customers DJS Research.

³ For further information, please see appendix 7a Experian Yorkshire Water Household Income.

⁴ For further information, please see appendix 18b Lifestyle Research.

We are working successfully with credit reference agencies as part of a data sharing agreement, identifying those likely to fall into debt and looking at ways to highlight our support schemes to them. Even with a high regional number of households struggling with bills, our debt performance is excellent, and we are reducing operating cost further. Better use of data is also supporting our ambition to better manage voids and gap sites. Our success will be measured through our affordability of bills, direct support given to customers, cost of bad debt, voids verification and gap sites performance commitments.

Performance commitments

In this section we further describe our performance commitments that sit within the Residential Retail price control. These performance commitments are a combination of regulatory requirements and measures, developed with our customers and stakeholders to ensure delivery against their priorities and our Customers and Bills Big Goals. For further information regarding our performance commitments, including the basis for our targets and incentives, please see appendix 19c.

The Forum engaged with us whilst we developed the performance commitments, challenging our ambition and approach throughout the process. A separate sub group was created to consider affordability and vulnerability, to provide the right level of scrutiny on this important area of our plan. The Forum has provided value to the process ensuring that our performance commitments focus in the right areas. The performance commitments have also been discussed and challenged by our Board and in a joint meeting between the Board and the Forum.

Priority services awareness

Big Goal: Customers

We will develop the deepest possible understanding of our customers' needs and wants and ensure that we develop a service tailored and personalised to meet those needs.

Table 18a

Annual performance targets – Priority services awareness					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Percentage	50	54	58	62	65

In summary

This performance commitment measures the percentage of residential customers aware of our Priority Services Register (PSR) and the services provided within the PSR. This is measured as the percentage of household customers who state, when questioned, that they are aware of the additional services offered. Awareness will be measured through a Consumer Council for Water (CCWater) commissioned survey.

We plan to significantly increase priority services awareness, targeting an increase of 20% in the period 2018-25.

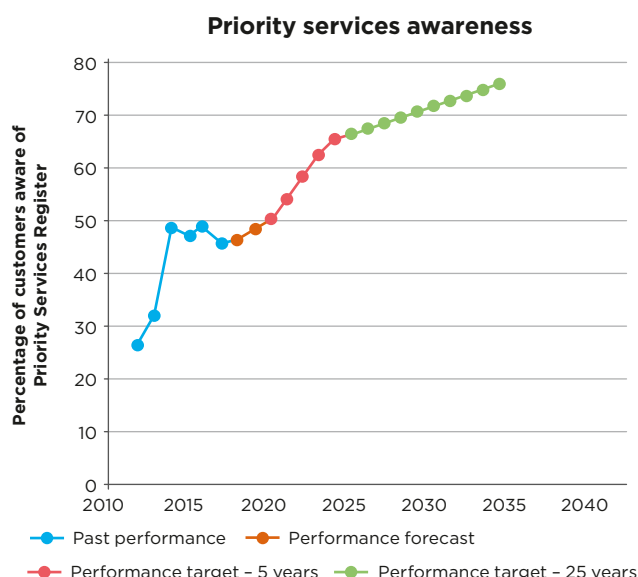


Figure 18b – Priority services awareness.

We want to provide a fully inclusive industry-leading service. We know we can be more proactive to identify customers that may need additional or different services. This commitment aims to make sure people can access our services and helps us to understand our customers to make sure we are always delivering what they need.

Any one of our customers could find themselves in a situation that may make them vulnerable. Raising awareness of our priority services means that customers know they have a choice and can register for our services, testing us to make sure our services are accessible. Increased awareness means family, friends and organisations in contact with people who may need the services can help us by reaching out to those who could really benefit from being on the PSR.

We know that vulnerability can be transient and some of our customers may not consider themselves to be in circumstances that make them vulnerable, so it is important that as many customers as possible are aware of our PSR. Raising awareness also ensures people can take advantage of our services at the earliest opportunity if their circumstances change.

The effectiveness of our inclusive customer service strategy will be measured using this and our priority services satisfaction and inclusive customer service performance commitments.

This is a bespoke performance commitment, meaning we have developed and agreed it with our customers and stakeholders based on their priorities.

The performance commitment is a new measure for the 2020-25 period. It has a financial outcome delivery incentive (ODI) with proposed under and out performance payments, to be recognised annually in-period.

Engagement

Our customers demonstrate high support for this performance commitment, with a majority rating it very important. Our customers typically want to see consistent improvement in our performance against this commitment over the short and long term.

Customers support approaches to improving the flexibility of the retail services we offer, and often consider our attention should be on driving awareness of options.

It is clear customers feel more should be done to tell people about the PSR and the expectation is that awareness should be increasing.

Our performance to date

As can be seen from our past performance we have made significant improvements in our priority services awareness since 2012. Since the winter of 2011 we have specifically promoted our priority services, proving how effective targeted communications can be. We have seen a plateau and slight drop in awareness over the last two years as we have moved closer to the limits of what is achievable using the methods we employed. Our overall awareness of all our communications activity peaks at just over 50% during annual billing. Our overall campaign recall is significantly lower. We do not believe we will be able to achieve growth at the rate seen initially at 2012 based on this evidence. Our previous activity has focused on traditional engagement methods, however we are now using our partner relationships to help us develop and deliver more effective communications with our customers, helping us to reach this stretching target.

Our plans to deliver this commitment

While we will be using our traditional methods of communication, we will also look at what our customer segmentation means for promoting our services. To increase awareness, we will work collaboratively with local charities, such as Age UK, SAFER, and community health teams to help us cover the gaps in our knowledge and provide information to customers who are considered hard to reach. Activities in other areas of our business are also being used to expand awareness.

Using existing internal and external relationships is the most cost-effective way to deliver this commitment. We have estimated costs for 2020-25 of £250,000 to support charities and organisations that will help us achieve our objective of raising awareness amongst groups where we have engaged with fewer people. This innovative use of cost-free and financially supported activities allows us to target particular groups, providing the best opportunity to be effective. We will also provide communities with benefits by supporting these charities.

We will use a monthly customer tracker to measure when partner relationships or communications activity delivers significant results; a process that ensures we develop and refine activities to improve cost efficiency and effectiveness. We will also capture the views of a minimum of 3,600 bill paying household customers with profiles that broadly represent our customer base.

Our incentive to deliver

The priority services awareness performance commitment is financially incentivised through under and out performance payments. The performance commitment is a new measure for PR19 and has had no previous incentive. Our customers consider priority services awareness to be of high importance but are

less supportive of large financial incentives. As such, we have used cost-based incentives to derive modest underperformance and outperformance payments for this performance commitment.

- The standard underperformance payment rate is -£2,292 per percentage.
- The standard outperformance payment rate is £2,292 per percentage.

There is no deadband for this performance commitment; standard under and out performance payments occur above or below the target level.

The ODI payments will be recovered from the Residential Retail price control.

Priority services satisfaction

Big Goal: Customers

We will develop the deepest possible understanding of our customers’ needs and wants and ensure that we develop a service tailored and personalised to meet those needs.

Table 18b

Annual performance targets - Priority services satisfaction					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Percentage	82	84	88	92	95

In summary

This performance commitment relates to the percentage of residential customers on our PSR who are satisfied with their experience of the PSR. This is a measure of customer satisfaction for the cutting-edge services we offer, tracking satisfaction in relation to the services provided and the overall experience of our PSR. A bespoke customer survey will be carried out monthly by an independent market research agency.

We seek very high satisfaction from our PSR, with a 2025 target of 95%.

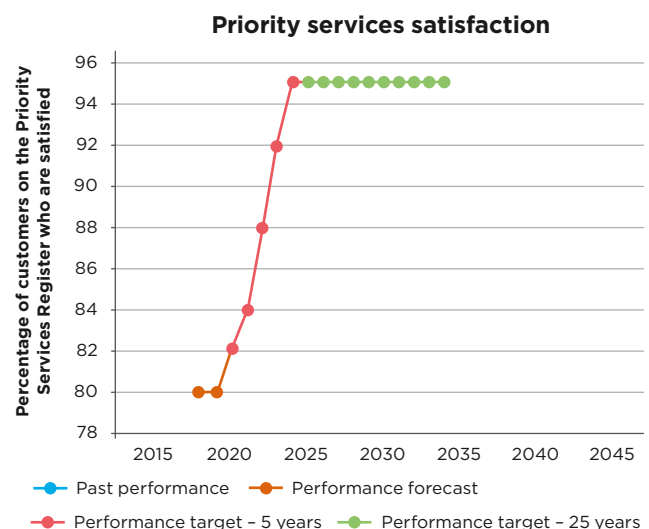


Figure 18c - Priority services satisfaction.

We provide a wide range of additional services to those on our PSR. The performance commitment ensures a focus on the service received by those who find themselves in circumstances that make them vulnerable. Surveying those who receive our PSR services will allow us to continually review the PSR and ensure it provides customers with what they want and need.

The effectiveness of our customer vulnerability strategy will be measured using this and our priority services awareness and inclusive customer service performance commitments.

This is a bespoke performance commitment, meaning we have developed and agreed it with our customers and stakeholders based on their priorities.

The performance commitment is a new measure for the 2020-25 period, replacing the current service commitment failure measure to remove duplication. The commitment has a non-financial incentive as we do not believe it is appropriate or possible to set a financial incentive currently. It will be measured and reported annually throughout 2020-25.

Engagement

Our customers demonstrate very high support for this performance commitment, with a majority rating it very important. Based on average importance rating, this ranks within the top 10 performance commitments.

Customers support approaches to improving the flexibility of the retail services we offer. The general consensus of our customers is 'do all you can, within reason'. Customers expect us to offer bespoke assistance to cater for the needs of those in circumstances that make them vulnerable. They do not want us to forget cost, but as a monopoly supplier, they expect us to do more to ensure the community is well served.

“We all have a responsibility to help the most vulnerable people. It’s good to see Yorkshire Water are doing that”

- Residential customer, Leeds

Our performance to date

This will be the first time we monitor satisfaction among those on the PSR and we are, at the moment, using our domestic tracker to establish how we are currently performing. This process uses a limited sample size of those on the PSR but shows that current satisfaction rests between 75% and 100%. Allowing for the limited sample size and variation in scoring, we expect to meet satisfaction for a large percentage of our customers. As we increase the sample size, we expect to be able to improve on the service as we become aware of where the PSR does not meet our customers' needs. We have mechanisms in place to monitor feedback and develop our services and the way they are delivered, to allow us to improve.

Working with partners and charities, we have already created our own inclusivity group. The group works with people in our region who may benefit from the PSR. With this group we progress varying themes exploring

our service, looking at our impact on customers to gain a different perspective about where we can be more successful. The purpose is to provide ongoing insight of our services for those who find themselves in circumstances that make them vulnerable, using their specialist knowledge to develop our services and improve our service to customers.

Our plans to deliver this commitment

The PSR ensures we can provide a tailored service to customers who may require it. For example, we know that some customers would struggle to prepare for a disruption to supply, as they would struggle to carry heavy water containers⁵. We can provide alternative facilities to those on the PSR.

For some customers in circumstances that make them vulnerable, the worst aspect of an unplanned disruption to their water supply is the psychological and emotional impact. Our PSR helps ensure we communicate with these customers as early as possible to provide them with the support they need.

This performance commitment helps us engage with customers on the PSR and ensures we have a continual focus on the quality of our service delivery for them. It provides us with an alternative method for engaging with some of our customers, for example, those with a hearing impairment or those unwilling to engage via traditional survey measures perhaps due to other circumstances.

Our inclusive customer service strategy includes working closely with local charity organisations, public services and other utilities to build knowledge in the community about the PSR, and to increase our understanding of what good service provision looks like. These partners include Northern Powergrid, West Yorkshire Police, Alzheimer's Society and fraud prevention charities.

We are creating new opportunities for our staff to develop their skills to be able to provide a better customer service experience. West Yorkshire Police is supporting our 'safeguarding champions' initiative by providing bespoke guidance to ensure everyone is safe, well and free from harm. We have taken part in shared training with Yorkshire Fire and Rescue on topics such as fuel poverty and high fire risk, so our colleagues can directly signpost when they come across these situations. We are empowering our teams to think differently about our customers so individual needs are met. Gaining knowledge from partnering is the most cost-efficient method of delivering this performance commitment.

Our incentive to deliver

The priority services satisfaction performance commitment is a new bespoke commitment and is a non-financial incentive measure. Our customers consider this performance commitment be of very high importance but only moderately support financial incentives. As the measure is new, and we need to build a better understanding of customer support for incentives in this area, a non-financial incentive has been applied for this reporting period.

⁵ For further information, please see appendix 7m Understanding vulnerable customers.

We will continue to develop the measure throughout the 2020-25 period and will engage with customers to understand if they would prefer the measure to become financially incentivised in the longer term.

We are committed to ensuring that information on our performance is easily accessible to all. We will be promoting our annual performance against non-financial incentives, as well as other key measures which are not regulatory, through a wide range of media channels, customer campaigns and our Executive pay and incentive scheme.

Inclusive customer service

Table 18c

Annual performance targets – Inclusive customer service					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Percentage	-	-	-	-	20

In summary

This performance commitment measures improvement in the services provided to customers in circumstances that make them vulnerable, as reviewed and assessed by an independent panel of third-party organisations and charities. The review will cover three areas: the accessibility of our service provision, the types of services provided and the effectiveness of services provided.

This is a new measure. We will shadow report against it until 2020, when we will be assessed to form a baseline. We are targeting a 20% improvement in our performance by 2025.

This commitment recognises that we can learn from, and work with, experts on vulnerability to continually improve. Our customer engagement work has shown that our customers have low expectations with respect to additional support. Additionally, customers who could benefit from our services often do not see themselves as needing these services. We therefore recognise it is our responsibility to ensure we continually improve the service provision and its accessibility.

The effectiveness of our customer vulnerability strategy will be measured using this and our priority services awareness and priority services satisfaction performance commitment.

This is a bespoke performance commitment, meaning we have developed and agreed it with our customers and stakeholders based on their priorities.

The commitment has a non-financial incentive. It will be measured and reported annually throughout 2020-25.

Engagement

We have been challenged by the Forum to create a way of measuring performance around customers in circumstances that make them vulnerable. Initial testing of this performance commitment demonstrated a significant majority wanted to see it within our business plan.

The 2016 report by Populus “Public Trust and Confidence in Charities”, see appendix 18g, shows that 61% of the public think charities are trustworthy and act in the public interest. This trust is an integral part to this performance commitment, as it allows our customers to see our performance measured by trusted experts.

Our performance to date

This is a new performance commitment and has not previously been measured. We will shadow report during 2018-19 to bench mark our current position. We know we have improvements to make in our service delivery for customers in circumstances that make them vulnerable, and realistically expect our starting point will be at the lower end of the scale.

Our plans to deliver this commitment

The review process of this performance commitment is designed to also provide qualitative feedback on our performance. This allows opportunities to target innovation and change in the areas in which we are not scoring as highly.

We will use our ongoing engagement with customers through our other vulnerability strategy performance commitments and our work within our Inclusive Customer Service Group, made up of external charities and organisations, to guide improvements.

Our Infrastructure North Alliance with Northumbrian Water, Northern gas Networks and Northern Powergrid has already allowed opportunities to share good practice and resources to improve our efficiency and effectiveness. This will be developed, along with other partnerships, to help us be more proactive in our identification of those in circumstances that make them vulnerable, and to ensure we are delivering what is needed.

Our incentive to deliver

The inclusive customer service performance commitment is a new, bespoke commitment. Inclusive customer service is of moderate importance to our customers. As the measure is new, and we are currently working with the Forum to develop and embed the independent review panel, we do not think the measure is sufficiently mature enough to justify a financial incentive. As there is customer support for the performance commitment, we will continue to develop the measure throughout the 2020-25 period and will engage with customers to understand if they would prefer the measure to become financially incentivised in the longer term.

We are committed to ensuring that information on our performance is easily accessible to all. We think it is particularly important for this measure and are working with the Forum and independent review panel to develop new ways to communicate our performance. We will also be promoting our annual performance against non-financial incentives, as well as other key measures which are not regulatory, through a wide range of media channels, customer campaigns and our Executive pay and incentive scheme.

C-MeX

Big Goal: Customers

We will develop the deepest possible understanding of our customers' needs and wants and ensure that we develop a service tailored and personalised to meet those needs.

In summary

This performance commitment relates to the overall customer experience of the services we provide. The commitment is still in development; Ofwat will make its final decision on all aspects of the measure after completion and evaluation of the 2018-19 pilot.

C-MeX, the customer measure of experience, is replacing the service incentive mechanism (SIM). We are pleased with the move, specifically that performance will be judged directly from the customer experience. The measure drives the right incentive to truly understand our customers' needs and react to the changing environment.

It is important that customers consider that they receive excellent service and value for money. This measure will provide a sound indicator of our overall performance in delivery against our customers' priorities; our 5 Big Goals.

The performance commitment is a new measure for 2020-25, replacing the existing SIM and overall customer satisfaction measures. The performance commitment has proposed under and out-performance payments to be recognised annually, in-period.

Engagement

Our customers demonstrate good support for this performance commitment, with a majority rating it as important.

Customers are typically supportive of this measure in principle, though comment that the practicalities require careful thought. Some raise concerns over the number of customers that are engaged with, while others comment that many customers only engage when they are dissatisfied.

Our performance to date

Whilst C-MeX is a new measure for the industry, we have been comparing our performance in the UKCSI survey since 2013. We consistently perform in the upper quartile for utilities and have been the leading water company overall. Within the SIM we have improved performance year on year. In billing, we are the leading performer in the industry and aspire to achieve the same level of customer service for water and wastewater services.

Our plans to deliver this commitment

While Ofwat is yet to make final decisions on the design of C-MeX, the proposal for measuring performance is to use three types of customer survey:

- Customer service – quarterly satisfaction survey based on a recent contact from the customer.
- Customer experience – quarterly satisfaction survey based on customers who may or may not have contacted the company.
- Results of a quarterly Net Promoter Score.

We know that C-MeX will reflect the overall customer experience, so performance in wholesale and retail activity will deliver this commitment. Our Residential Retail strategy will deliver excellent service, ensuring we score positively in the customer service component of the measure. Our stretching wholesale asset and operational performance plans will deliver performance against the customer experience component of the measure.

Our incentive to deliver

Each year the top three performers will receive an outperformance payment of up to 1.2% of Residential Retail revenue. Higher performance payments of up to 2.4% of Residential Retail revenue will be available if a company is within the top three performers and performs at, or above, the cross-sector threshold. The poorest performers will be liable for an underperformance payment of up to 2.4% of Residential Retail revenue.

Affordability of bills

Big Goal: Bills

We will use innovation to improve service, eradicate waste and reduce costs so no one need worry about paying our bill. We will not waste money.

Table 18d

Annual performance targets – Affordability of bills					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Percentage	81	82	83	84	85

In summary

This performance commitment relates to the percentage of household customers who find their water and sewerage bill affordable. This is measured as the percentage of household customers who agree, when questioned, that they find their water bill affordable. Awareness will be measured through a CCWater commissioned survey⁶.

In 2017-18, the industry leader for this achieved 81%. We have set this as our starting performance target for 2020, rising to 85% by 2025, with a stretching long-term target of 90%.

⁶ For further information, please see appendix 18c CCWater Water Matters 2017/18.

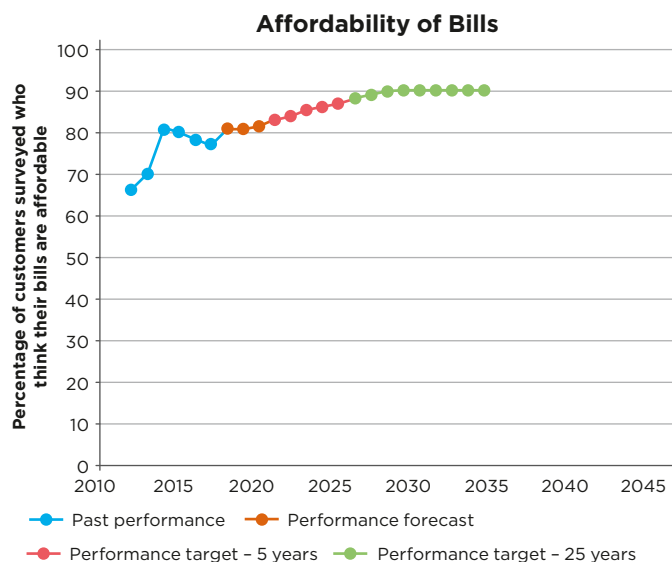


Figure 18d - Affordability of Bills.

Our residential customers cannot choose their water company, so it is essential that we provide our services as efficiently as possible so that our customers believe they are getting value for money and feel that our bill is affordable.

We are also aware that some customers are particularly sensitive to the affordability of our bills. This performance commitment helps us engage with individual households and drives positive action to understand the causes of affordability, resulting in more meaningful support.

This is a bespoke performance commitment, meaning we have developed and agreed it with our customers and stakeholders based on their priorities.

The performance commitment is a new measure for the 2020-25 period, replacing the current service commitment failure measure to remove duplication. The commitment has a non-financial incentive. It will be measured and reported annually throughout 2020-25.

Engagement

Our customers demonstrate very high support for this performance commitment, with a majority rating it very important. Based on average importance rating, this ranks within the top 10 performance commitments we tested.

Our customers typically want to see consistent improvement in our performance against this commitment over the short and long term.

Our performance to date

This is a new measure, however within CCWater's annual tracker survey, known as Water Matters, our score has consistently been above average compared to the industry. Our track record of identifying and supporting those most at risk of affordability issues is excellent, and customers tell us they appreciate the support they are given.

Our plans to deliver this commitment

We are introducing an industry first; a promise that every customer bill will be reviewed each year, ensuring customers can access the best tariff for their circumstances. Where a customer has paid more than necessary, we will refund them the difference.

We will obtain a greater depth of understanding of individual household needs through data capture and observed behaviour, allowing us to promote help in targeted ways, such as payment holidays, flexible arrangements, water efficiency advice and promotion of metering. We will use data from the Department for Work and Pensions to target WaterSupport, one of our customer support programmes.

Research relating to our social tariff tells us customers are willing to contribute more than in the past to support those most in need of help⁷. There are many factors that influence customers' views on affordability. We use the outputs from the surveys as a basis for our wider conversations with customers to ensure we are meeting their expectations.

Our digital transformation gives us an efficient way of providing access to support, supplemented by our work in the community in known areas of deprivation. Our use of data and multiple communications channels opens access for everyone.

There is a support scheme available to every household, whether it is to prevent them falling into trouble in difficult times or help them get back on their feet.

For further information regarding how we are ensuring our bills are affordable for all, including those struggling to pay, please see our Affordability and vulnerability chapter 7.

Our incentive to deliver

The affordability of bills performance commitment is a new, bespoke commitment and is of very high importance to our customers.

Although some of our customers strongly support the use of under and out performance payments, we do not consider it is appropriate to financially incentivise performance for this measure as it could create perverse effects.

We are committed to ensuring that information on our performance is easily accessible to all. We will be promoting our annual performance against non-financial incentives, as well as other key measures which are not regulatory, through a wide range of media channels, customer campaigns and our Executive pay and incentive scheme.

⁷ For further information, please see appendix 18f Finline Social tariff research.

Direct support given to customers

Big Goal: Bills

We will use innovation to improve service, eradicate waste and reduce costs so no one need worry about paying our bill. We will not waste money.

Table 18e

Annual performance targets - Direct support given to customers					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Number of customers	50,000	50,000	50,000	50,000	50,000

In summary

This performance commitment relates to the number of residential customers who receive financial help from us each year.

We already provide help to approximately 28,000 of our customers annually and will increase this number to 50,000 from 2020 onwards.

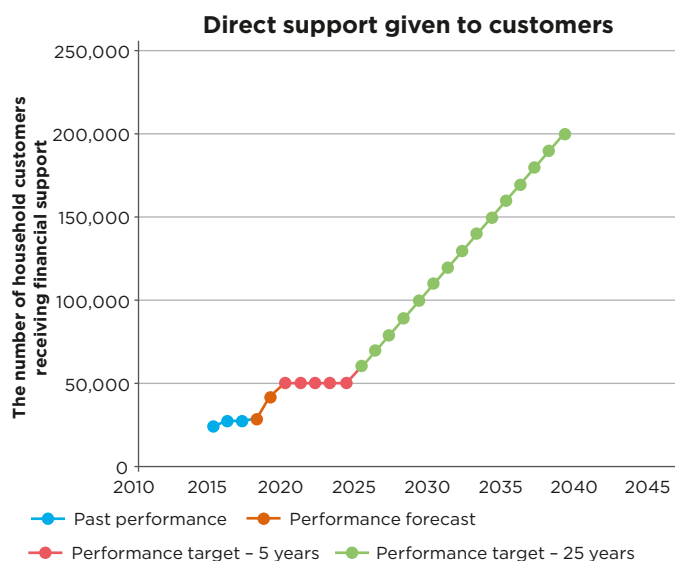


Figure 18e - Direct support given to customers.

Pressure on household budgets continues to be an issue for many in our region. Low-income families and some people over the age of 65 are predicted to have less disposable income in the future, so it is essential that we provide support to ensure that no customer worries about paying their bill. Our targeted support can prevent customers from falling into debt or remove debt to help them get back on their feet.

This is a bespoke performance commitment, meaning we have developed and agreed it with our customers and stakeholders based on their priorities.

This performance commitment is an existing measure, reported in the current period. It has a non-financial incentive. It will be measured and reported annually throughout 2020-25.

Engagement

Our customers demonstrate high support for this performance commitment, with a majority rating it very important. Our customers typically want to see consistent improvement in our performance against this commitment over the short and long term. Research indicates customers are prepared to pay more now than in the past to assist those most in need of help.

Our customers tell us they are highly satisfied with our service when contacted and find our support schemes easy to join. 97% of customers tell us they find it easy to sign-up to our social tariff.

“It provides that comfort as well. If anything happened to you or indeed a family member, there's options there. It's good to know there are options there.”

– Future bill payer, Harrogate

Our performance to date

Based on customer segmentation, we know who is most at risk from falling into debt. Our support is primarily focused on those at risk of falling into debt and those who are already in debt. Our social tariff, WaterSupport, is unique, as is the way we target those in temporary circumstances, such as family illness. Understanding customers in this way helps ensure support is targeted and efficient.

Table 18f

Direct support schemes offered		
Scheme	Funding	Description
WaterSure	Tariff for vulnerable households.	High water usage, on benefits and/or large family.
WaterSupport	Social tariff.	Low income. High bill.
Temporary help	Part bill reduction.	Hard to reach with a life changing event.
Resolve	Payment matching.	In debt. Aimed at changing payment behaviour.
Community trust	Charity awards.	In debt with us and others.
Fresh start	Live debt write-off.	Hard to engage with. In debt year on year.
Domestic Meter Option for those in debt	Promotion of metering to those struggling.	Those paying on rateable value but switch to be better off on a meter.

Our plans to deliver this commitment

Our plans to increase the number of customers receiving financial help will be achieved by sharing data with partnership organisations such as the Citizens Advice Bureau. Combining this with customer-provided data and information we routinely capture from credit reference agencies, gives us the indicators we need to identify the customers in most need.

In order to maximise the support available when it is needed most, we have matched our schemes to each of the following circumstances:

- Longer term low income households, not in debt.
- Longer term low income households, in debt.
- Temporary circumstances of low income, not in debt.
- In debt with ability to pay.
- In debt without the ability to pay.

Our industry leading approach to social tariffs ensures hard to reach customers are not left out and allows for flexible methods of support. Existing help is innovative in the way it is distributed and how it targets debt prevention.

Customers expect us to contribute financially in addition to the amount of financial help subsidised by other customers and through debt write-offs. We already contribute to the £8 million of annual help provided, and to show our commitment, we are increasing the amount of financial help offered directly from us. For WaterSupport, we supplement the amount paid through bills with a £1 million per year additional contribution.

With the help of innovative technology, we will continue to build a profile of our customers, sharing data where we can. Our plans target help based on common needs within each of our known customer segments. We will also capture individual household needs in order to adapt to their circumstances.

We have assessed the costs and benefits of each existing scheme to ensure they deliver best value. Each scheme cannot be viewed in isolation, as together they provide a package of support to meet different circumstances. The scheme that offers the most meaningful support is the social tariff, WaterSupport. It aims to prevent debt rather than remove existing debt. We know too, that more customers are eligible for this tariff than any of our other schemes. WaterSupport provides great social benefit by reducing worry and making bills more affordable for those who need it most. This is evidenced in research, showing 84% of customers find WaterSupport helps them to afford their water bill, and for this reason, we intend to grow WaterSupport.

To get best value for our customers, we have designed our administration in the most cost-effective way. We use data from credit reference agencies and information we build up from customer behaviour to target support. Our customers do not need to fill in an application form and can be verified for eligibility immediately through our online portal, keeping costs down and providing a great customer experience.

Our incentive to deliver

The direct support given to customers performance commitment is a bespoke commitment and is an existing measure from PR14. Direct support given to customers is of very high importance to our customers.

Although the use of under and out performance payments was supported by some customers, we do not consider it is appropriate to financially incentivise performance for this measure.

We are committed to ensuring that information on our performance is easily accessible to all. We will be promoting our annual performance against non-financial incentives, as well as other key measures which are not regulatory, through a wide range of media channels, customer campaigns and our Executive pay and incentive scheme.

Cost of bad debt

Big Goal: Bills

We will use innovation to improve service, eradicate waste and reduce costs so no one need worry about paying our bill. We will not waste money.

Table 18g

Annual performance targets – The cost of bad debt					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Percentage of customers bill	2.79	2.79	2.79	2.79	2.79

In summary

This performance commitment relates to the percentage of bill paying residential customers' bills that results from bad debt. The commitment measures the cost of interest on revenues not collected, debt written off and debt management costs incurred, expressed as a percentage of the average annual water and sewerage bill for residential customers.

Our aim is to reduce the cost of bad debt to 2.79% of our customers' bills, and keep this figure constant into the future, helping to keep customers' bills stable and affordable.

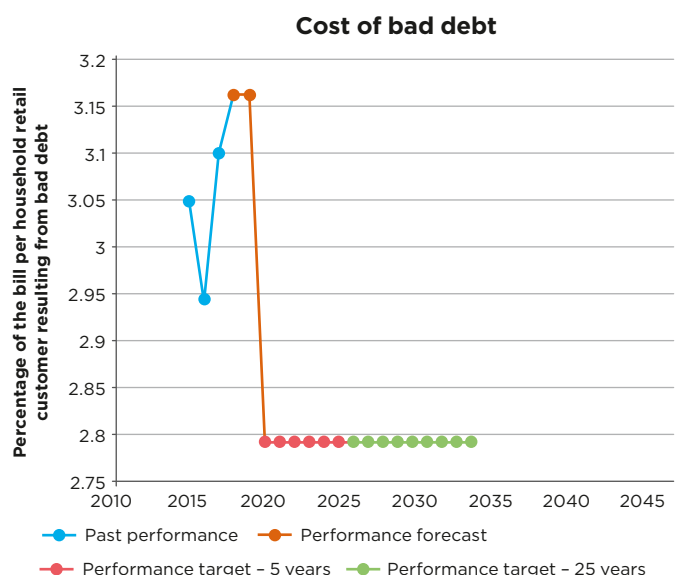


Figure 18f - Cost of bad debt.

The measure keeps bills low for all customers by incentivising us to reduce write-offs and keep debt management costs as low as possible. Preventing and reducing levels of unmanageable debt has value both for society and for us. Being in debt can cause financial exclusion, family breakdown and poor physical and mental health.

This is a bespoke performance commitment, meaning we have developed and agreed it with our customers and stakeholders based on their priorities.

This performance commitment is an existing measure, reported in the current period. It has a non-financial incentive. It will be measured and reported annually throughout 2020-25.

Engagement

Our customers demonstrate very high support for this performance commitment, with a majority rating it very important. Based on average importance rating, this ranks within the top 10 performance commitments we tested.

Our customers typically want to see consistent improvement in our performance against this commitment over the short and long term.

“I support them doing that, definitely. As long as they’re not spending more on sorting it out than they would be if they did nothing.”

– Residential customer, Hull

Our performance to date

Our region has the third lowest average household income nationally and a materially higher proportion of customers in the highest debt risk profile group. This significantly affects the ability to manage and reduce debt. We are pioneering a digital ‘nudge’ strategy, targeting different customer segments using creative techniques to maximise payment success and minimise debt.

Our record is strong compared to our peers. A cross-sector benchmarking exercise completed by Economic Insight in June 2018 concluded Yorkshire’s bad debt costs are already at an efficient level and any reduction would represent an ambitious and stretching efficiency target (appendix 18d). We have built in an efficiency equivalent to a 6% reduction in debt compared to our forecasts, demonstrating our commitment to challenging ourselves even further. Our research tells us customers do not want to see a rise in bills and they expect us to minimise the cross subsidy created from non-payment.

Our plans to deliver this commitment

To meet the commitment, we will continually keep ahead of the industry. The forecast of income levels in our region indicates there will be pressure on household budgets, so to improve year-on-year is going to be a challenge which can only be met through marked changes in debt recovery practices. The support we provide to our customers will also help us to deliver this performance commitment.

Our investment in technology and ways of working will improve our strong understanding of different customer circumstances, allowing us to target support in efficient ways. The biggest driver within this measure is debt write-off. We plan to improve by better void management, more effective debt recovery practices, and by adjusting our bad debt cost targets to reduce relative to income. By supporting customers with options and tariffs such as WaterSupport, we will reduce the number of customers failing into debt.

Our incentive to deliver

The cost of bad debt performance commitment is a bespoke commitment and is an existing non-financial incentive measure from PR14. Cost of bad debt is of high importance to our customers, who show less support for the measure to be financially incentivised, therefore a non-financial incentive is appropriate.

We will continue to develop the measure throughout the 2020-25 period, engaging with customers to understand if they would prefer the measure to become financially incentivised in the longer term.

We are committed to ensuring that information on our performance is easily accessible to all. We will be promoting our annual performance against non-financial incentives, as well as other key measures which are not regulatory, through a wide range of media channels, customer campaigns and our Executive pay and incentive scheme.

Voids verification

Big Goal: Bills

We will use innovation to improve service, eradicate waste and reduce costs so no one need worry about paying our bill. We will not waste money.

Table 18h

Annual performance targets – Voids verification					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Percentage verified	85	85	85	85	85

In summary

A void is a property that is vacant or uninhabited. The commitment measures the percentage of residential voids that we have confirmed through our rigorous verification process. Without verification a void could actually be occupied, therefore using our services without paying.

We will significantly increase the percentage of voids that are verified. We are targeting an improvement of 33% by the start of the 2020-25 period.

This measure aims to ensure everyone pays their fair share by registering properties consuming water to paying customers. We do not know the number of voids in Yorkshire. Sometimes customers do not inform us that they have vacated a property. Our measure therefore concentrates on what is under our management control, verifying that registered voids are in fact unoccupied (appendix 18e).

The performance commitment is a new measure for the 2020-25 period. The commitment has a non-financial incentive. It will be measured and reported annually throughout 2020-25.

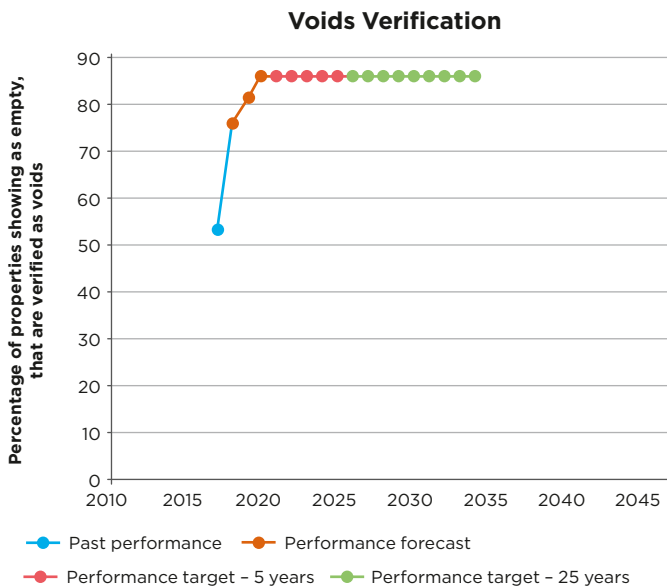


Figure 18g - Voids Verification.

Engagement

Our customers demonstrate good support for this performance commitment, with a majority rating it as important.

Our research tells us customers do not want bills to increase, they expect us to be transparent about our charges and expect fairness. We have a responsibility to charge all customers using our services, this helps to keep all our customers' bills low.

“I think that’s pretty important, because I didn’t realise that happened and it’s costing a lot of money by the sounds of it.”

- Business customer, Huddersfield

Our performance to date

In 2016-17 the number of empty properties on our billing systems reduced by 2% to 105,571, equating to 4.8% of all known properties. This demonstrates that through pro-active verification of voids, we have been able to increase registration of properties to customers.

Our plans to deliver this commitment

We employ data checks and verification initiatives to give us confidence about occupancy rates. We have a robust process in place for delivering this commitment, consisting of site visits, meter readings, account set ups and credit checks. The process considers how long a property has been reported as unoccupied, the point in the billing cycle, and if any techniques have been attempted to verify the void status. We believe this is the most cost-efficient method to manage void verification. We will continue to review this process, making use of more innovative data processing methods to streamline the way we do this.

Our incentive to deliver

The voids verification performance commitment is a common performance commitment set by Ofwat. Our customers consider voids verification to be of lower importance and are less supportive of financial incentives. Therefore, a non-financial incentive is appropriate.

We are committed to ensuring that information on our performance is easily accessible to all. We will be promoting our annual performance against non-financial incentives, as well as other key measures which are not regulatory, through a wide range of media channels, customer campaigns and our Executive pay and incentive scheme.

Gap sites

Big Goal: Bills

We will use innovation to improve service, eradicate waste and reduce costs so no one need worry about paying our bill. We will not waste money.

Table 18i

Annual performance targets – Gap sites					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Percentage verified	80	83	86	90	94

In summary

A gap site is a property where water and/or wastewater services are being received, but the property is not on our billing system. The commitment measures the percentage of gap sites we register to our billing system. Without registration to the billing system, a customer occupying a gap site can continue to benefit from our water and/or wastewater services without paying. The number of gap sites registered will be based on accounts set up as a result of information received or investigation. All properties set up for new supplies will be excluded.

We are targeting high and improving performance against this measure throughout 2020-25, with a 2025 target of 94% of gap sites registered to customers within 12 months of identification.

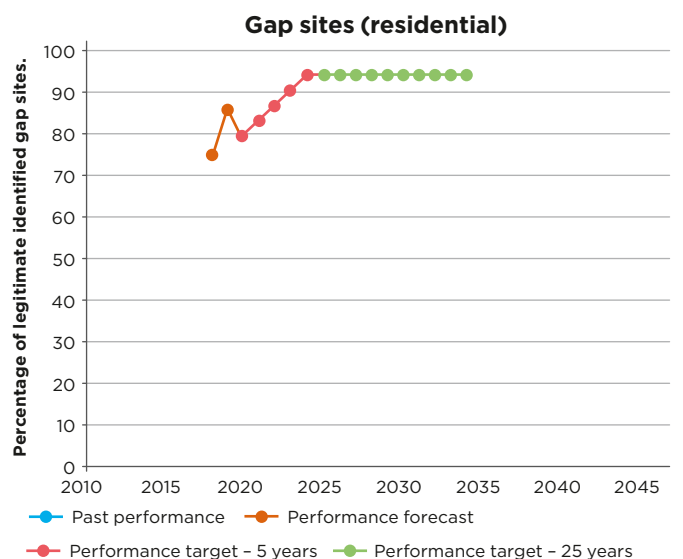


Figure 18h - Gap sites.

In the interest of being fair to all our customers and ensuring bills are affordable, it is important that any properties consuming water are registered to customers and managed through the bill payments system. This performance commitment incentivises us to find and raise charges more quickly, improving the customer experience and lowering the average bill.

The performance commitment is a new measure for the 2020-25 period. The commitment has a non-financial incentive. It will be measured and reported annually throughout 2020-25.

Engagement

Our customers demonstrate good support for this performance commitment, with a majority rating it as important.

Our research tells us customers do not want bills to increase, they expect us to be transparent about our charges and expect fairness. We have a responsibility to charge all customers using our services, this helps to keep all our customers' bills low.

“You want to make sure that they’re not just letting people get away with not paying.”

- Future bill payer, Harrogate

Our performance to date

Our process for capturing properties not being billed is a mature one. We have based our targets on the number of historical cases, which we are confident can be improved further.

Our plans to deliver this commitment

The measure has been designed to identify gap sites in the most cost-effective way, reducing set up timescales, which in turn reduces repeat work. The sooner properties are set up, the fewer unnecessary contacts are received from our customers, improving the service we provide.

The most cost-effective way to deliver this commitment is to use the market rather than in-house resource. A robust procedure will be followed to ensure we maximise the number of gaps sites identified and verified. Identification and verification will be based on information received relating to a potential gap site. We may carry out a site visit to assess whether the property is receiving water and/or wastewater services. If a property is identified as a gap site, it will be registered as such. If it is connected for our services, it will be registered to a customer and consideration will be given to recovering any revenue.

Our incentive to deliver

The gap sites performance commitment is a common performance commitment set by Ofwat. Our customers consider gaps to be of lower importance and are less supportive of financial incentives. Therefore, a non-financial incentive is appropriate.

We are committed to ensuring that information on our performance is easily accessible to all. We will be promoting our annual performance against non-financial incentives, as well as other key measures which are not regulatory, through a wide range of media channels, customer campaigns and our Executive pay and incentive scheme.

Cost efficiency

Managing Residential Retail cost relies on our ability to efficiently collect revenue while delivering great customer service. Historically, we have found the right balance. Our bad debt performance has been exceptional considering some of the factors specific to Yorkshire. Our innovative approach to using data has allowed us to keep operating cost low, improve service and increase the support for those struggling to pay.

Bad Debt

Economic Insight's cross-sector benchmarking exercise for bad debt costs concluded Yorkshire's bad debt costs are already at an efficient level and any reduction would represent an ambitious and stretching efficiency target. Our plan aims to reduce the level of bad debt in real terms. We believe this can be achieved by getting to know our customers and focusing on preventing debt from occurring in the first place.

Digital strategy

While we continue to serve our customers through multiple channels, the steps we are taking to increase the use of digital channels for information and transactions is proving a more cost efficient way to interact. This enables us to offer a personal service while driving affordability for all customers.

The efficiency challenge is ambitious, but we are confident it can be achieved based on transformational changes observed outside the water industry. By understanding and engaging with our customers we will offer more opportunities for self-service, reducing operating cost through fewer contacts being handled by our contact centre and reducing mailing and postage.

We have investigated the opportunities markets bring to our Residential Retail service. We know the services provided by Loop, the Kelda Group customer services function, strike the balance between cost efficiency and service, while also retaining our strong brand. We continue to evaluate the benefits of outsourcing and offshoring, and will keep this under review to ensure we provide high quality services while maintaining cost, efficient customer contact handling and billing services.

In challenging our efficiency in this area, we have focused on our customer service costs using innovation and digitalisation to drive down costs. This provides the majority of our total efficiency. We are also challenging ourselves on the cost of bad debt. We are efficient relative to other water companies, but we know that other industries are performing more efficiently. The aim is to ensure we are still a leader in Residential Retail cost efficiency throughout the period 2020-25 and beyond by delivering efficiency of 10% in this price control.



Our cross-cutting performance commitments

Our PR19 plan has customers at its heart. A key component of this is the delivery of our performance commitments. Shaped by customers, stakeholders and our regulators, our stretching performance commitments use innovation to deliver the services our customers have told us they want, at a price that they can all afford.

Some of our performance commitments are associated with just one price control, which are detailed in the price control chapters. However, a small number are associated with multiple price controls (called appointee level performance commitments) and they are discussed here. All are bespoke with the exception of D-MeX, which is a common measure defined by Ofwat. The Yorkshire Forum for Water Customers (the Forum) has reviewed the customer research that has contributed to these commitments and reviewed and challenged the commitments themselves. For more detail about all our performance commitments, please see appendices 19b and 19c.

Each year our Annual Performance Report provides information about how we are delivering against our performance commitments. We review our performance against our commitments with the Forum each year and also the associated outcome delivery incentive for over and under performance. As part of the process to develop our performance commitments, the non-executive and executive members and the Chair of our Board met with the Forum on 8 March 2018 to review the commitments. Our Board receives regular updates on our performance against our commitments.

Please see appendix 19c to find out about the challenges we have received from the Forum regarding our commitments and the actions we have taken to respond to the feedback we received from Ofwat

following the submission of our draft definitions. Appendix 19c also provides detail regarding the customer support we received for each commitment.

We have 10 appointee performance commitments:

- Working with others.
- Land conserved and enhanced.
- Integrated catchment management.
- Length of river improved.
- Biosecurity implementation.
- Carbon.
- Education.
- Water recycling.
- D-MeX.
- Creating value from waste.

Working with others

Big Goal: Bills

We will use innovation to improve service, eradicate waste and reduce costs so no one need worry about paying our bill. We will not waste money.

Table 19a

Annual performance targets - working with others					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Projects	-	-	-	-	45

In summary

We know that collaboration with others encourages innovation and delivers greater overall benefits for our customers and the environment. This performance commitment relates to the number of projects delivered in partnership with other agencies, organisations or individuals for mutual benefit to deliver holistic and sustainable outcomes for our customers, stakeholders and the environment.

We want to deliver at least 45 partnership projects for the 2020-25 period, an ambitious 15% increase from the 2015-20 period, building on the positive benefits we have achieved.

In line with our long-term strategy, we know that we face challenges to maintain and deliver our services as the climate changes and our population grows. We cannot always resolve these challenges on our own and need support and action from landowners, local authorities, businesses, and others. For example, working with farmers to encourage better management of land to protect raw water quality, or working with local authorities to manage surface water flood risk. Tackling these issues in partnership often achieves better, more affordable solutions than working alone, resulting in the best benefits for our customers and the environment. By working with others we build relationships and gain better knowledge, ensuring we deliver innovative, resilient and cost effective solutions.

The performance commitment is an existing measure continued into the 2020-25 period. It has a proposed financial outcome delivery incentive (ODI) with outperformance payments, to be recognised at the end of the 2020-25 period.

Engagement

Our customers demonstrate good support for this performance commitment, with a majority rating it important. The majority of our customers seek improvement in our performance against this commitment over the short and long term.

Our customers and stakeholders expect us to play our part in managing shared risks. Customers want us to make the most of shared opportunities across our region and expect us to work collaboratively where it makes sense to do so.

Our customers want us to work increasingly with partners to protect water quality into the future. They also want to see us working in partnership to mitigate flooding risk as efficiently as possible, with the use of innovative and natural approaches, particularly resonating.

Our performance to date

The 2015-20 target was to deliver 16 projects, however we have exceeded the target and expect to outperform, delivering 39 projects for the 2015-20 period.

The partnership schemes delivered so far have had multiple benefits, including building relationships with stakeholders, avoiding future costs, leveraging additional funding, delivering better solutions for less, aligning delivery of different activities across organisations, enabling access to specialist expertise and allowing us to trial innovative techniques. Examples of where we have worked together to reduce flooding risks are:

- Our contribution to the Runswick Bay coastal defence scheme enabled the local council to successfully apply for government funding allowing the sea wall defence scheme to progress.
- Working in partnership with local authorities to reduce flooding through surface water management schemes.
- Contributing, alongside the Environment Agency and a business customer, to a scheme to prevent the customer's premises from flooding internally.

By working with others, we have avoided operational costs and delivered more efficient solutions, helping to keep our customers' bills low. For example, working with farmers in Nidderdale, we re-used gravel extracted from our aqueducts, diverting nearly 500 tonnes of debris from landfill and avoiding disposal costs of more than £300,000.

Our plans to deliver this commitment

In the 2020-25 period we will build on existing knowledge and relationships, expanding them further. We will continue to trial new techniques, such as river restoration, engaging local communities in managing our assets and working with new stakeholders, such as global food supply chain companies. We want to work with more local and community groups to help tackle these problems.

All projects go through the same cost-benefit assessment and business approval processes as any of our projects and face the same level of scrutiny and challenge. Only partnerships with a clear cost-benefit to help meet our strategic business objectives are progressed.

Our incentive to deliver

The working with others performance commitment is financially incentivised through an outperformance payment. The incentive type is a continuation of the PR14 measure, which is also reward only. Our customers consider working with others to be of moderate importance and support an outperformance payment incentive reward for over achievement against this performance commitment.

Following the PR14 approach, the incentive rate is set at 5% of the annual average totex of the partnerships schemes delivered over the target. The final incentive rate will be calculated at the end of the period, once the final level of totex has been confirmed.

The incentive approach encourages greater consideration of alternative delivery models to improve performance and explore non traditional options for enabling multiple benefits to be achieved. As we do now, any outperformance will be reinvested into other working with others partnerships, and this process is subject to review and challenge by the Forum.

The ODI payments will be recovered across the Wastewater Network Plus, Water Resources and Residential Retail price controls.

Land conserved and enhanced

Big Goal: Environment

We will remove surface water from our sewers and recycle all wastewater, protecting the environment from sewer flooding and pollution.

Table 19b

Annual performance targets – land conserved and enhanced					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Hectares (ha)	-	-	-	-	15,239

In summary

This performance commitment relates to the area of land conserved and enhanced in our region through land management, biodiversity focused projects and investments on our land, and land owned by others. In addition to delivering our legal obligations, this performance commitment provides additional environmental benefits such as conserving and enhancing biodiversity, improved water quality, and flooding attenuation. All of which meets our customers' and stakeholders' needs and expectations.

The target applied to this commitment is 15,239 ha by 2025, an ambitious 30% increase from 2015-20.

This performance commitment is an existing measure for the 2015-20 period, however, its definition has been modified to align the process for claiming land conserved and enhanced with those of other similar performance commitments, such as length of river improved.

The Forum was keen to understand how the definition had changed from the PR14 measure, particularly as the scope has broadened to include activities on land not owned by Yorkshire Water. We explained that by expanding out the performance commitment, it allows us to implement improvement schemes where they provide the biggest benefit for customers, irrespective of the land owner status. We can only claim performance improvements where we have undertaken significant activity that benefits our operational processes. The Forum supported this approach.

It has a financial ODI with proposed under and out performance payments, to be recognised at the end of the 2020-25 period. This allows sufficient time for conservation and enhancement projects to mature enough to ensure a measurable benefit is achieved.

Engagement

Customers are often surprised by the amount of land we own and expect it to be used responsibly. Our customers demonstrate good support for this performance commitment, with a majority rating it important. The majority of our customers seek improvement in our performance against this commitment over the short and long term.

We have used direct and group-based consultation sessions with stakeholders to develop this commitment. For example, the regional Wildlife Trusts and Rivers Trusts attended one of our consultation events to ensure our programme would align with their needs and meet our regulatory obligations whilst delivering for customers. We have also consulted with and gained support from numerous other groups such as, Wildlife and Countryside Link, local councils and universities.

Our research has revealed that our key stakeholders expect us to take a long-term approach to ensuring the quality and resilience of our service, focusing particularly on effective management of the environment. We are seen as having significant influence and our stakeholders want us to take an active and leading role.

“Yorkshire Water need to shout louder, communicate more, be more visible!”

– Chief Executive, Yorkshire-based local authority

Our performance to date

We are on track to deliver our target of 11,689 ha land conserved and enhanced during the 2015-20 period.

Our plans to deliver this commitment

Delivery of this performance commitment is through:

- Projects and investments relating to protected sites, such as a Site of Special Scientific Interest (SSSI), Local Wildlife Sites or equivalent.
- Projects that deliver a conservation or enhancement benefit to biodiversity on non-protected sites through measurable benefit to regional biodiversity, in line with the government's Biodiversity 2020 strategy¹.

¹ Biodiversity 2020: A strategy for England's wildlife and ecosystem services, Defra, 2011.

SSSI programme

We own over 11,000 ha of land designated as an SSSI. We have a legal duty to manage this land in ways that align with the site-specific conservation objectives of the various sites.

Our 2020-25 programme focuses on meeting or maintaining the conservation objectives of the Natura 2000 sites, developed by Natural England and informed by the Common Standards Monitoring Guidance (CSMG).

Investment in this area is driven through the Water Industry National Environment Programme (WINEP) and regulated by the Environment Agency and Natural England.

Local Wildlife Sites or similar programme

The term Local Wildlife Sites is used to refer to land being managed under this programme, whether it is a Local Wildlife Site, a similar site named under a different council system or a site identified by Natural England mapping.

We have over 50 sites recognised as Local Wildlife Sites, where we have never undertaken formal habitat management targeted specifically at biodiversity. Identification of specific sites is done in collaboration with the Environment Agency and Natural England, local councils and our stakeholder Biodiversity Advisory Panel.

Work arising from our SSSI programme and Local Wildlife Site programme, as a result of WINEP process, will receive formal review and sign-off against the success criteria set by the Environment Agency and Natural England at the end of 2025.

Biodiversity enhancement programme

Our Biodiversity programme has been developed with Natural England and the Environment Agency and is funded as part of our WINEP obligations. We are committed to contributing to conserving and enhancing regional biodiversity in line with the process set out in the Making Space for Nature: A review of England's Wildlife Sites and Ecological Network, Defra, 2010. We invest where there is a benefit for nature and our customers and we are working with approximately 30 non-government organisations (NGO) to deliver 12 enhancement projects. This has unlocked match funding at a return of over £3 for every £1 invested, as well as facilitating over 250 individual volunteers working to restore 70 ha of habitat.

We believe this programme offers the most cost-efficient method of delivery for this performance commitment.

There is £5.3 million of WINEP investment supporting this commitment through the SSSI, Local Wildlife Site and Biodiversity Programmes, and £4.7 million of Management and General investment supporting Beyond Nature.

Beyond Nature land management

In collaboration with external stakeholders and in agreement with Natural England, we have developed our 'Beyond Nature' vision. We use this to develop site-specific farm management plans with agricultural tenants. The aim is to manage land to benefit multiple biodiversity priorities; ensuring the environment and biodiversity is conserved and enhanced beyond compliance. This has already been delivered successfully at three pilot sites during the present business plan period.

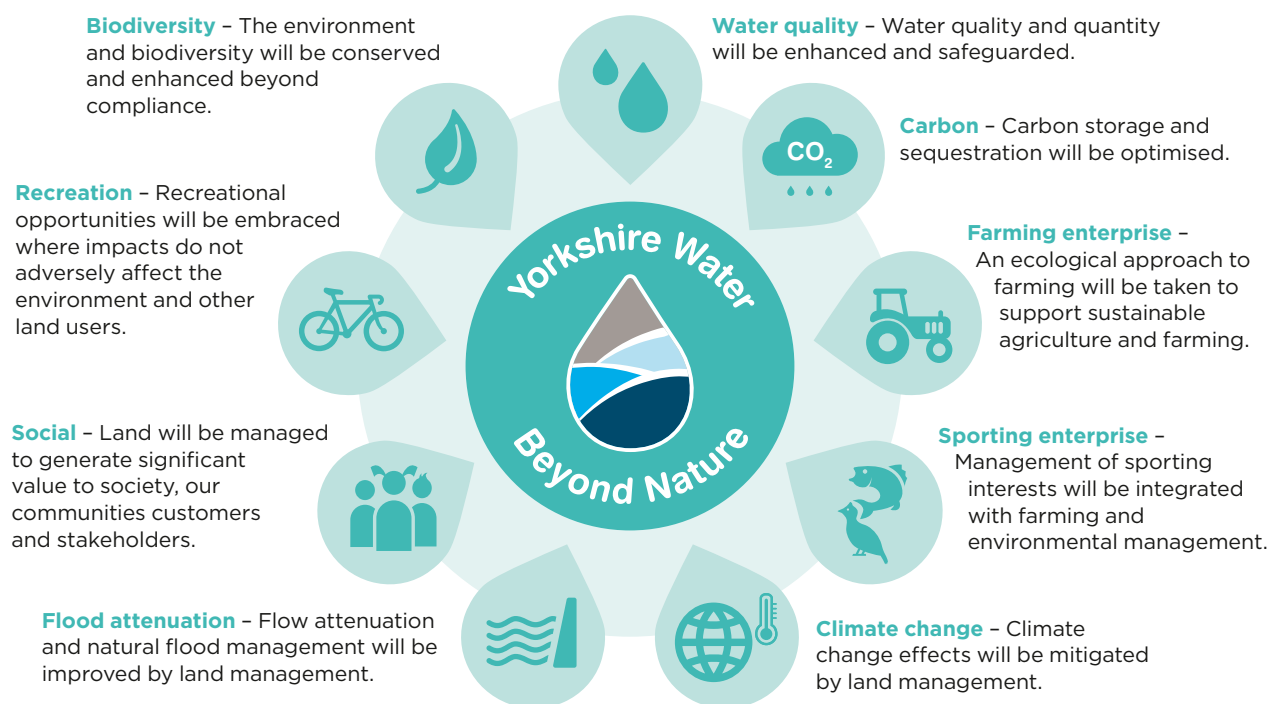


Figure 19a – Our Beyond Nature vision.

Our incentive to deliver

The land conserved and enhanced performance commitment is financially incentivised through under and out performance payments. The incentive type is a continuation of the PR14 measure, where rewards and penalties apply. Our customers consider land conserved and enhanced to be of moderate importance and strongly support the continuation of underperformance and outperformance payments for the performance commitment, with the incentive rates drawn directly from customer valuation research.

The ODI follows the prescribed formula for calculating incentive rates, using marginal benefits and marginal costs calibrated for the forecast totex sharing rate:

- The standard underperformance payment rate is -£1,132 per ha.
- The standard outperformance payment rate is £1,132 per ha.

There is no deadband for this performance commitment; standard under and out performance payments occur above or below the target level.

The ODI payments will be recovered across the Wastewater Network Plus and Water Resources price controls.

Integrated catchment management

Big Goal: Environment

We will remove surface water from our sewers and recycle all wastewater, protecting the environment from sewer flooding and pollution.

Table 19c

Annual performance targets – integrated catchment management					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Percentage	-	-	-	-	7.7

In summary

This performance commitment relates to the proportion of catchments where, working with stakeholders, we implement the Natural Capital Operator Model. We deliver the best, most sustainable environmental benefits for our customers, working with others to coordinate planning and investment rather than delivering our services in isolation. This performance commitment measures the percentage of catchments where a Natural Capital Operator based management plan is formally developed and agreed, and relevant actions implemented.

We are implementing management plans in 7.7% of our operational catchments, with a target of 20% by 2030.

Defra's recent 25-year environment plan emphasised the role of natural capital and the importance of sustainably realising economic and social benefits from the UK's

ecosystems when managing the natural environment. Under our guidance, the performance commitment brings together various stakeholders and the strands of catchment management activity they each deliver.

We want to be recognised as a leader of environmental management for the region. We intend to mitigate risk to water quality and protect the environment for current and future generations. We will develop integrated catchment plans that seek to protect and improve:

- Water quality, current situation and trends.
- Flow attenuation and natural flood management.
- Biodiversity.
- Recreational opportunities, health and wellbeing for people.
- Social value for customers and stakeholders.
- Carbon sequestration (locking in of carbon).
- Healthy catchments to resist pressures of changing climate.

For each catchment, an independently reviewed Natural Capital Operator management plan will be produced to ensure an evidence-based joined up approach delivers the best interests for society over the long-term. Catchment plans will be developed, consulted upon and agreed with stakeholders including Natural England, the Environment Agency, the relevant Catchment Based Approach (CaBA) partnership², Local Nature Partnership³ and the Yorkshire Water Biodiversity Advisory Panel. We will also engage stakeholders from across the region, such as Wildlife and Rivers Trusts.

The performance commitment is new for the 2020-25 period with a non-financial incentive.

Engagement

Our customer focus groups have identified very high customer support for this activity, with a strong majority of customers considering it should form a performance commitment for 2020-25.

Overall perceptions of the performance commitment are positive. It is perceived as being able to benefit all involved. The teamwork and community aspects particularly drew attention and praise in testing.

We know that being certain their water is always safe to drink is of paramount importance to our customers, and research reveals customers want us to increasingly work with partners to protect water quality into the future. Whilst typically averse to paying more for improvements, our customers show above average support for paying more for initiatives that serve this aim.

“I especially like the way that it doesn't just focus on building expensive infrastructure to achieve its goals, but involves the local community in setting up a diverse range of systems to enhance both the environment and public health and wellbeing”.

– YourWater respondent

² www.catchmentbasedapproach.org.

³ www.gov.uk/government/publications/map-of-local-nature-partnerships.

Our performance to date

We have extensive experience delivering integrated catchment management and were one of around 50 organisations globally to pilot test the then draft Natural Capital Protocol⁴. As an example:

- Little Don catchment – we created a framework and model for comparing options for the area, going beyond financial considerations to value the impact on people’s health and wellbeing, job creation, the local economy, and the natural environment. We are now using this approach in other areas of the business, including some of our operational sites.
- Rivelin wastewater treatment works (WwTW) – we used economic valuations to understand the positive and negative natural capital effects of different potential solutions. Our assessment showed our chosen option significantly reduced negative environmental impacts and introduced positive enhancements, enabling an environmental value of around £3.8 million. We used economic valuations to understand the positive and negative natural capital effects of different potential solutions. Our assessment showed our chosen option significantly reduced negative environmental impacts and introduced positive enhancements, enabling an environmental value of around £3.8 million.

Our plans to deliver this commitment

We are adopting a market-based approach to deliver the greatest customer benefit across a variety of ecosystem services for the lowest costs. The adoption of a participatory way of working with our stakeholders ensures a resilient outcome, as multiple parties invest time, finances and effort for a successful outcome. We are implementing a new sustainable way of working to ensure the natural capital within our catchments is appropriately understood, utilised and safeguarded on behalf of present and future customers.

To deliver a sustainable catchment plan that ensures sustainable water services, we identified a number of sites where integrated catchment management can deliver improvements to water quality:

- **Chellow Heights** – currently has low dissolved oxygen levels and sub-standard fish populations.
- **Oldfield/Sladen Valley** - has failures linked to phosphates and fish passage.
- **Fixby** - has fish, macroinvertebrates, phytobenthos and phosphates failures.

With our leadership, stakeholder steering groups will be set up to deliver the co-creation of catchment management plans.

Learning from our innovative approach will be shared with national stakeholders, such as Defra, the Environment Agency, and the Natural Capital Committee.

The performance commitment will deliver greater benefits across the identified ecosystem services, for the same price or less than our existing investment profile within a catchment, therefore delivering value for money for our customers.

This performance commitment will be delivered at a cost of £400,000 capital and £140,000 operational spend.

Our incentive to deliver

The integrated catchment management performance commitment is a new, bespoke commitment. Integrated catchment management is of medium importance to our customers. As the measure is new, and reporting is not sufficiently mature, a non-financial incentive is appropriate.

As there is customer support for the performance commitment we will continue to develop the measure throughout the 2020-2025 period and will engage with customers to understand if they would prefer the measure to become financially incentivised in the longer term.

We are committed to ensuring that information on our performance is easily accessible to all. We will be promoting our annual performance against non-financial incentives, as well as other key measures which are not regulatory, through a wide range of media channels, customer campaigns and our Executive pay and incentive scheme.

Length of river improved

Big Goal: Environment

We will remove surface water from our sewers and recycle all wastewater, protecting the environment from sewer flooding and pollution.

Table 19d

Annual performance targets – length of river improved					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Kilometres (km)	-	-	-	-	767.63

In summary

This performance commitment relates to the length of river improved in our region. We have a key role in protecting and enhancing the water environment. This performance commitment contributes to increasing the health of our waterways by improving river water quality and habitat, to aid the resilience of aquatic wildlife. It also helps deliver socio-economic benefits, such as increased opportunities for salmon fishing, which would not be present without installation of fish passes and improved water quality in Yorkshire’s rivers.

The total length of river improved target for the 2020-25 period is 767.63km, an increase of 45% from our current target, demonstrating our ambition and commitment to stretching targets.

The total sum of wastewater and clean water improvements are broken down as:

- Wastewater length of river improved: 663.18km.
- Clean water length of river improved: 104.45km.

⁴ Natural Capital Protocol aims to enable businesses to measure and value their direct and indirect impacts and dependencies on the natural capital: www.naturalcapitalcoalition.org/wp-content/uploads/2016/07/NCC_Pilot_business-insight_16pp_WEB_PM.pdf.

We work in collaboration to deliver improvements to ensure compliance with UK legislation. We collaborate with the Environment Agency to define a series of environmental objectives for the WINEP to achieve “Good status”, or “pathway to Good”, by 2027. River water quality improvements are achieved by increasing the quality of the effluent that is discharged to the watercourse from our wastewater treatment works.

This performance commitment is an existing measure for the current period, however, its definition has been modified to include non-Water Framework Directive schemes and schemes not associated with our land or assets. It has a financial ODI with under and out performance payments, to be recognised at the end of the 2020-25 period.

Engagement

Our customers demonstrate high support for this performance commitment, with a majority rating it very important. Our customers typically want to see consistent improvement in our performance against this commitment over the short and long term.

Our testing has revealed that ensuring we recycle sewage back into the river in a way that protects plant and animal life is important to customers.

Environment Agency support for this performance commitment has been gained during the current period and in the planning process for 2020-25. The Environment Agency reports to Defra on the length of river improved to quantify the improvement delivered to the environment through WINEP.

“It’s important, we want to look after the fish and where they’ve cleared up areas of the rivers over the last few years it looks great and it feels better. They should be doing it.”

– Residential customer, Leeds

Our performance to date

The length of river improved performance commitment is delivered through a series of wastewater and clean water improvements.

Wastewater improvements include:

- Introduction of new or tighter environmental permit water quality limits for a defined determinand and (for example ammonia, phosphorus) at WwTW.
- Storm storage solutions defined through Water Framework Directive water quality investigation and impact modelling to reduce the volume and frequency of storm discharges from the wastewater network.

Clean water improvements include:

- Improvements to river flow.
- Fish passage.
- Ecological habitat.

By participating in a national trial coordinated by UKWIR, we have tested different phosphorous removal processes. This has provided us with the insight to deliver the most efficient and effective phosphorous removal at our wastewater treatment works.

The 2015-20 period is the first where clean water length of river improvements have been measured and recorded. We forecast to significantly outperform our PR14 performance commitment, demonstrating our capability and ability to deliver river improvements in line with length of river targets.

Our plans to deliver this commitment

We always consider innovative solutions to ensure cost efficiency and outcome resilience, and an initial options appraisal considers innovative, novel designs. Priority weighting is given to options which increase ecological resilience. For example, using fish pass schemes to remove obstacles to fish migration offers optimal ecological resilience, and this option is prioritised wherever possible. In taking this approach to increase ecological resilience, Yorkshire’s rivers become more resistant to shocks and stresses.

Each obligation in WINEP must be achieved and there are various options to do this. For example:

- Building tertiary treatment at a wastewater treatment works to achieve the required phosphorus removal.
- Transfer to another wastewater treatment works with available capacity for treatment.
- Deliver tighter phosphorus removal at an upstream works to remove the need for phosphorus removal at the downstream works while maintaining the same length of river improved.

Water quality modelling work would be used to understand and justify where this is possible.

We are adopting alternative storm storage solutions, such as surface water separation and sustainable urban drainage solutions. These deliver greater resilience and potential for absorbing climate change impacts, such as the likelihood and severity of storm flows into our sewers.

Analysis allows us to ensure the delivery of a scheme is cost-beneficial using a method agreed with the Environment Agency.

Obligations included in WINEP under the Urban Waste Water Treatment Regulations, for example Sensitive Area (Eutrophic), are statutory obligations and must be delivered. We ensure the most cost-effective solution is used to deliver these obligations, using our approach to procurement and contract management.

Our incentive to deliver

The length of river improved performance commitment is financially incentivised through under and out performance payments. The incentive type is a continuation of the PR14 measure, where rewards and penalties apply. Length of river improved is of very high importance to our customers. Our customers are also extremely supportive of the underperformance and outperformance payments for the performance

commitment, with the incentive rates drawn directly from customer valuation research.

The ODI follows the prescribed formula for calculating incentive rates, using marginal benefits and marginal costs calibrated for the forecast totex sharing rate:

- The standard underperformance payment rate is -£176,120 per km of river.
- The standard outperformance payment rate is £176,120 per km of river.

There is no deadband for this performance commitment; standard under and out performance payments occur above or below the target level.

The ODI payments will be recovered across the Wastewater Network Plus and Water Resources price controls.

Biosecurity implementation

Big Goal: Environment

We will remove surface water from our sewers and recycle all wastewater, protecting the environment from sewer flooding and pollution.

Table 19e

Annual performance targets – biosecurity implementation					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Management plans	-	-	-	-	12

In summary

This performance commitment relates to the number of biosecurity interventions we implement to reduce the spread of invasive non-native species. Biosecurity encompasses reasonable and practicable measures to prevent the spread of harmful organisms, such as plants, animals, fungi or pathogens. We do this through the use of pathway management plans.

We will deliver 12 meaningful interventions, agreed with the Environment Agency and other stakeholders, by the end of the 2020-25 period.

The performance commitment is a new measure for the 2020-25 period. It has a non-financial incentive. We will report on our progress annually.

Invasive non-native species (INNS) and pathogens can have a large impact on our operations, our environment and our customers. Different species spread from place to place through a variety of methods. The best way to enhance resilience, prevent damage and minimise the costs associated with the damage caused by these species, is to stop them arriving in the first place. This can be achieved by good biosecurity, the term given to interventions designed to stop their spread.

As set out in Defra’s 25 Year Environment Plan, enhancing biosecurity is now a key Government ambition. Our pathway management plan approach is modelled on pathway action plans produced by GBNNSS⁵, the organisation responsible for coordinating efforts to follow the EU Invasive Alien Species Strategy in Great Britain

The performance commitment supports:

- The WINEP drive to reduce the spread of INNS.
- The outcomes of the Yorkshire Water INNS Position Statement⁶.
- The 2015 GB INNS Strategy.
- Legal requirements under the Invasive Alien Species Regulations 2014, and the Wildlife and Countryside Act 1981 (as amended).
- Prevention of Water Framework Directive deterioration through the new arrival of INNS, such as killer shrimp or crayfish plague.

Engagement

Our customers demonstrate good support for this performance commitment, with a majority study rating it important. Research reveals customers consider that the security around our water supply is an important future issue.

We have consulted with and are supported by the Yorkshire Invasive Species Forum, our regional Local Action Group for invasive species, originally funded by Defra. We also have support from the Yorkshire Dales Biosecurity and Invasive Species Steering Group. We have shared and developed this commitment with key regional and national stakeholders such as the Yorkshire Wildlife Trust, Wildlife and Countryside Link.

Our performance to date

We are working with others, such as the Yorkshire Invasive Species Forum, British Canoeing and the Environment Agency, to promote good biosecurity.

We are one of only a small number of water companies whose advance preparation has enabled us to develop a commitment specific to mitigating this emerging risk. We have improved our organisational resilience through new biosecurity measures during the 2015-20 period by:

- Mapping invasive species presence at over 120 of our critical assets to inform the development of a corporate risk assessment and prioritisation framework.
- Completing work to identify the key pathways of spread, and where intervention is required.
- Tendering contracts with biosecurity as standard.
- Building biosecurity infrastructure such as kayak wash-down areas at Thruscross reservoir.
- Being one of eight water companies supporting Defra’s national Check Clean Dry campaign.
- Developing novel monitoring techniques for INNS, such as the use of environmental DNA technology to monitor for zebra mussel.

⁵ Great Britain Non-Native Species Secretariat, a body jointly supported by Defra, the Scottish Government and the Welsh Government.

⁶ www.yorkshirewater.com/about-us/what-we-do/investment-environment/biodiversity.

We are working with the University of Leeds to support academic research and dissemination of learning focused around preventing the spread of INNS, and are supporting the Centre for Agriculture and Bioscience International (CABI) in their development of biocontrol management techniques as a sustainable method for future INNS control. We have also organised a regional scientific conference focused on linking academics and practitioners to disseminate best practice.

Our plans to deliver this commitment

We have identified the pathways under our control and will implement biosecurity along these pathways to prevent the spread of INNS and pathogens. An independently reviewed pathway management plan will be produced for each biodiversity intervention, with specific actions that must have been achieved and evidenced before biosecurity interventions can contribute to our performance. The pathway plans will be reviewed and agreed by the Environment Agency in advance. All actions must be complete and signed off by the Environment Agency before we can consider a pathway as implemented.

The majority of interventions are linked to our WINEP, scoped in collaboration with the Environment Agency and Natural England. Our primary focus is on strengthening operational and environmental resilience and mitigating the cost associated with resolving any problems caused by INNS, for example clogged valves and water quality incidents.

Managing invasive species that have established on our sites is not a sustainable or efficient long-term option. Through work with the University of Leeds, we have been able to benchmark our current biosecurity strength and that of our recreational users. Working with the University of Leeds and the Environment Agency, we have been successful in gaining NERC funding to employ a translation fellow to help us implement up-to-date scientific learning on biosecurity.

To support the delivery of our pathway management plans, we will:

- Trial environmental DNA using new monitoring tools to allow us to establish what species are present and where, upstream of our sites.
- Work with CABI and the University of Leeds to develop and trial novel management techniques to establish sustainable and cost-effective approaches to INNS control.

Our work in the 2015-20 period has enabled us to understand the scale of the risk to our operations posed by each pathway, and the relative maturity of the biosecurity interventions associated with each. Our pathway management plans for the 2020-25 period are designed to achieve a balance between 'quick wins', such as staff training and the provision of equipment washing facilities, through to research investigations into potential mitigation measures to prevent the spread of INNS through our raw water transfer pipelines.

Our 2020-25 period programme takes a holistic and inclusive view of corporate biosecurity, where we recognise we are intertwined with other catchment users and can only truly safeguard our sites if we work with others to do so.

Affordability is central to this commitment, with an emphasis on evidence-based approaches to manage the threats from invasive species cost effectively. Prevention is better than cure.

Within the WINEP, 19 schemes have been identified through the Environment Agency's PR19 INNS Driver Guidance. We plan to deliver these at a cost of £4.7 million.

While the Environment Agency has confirmed that no cost-benefit assessment is applicable, due to our obligations under the Water Framework No Deterioration driver, we endeavour to work with them to produce a cost-effective solution to balance investment and risk.

We are focused on implementing biosecurity over management. This is a sustainable and proven approach to deliver a good outcome at a lesser cost. Through our ongoing work, we have proven the success of working with others (such as the Yorkshire Invasive Species Forum) to deliver cost effective outcomes that deliver additional benefits for customers.

Our incentive to deliver

The Biosecurity performance commitment is a new, bespoke commitment to Yorkshire Water. Biosecurity is of high importance to our customers. As the measure is new, and reporting is not sufficiently mature, it is not appropriate to financially incentivise the measure.

As there is customer support for the performance commitment we will continue to develop the measure throughout the 2020-25 period and will engage with customers to understand if they would prefer the measure to become financially incentivised in the longer term.

We are committed to ensuring that information on our performance is easily accessible to all. We will be promoting our annual performance against non-financial incentives, as well as other key measures which are not regulatory, through a wide range of media channels, customer campaigns and our Executive pay and incentive scheme.

Carbon

Big Goals: Water supply

We will always provide you with enough safe water, we will not waste water and always protect the environment.

Table 19f

Annual performance targets - carbon					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
kt CO ₂ e	-	-	-	-	280

In summary

This commitment is focused on maintaining and further enhancing our success in substantially cutting greenhouse gas emissions, 'carbon', from our operations and asset management, whilst also increasing the carbon stored in our land estate. We recognise that climate change is a real, material challenge for society, specifically for the water and wastewater services on which our customers rely. We are acting to reduce the carbon emissions linked to our business operations. This performance commitment will assist us in working towards our long-term ambition of supporting the UK's commitment to cut carbon emissions by 80% by 2050.

We will cut 280kt CO₂e from our forecast carbon footprint over the 2020-25 period.

This is a stretching target since the changes in regulation to phosphorus consents has significantly increased the size of our business plan. This, coupled with population growth and climate change, is putting upward pressure on our emissions every year. We must work hard just to keep our emissions stable. This target pushes us to go even further to cut a significant amount of carbon from our operations. This means that we will have to become even more efficient, which will help us to keep bills down and save money for customers.

The outcomes of this commitment deliver multiple benefits for customers and society; supporting the long-term resilience of water and wastewater services, playing our part in reducing environmental harm and the growing consequences for people, and facilitating partnerships.

The performance commitment is a new measure for the 2020-25 period. It has a financial outcome delivery incentive (ODI) with proposed under and out performance payments, to be recognised at the end of the 2020-25 period.

Engagement

Our customers demonstrate good support for this performance commitment, with a majority rating it important. Our customers typically want to see consistent improvement in our performance against this commitment over the short and long term.

Reducing our carbon footprint is something our customers simply expect from us. They recognise

our direct relationship with the environment, so expect us to lead the way. Research reveals that customers consider we should focus our efforts on this activity into the future to ensure we have appropriate plans and resources to mitigate for population growth, extreme weather and climate change.

“The environment is so important, it's great to see that they're doing things like this. They need to be really ambitious as far as I'm concerned.” – Residential customer, Hull.

Our performance to date

In 2013, in support of the Infrastructure Carbon Review (ICR), we made several commitments. One was to strive to reduce carbon embedded in the assets that we build by 50% by 2020 and another was to continue to reduce our operational carbon emissions every year. At the time, these appeared stretching yet achievable targets.

Our approach to carbon reduction is mature and we have reduced our carbon year-on-year from 386kt CO₂e in 2012-13 to 289kt CO₂e in 2017-18. The main contributing factors to the reductions are:

- Reduction in overall consumption: we have invested and upgraded our sludge facilities which has led to an increase in Bio-Gas production through anaerobic digestion, which is converted into electricity via combined heat and power (CHP) engines.
- Increasing self-generation: we have invested and upgraded our sludge facilities which has led to an increase in Bio-Gas through anaerobic digestion, which is converted into electricity via combined heat and power (CHP) engines.
- Reduction of the grid emission factor: the decarbonisation of the national grid has led to a reduction in the electricity emission factors.

The table below highlights our ranking in comparison to other water companies, in relation to carbon emissions for clean and wastewater sites, and demonstrates our commitment to reducing our emissions. We have made great strides in reducing our emissions from wastewater sites, in particular. Over the past three years our wastewater emissions decreased by 108 kgCO₂e /MI, which is significantly more than any other water company.

Table 19g

Comparative table of water company reductions in carbon emissions (kgCO ₂ e /MI)								
Year	Wastewater			% reduction	Clean water			% reduction
	14/15	15/16	16/17		14/15	15/16	16/17	
Anglian	372	364	332	11%	422	388	361	14%
Northumbrian	316	319	252	20%	201	200	191	5%
Severn Trent	204	179	192	6%	371	350	321	13%
Southern	401	380	389	3%	378	360	329	13%
South West	446	387	393	12%	308	284	321	+4%
Thames	298	303	225	24%	296	273	141	52%
United Utilities	272	266	257	6%	240	227	229	5%
Welsh Water	266	249	242	9%	367	273	263	28%
Wessex	256	300	233	9%	333	320	303	9%
Yorkshire	326	265	218	33%	301	282	263	13%

All figures are in kgCO₂e /MI. Source: <https://discoverwater.co.uk/energy-emissions>

We are proud of the reductions we have made to our operational carbon emissions. However we are only just beginning to understand our embedded carbon emissions and are at the beginning of our journey to reduce the emissions associated with maintaining our asset base. We have recently determined that so far this period, we have made a 23% reduction in carbon embedded in the assets we build, compared to our 2015 baseline. This indicates we could save around 127kt CO₂e over 2015-20.

Over the past year, we have developed a much richer understanding of the carbon footprint associated with maintaining our assets. We can now see the impact of our infrastructure programme on both our embedded and operational carbon emissions. This shows us that our embedded carbon emissions are only about a third of our total carbon emissions. We therefore want to evolve the ICR commitments into one overarching performance commitment to reduce our overall carbon footprint. We will take a whole-life-carbon approach to our asset management programme as we need to strike the right balance between operational and embedded carbon reductions. Getting this wrong can have an unintentional adverse effect on overall emissions, for example, concentrating solely on reducing embedded carbon can drive up operational carbon and vice-versa.

We are working to understand the net emissions of our land holdings so that we can understand all the carbon emissions associated with our activities. Our work to date suggests there is currently a relatively small amount of carbon being stored in our land every year. We believe this is an important part of our carbon-footprint as we are working to store more carbon in our peatland and woodland as part of our land management programmes. We anticipate that the carbon we are locking away in our estate will begin to increase as the projects we are undertaking on the land begin to take effect.

Our plans to deliver this commitment

We have identified the areas of our business that have the greatest impact on our carbon footprint.

Innovative approaches to asset design and maintenance

We are proactively addressing the issue of the large amount of carbon that is associated with our infrastructure maintenance. We will show leadership to our value chain members, establishing an effective governance system for reducing whole life carbon by promoting innovative solutions that result in whole-life-carbon reductions.

Increased generation

Renewable energy is classed as carbon neutral. As such, an increase in generation will result in a lower carbon footprint, as well as helping to reduce customers' bills due to lower electricity costs. We will produce 12% of our electrical consumption through renewable technology and this will help drive down our carbon emissions. Self-generation increases our resilience, as it helps us be less reliant on the national grid for our energy. Our generation also supports national resilience by easing pressure on the national grid and diversifying to locally produced energy sources.

At Knothrop WwTW we are installing a £72 million anaerobic digestion plant that will generate an estimated 23.6GWh of energy per annum. This will provide 60% of the electricity at Knothrop, reducing the amount we buy from the national grid and keeping our customers' bills low. We are also constructing anaerobic digesters at our Calder Valley site, which could provide a further 11GWh per annum.

Energy Saving Opportunity Scheme (ESOS) projects

Yorkshire Water must comply with ESOS. The scheme requires us to assess 90% of our energy consumption and identify efficiency projects to promote energy reduction.

Phase one was completed in 2015-16 with multiple opportunities identified. The second phase of the scheme is now underway and additional projects have already been identified. There is a long-term plan and schedule in place for energy audits to be carried out ensuring we are compliant with the scheme and that we can reduce our energy consumption.

We are committed to reducing our annual electricity consumption by replacing old inefficient assets with highly efficient equipment.

Land management

Through our land management programmes, we are working to restore, maintain and enhance our land to deliver a range of benefits to the water environment and wider society, including carbon sequestration. We own large quantities of peatland and woodland, which can help us sequester (lock in) carbon. We have a number of innovative projects on our land such as our Beyond Nature scheme (to read more about this see our land conserved and enhanced performance commitment), which encourages more sustainable farming practices and our pledge to plant 1 million trees.

Our incentive to deliver

The carbon performance commitment is financially incentivised through under and out performance payments. The performance commitment is a new measure for 2020-25 and so has had no previous incentive. Our customers consider carbon to be of high importance. Our customers also strongly support the underperformance and outperformance payments for the performance commitment, with the incentive rate derived from the shadow market carbon price.

We have engaged with customers and they support the use of a financial incentive for this performance commitment.

The ODI follows the prescribed formula for calculating incentive rates, using marginal benefits and marginal costs calibrated for the forecast totex sharing rate.

- The standard underperformance payment rate is -£94,400 per kt CO₂e.
- The standard outperformance payment rate is £94,400 per kt CO₂e.

There is no deadband for this performance commitment; standard under and out performance payments occur above or below the target level.

The ODI payments will be recovered across the Water Network Plus, Wastewater Network Plus, Water Resources and Bioresources price controls.

Education

Big Goal: Water Supply

We will always provide you with enough safe water, we will not waste water and always protect the environment.

Table 19h

Annual performance targets – education					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Hours	20,000	20,000	20,000	20,000	20,000

In summary

This performance commitment relates to the number of learning hours we provide to raise understanding of the value of water. Through our education programme we are encouraging engagement and future participation by creating:

- A shared knowledge with current and future generations.
- An understanding of the water industry, resulting in demand reduction and addressing sewer misuse.
- An understanding of where the money we obtain from customer bills is spent.

It is our aim to deliver 20,000 educational hours per financial year, increasing to 40,000 by 2045.

The performance commitment is new for the 2020-25 period. It has a financial ODI with a proposed underperformance payment, to be recognised annually in-period.

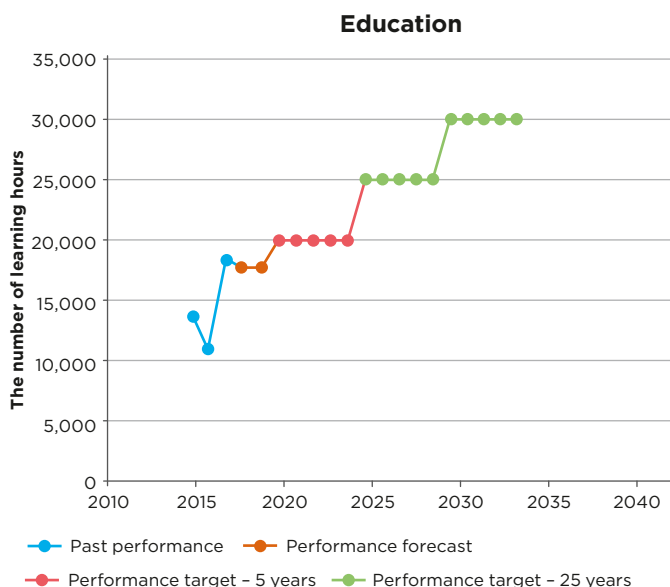


Figure 19b – Education.

Our education programme works on the principal that ‘I hear, and I forget, I see, and I remember, I do, and I understand’. All activities are designed to be interactive and have a lasting impression on the people we engage with. The experiences offered to students will not only benefit the region in which they live, Yorkshire, but also (as we live in a very transient world), support other geographical locations as they take the knowledge gained with them throughout life’s adventures.

Engagement

Our customers demonstrate good support for this performance commitment, with a majority rating it important.

Our customers show strong support for initiatives that seek to educate communities, particularly regarding water management. Once engaged, customers are often surprised and impressed by the scope and ambition of our operations. They recognise the low appreciation for water and see education as essential to changing consumer behaviour and future-proofing our operations. Those in circumstances that make them vulnerable often show increased interest in educational elements of initiatives.

Customers recommend visual, interactive and fun campaigns which focus heavily on schools, but reach adults through other channels.

“It’s all about the schools because young people really take this sort of thing on-board. If you get in early, it can work.”

– Workshop attendee

Our performance to date

We have engaged with young people through education for decades and have a track record of delivering a high-quality experience. We are proud that all our centres hold the Learning Outside the Classroom Quality Badge; a nationally recognised indicator of good quality education.

Feedback from post-visit evaluation provides an indication of impact on students’ learning. Summary data from evaluation forms received in autumn 2017 and spring 2018 are detailed below:

From a teacher’s perspective:

“Knowing that a real person outside of the classroom was taking an interest in the children’s questions brought the topic to life for them. It took the topic from the theoretical to the real with the result that they began to ask questions in closer detail about the processes of cleaning wastewater. As a result, they were engaged and excited about what they were learning.”

Our plans to deliver this commitment

Our education sessions:

- Raise awareness of the value of water.
- Develop understanding of clean and wastewater treatment processes.
- Inform people about our services.
- Show how people can use water and our sewerage systems wisely.

Where appropriate, content is linked to the national curriculum and our main focus is educating children through on-site visits. We will also deliver sessions to community groups, universities and businesses. The performance commitment covers operational tours, open days, workshops, subject specific talks and assemblies.

While the education programme focuses on visits to operational sites, we also offer outreach sessions within a school environment where these are most appropriate.

The programme content offered is fluid as we recognise all our visiting customers have different needs, learning styles and learning objectives. We can adapt our programmes if required, introducing activities to meet new company obligations and areas of focus relatively easy. Our team of experienced educational professionals has the capacity to create, evolve, trial and deliver at short notice. As a result, we are flexible to the needs of our customers, the business and our regulatory obligations.

What we teach

We believe that learning away from the classroom environment is important to widening awareness of the world around them, while opening students' eyes to the variety of career opportunities available as they progress through education.

Centre based activities

At our water treatment sites pupils can learn about the water cycle, the environment and how we ensure Yorkshire has a constant supply of fresh drinking water. We offer a range of activities including guided tours and group activities.

Through a range of interactive tools, we raise awareness on the finite resource that is water, why it is important to not waste water and how small actions can help prevent sewer blockages and alleviate flooding in high-risk areas.

Students are able to really get stuck in, working on a series of projects that help explain the water cycle and what we do with water to make it safe to drink. We offer student booklets and teacher resource packs so further learning can continue in the classroom.

Our Big Wish activity programme has been devised in collaboration with WaterAid and is the first of its kind in the industry. It focuses on the difference between communities in Ethiopia and the Yorkshire region. The programme explores how villagers access their water supplies and the benefits of working with WaterAid to bring clean water and sanitation to those less fortunate.

Outreach activities

We will deliver outreach sessions to schools and community groups on a variety of subjects, with content driven by business need and requests made by teachers. These may be delivered through assemblies or workshops depending on individual requirements. Content covers the water cycle, safety around operational works, water conservation, sewer blockage prevention, WaterAid and sustainable drainage.

Open days

All our customers are invited into our operational works to see the processes or investment made by us. These events follow a similar structure to the centre-based visits; they are aimed at adults and children and include a site tour.

We use a low-cost model of operation to deliver our education programme and our facilities are based on operational works, so there are no expensive assets such as touring exhibition units or stand-alone centres.

Soak It Up' - teaching about sustainable drainage

'Soak It Up' is a new programme for 2018. A collaboration with Yorkshire Wildlife Trust, it will provide a workshop-based activity to schools and community groups about the installation of sustainable drainage systems (SuDS) in communities affected by surface water flooding.

The activity will bring together educational workshops, community participation and colleague volunteering to bring a new approach to community engagement.

The estimated cost of delivery is based on 2018 values of approximately £3.60 per hour per student. Our in-house education programme is efficient and offers value for money; we believe it is the most flexible way of delivering to our target audiences.

Our incentive to deliver

The education performance commitment is financially incentivised through an under-performance payment. The performance commitment is new for 2020-25 and so has had no previous incentive. Our customers consider education to be of lower importance and give lower importance to financial incentives. We have incentivised this performance commitment through a cost-based underperformance payment only, as compensation for under delivery of the performance commitment.

Customers will be appropriately compensated for underperformance by having the costs of non-delivery returned to them, adjusted for any costs that will be returned to them through the totex sharing incentive.

- The standard underperformance payment rate is £2 per hour.

The ODI payments will be recovered across the Water Network Plus, Wastewater Network Plus, Water Resources and Bioresources price controls.

Water recycling

Big Goal: Water Supply

We will always provide you with enough safe water, we will not waste water and always protect the environment.

Table 19i

Annual performance targets – water recycling					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Megalitres per day	0.00	2.77	5.79	6.04	6.29

In summary

We know that we face pressure like population growth and a changing climate. Using demand management solutions will enable us to continue to keep our bills low and prevent future harm to the environment through further extraction. This performance commitment is key to building our understanding and relates to the volume of water recycled through recycling wastewater. Recycling water helps us reduce the volume of water abstracted from the environment.

We will increase the volume of water recycled per day. The final year target of 6.29MI/d is the cumulative total for the 5 years of water recycling.

The performance commitment is new for the 2020-25 period. It has a financial ODI with proposed under and out performance payments, to be recognised annually, in-period.

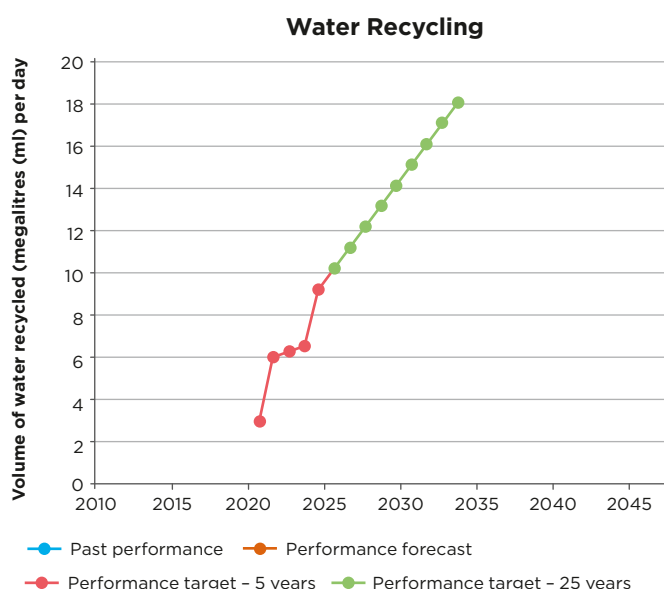


Figure 19c – Water Recycling.

Recycling water is the process of converting wastewater into water of a quality suitable for other purposes. This may include using recycled water in our existing treatment processes or substituting some commercial potable water supplies for final effluent from our wastewater treatment sites. We are also encouraging all customers, household and commercial, to adopt grey water systems to reduce demand and capture rainwater for non-potable use. The success of this performance commitment relies on collaboration with commercial and industrial users as well as the activities we implement on our own processes. This will support the delivery of the per capita consumption performance commitment.

Engagement

Our customers demonstrate very high support for this performance commitment, with a majority rating it very important. When forced to choose, customers ranked this as one of the five most important performance commitments we tested.

Customers are concerned by the long-term effects of population growth and are supportive of initiatives to reduce business and consumer water consumption. Our testing has revealed that ensuring there is enough water to meet demand now and in the future, is of very high importance to customers and, whilst typically averse to paying more for improvements, our customers show above average support for paying more to see our performance improve.

Many customers are interested in participating in water recycling, motivated by the environmental benefits and the potential to reduce their bills through grey water systems and surface water disconnections. They recognise that behaviour change takes time, so understand the need to make changes now to meet future pressures. However, we must gain their respect by taking a leading role. Our customers are sensitive to feeling that they are picking up responsibility which should be ours to bear.

“For me, that’s extremely important. We’ve got to do it. We have no choice. We’ve got to do it.”
– Residential customer, York

“It’s really important, we can’t keep wasting things – and that’s all of us.”
– Residential customer, Hull

Our performance to date

Historically we have sought opportunities to reduce potable water demand in our treatment processes, for example through the use of wastewater effluent for on-site cleaning. We have trialled various water recycling initiatives during the 2015-20 period, determining viability, cost and benefits to deliver. We are implementing a number of these initiatives to deliver this performance commitment in the 2020-25 period.

Our plans to deliver this commitment

Water treatment works

Process water 'wash water' used in clarification and filter washing at our WTW is going to be reused; this avoids discharge into the sewerage system.

By recycling the process water, we:

- Reduce the volume of water abstract from the environment.
- Minimise the volume of wash water discharged to the sewer system, therefore reducing distribution and treatment cost and the likelihood of sewer flooding.

We have designed systems at six WTW to achieve re-use of process water while ensuring the process complies with water quality regulations. We have estimated that 5.54Ml/d of water can be recycled in this way, which equates to around 0.5% of daily demand. This will be delivered by the end of year 3.

Case Study: Reducing the flow at Irton and Ruswarp treatment works

The process water from our Irton and Ruswarp sites currently goes into the sewer forming a high percentage of the flow into the receiving WwTW. This flow is consented as 'dry weather flow' and regulated by the Environment Agency. Both wastewater treatment works are deemed at risk of failing their dry weather flow consents in the future. By reducing the flow from the water treatment works, we have calculated that dry weather flow will be reduced enough to mitigate any further investment at the two sites. Recycling also provides energy saving benefits at the treatment sites; by producing less water and treating less flow.

Wastewater treatment works

At Old Whittington WwTW final effluent is going to be used to wash screens and make up polymer in the combined heat and power plant (CHP).

Collaborative working

We have identified recycling opportunities by working with commercial customers to re-use final effluent as a non-potable substitute, reducing the demand for potable water. We have identified a number of innovative ways to do this:

- Tarmac - using final effluent as a substitute for potable water in concrete production.
- Air Products - using final effluent in their process in Hull.
- BP - Using final effluent in their process in Hull.

We will continue to investigate and develop further initiative for recycling. We will promote the most economic initiatives to deliver the performance commitment.

The remainder of the forecast recycling target is associated with potential final effluent initiatives, we have been conservative with the volumes we think we can achieve through these routes.

Our incentive to deliver

The water recycling performance commitment is financially incentivised through under and out performance payments. The performance commitment is a new measure for 2020-25 and so has had no previous incentive. Water recycling is of very high importance to our customers. Our customers are extremely supportive of a large underperformance and outperformance payments for the performance commitment, with the incentive derived from wider benefit valuations. The ODI follows the prescribed formula for calculating incentive rates, using marginal benefits and marginal costs calibrated for the forecast totex sharing rate:

- The standard underperformance payment rate is -£14,686 per Ml.
- The standard outperformance payment rate is £14,687 per Ml.

There is no deadband for this performance commitment; standard under and out performance payments occur above or below the target level.

The ODI payments will be recovered across the Water Network Plus and Wastewater Network Plus price controls.

D-MeX

Big Goal: Customers

We will develop the deepest possible understanding of our customers' needs and wants and ensure that we develop a service tailored and personalised to meet those needs.

In summary

This performance commitment relates to the service we provide to property developers, self-lay providers (SLPs), and those with new appointments and variations (NAVs), in relation to new connections to our water and sewerage networks.

D-MeX, the developer services measure of experience, is a new measure and is being piloted by Ofwat between April 2018 and March 2019. The initial pilot will be used as a scoping exercise to test the process of data extraction, assess the appropriate sample numbers, structure and quotas, review customer response rates and test relevant lines of questioning.

Ofwat has proposed that the performance commitment is measured using two types of customer survey:

- Feedback from regular qualitative satisfaction surveys.
- A quantitative measure of our performance against a set of key metrics, based on Water UK's existing service level metrics for developer services customers.

We will report on this measure each year in our published Annual Performance Report.

The performance commitment has a financial ODI with proposed under and out performance payments, to be recognised annually in-period.

Engagement

We have worked closely with all our customer groups to understand their needs, frustrations and how we can improve their experience of dealing with our developer services. Our customers demonstrate good support for this performance commitment, with a majority rating it important.

“Well as a developer I obviously find this quite important! It’s important to be able to give feedback and hopefully improve the relationship and communications going forward” – Business customer, Huddersfield

Our performance to date

Since July 2015, Water UK has published quarterly performance results against a set of standard performance metrics for the provision of new connection services. Reporting by Water UK has encouraged improvements to the timescales for service delivery.

In April 2017, Water UK increased the number of reportable metrics and made the targets more stretching. We reviewed our new connections processes and carried out refresher training for our teams. We are working with our partners and developers to provide an understanding of our aims, how to reach them and how to improve on them. By working with our partners, explaining to them the reporting metrics for construction, we have reduced the number of metrics and have also implemented a new portal that allows developers to make applications and payments online.

We have seen an increase in new connection applications due to the upward trend of building, however there are areas within developer services where we can improve to achieve the performance commitment and provide excellent customer service. We are improving our performance to achieve upper quartile status by 2019-20.

Our plans to deliver this commitment

We will achieve our performance commitments by offering a personal service to drive affordability and choice for all customers. Our ambition is to improve and change our business by providing a fair, flexible and accessible experience for our developer services customers. Our approach aligns to our wider end-to-end customer service strategy (read more about our customer service strategy in chapter 6).

Environmental incentives

As part of the new connection services charges arrangements, we offer environmental incentives in the way of reductions on infrastructure charges to our developers. For example, if a developer constructs properties that use less water or dispose of surface water to a source other than the existing public sewer, a reduction in infrastructure charges will be applied. With the upcoming adoption of SuDS, environmental incentives will be reviewed. We are also investigating how charges could be reduced if surface water disposal is reduced to the existing public sewer by means of SuDS.

Throughout the 2020-25 reporting period, we will continue to actively engage with water companies, other sectors and our third-party partners to understand new, innovative and proven methods, techniques and tools. This will proactively contribute to us delivering exceptional, resilient and affordable services to all our customers. We understand the importance of continuous improvement and ensure our services are as resilient and affordable as possible. We will also engage and seek feedback from our customers throughout the next reporting period to understand what really matters to them.

To ensure that efficiencies are passed on to our customers in the form of reduction in future charges, we regularly review and document improvements in:

- Time taken to undertake our services and improvements.
- The end-to-end customer journey experience.

We will ensure these are considered when we undertake our annual review of developer services performance and costs required to calculate future charges.

Our incentive to deliver

We will be subject to financial performance payments of up to 2.5% of annual developer services revenue and performance penalties of up to 5% for the best and worst performers. To read more about our Developer Service performance commitment see appendix 19a.

Creating value from waste

Big Goals: Customers

We will develop the deepest possible understanding of our customers' needs and wants and ensure that we develop a service tailored and personalised to meet those needs.

Table 19j

Annual performance targets – creating value from waste					
Unit	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Value delivered (£m)	-	-	-	-	65.0

In summary

This performance commitment relates to the additional environmental, social and financial benefit we create from resources currently under-used or classified as waste. By applying our six capitals approach, we provide value to our customers, the wider society and the environment. Resources in this context has a broad meaning, including, for example, waste we divert from landfill as per our 2015-20 performance commitment, which this commitment replaces. We are going further during the 2020-25 period to deliver greater benefits on our resources including wastewater, heat and the under-used land or other assets on our sites. Our action towards this performance commitment follows our history of driving innovation to reduce costs by eliminating waste in all its forms. This commitment supports our aspirations to lead the industry through building trust and integrity, by demonstrating how we always working in the interests of the society we serve.

The performance commitment is an evolution of the existing performance commitment 'waste diverted from landfill' in the 2015-20 period. As we have achieved our 100% target of diverting waste from unsustainable disposal routes, such as landfill sites, we have developed the performance commitment for the 2020-25 period to drive the maximum amount of value from waste and under used resources.

The target applied to this commitment is £65 million net value to society by the end of 2025. The net value to society is calculated using the economic valuation approach used in our decision making process, and is based on the valuations customers place on key environmental improvements.

The performance commitment is a new measure for the 2020-25 period. It has a non-financial incentive. We will report on our progress annually.

Engagement

Our customers demonstrate good support for this performance commitment, with a majority rating it important. The majority of our customers seek improvement in our performance against this commitment over the short and long term.

Our performance to date

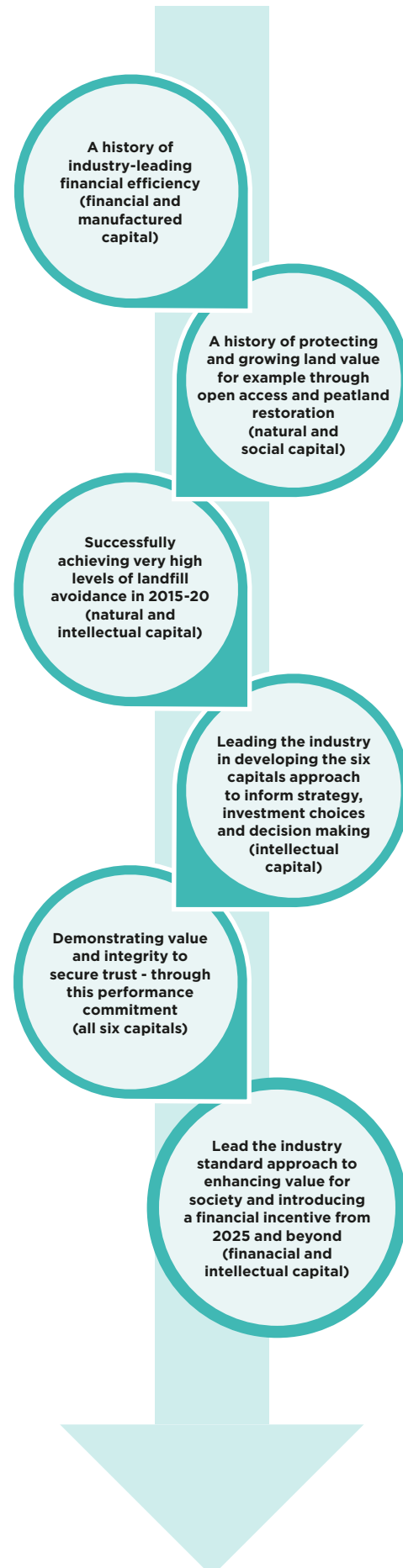


Figure 19d – Creating value from waste: our performance to date.

Our plans to deliver this commitment

This performance commitment will deliver an ambitious programme creating at least £65 million of net value to society. The programme is based on what we know from delivering wider value from our current 'waste diverted from landfill' performance commitment, as well as other activities in this period. The proposed commitment covers a range of activities and their multi-capitals benefits, such as:

- Developments on under-used areas of our operational land to achieve social, natural and financial capital. For example, building highly water efficient and sustainable homes and businesses on brownfield land at Esholt wastewater treatment works, reusing wastewater and heat from our operations.
- Re-purposing operational sites to offer new recreational example which generate social, natural and other capital benefits. For example, through the vision we have developed in partnership with others for the Little Don.
- Further reducing traditional waste by seizing opportunities to turn materials into products with a value to us or others. For example by finding uses for the sludge, grit and screenings we manage and produce in our operations.

We will use the six capitals approach to shape our strategic thinking and for detailed benefits monitoring. The cutting-edge accounting functionality we have built into our new Decision Making Framework will help measure the costs and benefits through a robust and consistent approach.

Delivering benefits from our under-used resources is likely to involve a wide range of third parties and may best be delivered through other organisations once an approach reaches the right stage in its development. For example, Keyland Developments, also part of the Kelda Group, develops group assets in partnership with other organisations. This helps reduce risk to water customers while ensuring success and secured benefits to customers and wider society by engaging the right skills and experiences. The highly innovative approach we have taken to sustainable housing development at our Esholt site demonstrates how this multi-entity working creates value significantly beyond approaches we might achieve working alone.

This performance commitment covers the whole 2020-25 period, rather than being subject to annual targets. This reflects the timescales required to develop these innovative and partnership projects to a stage in which they start delivering benefits.

Our incentive to deliver

The creating value from waste performance commitment is new and builds on our previous waste diverted to land performance commitment. Creating value from waste is of lower importance to our customers and so we have worked hard to evolve the commitment into something more relevant for our wider business. As this is a new measure, we propose a non-financial incentive for this performance commitment, recognising that the approach is at an early stage of development. By further maturing associated measurement techniques through the 2020-25 period, we will continue to lead the industry by embedding a standardised methodology that will support a financial incentive in the 2025-30 period.

There are a range of incentives inherent with this performance commitment:

- Building trust and supporting our brand by overtly showing how we strive to grow the value we provide to the society we serve and working in partnership with others.
- Financial savings can be achieved by finding new ways to create value and be more efficient, which in turn lowers customers' bills.
- Growing new skills and knowhow by researching innovative approaches which develop new understanding and relationships.
- Supporting long-term resilience by removing risks to ours, and others, supply and value chains by providing sustainable, local and circular approaches that are less reliant on external inputs which can be interrupted.

Work under this commitment complements others such as our carbon, land conserved and enhanced, working with others and integrated catchment management performance commitments. Aligning closely with our working with others performance commitment, it incentivises how we approach and conduct our operations in a responsible and efficient way, achieving as much as we can. We have ensured that the interactions have not resulted in duplicate incentives. We are committed to ensuring that information on our performance is easily accessible to all. We will be promoting our annual performance against non-financial incentives, as well as other key measures which are not regulatory, through a wide range of media channels, customer campaigns and our Executive pay and incentive schemes.



Managing our performance now and in the future

At Yorkshire Water we have a history of applying governance and control over the delivery of our obligations, outputs, outcomes and commitments to customers. We see good governance as fundamental to the successful delivery of business improvement for customers and shareholders. We have consistently demonstrated the ability to balance service quality and efficiency which has seen us become one of the lowest cost providers in the sector.

To this end we ensure that we always have a clear line of sight between front line daily delivery of service to the corporate objectives of the business with all its obligations.

The Board sets the strategy and direction for the business, through a continuous process of understanding its customers and other stakeholders. This is cascaded into our operational business plans via the executive, and where investment is required, through the Board Investment Committee.

Our rigorous governance and assurance approach ensures that we continue to exceed the performance commitments agreed with customers at PR14, invest in assets that keep bills low in the long term, and reinvest efficiencies to meet the updated service priorities of our customers.

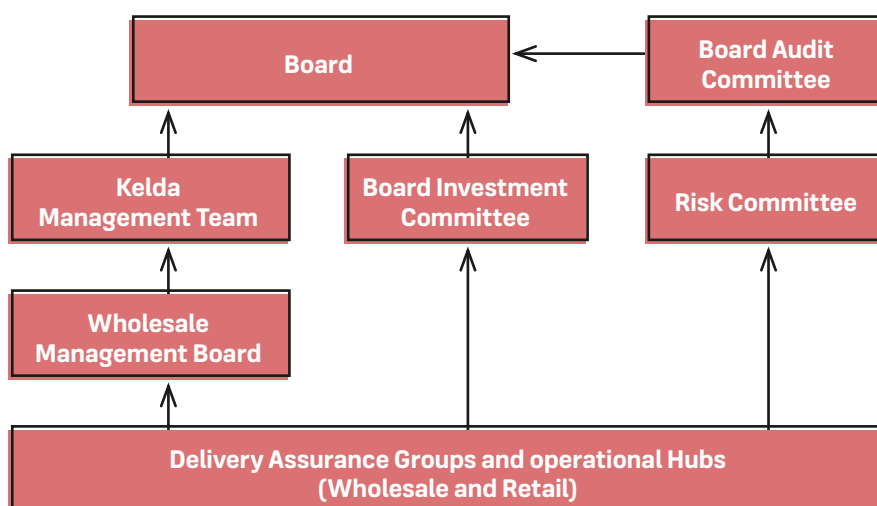


Figure 20a – Control framework for reliable delivery of performance.

Summary of delivery between 2015-20

We have met or outperformed most of the performance commitments to customers at the same time as reinvesting outperformance into the long-term efficiency for customers and their priorities for further service improvement. Based on our latest forecasts we are expecting to have only one of our 26 performance commitments incurring penalty by the end of the period. This is associated with meeting 100% compliance with drinking water quality.

The reinvestment of some £230 million of efficiencies into further reducing leakage, water supply interruptions, pollution incidents and sewer flooding incidents is in direct response to customer's feedback on our performance and what they now expect from us.

We are delivering this performance against the backdrop of experiencing a number significant events. One related to the fatality of one of our people while working on our assets. We also experienced the contamination of the water supply as a result of a third parties activity, the flooding of assets during December 2015 and the freeze/thaw event of 2018.

From this we learnt that operationally we need to maintain an agile response capability to ensure that services to customers are maintained while we recover the system integrity, and that good planning, defined response procedures and communication strategies are key to sustaining services for customers.

In responding to the fatality, we focussed significant employee and management resource on understanding and internalising the event so that we could focus the business on further improving safety for employees, partners and customers whilst not impacting on our service and compliance record.

These events have all had significant impact on the business. Safety has even greater focus, with **Everyone, everyday, safe and well** at the forefront of everything we do to protect people. We are prudent over escalation with rapid de-escalation now implicit in the way we manage incidents and minimise service impact to customers. This thinking has fed into our approach to whole business resilience.

Ensuring delivery for customers

We have delivered, and outperformed, our performance commitments to customers by putting a clear governance and control framework in place that means those who are charged with delivering performance are given the responsibility and empowerment to command resources needed to meet those commitments.

It starts with the Board. The Board understands that it is accountable for delivering services to customers and protecting the environment. The Board has an established framework as shown in figure 20a, which has been successfully deployed to robustly manage the delivery of service performance and efficiency for customers.

Performance commitments are part of the Board's strategy and business plan are cascaded into the business through the executive Kelda Management Team. The Board Investment Committee translates those priorities into the Company's investment programme while the Risk Committee establishes the programme of work to test the risk being carried across the business in relation to the delivering the strategy.

Ultimately the responsibility is passed down to operational Hubs, which run the day-to-day delivery of targets required to meet customer's performance commitments. These teams focus on meeting operational targets that aggregate up to meeting the corporate level business plan. They are empowered to take the local actions necessary to meet their specific targets.

The Delivery Assurance Groups take an overview of the operational performance in meeting the customer performance commitments and identify interventions required to maintain performance on plan, including requests for reprioritisation or injection of investment. On a regular basis the Delivery Assurance Groups report to the Board Investment Committee on progress in delivering the performance commitments. Annually each group presents its options for investment for consideration as part of updating the Board's business plan. In addition, the risks associated with delivering the business plan and performance commitments are reported to the Risk Committee to monitor delivery risk within the plan.

The Board Investment Committee and Risk Committee carry out their duties of monitoring delivery of the customer performance commitments, risk and investment requirements for the business and work to ensure that the resources of the Company are focussed on the areas of greatest risk and how to deploy additional resources to deliver more for customers. The Board Investment Committee reviews the investment programme monthly, reallocating funds across the programme releasing contingency funds to meet the Board's strategy and plan.

The Board Investment Committee takes specific overview for the delivery of the regulatory obligations within the Company's determined investment programme. The Risk Committee through an annual compliance assessment activity monitors and reports the controls and risks associated the Company meeting its statutory and legislative requirements. This is formally reported to the Board Audit Committee and Board.

The Wholesale Board is made up of the leadership of our Service Delivery and Asset Management Directorates and chaired by two executive directors of the Board. It monitors the delivery of the businesses operational performance in delivering performance commitments and considers the changing priorities of customers and other stakeholders to drive the near and long term operational planning of the business.

The executive Kelda Management Team is led by the Chief Executive. It takes a holistic view of the business receiving monthly management information consolidating information from the other bodies so that it has a full picture of Company performance and make organisation wide interventions to ensure the delivery of the Board's strategy and plan including customer's performance commitments.

The Board Audit Committee receives updates from the Risk Committee on the assessed level of risk within the business against a wide range of business risks including statutory and legislative compliance alongside operational performance. It also monitors the performance of the controls within the business in managing delivery.

The Board receives monthly management updates on whole business performance that allows it to challenge the executive in delivering the Board's strategy and for the Board to agree any strategic changes in what the businesses targets should be and how they are delivered. This allows the Board to properly consider whether it is delivering its commitments to customers.

This is a mature framework that has been in operation from the start of the current plan period and has proved key to our success in delivering performance commitments to customers and the obligations placed upon the Company.

What have we learned

We are on track to deliver or outperform the majority of performance commitments to customers and in aggregate we are delivering higher levels of service than determined, as evidenced by the ODI reward position included with the PR14 reconciliation.

In summary, our learning from the delivery of our current performance commitments is that:

- We can deliver better outcomes if we work openly with others.
- We need to be resilient to shocks and stresses so that service is maintained.
- We have an ageing asset base which needs managing to reduce system stress.
- We need to continue to apply a framework of control and governance to assure delivery.

This relationship between understanding the needs of stakeholders, through our operational capability to the control framework to assure delivery is represented in figure 20b.

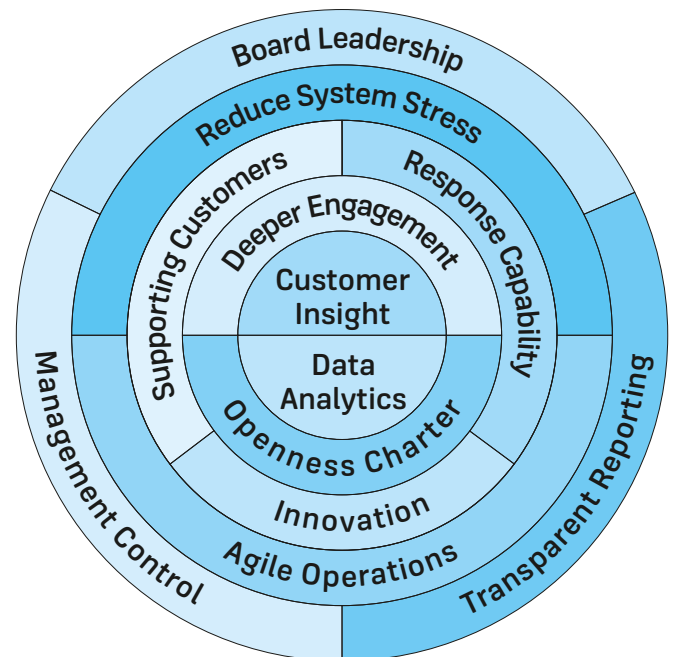


Figure 20b - Our learning from delivering for customers 2015-20.

Working with others

We have engaged with our customers and stakeholders and have changed the way we work and our service targets to reflect their expectations. In particular, this has resulted in the us reinvesting some £230 million of efficiency to drive service performance improvements identified by customers. We know that customer's priorities are not static and that we need to maintain our engagement with them so that we can continue to focus the resources of the Company where customers most value the services.

Through engagement we have identified more efficient ways of delivering benefits. Working directly with customer groups, other organisations and agencies. We have been able to deliver solutions to problems that one party alone cannot resolve. This is demonstrated by the successful over delivery against our working with others performance commitment.

In a similar way we improved our online presence to help customers access the information and services they need, for example, by providing more digital channels for communicating with us and providing self-diagnosis capabilities.

We have developed our 'Openness Charter' where we are making more of the Company's data available to allow leading edge analysis techniques and use of our data to help solve problems in new and innovative ways. Our open data 'hackathon' has identified new approaches to data visualisation of sound that is now being developed to help us detect leaks more efficiently.

We have learned that maintaining the trust and confidence of our stakeholders is key to our success. We want our reporting to be easy to access, easy to read, accurate and trustworthy. We have made significant strides to achieve this through extensive dialogue with customers, the Yorkshire Forum for Water Customers (the Forum) and other stakeholders in our business. We plan to build on and enhance our reporting through to 2025.

Managing network stress

From delivering our performance commitments associated with drinking water contacts and water supply interruptions, we understand that we have an ageing asset base that would require investment to stabilise condition at a rate which exceeds the current ability of customers given all the pressures on bills. We know our water mains network is the oldest in the industry and still has a significant proportion of unlined cast iron mains which in turn presents increased risk of drinking water discolouration and bursts during acute events. This has led us to continue with the development of our calm network strategy, as we cannot sufficiently invest in the network to reduce these risks. This strategy has introduced controlled flushing of high risk parts of the network to reduce the risk of discoloured water to customers. This has been a key contributor to our performance improvement in this period.

The continued use of instrumentation and monitoring in the network has allowed us to advance our control of the water mains network, preventing unnecessary stress on the system and minimise the interruption of supplies to customers.

We also continue to upskill our network operators and partners to understand the service risk to customers when undertaking operational activities on our systems, minimising the risk of unnecessarily impacts on customers. In the event that customers are impacted by events, we will continue to case manage individual customers with particular focus on customers in need of specific help. We recognise the opportunity to extend the use of our priority services to a wider range of customers.

In addition, we have improved the information we provide online, so that customers are better able to understand the risks associated with their water supply and decide whether they need our assistance or not. This is better for customers and allows us to focus our resources where they best serve customers in need of help, especially those in circumstances that could make them vulnerable.

Agile operations

We understand that our networks are ageing and require an agile operational capability that can be quickly escalated and de-escalated to secure delivery of service for customers while the network is under stress. We successfully implemented our Company incident management plan, successfully implementing rapid response with the appropriate level of executive control to secure customer services and system recovery. One of the key learnings for us was the need for rapid communication with customers potentially impacted by events in parallel with the operational response. We will continue to operate this proven model to ensure resilient services for customers.

The forum control framework

We have applied a control framework to assure delivery of our performance commitments and obligations. The framework has been fundamental in ensuring that resources are properly deployed at a corporate level and then utilised efficiently at an operational level.

We have seen this applied to the successful delivery of the National Environment Programme, which was subject to major amendments at the start of the period. This presented a significant risk to the efficient and timely delivery of the obligations. Focussed attention through the control framework has ensured that compliance dates will be achieved, and performance commitments will be met. It has resulted in a major review of our approach to procurement that ensures partners can operate rapidly and effectively, yielding efficiency at the same time. We are carrying this learning forward into our future delivery and the efficiency proposals within our business plan.

Carbon management

We have developed and introduced an improved approach for carbon accounting when implementing asset improvements. We have started to see real benefits coming through the projects approved at the Board Investment Committee. The reduction of embodied carbon within schemes has been on an improving trend over the last year to a point where carbon is currently 25% below the 2015 carbon baseline. This has also translated into lower cost of outcome delivery which we have been able to reinvest for the benefit of customers. This lower cost base is embedded in our costs for the business plan.

Ensuring delivery in 2020-25

We have reviewed the level of stretch in our performance commitments for 2020-25 against those for 2015-20 to determine whether our methods of delivery, control framework and governance will continue to deliver for customers.

In the areas of land conserved and enhanced and length of river improved, we need to deliver approximately 35% more improvement proposed than in the current period. The activities are of a similar nature to the current plan period. We are already at an advanced stage in securing our delivery partners for 2020-25 and have factored in the increased scale of activity and coupled with our framework for reliable delivery, we can be confident that these commitments will be delivered.

Due to the significant improvement of water supply interruptions we have made in the current period, the scale of proposed improvement is less with those in the current period. Our approach to managing network stress using agile operations and deploying better analytical capability will ensure these performance commitments can be delivered.

For leakage we are proposing an improvement in performance of approximately 15% in the latter part of the current period, which is based upon increasing the resources deployed to drive greater levels of leakage find and fix activity.

We recognise that this is an inefficient approach in the long term and have plans in place to install 30,000 acoustic loggers across the network, supported by new analytics being generated from our open data programme. The activities and costs have already been approved by the Board Investment Committee and implementation is being driven by the Wholesale Board. This approach will allow us to drive a further 25% reduction in leakage through to 2025. Close monitoring through the company's control framework will be key to the delivery of the benefits.

We have made a significant improvement in the number of drinking water contacts received through our flushing programmes, trunk main conditioning trials and approach to managing network stress in the current period. Given the improvement we have made in this period the scale of the challenge to 2025 is less. We are confident that our plans will deliver performance commitment improvements.

Compared with the current period, we are proposing significant improvements in pollution and internal sewer flooding through to 2025. In support of this we are investing in increased network visibility and reducing the number of repeat incidents. Much of the work to drive and maintain the performance through to 2025 is based upon techniques we understand but founded on smart networks, more comprehensive data and analytics to allow better targeting of resources. We will continue

to expand our partnership working to solve problems in a multi-agency way. We have a successful record in working in this way and our control framework for managing programmes of this type is well embedded but will need to be targeted robustly in these areas.

We have consistently achieved and outperformed our residential retail performance commitments. For 2020-25 the performance commitments are measurably different and focus on ensuring customers' bills are affordable and that customers in need of support are aware of the services available to them and then receive that support. These are challenging and different and will require a step change in the engagement we have with our customers. We will need to put in place rigorous control and monitoring of retail service delivery for customers and we have started this through the appointment of a new Director of Customer Experience to drive the improvements in performance.

Overall, we believe that through the successful delivery of performance and efficiency over the current plan period we have the plans and control framework in place to focus resources and manage the risk of delivering these stretching commitments in the plan.

Past delivery and the PR14 reconciliation

We have undertaken the reconciliation of PR14 performance and adjustment mechanisms in line with both the guidance¹ and PR14 reconciliation rulebook² published by Ofwat. The full details of the PR14 reconciliation and our proposed adjustments to our revenues and Regulatory Capital Value (RCV) to be included in the 2020-25 plan are explained in a number of defined data tables, reconciliation models and commentaries within the appendices 20c to 20h.

In our Final Determination 2014 (FD14), we committed to delivering on performance and service outcomes for our customers by making investments that reflected their views and priorities. The outcomes are supported by 26 performance commitments, spread over 34 specific measures agreed with our customers and stakeholders. A number of our PR14 performance commitments have financial rewards and penalties attached to them, and others have reputational impacts if we outperform or underperform against them. Each year we report on our achievement against these performance commitments through the annual performance reporting (APR). Our most recent APR can be found on our website.

The independent customer challenge group (CCG) and the Forum is updated on our performance throughout the year, including access to our external auditors and the reports that they produce. This supports our commitment to be ever more transparent in how we deliver our services and protecting the environment.

¹ Delivering Water 2020: Our methodology for the 2019 price review – updated guidance for the final business plan data tables – 31 May 2018

² Ofwat PR14 reconciliation rulebook – updated 13 Dec 2017

Our service performance in the 2015-20 period

Our business and operational performance has been strong, we are meeting or outperforming the targets for a great majority of our 26 performance commitments. For the performance commitments with a financial outcome delivery incentive we have achieved an overall performance commitment reward position in each of the first three years of the 2015-20 period. This was despite a number of challenging events faced by the business and many of our customers over that period, such as significant flooding in 2015, and severe winter weather in 2017-18.

We also forecast to meet or outperform the targets for the majority of our measures for the remainder of the 2015-20 period as we plan the transition into the PR19 plan period. In addition to this strong underlying performance, we have also initiated a number of important additional investments focused on what matters most to our customers.

Readiness for PR19

As part of the development of our new service strategy and performance commitments for our PR19 plan, the scale of our customer engagement has become the largest and most continuous we have ever undertaken. We have spoken to customers about their views on the services we provide in the context of their current expectations and future challenges.

It is clear from this engagement that although our customers are broadly content with the service they receive, they believe our performance could be

much improved in areas which mean the most to them; leakage, pollution incidents and instances of sewer flooding. Although they like our performance on interruptions to supply, where we are one of the leaders in the sector, they also think we should pursue further progress.

We will make a significant investment of some £230 million in service improvements within the last two years of the 2015-20 period. This investment was approved by our Board and agreed by the Forum. The investment will deliver dramatic service enhancements including a 40% reduction in leakage by the end of the next five-year period and a 70% reduction in internal sewer flooding. We are also targeting a 40% reduction in minor pollution incidents and a reduction in supply interruptions.

The new performance levels will be delivered in three ways:

- Deployment of additional resources to traditional activities such as leakage inspection providing much greater coverage in the field.
- Using of new analytics to change the way in which we deploy our resources to ensure they have the greatest effect for our customers and the environment.
- Using new technology to provide us with better information on how our water and wastewater networks are performing.

We forecast to earn £94 million ODI outperformance rewards over the 2015-20 period that will apply as a revenue adjustment across the 2020-25 period. Table 20a provides a summary of our performance commitments to date and our forecast cumulative incentive position to the end of the 2015-20 period.

Table 20a

Summary of commitment performance for the 2015-20 period						
Performance Summary	2015-16 Actual	2016-17 Actual	2017-18 Actual	2018-19 Forecast	2019-20 Forecast	Total
Achieved target or outperformed in reward	15	15	13	15	23	
Missed target (within deadband)	1	1	2	1	2	
Under performed in penalty	0	0	1	1	1	
Missed target (reputational only)	1	1	1	0	0	
Not applicable in year	9	9	9	9	0	
ODI reward (£m) 2012-13 price basis	5.74	8.78	19.23	16.68	31.99	82.41
ODI penalty (£m)* 2012-13 price basis	0.00	0.00	(6.57)	(4.26)	(3.60)	(14.44)*
Net position (£m) 2012-13 price basis	5.74	8.78	12.66	12.41	28.39	67.97
ODI adjustments (£m) factored to 2017-18 CPIH FYA						94.35

* Penalty value assessed against performance commitment with a financial outcome delivery incentive is reinvested in service improvement and does not contribute to revenue or RCV adjustments in the 2020-25 period.

We outline the performance commitments where we have outperformed our targets or where we have not performed as well as we planned, provided with this plan in appendices 20c to 20h.

Performance commitments with ODI rewards

Performance commitments where we have outperformed, or are forecast to outperform, our PR14 targets in the 2015-20 period that result in a financial ODI reward are pollution incidents, water supply interruptions, internal sewer flooding, solutions delivered by working with others, leakage, and length of river improved.

Water supply interruptions

We have outperformed our target in all three years of the period for the number of minutes lost supply per property served, and the performance has also improved year on year.

We have invested in a balance of capital improvement to target our high-risk supply interruption areas, to reduce the number of properties reliant on a single water source on our network, as well as ensuring our operational response to supply interruption is swift.

Our service reservoir and water towers programme of £31 million has been re-prioritised targeting fewer strategic rebuilds than identified in our FD14 and we used some of the investment to promote a regional membrane replacement programme. This has allowed us to re-allocate £11 million of funds to support our upper quartile performance plans.

We reviewed our plans for £78 million of structural mains investment in consideration of supply interruptions performance, with fewer issues meeting our criteria for investment. This has resulted in approximately £30 million being re-allocated to fund our performance plan for the current period ahead of the 2020-25 period.

We are creating a supply restoration team, which will focus on the restoration of supplies in a more proactive manner, through the deployment of continuous supplies techniques.

We have increased capital investment by a further £10 million to fund additional pressure and flow monitoring on the network, to enable us to respond to issues more quickly.

We forecast our outperformance position to further improve across the remainder of the 2015-20 period, resulting in an ODI reward of about £35 million across the five years. We will make further advances to continue to be one of the sector leaders for this measure position.

Solutions delivered by working with others

This performance commitment identifies and funds solutions delivered through collaborating with other agencies, organisations or individuals, outside our normal operational supply partners.

We have delivered 21 multi-party solutions so far and forecast to have delivered 39 solutions by the end of 2019-20 against a target of 16.

The solutions have reduced the risk of flooding by removing surface water from our network, contributed to region wide efforts to tackle invasive species, enabled the village of Runswick Bay to get a new sea wall, helped farmers improve and diversify their businesses, improved habitats for wildlife, reduced lead exposure to 1000 customers, and prevented critical infrastructure being flooded.

We have contributed £2.5 million towards working with others solutions to date and we forecast to contribute a further £2.9 million by 2019-20. The small financial rewards this earns is reinvested in identifying and funding further partnership working projects for the 2020-25 period. We are developing a number of projects including several large multi year, multi million pound catchment restoration partnerships alongside extremely beneficial surface water separation schemes with local authorities.

Leakage

We have achieved leakage performance against our target for the 2015-16 and 2016-17 periods. Our leakage performance for 2017-18 was impacted by severe winter weather in December 2017, when freezing temperatures contributed to a 58MI/d increase in our leakage performance. To resolve this we increased our leakage reduction activities over Christmas and New Year. As a result we recovered our performance to meet our leakage target by the end of February 2018. The mitigation put in place meant we were better placed to deal with Beast from the East that hit us in late February into March 2018. This second winter weather event, in particular the rapid freeze then thaw characteristics, increased our leakage by 41MI/d. The concerted leakage activities across our network kept the prolonged supply interruptions for customers at a minimum. The timing of the event meant it was not possible to introduce further remedial measures to allow us to achieve the annual target by the end of March 2018.

We had put in place winter preparations ahead of the harsh weather, including additional resources to find and fix leaks as they occurred and, securing and distributing strategic stocks of bottled water. These actions, amongst others, helped mitigate both an excessive rise in the volume of water lost and some of the negative impacts experienced by customers. Despite this difficult period, we performed within our deadband, with leakage being 300.3 MI/d leakage for 2017-18.

We have increased investment and will make significant improvements in leakage levels to ensure we achieve upper quartile performance for the 2020-25 period. We have increased our planned capital funding by £64 million. This funding has been secured as a result of outperformance in other areas of the wholesale water programme.

We have reallocated a further £16 million of water network rehabilitation investment into leakage management. In addition to the increased find and fix resource, we will carry out further mains rehabilitation and communication pipe replacements.

We plan to outperform our PR14 target in 2019-20 with a leakage level of 235 MI/d, which will attract a financial reward of around £1 million.

Length of river improved

This performance commitment is measured at the end of the 2015-20 period. We forecast to have improved 464km of river length against the Environment Agency (Environment Agency) Water Framework Directive component measures target of 440km.

Following our FD14 river length improved outputs were revised as part of the national environment programme 5 (NEP5) final review. We have not amended the target or deadbands for this performance commitment following the recalculation. We are only assessing a financial reward where we have outperformed an improved river length against a deadband of 459km. A reward of £0.3 million is associated with this environmental performance commitment.

With the revised regulatory outputs and delivery efficiencies we have reduced the £203 million expenditure from our FD14 by £47 million, we have reallocated this money to fund other areas our water and wastewater programmes.

Pollution incidents

Throughout the 2015-20 period we have targeted our investment to ensure pollution from our assets is kept at a minimum. Due to the outputs associated with intermittent discharges being removed as part of NEP5 revisions, our FD14 investment of £42 million has been reduced by £37 million.

Each year we have reduced the number of category 1 and 2 pollution incidents caused by discharges or escapes from our wastewater assets (excluding private pumping stations transferred to us from 2016). We have maintained levels of category 3 pollution events below our target and reward deadband threshold, this has contributed to a reward of around £8 million in the first three years of the 2015-20 period.

To target upper quartile performance by the end of 2020-21, we are investing a further £33 million for increased sewer network repair and maintenance, and the deployment of additional telemetry.

We forecast to further reduce the numbers of category 3 incidents below PR14 targets by the end of the 2015-20 period; this will result in reward values of about £16 million.

Internal sewer flooding

We have reduced the numbers of internal sewer flooding of homes and businesses. We have seen a reduction in the numbers of incidents due to overloaded sewers. To optimise the benefits for our customers we are addressing the most cost-effective solutions. We have transferred around £30 million of planned investment from hydraulic overloading to the other causes of internal sewer flooding. This has enabled more sewer flooding issues to be resolved, reducing the number of customers impacted by the consequences of internal sewer flooding.

Internal sewer flooding is very stressful and disruptive for the customers impacted, and understandably our customers give a high priority to tackling this issue. The internal sewer flooding performance commitment measure for the 2020-25 period is set against a revised definition and we have used this to determine our plans to target upper quartile performance. To significantly

improve our performance we are increasing the level of repair and maintenance on our sewer network. We are investing capex outperformance of around £40 million.

For internal sewer flooding we are forecasting a £19 million reward contribution to our overall PR14 ODI adjustment.

Asset health performance commitments

For our performance commitments that evidence the health of our assets and our customers water usage, we have either met the targets without attracting an outperformance reward, or the performance commitment does not have a financial ODI associated to it. The achievement of these commitments is also critical to deliver services for our customers and protect the environment. These include water and wastewater quality, water and sewer network stability and reliability factors and customer water usage. See appendix 20a.

The four stability and reliability measures are assessed against a number of key indicators, or sub-measures. We assess our performance for the sub-measures and classify them collectively as improving, stable, or deteriorating.

Water quality stability and reliability factor

Across the five sub-measures of water quality, water treatment works coliform non-compliance, service reservoir coliform non-compliance, turbidity, enforcements, and reactive equipment failures, we assess our performance as stable across the period. Our overall expenditure is £17 million above the £100 million required in our FD14.

Water network stability and reliability factor

Across the six sub-measures of water networks; mains bursts, supply interruptions >12 hrs, low pressure, customer contacts for discolouration, distribution index TIM, and reactive equipment failures, we assess our performance as stable across the period. Our overall expenditure is lower than set out in the FD14. £18 million of efficiencies in our reservoir safety programme relating to spillway improvements has been allocated to our upper quartile performance plans.

Wastewater quality stability and reliability factor

Across the three sub-measures of wastewater quality, wastewater treatment works non-compliance, population equivalent percentage non-compliance, and reactive equipment failures, we assess our performance as stable for the period. Overall expenditure in the period has benefited from approximately £72 million investment above PR14 in the capacity and renewable energy generation capabilities of Knostrop wastewater treatment works.

Sewer network stability and reliability factor

Across the six sub-measures of sewer networks, sewer collapses, pollution incidents, properties flooded due to other causes, properties flooded due to overloaded sewers, sewer blockages, and reactive equipment failures. We assessed our performance as stable across the period.

The pollution and properties flooded due to other causes sub-measures will gain around £30 million additional from our upper quartile investments. Customers will benefit from a step change in sewerage escapes.

Expenditure on remedial improvements on adopted pumping stations is £10 million higher than expected, but we have funded this from efficiencies in other areas of this performance commitment.

We have experienced a significant reduction in the numbers of third party sewer diversions and requisitions compared to historic levels, and a reduction in the associated grants and contributions income.

We forecast this lower level of expenditure to continue and forecast a net £20 million reduction in this element of the programme. This investment has been reallocated to other areas of pressure and our upper quartile plans.

Water usage

The amount of water customers use, or per capita consumption (PCC) is measured in litres per head per day, it is a key measure of water demand and is a common measure across the sector. We have delivered a steadily improved PCC level year on year across the current 2015-20 period, and are setting further enhanced PCC targets for the 2020-25 period.

Making material and sustained reductions in customer water demand will help our water resources accommodate the growing population in our region, mitigate some of the effects of climate change, and increase the potential for effective water trading in future between areas of surplus to areas of deficit.

We have provided around 40,000 water saving packs free to customers each year. This approach does not ensure a high proportion of the devices provided are installed and operate effectively. To help the assumed benefits from retrofit solutions to become more reliable, for the remainder of this period we are trialling a proposal to visit customers' properties and fit water saving devices free of charge. If successful we will continue to offer this service from 2020 onwards.

We also continue to develop and deliver water efficiency behavioural campaigns, looking to influence and drive customer behaviour change. These are becoming more innovative and targeted to communities using tailored messages and multiple communication channels.

We currently have around 50% of our residential customers on metered accounts, paying directly for the water they use. We forecast this to increase due to housing growth, customers opting to have a meter fitted, and through reviewing unmeasured accounts and promoting meters to our customers. We plan to review 100,000 residential customer accounts this year and where the customer would have a lower overall bill under a metered account, we will offer the switch to them. If this trial is effective we will continue to work with our customers to ensure that they are on the best tariff.

There are three performance commitments where we have not met our targets at times within 2015-20.

Drinking water quality compliance

In 2015-16 we achieved 99.954% compliance compared to a target of 99.960%. This was due to high nickel, lead and iron failures in the distribution system. In 2016-17 we improved the position to 99.962% against a 99.960% target.

For 2017-18 the target has increased to 100%.

We forecast to further improve our performance for the final two years of this period, however we may not reach this target. A financial penalty will not apply, as our performance will remain within the allowable deadband.

We have 16 defined regulatory water quality investigations and solutions within our FD14. Four of these obligations have been delivered with the remaining 12 forecast to complete, meeting their corresponding compliance dates. We have experienced significant cost pressures from our delivery partners on some of these improvement schemes and are forecast to exceed our £42 million funding from our FD14 by £24 million.

Our lead communication pipe programme has not met the unit rate in our FD14 and we have been unable to fully utilise the pipe lining approach promoted in our plan. To ensure we meet our commitments to customers to remove lead we have reverted to pipe replacement, leading to additional site costs and a more disruptive programme of works. We have increased investment by £3 million over our £15 million plan for this programme.

Renewable energy generation

We failed to meet our target of 12% of our overall energy requirements from energy generated through renewable technology for 2015-16 through to 2017-18. A number of our key renewable generation assets suffered significant damage during the flooding experienced in our region over the Christmas and New Year in 2015-16. The scale and duration of the capital projects to make repairs and protect these assets from future severe events meant these assets did not return to full capacity until later in the plan period.

We forecast to achieve the renewable energy generation commitment for the remainder of the period. For the 2020-25 period we are greatly increasing the percentage of our renewable energy generation through the operation of new bioresources assets.

This performance commitment does not have a financial reward or penalty associated with it. We could face reputational impacts with our customers and other stakeholders if we continue to miss our targets.

Drinking water contacts

We have improved and expect to further improve our performance on this commitment each year across the period, in year one we had 10,007 customer contacts. We are predicting a reduction to 7,200 contacts by the 2019-20 period. Our year on year improvement has been driven by changes to our original plan of mains rehabilitation towards a mix of mains rehabilitation and network flushing activities.

We have reprioritised our capital investment, carrying our systematic flushing rather than renewal and relining the water network. To date we have flushed more than 11,800km of water mains, and forecast to have flushed over 22,000km by the end of the period, this is equivalent to 71% of our water network. The redirection of capital investment from renewal and relining to flushing has enabled £16 million to be reallocated to additional activity to support our leakage upper quartile plan.

From 2016-17 our progress has not kept up with our improving target profile, which reaches 6,108 contacts for 2017-18. We do not forecast to meet the 6,108 contacts upper quartile target determined by Ofwat in our FD14 for the remainder of the period. We are forecasting a financial penalty of £14.4 million (at 2012-13 prices) for this performance commitment.

As determined by our customers at PR14, the underperformance penalty will be invested, with inflation applied, to drive material service improvements within three years following when the underperformance occurred. We have ensured that the reinvested funds within this period and for the 2020-25 period are not included in totex out or under-performance sharing mechanisms.

Customer service and SIM performance

The service incentive mechanism (SIM) was put in place for PR14 to compare and incentivise the delivery of improved customer experience across all water and/or sewerage companies. The SIM operates a relative incentive mechanism, those companies that delivered upper quartile performance for the SIM would be able to collect high performance rewards. Those in the lower quartile would face poor performance penalties. The SIM performance achieved by us is rated relative to the performance of other companies in order to determine whether a reward or penalty is applicable.

Ofwat has confirmed proposals not to include company performance for 2019-20 in the SIM financial incentive, as the new C-MeX measure of experience will be trialled during 2019-20 ahead of PR19.

We forecast to be at a performance level relative to other companies at the end of the SIM reporting period 2018-19 and we do not anticipate making a reward or penalty revenue adjustment for our SIM performance. We have improved performance year

on year (see table 20b for overall SIM scores). In billing we are the leading performer in the industry according to customer satisfaction scores.

We plan to improve our performance against the SIM customer experience measure to the end of the PR14 period. Although SIM will only operate formally to 2018-19 as it is being replaced with the new C-MeX measure for PR19, we are making improvements to our customer management approach to provide a better experience for customers who face service issues. Improvements will include how we fully resolve service issues promptly in a more unified way between our front office and our operational teams. We forecast to improve our total SIM score (which is a combination of qualitative and quantitative results) for 2018-19 to 87.3.

We now understand our customers' lifestyles and preferences much better. We have tailored services to ensure everyone can access them by offering a choice of communications channels, for example, introducing web chat ahead of other water companies and providing call back services to make the experience easier for our customers. Since the introduction of the SIM we now receive 60% fewer water related unwanted calls. We are proactive in our communications to customers when there's an incident and if we can't resolve issues immediately we keep the customer fully informed of progress.

Written customer complaints have reduced across the period. For sewerage related issues the number of complaints received have halved in the last two years. We now react to issues faster and bring about resolution to prevent further problems occurring.

Our written complaints performance across household and non-household customers (including developers) is summarised in table 20c below. A detailed breakdown is provided in the PR14 reconciliation commentary to data tables.

Table 20b

Yorkshire Water Service Incentive Mechanism (SIM) overall scores 2014 to 2020					
Yorkshire Water SIM Performance Summary	2015-16 Actual	2016-17 Actual	2017-18 Actual	2018-19 Forecast	2019-20 Forecast
SIM overall score	82.7	83.4	84.3	87.3	87.3*
SIM performance payment / penalty £m	0.0	0.0	0.0	N/A	N/A

* The SIM score for 2019-20 will not be included in the assessment of performance for reward or penalty, but we will report on that year against our performance commitment for the final year of the PR14 period.

Table 20c

Summary of complaints from customers and escalations and investigations (household, non-household and developers)					
Complaints from domestic and business customers	2015-16	2016-17	2017-18	2018-19	2019-20
Stage 1 complaints received	7562	6434	5353	4749	4749
Complaints escalated internally to stage 2	499	306	164	147	147
Complaints referred to Consumer Council for Water (CCW)	532	496	434	363	328
Investigations opened by CCW	1	0	0	0	0
Complaints investigated by Ofwat or the Water Redress Scheme	7	17	10	10	10

Our household retail strategy is a simple one. We deliver our Customer Promise which is to be easy to deal with, helpful and friendly, and get it right first time.

A new initiative that demonstrates our Customer Promise and the effective use of data and commitment to keep bills low for customers is our current 'Best Tariff' pilot. Our analysis identified 100,000 customers who are currently billed on rateable value who could potentially save money by switching to a meter. We are contacting these customers to see how they respond to the offer of a meter and metered tariff. We know many are put off switching to a meter for fear they might get a nasty surprise and end up paying more because of their consumption. To ease their minds and encourage the switch, we promise to keep their account under review for two years and to switch them back to an unmeasured tariff if it turns out that they don't save money.

Compliance and incident management

As part of the PR14 reconciliation we report our level of compliance with the Environment Agency's requirements. This includes the actual numbers and forecast numbers of category 1, 2 and 3 pollution events, the percentage of our water and wastewater treatment works that comply with the Environment Agency's discharge permits, the percentage of sludge we produce that is classified as to satisfactory standard, and the numbers of prosecutions and enforcement actions, and formal cautions made for breach of relevant environmental requirements by the Environment Agency.

We have not received any formal cautions or completed prosecutions from the Drinking Water Inspectorate (DWI) for breach of drinking water quality requirements during the period 2015-18.

Over the 2015-20 period we have reported three major pollution incidents, classified by the Environment Agency as category 1 incidents. We work closely with the Environment Agency to make sure our records and reports on pollution incidents comply with the Environment Agency's Common Incident Classification Scheme guidance. This information is also audited annually as part of our APR reporting regime.

Customer management during significant incidents

We have not experienced any events classified as major incidents by the DWI. We have experienced events that have been significant and required urgent and complex responses in order to protect public health and manage customers' concerns.

One such event occurred between 27 July and 4 August 2016 at Thorne and Moorends near Doncaster, during which the public potable water supply was contaminated by a business activity not known to us at the time. Applying our robust incident management processes we set up our company incident management team. Over 3,600 properties were impacted by the event. We advised our customers not to drink water and subsequently advised them to boil their water. We quickly identified the source of contamination and the boil notices were rescinded on 4 August.

As this was a significant incident with the potential to affect several thousand customers, both residential and business, we delivered a comprehensive and regular customer communications plan. Health protection advice remained in place until sufficient confidence was obtained that there was no ongoing risk to our customers. The boil water advice was issued by hand to 3440 residential customers and 208 business properties. We provided bottled water from 29 July at delivery centres within the locality in compliance with the Security and Emergency Measure Directive. We worked with other agencies, Doncaster Metropolitan Borough Council and British Red Cross, during the event to ensure that vulnerable customers were supported. We increased resources in our contact centre and control room to manage customer communications.

Key to accessing as many affected customers and those concerned was the use of local media and other stakeholders. We gained extensive national and regional radio, TV and print media coverage about the incident, which we utilised where possible to provide up to date public health messages. We know a large number of our customer prefer to access information digitally so we set up a dedicated webpage for customers to read updates on the situation and was a vital way to update customers on the situation and give advice. We continued with conventional communication methods for customers who did not have access to the website.

The full report of the event and findings is provided for information in appendix 20b.

We assess every event for its potential impact on customers and also whether customers may have concerns or are anxious about the nature of an incident. Our approach to communications changes as an incident evolves and actions are addressed. Recent examples include our management of the severe winter weather, where we used social media, our website and local communications widely to manage customers' issues and expectations.

Events impacting performance in the 2015-20 period

Although we have shown strong overall performance across the 2015-20 period, we have faced some challenging circumstances for which we have worked hard to mitigate impacts to our customers and our own operations.

2015-16 floods

Our business and many of our customers were impacted by some of the worst flooding ever experienced in parts of Leeds, Bradford, York and the Calder Valley over Christmas and New Year in 2015-16. We maintained water services to all our customers even though more than 100 water treatment works and pumping stations were flooded. The damaged assets are under a continued programme of remedial works that started in 2016 and we have delivered work with external agencies on surface water management to minimise the risk of similar events in the future.



We received £51.9 million (at 2012-13 prices) of insurance reflecting the fair value of estimated exceptional costs to restore the assets, and within our statutory accounts, recorded exceptional opex costs of £25.15 million (at 2012-13 prices) to rectify the damage incurred. As these costs were covered by insurance we have excluded them from the actual totex. None of these costs will be recovered from our customers via the PR14 reconciliation adjustments. Damage to our assets did negatively impact our performance commitment to deliver 12% of our energy needs from our own renewable generation capabilities.

2018 freeze / thaw event

Early in 2018 extreme winter weather hit our region, as a result of our operational readiness and comprehensive incident management processes we performed well, minimising impact to our customers. Our annual preparations for a potential cold weather event started in November 2017, we obtained additional equipment and resource and our contingency plans were reviewed. We recruited more leakage inspectors and obtained increased repair resource from our partners.

Our executive team considered long-range weather forecasts and took the decision to deploy resources to prepare for a predicted increase in both leakage and water demand. Both the operational company incident management team (CIMT) and the executive led crisis management team (CMT) were formed to manage the response during the event. While the significant freeze and subsequent thaw situation did have an impact on some of our performance commitment service levels, in the short term we maintained supplies and services to all but a small number of customers. Ofwat acknowledged in its June investigation report that we had performed well and communicated with customers throughout the event.

Most issues reported by customers during the period were caused by frozen private supplies or isolated bursts on our network. Our earlier decisions to source and mobilise significant additional resource enabled us to minimise the impact on our customers by responding rapidly to any supply interruptions.

Based on the information that we received from a customer survey that we carried out after the event, along with the findings of the Ofwat investigation into the resilience of services in England and Wales to this event,

we have reviewed our readiness and response to extreme winter weather situations and we will further develop our approach to manage future incidents of this scale.

Customer support for PR14 reconciliations

Our customer acceptability testing shows that 86% of our customers are supportive of our plan.

PR14 reconciliation

We submitted a PR14 reconciliation document to Ofwat, it consists of a suite of complete, audited data tables and reconciliation models, which we have completed in accordance with the data requirements set out in Ofwat's PR14 reconciliation rulebook and PR19 data table guidance. The submission has been subject to both internal and external assurance, and includes an assurance statement from our Board.

The full suite of PR14 reconciliation documents are also published on our company website, and are provided in support of our PR19 plan.

The submission contains the following three PR14 reconciliations models and two feeder models:

- Totex menu PR14 reconciliation model spreadsheet.
- Wholesale revenue forecasting incentive mechanism (WRFIM), PR14 reconciliation model spreadsheet.
- Household retail PR14 reconciliation model spreadsheet.
- Revenue adjustments feeder model.
- RCV adjustments feeder model.

Summary of the PR14 reconciliation proposed adjustments

The PR14 reconciliation has been undertaken against our FD14. The incentive mechanisms will generate RCV and revenue adjustments for us for the 2020-25 period. The adjustments will apply to relevant controls (Water and Wastewater Network Plus and the Household Retail Controls). Table 20d provides a high level summary against the relevant price controls of the proposed adjustments as a result of the PR14 reconciliation exercise carried out, as part of the PR19 business planning process in accordance with Ofwat's requirements and guidance.

Table 20d

Proposed PR14 reconciliation adjustments		
Price Control	Revenue adjustment £m	RCV adjustment £m
	2017-18 FYA (CPIH deflated)	2017-18 FYA (CPIH deflated)
Total wholesale water adjustments	41.492	(6.096)
Total wholesale wastewater adjustments	32.457	(131.971)
Total residential retail adjustments	(3.127)	
Total adjustments	70.822	138.067

The summary outputs of PR14 and PR09 reconciliation by price control are provided below split between revenue (table 20d) and RCV (table 20f) adjustments. Household retail adjustments are shown in table 20h.

Table 20e

Wholesale water and wastewater revenue adjustments							
Incentive mechanism	Data tables	Revenue adjustments (at 2017-18 FYA CPIH deflated)					
		£m	£m	£m	£m	£m	£m
		Wholesale Water	Water Resources	Water Network +	Wholesale Wastewater	Wholesale Wastewater	Bioresources
Outcome delivery incentives	App27	44.460	0.405	44.056	49.892	49.892	0
Wholesale total expenditure (totex) reconciliation	WS15, WWS15	3.822	0	3.822	(6.410)	(6.410)	0
Wholesale revenue forecasting incentive mechanism (WRFIM)	WS13, WWS13	(8.263)	-	(8.263)	(14.057)	(14.057)	-
Water trading incentive	WS17	0	0	0	-	-	-
PR09 2010-15 reconciliation	App25	1.473	-	1.473	3.032	3.032	-
Total wholesale Water adjustments		41.493	0.405	41.088	32.457	32.457	0.000

Table 20f

Wholesale water and wastewater RCV adjustments							
Incentive mechanism	Data tables	Revenue adjustments (at 2017-18 FYA CPIH deflated)					
		£m	£m	£m	£m	£m	£m
		Wholesale Water	Water Resources	Water Network +	Wholesale Wastewater	Wholesale Wastewater	Bioresources
Outcome delivery incentives	App27	0	0	0	0	0	0
Wholesale total expenditure (totex) reconciliation	WS15, WWS15	37.519	0	37.519	(65.837)	(65.837)	0
PR09 2010-15 reconciliation	WS13, WWS13	3.468	-	3.468	3.662	3.662	-
Land disposals	WS17	(1.276)	0	(1.276)	0.242	0.242	0
PR09 CIS reconciliation	App25	(45.807)	-	(45.807)	(70.039)	(70.039)	-
Total wholesale Water adjustments		(6.095)	-	(6.095)	(131.971)	(131.971)	-

Table 20g

Residential retail adjustments			
Incentive mechanism	Data tables	Adjustments (at 2017-18 FYA CPIH deflated)	
		Revenue £m	RCV £m
Residential retail	R9	(3.127)	-
PR14 SIM incentive	R10	0	-
Total residential retail adjustments		(3.127)	-

PR19 adjustment for PR14 totex

The forecast outperformance that we have calculated using the Ofwat published model is shown in table 20h below.

Table 20h

Totex summary							
Outperformance	Price base	2015-16	2016-17	2017-18	2018-19	2019-20	2015-20
Water	2012-13	75	8	(44)	(80)	(53)	(94)
Wastewater	2012-13	99	51	17	(67)	(7)	94
Total	2012-13	174	59	(27)	(147)	(60)	(0)

The underperformance in wholesale water results in the PR19 adjustment shown in table 20i below.

Table 20i

Water totex adjustments			
Incentive mechanism	Item ref	Price base	Totex £m
Water: Revenue adjustment from totex menu model	WS15024	2012-13 FYA (RPI)	3.338
Water: RCV adjustment from totex menu model	WS15025	2012-13 FYA (RPI)	32.771
Water: Totex menu revenue adjustment at 2017-18 FYA CPIH deflated price base	WS15026	2017-18 FYA (CPIH deflated)	3.822
Water: Totex menu RCV adjustment at 2017-18 FYA CPIH deflated price base	WS15027	2017-18 FYA (CPIH deflated)	37.519

The outperformance in wholesale wastewater results in the PR19 adjustment shown in table 20j below.

Table 20j

Water totex adjustments			
Incentive mechanism	Item ref	Price base	Totex £m
Wastewater: Revenue adjustment from totex menu model	WWS15019	2012-13 FYA (RPI)	(5.599)
Wastewater: RCV adjustment from totex menu model	WWS15020	2012-13 FYA (RPI)	(57.505)
Wastewater: Totex menu revenue adjustment at 2017-18 FYA CPIH deflated price base	WWS15021	2017-18 FYA (CPIH deflated)	(6.410)
Wastewater: Totex menu RCV adjustment at 2017-18 FYA CPIH deflated price base	WWS15022	2017-18 FYA (CPIH deflated)	(65.837)

PR14 capital programme

In total we are forecasting to invest £1,805 million of regulatory capital in our assets to support both delivery of our performance commitments made to our customers in the FD14 in the 2015-20 period and our stretched aspirations to target upper quartile performance on the PR19 comparative measures for the 2020-25 period.

Table 20k identifies the capital expenditure split by wholesale water and wastewater in comparison to the FD14.

Table 20k

Summary of capex reconciliation (in 2012-13 price basis)		
Wholesale water	713.7	731.2
Wholesale wastewater	1,144.0	1074.2
Total Programme	1857.7	1805.4

While we have seen delivery cost pressures in this period we have managed to outperform our FD14 in each of the capital programme areas. This has allowed us to reinvest savings and efficiencies back into the programme to support our upper quartile plans for 2018-19 and into the PR19 period, as well as making significant investment into our energy generation assets to ensure long term sustainable.

Full details of the variance in wholesale water and wastewater capital investments against the PR14 plan are provided in the appendix 20c.

Opex performance

We have split the allowed PR14 opex into wholesale water and wastewater for the purposes of explaining our opex outperformance, and used existing (and forecast) APR operating cost to calculate under or out performance for the period.

Accounting changes and exceptional items

The following changes have been made to provide a revised outperformance number, and these are listed in table 20m.

Some of our infrastructure renewals accounting moved from capex to opex in 2015 as a result of the move to new international accounting standards. This totals £95.3 million (£51.8 million and £43.63 million) based on 2012-13 prices.

- We have experienced significant unexpected totex to recover the performance and condition of assets damaged during the floods on 26 December 2015. In this case we received £51.9 million of insurance reflecting the fair value of estimated exceptional costs to restore the assets, and within our statutory accounts recorded exceptional opex costs of £25.15 million during the period of construction to rectify the damage incurred.

- We have introduced price control charges for the consumption of water at our wastewater sites and for the treatment of clean water sludges, as well as refined overhead allocations resulting in more cost allocation to the wholesale water price controls.

Opex movements within 2015-20

Our opex costs remain close to our FD14 for both water and wastewater for the 2015-17 period, with 2018 achieving outperformance in both water and waste. For years 2018-20 we forecast to invest significantly more additional activity into the plan to drive up service standards in response to feedback from customers and our aim to achieve upper quartile targets for leakage, supply interruptions, pollution and sewer flooding.

A further £58 million of opex funding has been included within our wholesale water price controls and £17 million within wholesale wastewater price controls.

There have been significant opex movements during 2018. Whilst the severe winter event resulted in increased leakage expenditure of £8 million in water, these increases were largely offset by a successful refund from historic Cumulo 2005 rates appeal which resulted in a one-off £6.5 million refund.

Table 20l

Opex underperformance compared with our final determination after adjusting for infrastructure renewal (IAS16), (all values in 2012-13 price basis)						
Actual and forecast opex performance	2015-16 £m	2016-17 £m	2017-18 £m	2018-19 £m	2019-20 £m	2015-20 £m
Wholesale water derived opex - allowed expenditure from menu	152.08	153.32	154.13	154.71	155.74	769.98
Wholesale water actual opex	160.83	164.06	169.88	199.19	202.77	896.73
Wholesale water opex performance	(8.75)	(10.74)	(15.75)	(44.48)	(47.03)	(126.75)
	2015-16 £m	2016-17 £m	2017-18 £m	2018-19 £m	2019-20 £m	2015-20 £m
Wholesale wastewater derived opex - allowed expenditure from menu	158.65	158.88	158.88	158.88	158.88	794.17
Wholesale wastewater actual opex	164.17	183.46	155.56	161.62	162.50	827.32
Wholesale wastewater opex performance	(5.53)	(24.58)	3.32	(2.74)	(3.62)	(33.15)
Total opex underperformance	(14.28)	(35.32)	(12.43)	(47.22)	(50.65)	(159.90)
Changes in accounting treatment and exceptional items	2015-16 £m	2016-17 £m	2017-18 £m	2018-19 £m	2019-20 £m	2015-20 £m
Water IAS 16	9.77	9.72	10.84	11.13	10.33	51.80
Waste IAS 16	7.57	7.69	6.53	12.23	9.62	43.63
Exceptional items - waste - to adjust	1.41	16.53	7.21			25.15
Account for APR improvements - net changes to wholesale water	-	-	6.80	6.80	6.80	20.40
Account for APR improvements - net changes to wholesale wastewater	-	-	(6.80)	(6.80)	(6.80)	(20.40)



Continued efficiencies in 2018-20 are challenged by:

- Increases in Environment Agency Subsistence and Application charges previously funded by government through Grant Aid.
- The impact of the Environment Agency no longer allowing the recycling of green waste to agriculture.
- Increases to the insurance premium as a consequence of significant historic claims, for example December 2015 floods.

Traffic Management Act implementation, for example charges relating to road works, which impacts our wholesale prices controls, as a large number of our assets are in the highways.

Customer support for our proposed adjustments to 2020-25 price controls

The PR14 proposed adjustments in revenues and RCV equates to an approximate contribution of £4-5 on the average annual household combined bill.

Feedback from our customer testing shows that customers are supportive of the approach and the overall scale of the adjustments and how they impact bills. The final research output is presented as evidence of the strength of customer support for our proposed adjustments to the 2020-25 price controls in the context of the PR19 plan.

The Forum supports our upper quartile plans for the remainder of this PR14 period. Our PR14 reconciliation approach and proposed adjustment outcomes have been discussed with the Forum.



Business Retail

Since April 2016, Business Retail price control activities have been undertaken independently from the Wholesale and Residential Retail price control activities by a discrete division of our appointed business, Yorkshire Water Business Services (YWBS).

To allow us to focus on the needs of our Business Retail customers during the transition into the competitive market, without the distraction of undertaking legal separation and retail exit, YWBS was retained as part of the appointed business at market opening.

While YWBS remains part of the appointed business, we have implemented separation of our Business Retail price control to ensure a level playing field in the retail market. This includes:

- Trading as YWBS, to distinguish from the Wholesale and Residential Retail functions.
- Governance is undertaken via the Non-Household Retail Committee (a separate committee of the Yorkshire Water Board) with appropriate terms of reference and delegated authority from the Board, exclusively for YWBS matters.
- All YWBS activities have been outsourced under formal contract to an associated Kelda Group company - Three Sixty Water (see Figure 21a) - which operates from separate premises to the Wholesale and Residential Retail functions.
- All market and non-market transactions between Wholesale and Three Sixty Water are consistent with the way Wholesale transacts with all non-associated retailers.

In accordance with our obligations and the PR19 final methodology, YWBS as part of our appointed business has independently prepared a Business Retail price control business plan for this submission. The full business plan is included in appendix 21a, and YWBS' summary of their plan is shown on the following page.

Our objective for Business Retail has always been to ensure customers get the best possible service at the best price. To this end, we are continuing to seek to transfer the activities of Business Retail to an entity that holds the same values.

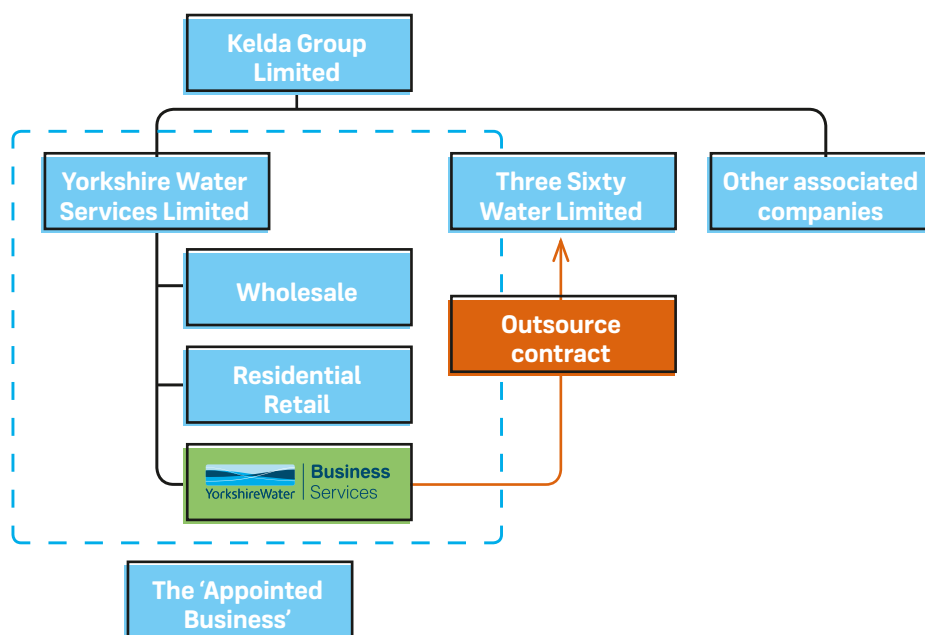


Figure 21a – Yorkshire Water Services Limited summary group structure.

We want our business customers to have a refreshingly positive experience every time they deal with us. We want them to notice we are different. We believe that this is already emerging in the reported Market Performance standards. Our main focus will be ensuring that we continue to provide our customers with this high level of performance at low cost. In addition, continuous improvement initiatives will be undertaken to further enable achievement of our operational vision.

To deliver a refreshing and exceptional service through our friendly people and expert knowledge.

We want to provide the industrial and commercial businesses Yorkshire with the level and type of services which best suits their needs. We also wish to assist customers in minimising the adverse impact of any service failure to which they may be vulnerable and keep their bills affordable. Acceptability testing of the services we plan to provide, and the cost of those services, has shown that 87% of customers support our proposals.

We will continue to offer 14 default tariffs which have been calculated in accordance with the PR19 final methodology guidance by rolling forward, from the PR16 determination, the 2019-20 retail margins for customer group 1 and increasing the customer group 2 gross margins to the uniform caps. This results in an average annual aggregated business retail margin of 3.6% across the 2020-25 price control period which, after additional costs not included in the build-up of the default tariffs, reduces to a 1.3% average annual profit before interest and tax.

We have demonstrated the stand alone financeability of this price control primarily by testing and evidencing that we are able to generate sustain positive cash flows. The business plan is financeable because the gross margin returns will be sufficient to fund all costs, including interest and tax. In addition, resilience has been demonstrated by undertaking testing as part of the appointed business RoRE assessments.