Yorkshire Water IAP response document

1 April 2019

YorkshireWater

Contents

Our response to Ofwat's initial assessment of plans (IAP) feedback

We submitted our PR19 business plan to Ofwat in September 2018. Ofwat reviewed the plan and published its initial assessment in January 2019. The assessment included a series of actions for Yorkshire Water to complete by 1 April 2019. This document summarises our response.

Ofwat placed Yorkshire Water in the slow track category. Ofwat found that parts of our plan were high quality and that other parts needed further work or additional evidence. We value the feedback provided and have considered it carefully with our Board and the Yorkshire Forum for Water Customers (The Forum).

In our response we have made a number of important changes:

- Adjusted our plan so that we are now able to propose a **stable bill** (that means that before inflation, the bill will not increase from 2019/20 prices). This means that customers in Yorkshire will have a decade of stable or falling bills.
- Increased the company-funded support for customers who are struggling to pay their bills.
- We are starting work to reduce our gearing and plan to keep it below 70% from 31 March 2021.
- Highlighted that it may become possible to re-phase our large environmental programme, leading to **a further bill reduction** prior to the final determinations later in 2019.

Our response also explains that there were two important areas in which we did not agree with all of Ofwat's feedback:

- On costs, we were surprised by Ofwat's feedback about the extent of what it thought was inefficiency. Having looked in detail at the feedback, we believe that the approach used has not completely recognised the impact of our ambitious targets to improve performance and our large environmental programme. So, we have provided additional high-quality evidence to explain these issues and suggest ways to better separate efficiency from activity.
- On performance commitments and financial incentives, we were surprised by the extent to which Ofwat has made changes to its PR19 methodology. Ofwat's approach risks creating a disconnect between the targets set and the costs allowed, as well as reducing the importance of what our customers have told us. It is simply not possible

for any company to deliver major changes in performance without incurring additional costs. So, where Ofwat does want to change its policy and requires companies to meet different performance standards, this must be considered alongside the efficient costs of doing so. Again, we have provided additional high-quality evidence to help explain these issues.

As with the development of our original plan, we have engaged actively with the Forum throughout and would like to thank Forum members for their ongoing involvement and support.

We have re-tested our plan with our customers and are pleased to report that 88% support our plan (an improvement on 2% from our original plan). Customer engagement also shows that 84% find it affordable (an increase of 18% from our original plan).
Our response has been developed with the active involvement of our Board, challenging us to respond positively to Ofwat's feedback wherever possible, and providing high-quality evidence where we disagree with the feedback. Changes to the plan have been fully assured and the Board has also updated its Board assurance statement.

1. About this document

This document forms part of our regulatory price review process (PR19). In September 2018 we submitted our PR19 business plan to Ofwat, our economic regulator. The PR19 plan contains our proposed service levels and costs for the period 2020 to 2025 and it is set in the context of our long-term strategy. You can find our PR19 business plan and our long-term strategy on our website.

Ofwat has reviewed the PR19 plans for all companies and in January 2019 published its initial assessment (IAP). Ofwat placed each company into one of four categories, exceptional, fast track, slow track and significant scrutiny. This was dependent on Ofwat's view of the overall quality of each plan.

Yorkshire Water was placed in the slow track category, this means that some parts of our plan have been assessed as high quality and in other areas Ofwat has asked us to look again, either amending our plan or providing further evidence to support the original plan. This section has been created to explain how we have developed our response and what the response contains. The section covers:

- The role of our Board and the assurance of our IAP response.
- How we have approached our review of the feedback, changes we have made and areas where we have provided additional evidence to support our plan.

- The next steps we, and regulators, need to take to finalise our Water Industry Environment Programme (WINEP).
- How our response provides what we believe is the best plan for our customers and the environment.

2. Our Board support and the assurance of our IAP response

As with our PR19 plan our Board's aim is to produce a high-quality IAP response that meets the expectations of customers in delivering the services they need, now and in the future, at a price they can afford to pay.

Our Board has been accountable for the leadership and preparation of our IAP response.

To lead the discussion on the development of the plan our Board has conducted several workshops. The workshops were used to challenge management and satisfy our Board that the IAP response meets the expectations of customers and all other stakeholders. Our Board used the workshops to ensure the IAP response continues to follow its strategy for addressing the long-term challenges of climate change, population growth, all round resilience and long-term affordability.

Our Board has applied robust assurance in the preparation of the IAP response. 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. Our assurance approach is 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 our Board that the plan is accurate, high quality and accessible, all elements of the plan including data are subject to our Board's robust assurance process. Our Board confirms that:

- Our assurance has followed the three levels of assurance as set out in our 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).
- All data changes and action responses have been subjected to review and sign-off through our internal level 1 and 2 assurance activities. This has tested completion and compliance of the information submitted in the IAP response submission.

- Independent level 3 assurance activities have been focussed on testing the most significant areas of data change and supporting evidence. Similarly, we have subjected the more significant IAP actions to independent assurance.
- Findings from these assurance processes have been fully reviewed and actions necessary to allow submission implemented. The process and outcome of the assurance activities have been reviewed by the Board Audit Committee, which has separately advised the Board on the sufficiency of the assurance.

3. How we have approached our review of the feedback, changes we have made and areas where we have provided additional evidence to support our plan.

We value the feedback we have received from Ofwat and have considered it very carefully with our Board and the Forum. In considering our response we have thought carefully about what is in the best interests of our customers and in line with the promises that we have agreed with them in our PR19 plan.

Ofwat has given each aspect of the plan a red, amber or green score. Of the 9 IAP test areas Yorkshire Water scored 3 green areas and 6 amber. We have focused on the 6 overall IAP amber score areas, grouping the actions into the following themes:

a) Increased support for customers who are struggling to pay their bills.
b) Further improving our financial resilience and building trust and confidence in the sector.
c) Delivering best value for customers through cost efficiency.
d) Managing the health of our assets.
e) Our performance targets and the associated package of incentives.
f) Our approach to direct procurement for customers.

This section steps through each of these areas, providing an overview of our analysis and the response to the actions raised.

a) Increased support for customers who are struggling to pay their bills

Ofwat's feedback: Against the test 'addressing affordability and vulnerability' Ofwat noted that our PR19 plan contained high-quality initiatives to address overall affordability. Ofwat asked us to look again at the levels of support for customers who are struggling to pay their bills. Ofwat also challenged us to be clearer about how we have tested our long-term bill profile with our customers to ensure that they find it acceptable.

Our response: We have shared the feedback with our Board and the Forum, reflecting very carefully and challenging ourselves to do more for customers who find themselves in vulnerable situations. We are amending our plan with the following actions:

1. Support of customers struggling to pay their bills

We will increase the number of households receiving direct support by 2025 from our current position of 26,000 households to 83,000.

This will be made possible by increasing the company contribution to the social tariff from the current level of £2.5 million for 2015 to 2020 to £10 million for the period 2020 to 2025. We did also ask customers if they were willing to increase the level of support funded through our prices, but they preferred not to.
An additional 60,000 households will be helped through flexible payment options, third party advice and targeted home visits.

We offer 8 assistance schemes designed to support customers, either to prevent them falling into debt or to help them get back on their feet if they do.

2. Plan acceptability and our long-term bill profiles

We have carried out additional acceptability testing, **88% of customers support the plan and 84% find it affordable** – this is an increase on the previous research. We have carried out additional customer research regarding our long-term bill profiles. **72% of customers find the bill profile up to 2030 affordable**.

3. Our 2020 to 2025 bill profile

Our average bill profile has been adjusted as part of the IAP review process, in response to new information we now have regarding some of our targets. This has moved the average bill from a proposed increase of around £3 a year to **no real increase** (excluding inflation) over the period.

This is excellent news for customers, who will receive better service for the same average costs as now.

A brief overview of our additional customer research, and a table of results is in Appendix A.

b) Further improving our financial resilience and building trust and confidence in the sector.

Ofwat's feedback: Ofwat required a series of actions to ensure that Yorkshire Water meets the expectations set out in its 'putting the sector back in balance' publication. Ofwat has also challenged us to be even more transparent about our corporate and financial structures and resilience. We do publish information in our annual performance

report (APR) but Ofwat would like additional information about how our financial and corporate structures impact on our financial resilience.

Our response: We are committed to help improve trust and confidence in the sector and so we have looked hard at what more we can do in this area. We have made the following adjustments to our PR19 plan:

Aspects of financial resilience and building trust and confidence in the sector

1. **Executive pay policy**

Ofwat states that our plan demonstrates high quality in the round in respect to executive pay. We confirm that any future changes to the policy will be published in our annual performance report (APR).

2. **Dividend policy**

We have confirmed that we are committed to adopting all the expectations on dividends for 2020-25 as set out in Ofwat's "Putting the sector in balance" publication. This will build even greater confidence that our dividend policy is transparent, considers the long term and is fair.

3. **Our projected gearing for 2020 to 2025**

We will take steps to reduce our gearing and will **target to reduce our gearing below 70%** by 31 March 2021. We will also include Ofwat's default financial sharing mechanism in our PR19 plan. Following receipt of draft and then final determinations, we will review the package in the round and if necessary fine tune our financing plan to reflect the determinations and financial market conditions.

We believe that these actions will resolve the concerns raised by Ofwat and demonstrate our continued drive to improving trust and confidence in the sector.

c) Delivering best value for customers through cost efficiency.

Ofwat's feedback: Ofwat's historical efficiency modelling found Yorkshire Water to be the second most efficient company in our water price control and the fourth most efficient in our wastewater price control. This confirms that we are an efficient company and is also in line with the results of the regular benchmarking that we undertake ourselves.

In contrast, looking forward, the results of the cost analysis carried out by Ofwat is that it believes that our forecast costs are about 18% more than Ofwat's view of an efficient company for our wholesale area. Ofwat found our residential retail price control to be 27% more efficient than its baseline making us the frontier company in that area.

Our response: We were very surprised by this feedback because of our strong track record for efficiency built up over 20 years. Yorkshire Water's average bill is consistently below the industry average levels. We have also applied the same stretching efficiency targets for PR19 as we have for previous plans.

Our long track-record of cost efficiency has been achieved by responding to all changes based on good evidence, following sound economic principles and tailored to specific circumstances. We do not believe that Ofwat's initial challenges have achieved these elements. The main concern for us is that Ofwat's approach puts at risk the promises we have agreed with our customers. It is not in customer's interests to place efficient companies in a position that they cannot meet commitments due to insufficient funding. Having looked in detail at the feedback, we believe that the approach used has not completely recognised the impact of our ambitious targets to improve performance and our large environmental programme. So, we have provided additional evidence to explain these issues and suggest ways to better separate efficiency from activity.
The table below summarises the key areas of the cost challenges in the IAP feedback where we have the most concern. We have provided Ofwat with detailed, high quality evidence to support our position that these costs relate to efficient expenditure to meet demonstrated requirements and so should be allowed. If you would like to review this evidence, it is available on our website.

15% reduction in leakage covered in base expenditure: Our evidence demonstrates that our ambitious leakage reduction plan is not funded within Ofwat's cost baseline. We also conclude that Ofwat's approach to assessing leakage enhancement costs penalises the most ambitious companies. This is inconsistent with Ofwat's stated objectives and provides the wrong incentives.

The impact of WINEP on our base expenditure does not appear to be recognised through the Ofwat financial modelling process: We believe that the requirements of WINEP means that some elements of base maintenance must be brought forward to meet the WINEP requirements. We believe that circa £140m of costs have not been attributed to WINEP in Ofwat's IAP review. We have provided substantial additional evidence on this point.

We recognise that enhancement expenditure modelling is a difficult area, but we are concerned regarding the outcomes of Ofwat's approach: We do not believe that the decisions regarding efficient unit costs for some activities fully reflect the work we need to do to deliver the promises we have made to our customers. Where this is the case we have supplied substantial additional evidence to support our position.

We have concerns around the evidence used by Ofwat to determine real price effects and frontier efficiency assumptions.

We have carefully considered Ofwat's forecasts and we have concerns regarding both some of the evidence used and the approach followed. To address this, we have provided further evidence in two expert position papers found in Appendix YKY.A1-1 and YKY.A1-2.

Our response to the feedback in the IAP on costs has been considered very carefully with the Board and the Forum. We are providing additional evidence as opposed to adjusting our costs only where we have robust evidence to do so and where we firmly believe that it is in the best interests of our customers.

We will continue to challenge ourselves to provide the best service at the lowest possible costs. We are concerned that the IAP assessments methods have penalised an efficient company with an ambitious service improvement plan and a large environmental programme. These penalties jeopardise our ability to deliver on those plans.

d) Managing the health of our assets

Ofwat's feedback: Ofwat found that overall, Yorkshire Water provided performance commitments that were appropriate and well evidenced, with stretching service levels. Ofwat has asked for more evidence to support some of our proposed service levels.

Our response: We have long-term plans in place to maintain the health of the assets. We take the health of our assets extremely seriously and currently use a basket of measures (reflective of the specific nature of our assets) to ensure that our assets are maintained in the most cost-effective way for our customers. After engagement with our Board and the Forum we are taking the following actions:

Investing at the right time: To ensure that we invest in the right places, at the right time, we consider the impact of potential asset failures on the services our customers receive. For example, we are repairing many more leaks – this does not impact directly on the service customers receive. However, interrupting the water supply *does* impact on our customers, so even though we are repairing many more leaks, we are reducing the number of times we interrupt supplies by working differently.

Reporting consistency: For example, Ofwat has asked us to exclude sewer collapses that are found proactively as other companies do not includes these in their reporting. We have adjusted our reporting to put it in line with other companies. We have also supplied additional evidence to support of our long-term targets.

Abstraction incentive mechanism (AIM): Ofwat has asked us to provide further evidence to prove that we do not have any water abstraction sites that would qualify under AIM. We have worked closely with the Environment Agency (EA) to supply additional evidence confirming that we do not have any abstraction sites that require AIM.

Yorkshire Water is a resilient company, evidenced by our performance during the extreme cold and the prolonged drought experienced in 2018. We were noted by Ofwat regarding our preparation for, and response to the "beast for the East". Also, the prolonged drought condition experienced in Yorkshire did not impact on the service our customers received.

We have provided details of our approach on asset health and the specific tools we have developed for this in IAP response YKY.OC.A1-A52: Delivering outcomes for customers.

e) Our performance targets and the associated package of incentives.

Ofwat's feedback: Overall, Ofwat concluded that our performance commitments (PCs) and outcome delivery incentives (ODIs) are 'appropriate, well evidenced and stretching'[1] and make for a "high quality plan". Ofwat has however requested a significant number of amendments to our PC and ODI package and we have reviewed these carefully.
Our response: Overall, we were surprised by the extent to which Ofwat have made changes to the PR19 methodology. Ofwat's approach risks creating a disconnect between the performance targets set and the costs allowed as well as reducing the importance of what our customers have told us. It is simply not possible for any company to deliver major changes in performance without incurring additional costs. So, where Ofwat does want to change its policy and require companies to meet different performance standards, this must be considered alongside the efficient costs of doing so. Again, we have provided additional high-quality evidence to help explain these issues.

If we were to implement all Ofwat's changes, the PC and ODI package would no longer reflect what our customers have asked of us. It would be harmful to customers and the company because it materially changes the balance of the package as evidenced by our return on regulated equity (RoRE) range modelling. This is a complicated area and if you would like to read more about this please go to our detailed document IAP response YKY.OC.A1-A52: Delivering outcomes for customers.

We have considered each of Ofwat's amendments individually and then looked at the PC and ODI package as a whole to understand the impact. This has allowed us to identify the changes that can be made without material distortion of the overall package. Where changes have a material impact we have provided further detailed evidence supporting either a compromise position where we adopt as much of the proposal as we can without distorting the overall package, or the original position.

f) Direct procurement for customers (DPC)
Ofwat's feedback: Ofwat has stated that Yorkshire Water provided limited evidence that we have fully considered DPC.

Our response: We are committed to finding the best delivery models that keep costs low for our customers and this is an area where we believe that we can learn from the approach taken by other companies. We have fully reviewed our process in line with that

[1] Yorkshire Water: Test question assessment page 3.

required by Ofwat and we are taking forward a ‘fast learner’ approach by embedding an improved process, not just for the PR19 process but for the long term. We have reviewed our original analysis using external experts and have re-confirmed that, at this time, we do not have a qualifying scheme.

4. The next steps we, and regulators, need to take to finalise our Water Industry Environment Programme (WINEP).

Our original PR19 plan contained circa £900 million of expenditure to deliver the environmental improvements required by the WINEP programme. Much of the programme was predicated on the expectation that a number of rivers in Yorkshire would be designated to a higher environmental standard in December 2018. As these designations had not yet occurred when we submitted our plan in September 2018, we followed Ofwat’s PR19 methodology and classed these as ‘amber’ items and included a ‘WINEP uncertainty mechanism’ that would allow these costs to be removed if the designations did not occur.

We understand that these designations are still anticipated to be made but, at the time of writing, they have not occurred. We have not been able to make changes in our IAP response as the end of the financial year has not yet passed. However, when the designations do happen, the rivers must be compliant to the new standard within seven years’ time which will likely now go beyond the PR19 period. We are working closely with the Environment Agency and Defra to establish when the designations are planned. As a result of this we still have uncertainty in this area and we are looking at how the WINEP investment should be re-phased as a result of the delay. We will continue to work with our Board, the Forum, Ofwat, the Environment Agency and Defra in April to confirm this re-phasing and this **should further reduce our average bill** for the period 2020 to 2025 as some of these costs will move into 2026. We began this period (2015 to 2020) with a bill reduction and then stable bills. Our revised stable bill for 2020 to 2025 means that, before the WINEP re-phasing, customers in Yorkshire will see a decade of stable or falling bills.

5. How our response provides what we believe is the best plan for our customers and the environment.

Our PR19 plan was developed through a step change in the nature of our conversations with our customers, making sure that we really understood what they want and expect. It built on our strong track record of efficiency whilst improving the services that matter most to our customers.

We have reviewed Ofwat's feedback carefully with our Board and the Forum. We have concluded that in some areas we should provide additional evidence and in other areas we should amend our plan to make it even better for our customers.

This means that we have been able to adjust our average bill profile so that before inflation, it does not increase even through the services we are offering deliver significantly more value to our customers. We will triple the number of households that are supported through our social tariff, alongside all the other support that we already have in place. This support emphasises using data to identify and support customers before they fall into debt.

We have further improved Ofwat's assessment of our financial resilience through targeting a reduction in our gearing and we have further taken steps to ensure that we comply with all aspects of the outcomes of Ofwat's work on transparency and trust. Where we believe our costs are appropriate we have provided further evidence as to why we believe that is the case and we have re-tested the acceptability of our plan, now and into the long term, with our customers.

Our plan is the start of a step change for us, moving into a sustainable, demand management future, working with our customers and stakeholders to deliver the best outcomes for Yorkshire. Our six capitals approach will allow us to monitor and report back on our success in improving our long-term sustainability as well as our affordability, as the two are intrinsically linked.

6. Conclusion

We would like to thank the Forum for its continued engagement and support in the PR19 process and all our customers who have been involved in the research that supports our plan. We have also re-tested our plan with customers and are pleased to report that 88% support our plan (an improvement on 2% from our original plan). Customer engagement also shows that 84% find it affordable (an increase of 18% from our original plan).

We have listened carefully to Ofwat's feedback and, following Board and Forum engagement, we have made key changes that improve our plan and bring additional benefits to our customers.

We will continue to look carefully at the costs and timing of our WINEP programme and wish to constructively engage with Ofwat and other regulators ahead of the draft

determinations to ensure that these costs are phased in a way that reflects the designation timescales and therefore spreads the costs fairly for our customers.

Navigating our IAP response

This document is to be taken as our revised business plan for our IAP response. In conjunction with our completed action tracker it provides responses to the actions set by Ofwat as part of its IAP process, as well as supplementary actions.

Two areas of our response go into sufficient detail to require submission as standalone documents. They are our responses to the Delivering outcomes for customers actions YKY.OC.A1-52 and our response to Securing cost efficiency YKY.CE.A1.

Our IAP response is also supported by a suite of appendices, signposted throughout this document and identified alongside the appropriate actions within our completed action tracker.

In support of our IAP response, we have received assurance reports and statements from Jacobs, Deloitte and the Yorkshire Forum for Water Customers.

Action Responses

The remainder of this document provides detailed responses to the actions posed by Ofwat and the supplementary actions.

Supplementary actions

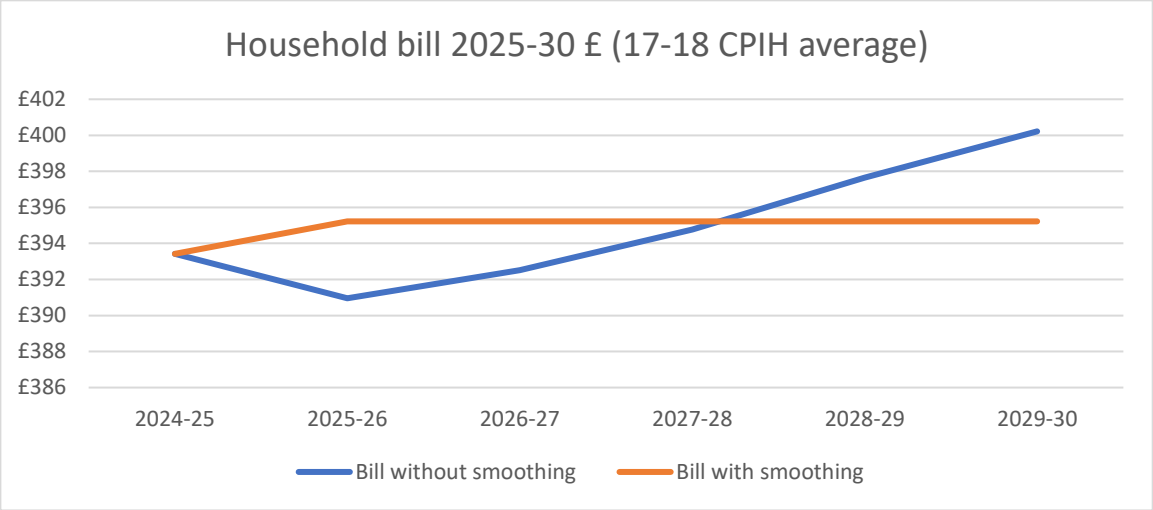
Further to the required and advised actions set by Ofwat, we have taken the opportunity to respond to some areas of challenge identified through Ofwat's IAP process that did not result in actions being set. We also include a revision we have made post-September 2018 submission (YKY.OC.C1). Together we term these as 'supplementary actions'. They are addressed in sequence in accordance with the IAP test area they relate to.

Addressing affordability and vulnerability

YKY.AV.A1

We provided our long-term bill profile on page 115 of our September 2018 submission. The bill was shown graphically on a natural and a smoothed basis, resulting in a proposed AMP7 closing bill value of £393. (Figure AV1).

Figure AV1 – The bill profile as per PR19 plan September 2018.

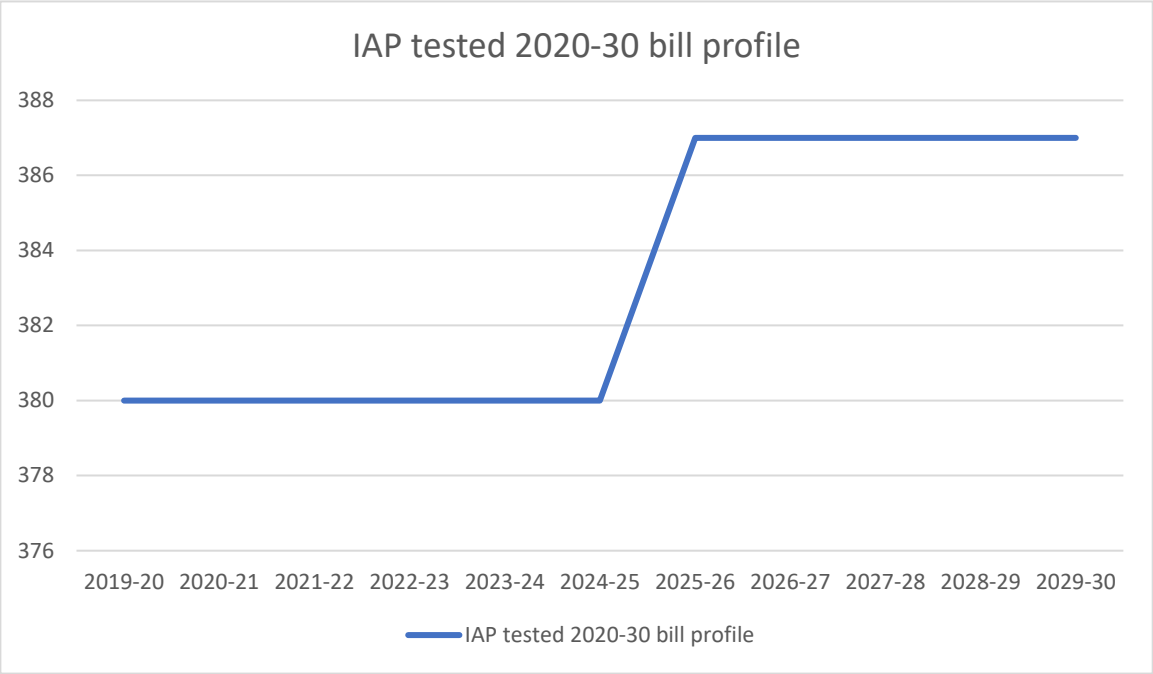


We consulted further with our customers, please refer to the response for action YKY.AV.A2 for the details of our customer engagement. The results of this additional customer engagement show that our customers support a ‘bill with smoothed’ profile over the 2025-30 period.

Our PR19 plan showed the bill profile for 2020-25 based on a ‘natural’ rising bill and not a ‘smooth' bill profile.

We have amended our 2020-25 bill profile from our PR19 plan submitted in September 2018 from a ‘natural’ rising profile to a ‘smoothed’ profile and to a ‘stable’ bill.

Figure AV2 – 2020-30 bill profile tested with our customers.



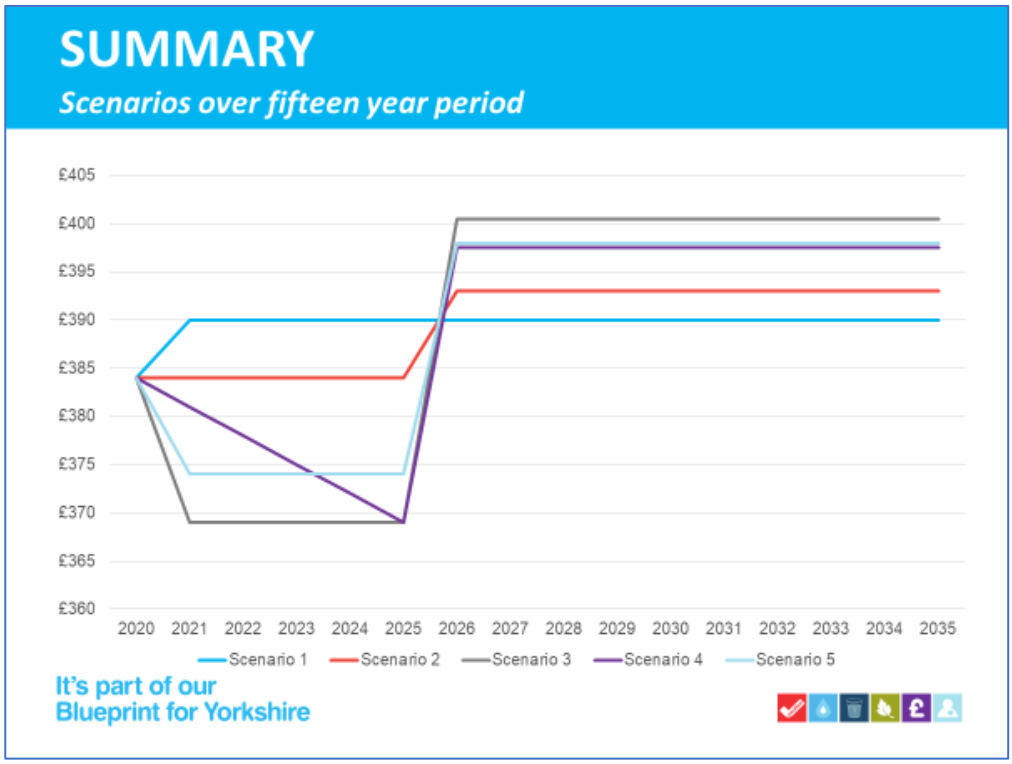
This amendment has resulted in a lower average household bill at the end of the 2020-25, resulting in an increase in the forecast real movement between 2024-25 to 2025-26 to approximately £7 instead of the forecast £2 shown in our PR19 plan submission in September 2018 Figure AV1.

We have through our bill affordability testing shown the 2020-30 bill profile to our customers Figure AV2.

YKY.AV.A2

For our business plan submission in September 2018, we tested a number of bill profile scenarios with customers. A summary of these can be seen in Figure AV3. The results concluded that customers preferred the consistency of scenario 1 as it remained constant for the longest period compared to the other scenarios. In order to manage their bills more easily, our customers prefer that their bills do not fluctuate, resulting in one less bill for them to worry about.

Figure AV3 – Summary of long-term bill scenarios tested for Business Plan submission



The feedback gathered at this stage was qualitative, having only been explored in focus groups. To provide sufficient evidence on preferred long-term bill impact up to 2030, and to demonstrate that customers support the long-term bill profile, we have undertaken a quantitative survey.

Introduction

We undertook further engagement work to understand our customers' preferences and support for various bill phasing scenarios. We collected data on preferences from a representative sample of household customers and customers on low incomes.

We appointed Qa Research to undertake a significant programme of qualitative and quantitative research.

About Qa Research

Qa Research are water industry research experts who provide their services to many water and wastewater companies. Qa Research are an MRS Code of Conduct and Company Partner. As an MRS Company Partner, Qa Research are committed to upholding industry standards. MRS Company Partners endorse and support the core MRS brand values of professionalism, research excellence and business effectiveness, and commit to complying with the MRS Code of Conduct throughout its organisation. Given the Qa Research credentials, we are confident that the approach and results of the research can be trusted and held up to are in line with social research best practice.

Methodology

We developed a mixed qualitative and quantitative methodology which was discussed and agreed with the Yorkshire Forum for Water Customers. The recommended approach included an online survey of a representative sample of household customers, supported by qualitative in-home depth interviews with those customers who may have struggled with paying their bills. Below is the sample breakdown for each methodology:

- **Quantitative online survey:** The overall approach to this research included an online survey with a representative sample of 1,065 customers. Interviews were completed between 4 and 11 March 2019.

- **Qualitative face to face in-depth interviews:** As affordability has a direct link to the long-term bill profile, we undertook in-home depth interviews with low income customers. This included 18 in-home depth interviews with customers who have affordability issues. The sample was split across our region and with a mix of life-stages

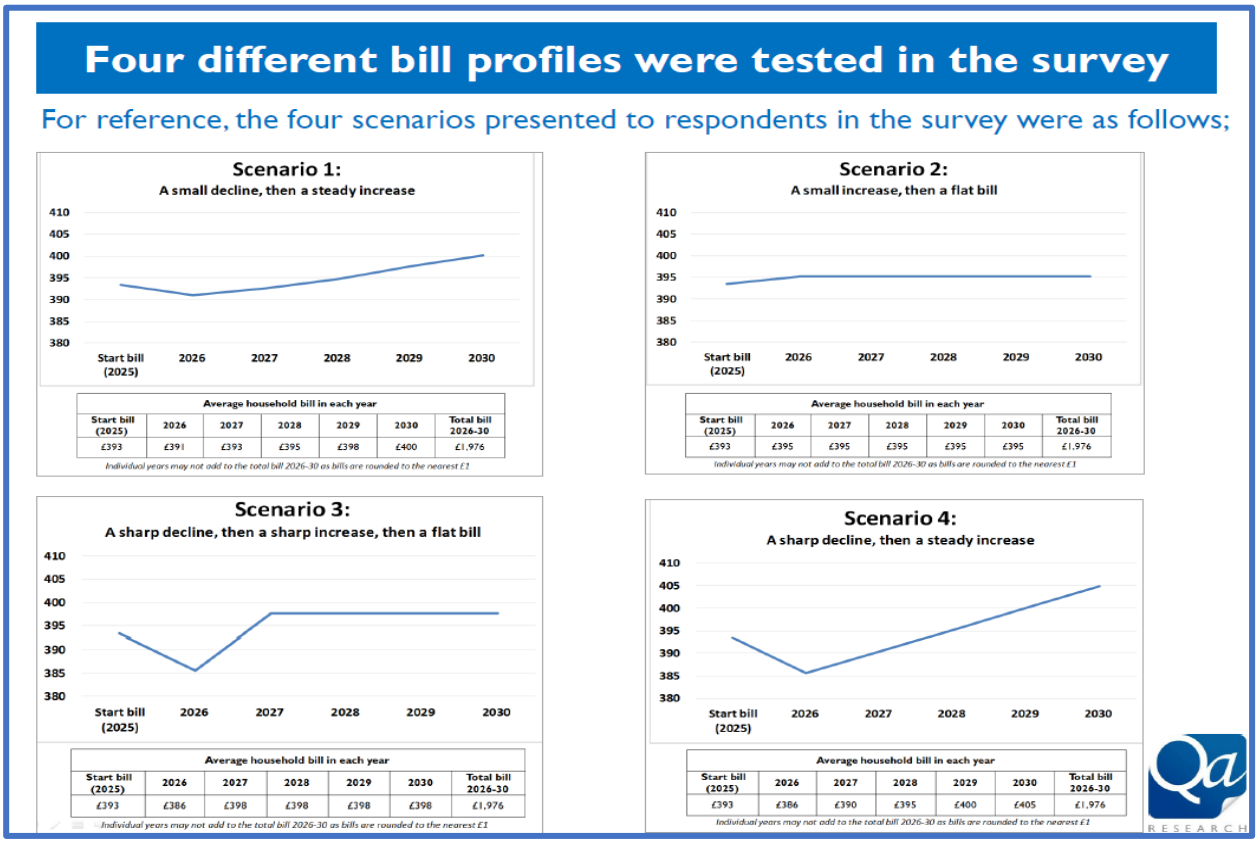
Key findings

We tested four different long-term bill profiles with our customers:

- A small decrease in 2026 followed by a steady increase to 2030.
- A small increase in 2026 followed by a flat bill to 2030
- A sharp decrease in 2026 followed by a sharp increase in 2027, then a flat bill to 2030
- A sharp decrease in 2026 followed by a steady increase to 2030

Figure AV4 outlines the four scenarios along with the proposed average bill that we presented to our customers.

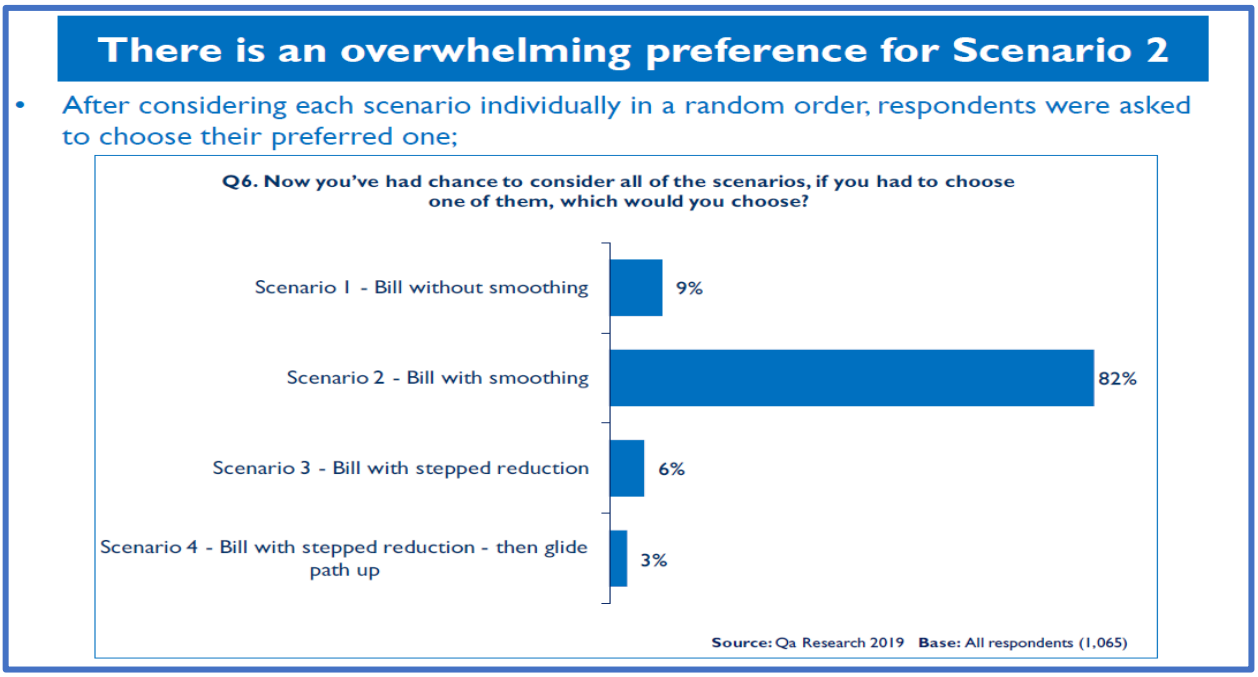
Figure AV4. Four bill profiles presented to our customers in the bill-profile survey



Customers were asked to consider each scenario individually, in a random order, and choose their preferred scenario. As shown in Figure AV5, the findings of the study are conclusive. Our customers have an overwhelming preference for scenario 2. That is a small increase in 2026 followed by a flat bill to 2030.

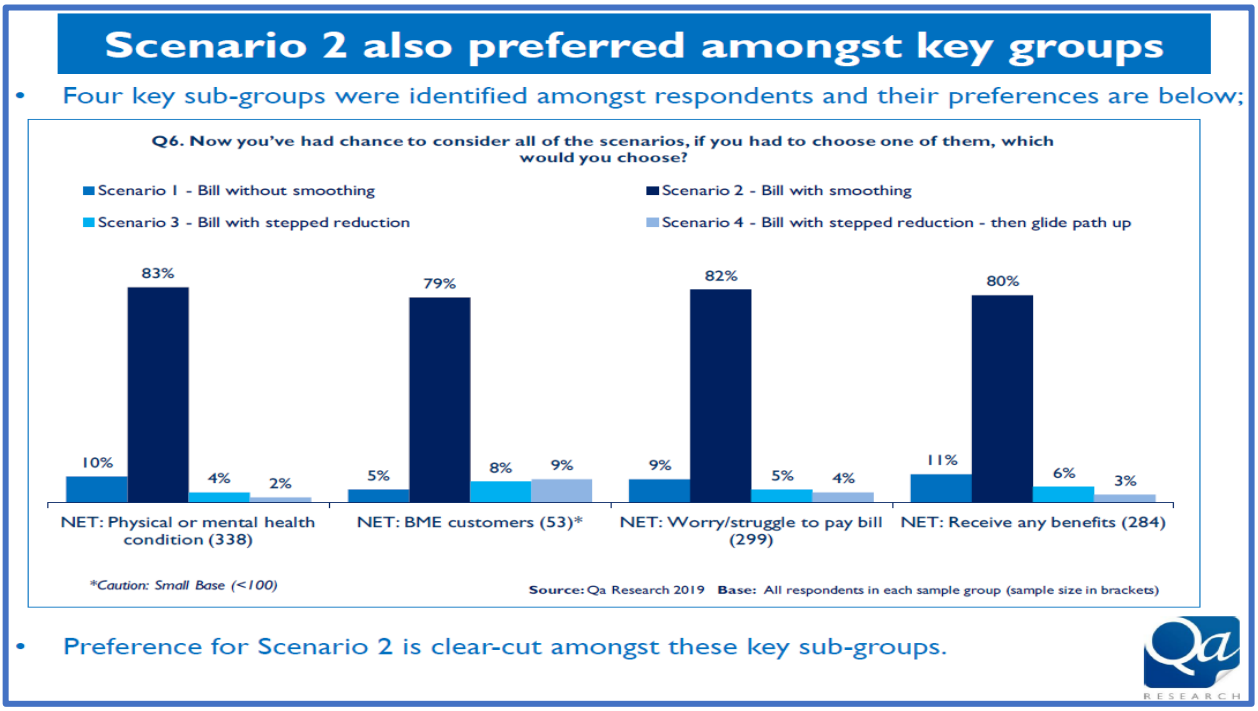
This is in line with previous research that we have undertaken. Customers have consistently told us that they prefer steady bills, helping them plan finances and manage household bills. The findings were consistent across all our customer groups.

Figure AV5 – High-level results of preferred bill scenario



It can be seen from Figure AV6 that scenario 2 is also clearly the most preferred scenario amongst customers who find themselves in vulnerable circumstances.

Figure AV6 – Sub-group scenario preferences



Conclusion

The results of the study are conclusive. Our customers prefer a bill profile which may incorporate a small increase but remains flat to 2030. Customers have a strong preference for this bill profile as over time it allows for better planning of household outgoings, avoiding fluctuations in bills which can be difficult to plan for. All results from the research were presented to the Forum on 22 March 2019 (Appendix YKY.AV.A2-2)

We provide the following appendices in support of this response:

- YKY.AV.A2-1 Bill Profile Research 2019 Report
- YKY.AV.A2-2 Yorkshire Forum for Water Customers minutes 22032019 (final)

YKY.AV.A3

Our approach to debt prevention is unique. Our innovative approach means we are the most efficient water company for providing customer service and debt management services. We led the way in data sharing; we were the first water company to introduce full credit reference arrangements. The use of data in day-to-day activity is now well embedded. Our approach continues to be unique in prioritising debt prevention. We view schemes that bring customers out of debt as necessary but only as a last resort.

We are providing additional company funding of £5 million in the next AMP to support the prevention of debt through our social tariff (WaterSupport). Through our Community Trust and WaterSupport we fund £14.5 million directly from the company.

In our September 2018 submission the social tariff was based on the level of cross subsidy accepted by our customers. To maximise the allowed cross subsidy our plan included the maximum amount allowed from year 1 of the next AMP. We know that our customers are willing to contribute towards those who find themselves in financially vulnerable circumstances and are more so if they know we are contributing. We commissioned new research in March 2019 to identify if the additional funding from the company might influence the contribution customers were willing to pay. Please see YKY.AV.A3-1 Social Tariff Research 2019, for the results.

Although the majority of customers surveyed (55%) were willing to increase their contribution there was a significant minority (39%) who were unwilling to increase their contribution. This is in line with our previous research, Fineline Social Tariff Research 2017 (Appendix YKY.AV.A3-2), demonstrating that the views of our customers have not changed even with our additional contribution. In October 2017 research completed by Fineline Market Research indicated that 61% of customers were willing to fund 97p, more than the contribution at the time of 65p. This value was agreed with the Consumer Council for Water and the Forum and is referenced in Appendix YKY.AV.A3-5. It was built into the plans for AMP7.

We shared the findings of the latest research with the Forum on 22 March 2019 who agreed that a further cross subsidy was not appropriate. Our additional £5 million company contribution allows further support on the scheme. The total number of customers using WaterSupport will more than double from the current number of 14,500 to 32,000.

Through the operational use of data, our scheme has proven to be easily accessible, so we are confident this level of help can be achieved. Our customer research confirmed 97% found sign-up easy for our social tariff (Appendix YKY.AV.A3-4).

We have identified three new areas that we have included in our Direct Support to Customers performance commitment (see our response to action YKY.AV.A4). All three areas are targeting customers on less than the minimum wage. The measures are for:

- those who switch to a meter to save money;
- those who are in receipt of our payment matching scheme, Resolve, and are currently paying their bill directly through the Department of Work and Pensions; and
- those who receive water efficiency packs.

Our Direct Support to Customers performance commitment has been adjusted based on these changes and includes the additional households on WaterSupport.

Excluded from the Direct Support to Customers performance commitment but equally important are our measures to provide flexible payment arrangements, our signposting to third party support and our targeted face to face visits. These are targeted to be 60,000 per year.

Our plan improves overall affordability for customers by preventing those on low income from debt and, where this fails, helping them to pay future bills. The tables below illustrate the increased levels of support up to 2025.

Table AV1 Support schemes and levels of support to 2025

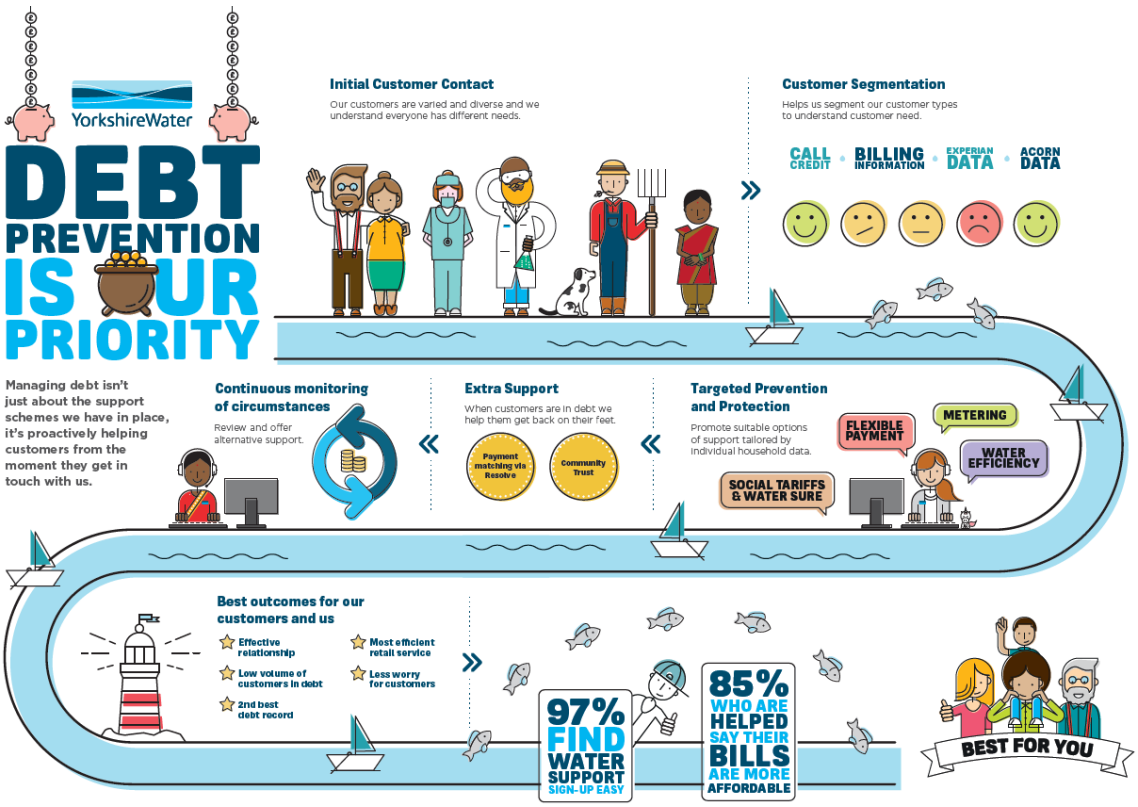
Support schemes:		2020-21	2021-22	2022-23	2023-24	2024-25
WaterSure	Households helped in the year	10,000	11,500	13,000	13,000	13,000
WaterSupport	Households helped in the year	26,000	32,000	32,000	32,000	32,000
Resolve	Households helped in the year	6,000	6,000	6,000	6,000	6,000
DWP Resolve	Households helped in the year	10,000	10,000	10,000	10,000	10,000
FreshStart	Households helped in the year	1,000	1,000	1,000	1,000	1,000
Community Trust	Households helped in the year	2,000	2,000	2,000	2,000	2,000
Water Meters	Low income households helped in the year	5,000	8,500	12,750	17,000	21,250
Water Saving kits	Low income households helped in the year	400	400	400	400	400
Total		60,400	71,400	77,150	81,400	85,650
Total once duplication removed		58,498	69,213	74,836	78,958	83,081

Table AV2 Additional Support not included in our Direct Support Measurements

Support provided	Definition	2020-21	2021-22	2022-23	2023-24	2024-25
External signposting	Referrals to other organisations who offer financial advice and support	5,000	5,000	5,000	5,000	5,000
Special payment arrangements	Payment arrangements made for customers who otherwise would struggle to pay	30,000	30,000	30,000	30,000	30,000
Face to face visits	Home visits to customers who need additional financial support	25,000	25,000	25,000	25,000	25,000
	Total	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**

The WaterSupport and WaterSure social tariffs represent key ways of preventing debt occurring. They are not the only mechanisms we provide to address affordability. Figure AV7 illustrates the range of support we offer.

Figure AV7 Illustration of the range of support that we offer



Our focus on debt prevention is proven. We are a leader in the industry in relation to levels of debt. The comparative efficiency modelling shown in our September 2018 submission shows that although our overall operating costs are industry leading, this does not limit our performance in debt management, which is also upper quartile. Our customer service for billing activity is also upper quartile, measured through the Service Incentive Mechanism.

Andrew White, Policy Manager at CCWater, noted that for affordability we offered a good suite of support options. CCWater also welcomes the fact we are one of few companies that provide a financial contribution to our social tariff fund and are significantly increasing that financial contribution in PR19.

The cross subsidy due to the social tariff was included in the bill profiles tested in February and March 2019. Overall, 88% of customers we engaged with supported our business plan, a 2% increase in support from our business plan submission in September 2018.

Overall, 84% of customers surveyed said the bill profile for 2020-2025 was affordable. This is an 18% increase in affordability from the bill profile presented to customers in the

September 2018 submission. 72% of customers felt bills would be affordable between 2026 and 2030. The reduction in overall affordability between the two periods (2020-25 and 2026-30) was due to the impacts of inflation and potential outperformance payments. To test this theory, we presented the 2020-30 flat bill profile (excluding any other cost effects) with customers. Overall, 79% of customers said they found the bill profile to be affordable.

We provide the following appendices in support of this response:

- YKY.AV.A3-1: Social tariff research 2019
- YKY.AV.A3-2: Fineline Social Tariff Research 2017
- YKY.AV.A3-3: Yorkshire Forum for Water Customers minutes 22032019 (final)
- YKY.AV.A3-4: WaterSupport Customer Survey Results
- YKY.AV.A3-5: Yorkshire Forum for Water Customers PR19 Assurance Report

YKY.AV.A4

The Priority Services Register (PSR) common performance commitment will form part of the suite of performance commitments that support the delivery our inclusive customer strategy.

This narrative is presented in the format that we used in our September 2018 submission.

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 AV3 Annual Performance Targets – Priority Services Register Reach

Unit	2020-21	2021-22	2022-23	2023-24	2024-25
Percentage %	4	5.8	7.5	9.1	10

In summary

This performance commitment consists of two component pieces which must both be attained for achievement of the performance commitment.

PSR Reach: the percentage of households that Yorkshire Water supplies with water and wastewater services which have at least one individual registered on the company's PSR.

PSR data checking: the percentage of distinct households with individuals on the company's PSR contacted at least once over the previous two years to ensure they are still receiving the right support.

We have set an ambitious target of 10% of our households having at least one person registered on our PSR by 2024/25. From the start of the AMP, we also target that at least 90%of individuals on the company's PSR will have been contacted at least once over the previous two years to ensure they are receiving the right support.

In preparation for our PR19 submission we began research using publicly available data, benchmarking and engagement with external stakeholders. Our engagement with external stakeholders continues with our 'Inclusive Customer Service Group' events. We know from this research that the eligibility of customers to our PSR will likely exceed a

third of our customer base but there will be challenges to ensure that we can identify and engage with them.

Complementing our existing inclusive customer service performance commitments, this performance commitment will help ensure we are bridging the gap between current PSR uptake and the expected need. Through this we can ensure we are reaching and supporting those who need it.

Our PSR information will be reported annually in our APR.

Engagement

Engagement with our customers in 2018 showed that our customers want us to do more for those who find themselves in vulnerable circumstances.

Our performance to date

The uptake of PSR has been very low, however we have experienced year on year growth. Our growth has historically come from non-targeted customer awareness campaigns. Previously we conducted periodic reviews of the needs of customers registered on the PSR for those using services other than the password scheme.
We experienced a step change growth during 2018/19, which is explained in the subsequent section ‘Using data more effectively’.

Our plans to deliver this commitment

Our bespoke performance commitment ‘Priority Service Awareness’ details how we will increase knowledge of the PSR using a multi-faceted approach:

- Traditional communication methods, for example, yearly billing information.
- External stakeholder engagement, for example, through our Inclusive Customer Service Group or attending external events.
- Paid partnerships, to access hard to reach customers.

Increased awareness of our PSR will lead to increased uptake of the services we offer.

Using data more effectively

We have developed a data mapping tool called ‘Custom Insights’. This is a highly intuitive mapping tool that allows us to select and understand any area of our region. Uniquely this tool blends our own customer data, including contact propensity and vulnerability, with open source data. Rather than being fixed to a timeframe, we can refresh the data used so that we have a current picture of our area.

This mapping has dual purposes. Proactively, we can see what challenges may exist in an area and where the penetration of our PSR is low. Reactively, such as during a water supply incident, we can immediately understand the types of needs our customers may have and how we can provide the right support quickly.

During 2018/19 we used this mapping tool to identify three areas to target for a winter PSR campaign. We used the data to help design bespoke communications material and an approach to reach customers in high deprivation and low PSR saturation areas. This targeted campaign has allowed us to more than double our historical annual PSR sign up. We expect that our learning from this initial activity will allow continued and efficient growth.

Our ongoing data sharing work with Water and Energy UK is a key activity, allowing our customers to register on our PSR when they speak to their energy provider or distribution network operator. The maturity of the energy industry approach to customer vulnerability allows us to grow our PSR through customers who are already engaged with other markets.

To ensure that we can confirm the needs of customers registered on our PSR we will use multiple methods suitable for individual customer needs. Our ongoing work to provide a better customer experience through digitals options will increase access to our PSR for some customers. Other customers will need alternative channels and engagement, which will be provided through ‘tried and tested methods’. We are using more innovative options such as ‘professional portals’, where people outside of our business are able to provide updates for customers where it is in the customers’ best interest and where we can be sure that the person providing the update is the right person to do this.

Delivering outcomes for customers

YKY.OC.A1 – YKY.OC.A52

Given the scale and complexity of this collection of actions, our response is provided in the dedicated ‘IAP Response YKY.OC.A1-A52: Delivering outcomes for customers’ document. Here you will find our detailed evidence base and third party commissioned work to support our response.

YKY.OC.C1

As part of the PR19 query process, our work to respond to query YKY-IAP-CA-028 we identified an error that required correcting.

We moved expenditure to WWS2 line 6 and outputs to WWS4 line 7, but we did not reduce the corresponding number of outputs in WWS4 line 8 to reflect U_MON4 and U_MON5 outputs only. Please see Table OC1 for the corrected number of U_MON4 and U_MON5 outputs.

Table OC1 – Summary of changes to WWS4

YKY-IAP-CA-028 - WWS4

	Line description	Item reference	Unit	DPs	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
7	Number of intermittent discharge sites with event duration monitoring	S4016	nr	0	174	169	168	0	60	60	60	60
8	Number of monitors for flow monitoring at STWs	STWM001	Nr	0	0	9	21	0	60	63	62	62

Corrected - WWS4

	Line description	Item reference	Unit	DPs	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
7	Number of intermittent discharge sites with event duration monitoring	S4016	nr	0	174	169	168	0	60	60	60	60
8	Number of monitors for flow monitoring at STWs	STWM001	Nr	0	0	9	21	0	36	39	36	39

Change

	Line description	Item reference	Unit	DPs	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
7	Number of intermittent discharge sites with event duration monitoring	S4016	nr	0	0	0	0	0	0	0	0	0
8	Number of monitors for flow monitoring at STWs	STWM001	Nr	0	0	0	0	0	-24	-24	-26	-23

U_MON3, U_MON4 and U_MON5 obligations are detailed in Appendix 8g of our PR19 plan, pages 263-280 (Appendix YKY.OC.C1-4).

We provide the following appendices in support of this response:

- YKY.OC.C1-1 - Query YKY-IAP-CA-028
- YKY.OC.C1-2 YKY-IAP-CA-028 Ofwat Tables
- YKY.OC.C1-3 WWS4 resubmission
- YKY.OC.C1-4 PR19 Appendix 8g - WINEP Technical appendix

Securing long-term resilience

YKY.LR.A1-YKY.LR.A3

This section summarises our response to actions YKY.LR.A1, YKY.LR.A2 and YKY.LR.A3 and is structured as follows:

- **Part 1** [YKY.LR.A1] *"The company should ensure that its common and bespoke performance commitments associated with operational resilience are clearly defined, sufficiently demanding for AMP7 and the long term, and supported by the right incentives."*
- **Part 2** [YKY.LR.A1] *"We expect the company to satisfy the relevant actions set out in relation to the outcomes areas…"*
- **Part 3** [YKY.LR.A1] *"… ensuring a line of sight between risks to resilience, and package of outcomes."*
- **Part 4** [YKY.LR.A2] "*The company should provide a commitment that it will, by 22 August 2019, prepare and provide to us an action plan to develop and implement a systems based approach to resilience in the round and ensure that the company can demonstrate in the future an integrated resilience framework that underpins the company's operations and future plans showing a line of sight between risks to resilience, planned mitigations, package of outcomes and corporate governance framework.*"
- **Part 5** [YKY.LR.A3] *"The company should provide a commitment to work with the sector to develop robust forward-looking asset health metrics and provide greater transparency of how its asset health indicators influence its operational decision making."*

Part 1: "The company should ensure that its common and bespoke performance commitments associated with operational resilience are clearly defined, sufficiently demanding for AMP7 and the long term, and supported by the right incentives." (YKY.LR.A1)

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 regulators, our stretching performance commitments are designed to reflect the priorities of those involved in shaping them. As an overall package our performance commitments ensure that we have taken account of "resilience in the round".

We have developed a new cutting-edge whole business resilience framework. We have completed a review of resilience in each area of our business, assessed how we are maintaining and enhancing resilience through our plan to 2025 and our strategy beyond.

Our resilience framework uses a systems-thinking approach that 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. More information is available on our dedicated webpage www.yorkshirewater.com/resilience, which we provide as a pdf in Appendix YKY.LR.A1-1.

Table LR1 – Resilience systems and associated performance commitments shows how our PR19 performance commitments align with our 16 resilience systems. Additionally, it shows the headline findings of our resilience assessment across internal systems that cover all our activities and how this changes over four timescales. Reporting on these commitments will help to monitor resilience through the 2020-25 period. The findings of the new resilience framework were discussed with our Board to ensure an appropriate balance of resilience in our PR19 plan.

Table LR1 – Resilience systems and associated performance commitments

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	• 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	• 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	• 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	• Drinking water quality • Unplanned outage • Drinking water contracts
5	Water distribution	Climate change, ageing infrastructure and disruptive technology.	Basic	Established	Established	Optimising	• 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	• 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	• 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	• 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	• Working with others • Education
14	Business planning financeability (short/medium term)	Cost increase, bad debt and financial crisis.	Established	Predictable	Predictable	Predictable	• 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	• Cost of bad debt
16	Financial transparency and reporting	Cost increase, bad debt and financial crisis.	Managed	Predictable	Predictable	Optimising	

Whilst we have mapped all our performance commitments to the 16 internal systems, to demonstrate how they contribute to our resilience in the round, there are two that are driven particularly by a requirement to measure resilience:

Risk of severe restrictions in a drought

- We have one of the most resilient water supply systems in the country, founded on multiple sources and with an integrated distribution grid. 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. This 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. Testing with customers has revealed that meeting demand now and in the future is of very high importance to customers. Our performance commitment for the period 2020-25 is that none of our customers (0%) will be at risk of severe restrictions in a drought.

Risk of sewer flooding in a storm

- This performance commitment relates to the percentage population equivalent susceptible to sewer flooding in a 1 in 50-year storm event. Long-term wastewater network resilience is very complex; the sheer number of stakeholders and regulatory interactions around drainage is significant, often calling for multi-stakeholder solutions to achieve best value for customers. Our DWMP will be key to the future interventions required to maintain and enhance wastewater network resilience (further information on our DWMP is available in our response to action YKY.CMI.A3).
- Our responses to actions YKY.OC.A21 and YKY.OC.A22 cover in greater detail how we have adopted the standard definition and amended our targets for the risk of sewer flooding in a storm performance commitment.

We believe that our ambition to deliver excellent service to customers is clear. We have responded to the expectations of our customers, stakeholders and regulators, and for those performance commitments that are key priorities we are not waiting for 2020 to start. For internal sewer flooding, leakage, supply interruptions and pollution incidents we have targeted significant improvements in service over the past year and will continue to do so in 2019/20.

Further detail concerning our asset health performance commitments can be found in ‘IAP response YKY.OC.A1-YKY.OC.A52: Delivering outcomes for customers’. This document contains our response to IAP actions to review the level stretch and appropriateness of incentives in relation to our overall package of performance commitments.

Part 2: "We expect the company to satisfy the relevant actions set out in relation to the outcomes areas…" (YKY.LR.A1)

Specifics relating to all performance commitments and their definitions, the level of associated stretch and incentives are addressed through the actions in 'IAP response YKY.OC.A1-YKY.OC.A52: Delivering outcomes for customers'.

Part 3: "… ensuring a line of sight between risks to resilience, and package of outcomes." (YKY.LR.A1)

In chapter 12 of our PR19 plan we explain the connectivity of our systems thinking approach to resilience, as shown in Table LR2. This shows that our approach encompasses our operational, corporate and financial resilience into the overall framework. In Part 1 of this section, we have already discussed the alignment between the 16 systems assessed as part of our resilience framework and our package of outcomes.

Table LR2 Connectivity of systems thinking to resilience

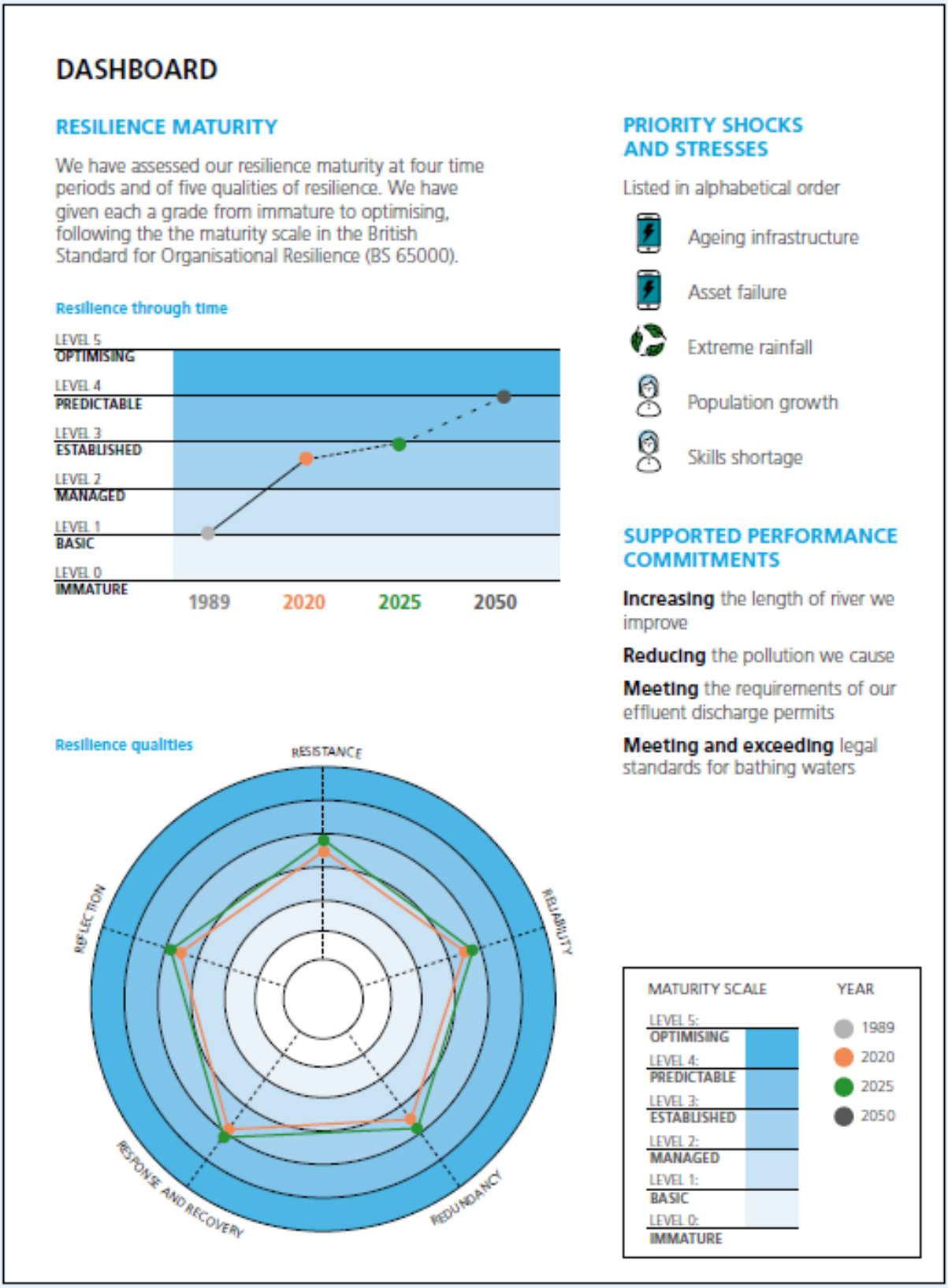
Systems thinking approach

Operational resilience systems	Corporate resilience systems	Financial resilience systems
Customer service	Company strategy and horizon scanning	Business planning financeability (short/medium term)
Land management	Supply chain management	Long term viability planning
Water resources and collection	Enabling business support services	Financial transparency and reporting
Water treatment and drinking water safety	Human resource planning and management	
Water distribution	Stakeholder management and communication	
Wastewater collection		
Wastewater treatment and effluent disposal		
Sludge treatment and bioresources		

External Systems
Such as the economy and environment

In Water Resilience in Yorkshire (Appendix YKY.LR.A1-2) we provided a series of dashboards that explain how each resilience system is represented through our package of outcomes, indicating the most relevant performance commitments. The dashboard for wastewater treatment is included as an example in Figure LR1.

Figure LR1 – Wastewater treatment dashboard



Part 4: "The company should provide a commitment that it will, by 22 August 2019, prepare and provide to us an action plan to develop and implement a systems based approach to resilience in the round and ensure that the company can demonstrate in the future an integrated resilience framework that underpins the company's operations and future plans showing a line of sight between risks to resilience, planned mitigations, package of outcomes and corporate governance framework." (YKY.LR.A2)

We confirm that as requested we will provide to Ofwat, by 22 August 2019, an action plan to further develop and demonstrate implementation of our systems-based approach to resilience in the round. This will build on the significant steps that have already been taken to develop a resilience in the round framework, explained in chapter 12 of our PR19 plan. More detailed information on the development of the resilience framework can be found in Appendix YKY.LR.A1-2 and on our dedicated webpage www.yorkshirewater.com/resilience, which we provide as a pdf in Appendix YKY.LR.A1-1.

Significant information was provided as part of our PR19 plan in September 2018 to demonstrate:

- We have worked with customers and stakeholders to produce a cutting-edge whole business resilience framework.
- We have worked with international resilience experts to develop a best practice framework that enables us to better govern and openly report our resilience.
- Our framework uses a systems-thinking approach which helps us quantify the resilience of all our activities through a robust and comprehensive evidenced-based assessment. 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.
- That we have undertaken a range of detailed resilience assessments to help shape our PR19 plan and specific proposals within it.
- Independent assurance confirms our robust approach.
- We have aligned our framework and integrated management system to the British Standard for Organisational Resilience (BS 65000).
- As a result of ongoing conversations with the Board and Risk Committee on resilience, we are expanding the Risk Committee to become the Risk and Resilience

Committee. This will ensure ongoing ownership and alignment at the highest levels in our business.

Resilience is a long-standing priority for us and our customers. Our latest advances in resilience will deliver lasting benefits to our business and services. It will also enable us to further enhance our governance of resilience and ensure ongoing improvement over time. To support this, we have embedded the best practice BS 65000 into our Integrated Management System (IMS). This ensures resilience is always a priority in our policies and our internal audits.

Our action plan will cover the next steps we plan to take to ensure that our approach to resilience in the round is fully integrated in our decision making and governance.

Part 5: "The company should provide a commitment to work with the sector to develop robust forward-looking asset health metrics and provide greater transparency of how its asset health indicators influence its operational decision making."(YKY.LR.A3)

We reaffirm our commitment to working with and beyond the sector to ensure that best practice is shared and adopted. This section describes some of the examples where we believe we are taking a leading approach to collaboration regarding resilience and asset health in the sector.

To develop resilience in the water sector and to advance our approach in Yorkshire, we will continue to learn from other leaders, share our learning and facilitate debate. We will work with national water industry working groups to support the development of a sectoral approach to resilience. We have published the report of our methodology and findings of our new leading resilience framework to contribute to this process – Appendix YKY.LR.A1-2.

We are also 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 Water Research Foundation and collaborators from international water companies.

We have been the catalyst to the forward thinking and innovative "Living with Water Partnership (LWWP)" in Hull and Haltemprice. The LWWP has been successful in its bid to be part of the City Water Resilience Framework (CWRF) project, which 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 the concept of resilient water governance.
- Establish a methodology by which CWRF can be practically implemented within existing governance structures and processes.
- Develop a web tool that supports key players in the water cycle to mobilise and drive collective action for improving resilience.

As well as our efforts to lead on international projects outlined above, we are also at the forefront of domestic efforts to improve understanding of risks and opportunities from climate change. We chair the Water UK climate adaptation group and are leading on development of a water sector overview and reporting template for the next round of Adaptation Reporting Power, as required under the Climate Change Act, 2008. Our most recent adaptation report was praised by Defra as one of the best submitted.

> *"There is excellent coverage of climate change issues in your report. The report leaves the reader with the deep impression that you have a sound understanding of climate risks and will continue to develop this understanding in the future. There is plenty of evidence that you have incorporated additional modelling and analysis into your analysis, for which you should be commended."*

We have been proud to represent the water sector on the non-governmental panel for the development of the latest set of UK climate projections, UKCP18. This representation has meant the outputs from UKCP18 are well tailored to the needs of the water sector, particularly the very high resolution 2.2 km convective permitting rainfall model outputs which will be released in July 2019. Colleagues from across the business are already involved in UKWIR projects to embed the new climate data into tools, resources and guidance for the water sector.

As well as water sector specific UKWIR projects, we have recently co-hosted a regional launch of UKCP18 with the Met Office and the University of Leeds, attended by more than 60 delegates from across various infrastructure sectors, regulators, academics and other stakeholders. We plan to build on the momentum afforded to us by this event to reinvigorate a regional climate change network, bringing together end users of climate data to share knowledge and raise capacity. We recognise the need to work

collaboratively to tackle the challenge of climate change and ensure our ongoing resilience. Our involvement in the iCASP partnership at the University of Leeds which seeks to bring NERC funded science into practice is a clear example of our commitment to this.

We also represent the water sector on the Infrastructure Operators Adaptation Forum which brings together infrastructure operators, regulators, government and academics to drive forward adaptation action.

Historically we have collaborated with others in the sector on a wide range of challenges and opportunities. We reaffirm our long-standing commitment to work with the sector. We plan to continue to undertake collaborative activity in respect to asset health. We contributed to the 'Targeted Review of Asset Health and Resilience in the Water Industry' in 2017. We have played an active role in the Water UK-led groups on asset health measures. For more detail on our approach to asset health, please see our response to action YKY.OC.A1 - long term plans to address asset health challenges.

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. 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.

We note that in Ofwat's feedback of our approach to resilience it was identified that "whilst the company provides a baseline resilience assessment, we consider there is insufficient evidence in some areas to explain how this informs decision making". In chapter 9 of our PR19 plan, we explain our Decision Making Framework. In this chapter we included Figure LR2, which shows how the components of resilience are embedded in our processes and approach to decision making.

For our business planning approach, we have 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 valuation framework. These 'needs' include those

associated with asset health. We have developed a common set of steps to calculate the expected service impact of a need. This is demonstrated in Figure LR2 and highlights how our-risk based approach also aligns to the four of the five infrastructure resilience components used in our Resilience Framework.

Figure LR2: Approach to assessing service impact in the DMF and connectivity to the resilience framework.

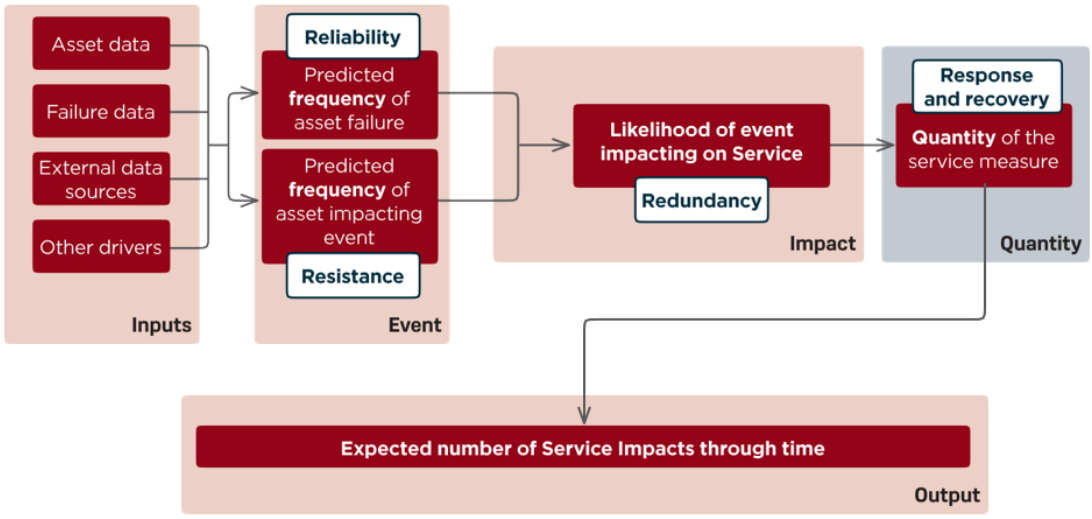


Figure 9d - Approach to assessing service impact in the DMF.

For further details of our response to Ofwat's challenge around financial resilience please see our responses to actions YKY.LR.A5 and YKY.LR.A4.

We provide the following appendices in support of this response:

- YKY.LR.A1-1 - Resilience webpage pdf
- YKY.LR.A1-2 Appendix 12b - Water Resilience in Yorkshire

YKY.LR.A4

Risks to financial resilience associated with our gearing level

We undertook a rigorous financial resilience assessment as part of our PR19 plan, the results of which are provided in Appendix YKY.LR.A4-4.

This assessment was undertaken based on both the notional structure and our actual structure, reflecting the gearing levels included within our plan.

We addressed the potential risks to our financial resilience from three different viewpoints:

- Prescribed scenarios – we considered all of the prescribed scenarios set by Ofwat.
- LTV scenarios – we considered all the scenarios that we ran in the LTV analysis included within our recent APR and statutory accounts.
- Reverse stress testing – we identified the levels of headroom within our key financial ratios. We considered the level of financial resilience within the plan irrespective of any specific risks identified, with the headroom identified providing an additional buffer against any unidentified risks.

From the above testing we concluded that we are financially resilient throughout AMP7 and beyond, both on a notional and actual basis, reflecting the levels of gearing included within our plan.

The Board have, after careful consideration of Ofwat's feedback, made the decision to review our gearing outperformance mechanism and to further strengthen our financial resilience by reducing our gearing level by approximately 8%, with the aim of securing gearing below Ofwat's "high" gearing threshold of 70% by March 2021.

As a result of the changes made to our PR19 plan submitted in September 2018, we have undertaken a full financial resilience exercise on the same basis as before and have included all of the results of this exercise within our revised Chapter 13 of our PR19 plan (Appendix YKY.LR.A4-1).

Risks to financial resilience associated with the introduction and any application of the gearing outperformance sharing mechanism for PR19.

As a result of the planned changes to our gearing outlined above, we expect our gearing to fall below the threshold at which the gearing outperformance mechanism will apply.

Due to the timing of our capital programme it is possible that our gearing could be slightly above the 70% threshold in one or two years, before returning below 70% again before the end of the five-year period.

Whilst we do not expect any financial impact as a result of the application of the outperformance mechanism, for prudence, given we expect to be close to the 70% threshold, we have included an additional scenario that considers a worst-case impact of including the gearing outperformance mechanism based on the original gearing levels included within our PR19 plan.

The results of this additional scenario are included within the revised Chapter 13 of our PR19 plan. The analysis provided within the revised Chapter 13 shows that we will remain financially resilient if the gearing outperformance mechanism is applied.

Risks to financial resilience associated with maintaining a target credit rating of BBB/Baa2, one notch above the minimum for investment grade.

Please see our response to action YKY.RR.A3

Risks to financial resilience associated with the requirements to refinance subordinated debt.

We will need to refinance £247 million of subordinated Class B debt during AMP7. This represents a relatively immaterial proportion of the total amount of debt, of £2 billion or more, that will need to be raised during AMP7 to refinance debt maturities and to fund our PR19 plan.

We have confidence that we will be able to raise new Class B debt given a successful track record since our securitised financing structure was implemented in 2009. Management of key credit ratios against covenants are regularly reviewed to ensure that we meet our obligations, provide the ongoing assurance that the debt obligations can be serviced and future requirements funded. Using this financing structure, we have been able to maintain access to several different sources of funding and have raised debt in public and private markets as well as bilaterally.

As a result of the planned reduction in gearing it is possible that some of the existing subordinated debt could be refinanced as Class A debt instead, reducing the potential risk.

Risks to financial resilience associated with Capital for the business raised as debt elsewhere in the corporate group.

Capital raised as debt elsewhere in the corporate group would be raised at shareholders' risk, rather than the Company's risk, and if injected into the Company it would be for the long-term benefit of customers as it is expected interest costs would reduce accordingly.

This debt would be structurally subordinated to the debt raised directly by the Company and its financing subsidiaries under the securitised financing arrangements.

The interest costs of debt raised elsewhere are borne by a finance company in the wider corporate group and the financial risk of this debt is borne by the lenders of this debt and the shareholders.

Outline associated risk management/mitigation approaches identified by the company to provide assurance on long term financial resilience.

Our approach to financial resilience is managed through the Finance Governance Group (FGG). This group meets bi-monthly, and ad-hoc where necessary, to consider all aspects of our financial arrangements, including a review of all our key financial ratios, both current and forecast. The group is chaired by our Director of Finance, Regulation and Markets and includes senior leaders from the Treasury, Finance and Regulation functions to ensure a holistic approach to our financial management.

The long-term financial review undertaken at the beginning of the current period provides evidence as to how this approach works in practice. Following internal initial assessments of the potential WACC in AMP7, FGG identified that there was a potential risk to our long-term financial resilience arising in AMP7.

Following the identification of this risk, we appointed Rothschild & Co to undertake a thorough financial review of the Company. Because of this review several key actions were put in place which included:

- reducing gearing, through both dividend retention and capital injections.
- a comprehensive restructuring of our hedging swap portfolio to improve resilience in interest cover ratios and address potential liquidity events arising from mandatory breaks.

The above measures enabled us to reduce our annual interest cost in AMP7 by over £50 million, ensuring that we are financially resilient throughout AMP7 and beyond.

Further assurance is provided by our securitised structure. Our securitised financing arrangements provide a common debt platform for the issuance or raising of debt, which is backed by cashflows derived from the entire range of our operating revenues. A common covenant and security package are provided to creditors that ensures stability from a credit viewpoint and is seen as an enhancement when assessing credit risk.

These arrangements contain, amongst other things, specified covenants, undertakings, representations, warranties, trigger events and events of default that will apply in respect of any debt or funding raised directly by the Company, or its financing subsidiaries, under the platform. They are subject to regular monitoring and, bi-annually, the Company reports publicly on its covenant performance.

We provide the following appendices in support of this response:

- YKY.LR.A4-1 Revised Chapter 13 of our PR19 plan
- YKY.LR.A4-2 Appendix 13e IAP - Financeability analysis - Appointee
- YKY.LR.A4-3 Appendix 13f IAP - Financeability analysis - Price controls
- YKY.LR.A4-4 Appendix 13g of our PR19 plan

YKY.LR.A5

As outlined within our response to action YKY.LR.A4 our approach to risk management is primarily managed through our Finance Governance Group. The success of this group is evidenced through the steps that have been taken during AMP6 to ensure that the company will be financially resilient throughout AMP7 and beyond.

In addition to a restructuring of our index linked swap portfolio, we undertook a long-term financial review with the support of our professional advisers Rothschild & Co. This review resulted in a number of equity injections from different sources being made during the current period, including:

- Retention of dividends by the Company – across the whole of AMP6, dividends paid to shareholders will total £45 million.
- Sale of non-regulated businesses – over the last two years a number of the non-regulated businesses within our Group have been sold. The proceeds of these sales have been re-invested into Yorkshire Water rather than being distributed to shareholders.
- Additional debt has been raised elsewhere in the corporate group and transferred to Yorkshire Water via the repayment of inter-company loans. The interest costs and financial risk of this debt are borne uniquely by the shareholders.

Targeted controls, markets and innovation

YKY.CMI.A1

In this section we explain our methodology for evaluating regional sludge production volumes and determining how much capacity we need to provide, through both self-built capacity and markets delivery to address forecast capacity shortfalls.

For clarity, the following terminology has been used to articulate the methodology:

- Sludge Production – the mass of sludge leaving the wastewater treatment processes requiring sludge treatment, given in thousand tonnes dry solids (TTDS).
- Operational Capacity – the size of a site and/or processes or unit(s) to manage and handle sludge production, either indigenous or otherwise, given in TTDS and meeting our asset standard processing parameters.

This action response should be read in conjunction with the additional evidence for our Bioresources cost adjustment claim (IAP Response YKY.CE.A1: Securing cost efficiency – Section 4), which specifically addresses sludge production within the 'need for investment' challenge.

There are two drivers that increase the demand for treatment capacity in Yorkshire:

- Population Growth – as the population grows, the volume of raw sludge being processed through our treatment works and passed across to our bioresources assets increases.
- Sludge Quality – when we deliver our regulatory environmental obligations in our Wastewater Network Plus price control, driven by WINEP, the sludge quantity increases and the quality may change. For example, as a result of a large Phosphorus removal programme, the type of sludge could change to a more ferric concentrated sludge.

We need to understand the impact of future population change and environmental drivers on sludge production volumes and quality so that we can adequately plan for how we treat or dispose of the sludge, either through self-built capacity or a market solution.

Our framework consultants, Arup, were tasked with developing a methodology to estimate future sludge production figures. Arup created a regional production model that

details how much sludge will be produced annually as a result of population growth and the quality programme for each asset within the Wastewater Network Plus price control. The methodology used to build the regional production model is as follows:

- A list of all existing wastewater treatment assets and the respective treatment processes has been obtained from the company's Asset Inventory (AI) system. The 14 large sites that account for approximately 70% of sludge production and treat the majority of the sewage have been verified by Arup to ensure the correct treatment processes have been allocated in the model.

- The residential population estimates for future population up to 2030 were obtained to understand the growth element of the estimates. The methodology was produced by our consultant, Edge, and has been fully assured. The methodology uses 2011 census data and projects future population estimates at catchment level. These are converted into population equivalent values and applied to all our growth investment needs. The values from Edge are applied across all our wholesale business.

- Deriving the population figures from Edge assured figures was consistent with the rest of our WINEP programme build elsewhere in the programme and based on population growth.

  The population equivalent figures used form a basis for quantifying the trade population equivalent by subtracting the residential population.

  Combined current and future population equivalent estimates were derived using the two data sets and entered in the model. The trade population equivalent was assumed constant from year to year.

- The NEP for AMP6 and the WINEP programme for AMP7 (issued by the Environment Agency on 31/03/2018) were obtained for the analysis. The WINEP programme was entered into the model by inputting the process selection that was made to address the new obligation. The majority of our AMP6 programme contains Phosphorous removal, so for example, Phosphorus removal driven by UWWTD on a small site would see an upgrade to a chemical dosing process with potential tertiary solids capture, changing the quantity and quality of the sludge produced.

A full methodology for our treatment selection process to address the needs of the WINEP programme is described in Appendix 8g of our September 2018 submission (Appendix YKY.CMI.A1-1), with further information provided in Appendix 8m, September 2018 submission (Appendix YKY.CMI.A1-2).

- A sludge yield factor table was used to estimate the sludge yield per population equivalent for each process. This is a key output to our model. The sludge yield was broken down into its components to ensure that the amounts of primary, secondary and tertiary (chemical) sludge could be estimated and better contribute to understand the impacts on sludge treatment assets. More detail can be found in Appendix YKY.CMI.A1-5.

  The sludge yield factors were determined using industry reference values and process calculations.

- Where applicable, we have included water treatment works sludge being disposed to sewer. The amount of water treatment works sludge was determined as part of the research project on coagulant recovery, and was estimated in line with the WRc methodology[2].

  The amount of water treatment works sludge produced has been assumed to remain constant each year and is treated as a chemical sludge due to the high percentage of coagulants.

- The product of the population equivalent for each site and the relevant sludge yield for the new process installed gives the estimated sludge production for the site. These figures are summed together for all bioresources sites to give a regional sludge production figure.

  The exercise is repeated for each year in the planning horizon, calibrated to 2016/17. The model distinguishes between growth and quality drivers by changing the yield factor associated with the technology choice associated to a quality driver and, the yield factor associated to existing sludge production for the growth driver to enable cost separation.

[2] WRc (1992) Water Treatment Processes and Practices, eds Hall, T. and Hyde, R. A., Swindon, UK.

This provides the sludge mass being produced within the Wastewater Network Plus price control. We have modelled a route to transport the sludge to the appropriate bioresources asset STF. This has been achieved by reviewing the logistics business plan figures for tanker and cake movements where available, or using the closest STF to the site in consideration.

- The sludge production model is calibrated against actual data. The reference year was taken as the financial year 2016/17, as reported in the CCC17 submission, which is similar in period to the 2016 population estimate year. 2016/17 has been used as it represents a typical operational year and is the year that many of the PR19 projections are based from. It is also the most representative data set. For example, the 2015/16 data set included external factors beyond management control which influenced overall sludge management, such as flooding and the unplanned outage which occurred at Hull WwTW.

  This calibration factor adjusts all sludge yield factors by the same amount and was used to align the reported data as part of CCC17 and the one estimated by the model. The calibration factor was estimated to be 0.89, resulting in the model's output being reduced by 11%, and is now applied to all estimates of current and future sludge production. The calibration factor was the difference between the sludge yield in 2016/17 and the estimates going forward. The effect of the calibration factor is shown in Table CMI1.

Table CMI1 – Output sludge yield per treatment site at incremental time steps

STC Feeds (required tds/yr treatment NEED)	AMP6		AMP7		AMP8	
Treatment Centre	2020	2020 Un calibrated	2025	2025 Un calibrated	2030	2030 Un calibrated
ALDWARKE/STW	6,339	7,119	7,465	8,385	7,651	8,594
BLACKBURN MEADOWS/STW	15,243	17,005	18,880	21,090	19,387	21,659
BRADFORD ESHOLT/NO 2 STW	24,138	26,806	27,679	30,783	28,291	31,471
BRIDLINGTON/STW	1,384	1,555	1,425	1,601	1,466	1,647
CALDER VALE/STW	3,509	3,913	3,907	4,359	4,024	4,491
DEWSBURY/STW	11,124	12,459	13,695	15,346	14,000	15,689
HUDDERSFIELD/NO 2 STF	14,926	16,597	17,978	20,024	18,387	20,484
HULL/STW	19,854	22,300	20,453	22,973	20,853	23,422
KNOSTROP/STW	32,187	35,940	38,844	43,416	40,274	45,022
LUNDWOOD/STW	3,026	3,399	3,871	4,347	4,030	4,526
OLD WHITTINGTON/STW	3,686	4,141	4,508	5,064	4,621	5,190
SANDALL/STW	3,049	3,424	3,501	3,933	3,568	4,007
WOODHOUSE MILL/NO 2 STW	3,442	3,866	3,831	4,303	3,935	4,420
YORK NABURN/STW	10,831	12,165	11,431	12,839	11,764	13,213
14 No Treatment Centres	**152,739**	**170,688**	**177,468**	**198,463**	**182,250**	**203,835**
Calibrated Variance impact		17,949		20,995		21,585
Calibrated consitent % Variance		11%		11%		11%

The calibration factor achieves the realistic forecast between the industry standard assessment approach for per capita sludge yields for different technologies in different modes of operation and the actual reported data, meaning that the overall exercise was within 5-10% agreement with site net production data.

The main reasons for calibrating the model are:

- The sludge yield factors will depend on the type of trade effluent, for example, some trade effluents have a very high strength, and result in a high population equivalent, effluent with relatively low solids load will skew sludge production figures.
- Cold digestion is likely to occur in the sewers, reducing the load to the treatment works.
- Local variation contributing factors, such as systems losses.
- Dry weather flow patterns varying daily sludge production.
- The accuracy will be in line with the CCC 16/17.

The model for regional sludge production is provided in Appendix YKY.CMI.A1-3: PR19 Sludge Strategy Q&G output Issue 8

Operational Capacity – Non-treatment

The operational capacity of our non-sludge treatment assets is defined against the following two criteria:

- Processing capacity of individual assets. For example, where a sludge thickening asset has a processing capacity of 0.8 dry tonnes per hour, the following asset standard parameters are applied to define the unit's annual capacity to process sludge.
- Asset standard expected operational hours. The asset standard expected operational hours includes a 20% reduction in supplier or historical peak processing rates for individual processing units and the expected hours of running for the associated size of WwTW.

The STF Asset Standard V11 states from clause 55 to 56 that:

'55. Default sludge processing rates shall be 35 hours per week. It is expected that the 35 hours will be distributed throughout the working week, for example 7 hours on each of 5 days, or similar.

56. For sites that meet the following conditions, processing can be achieved over a longer period of time (i.e. smaller units supplied), for existing process technologies.

- Site screens are compliant with current screens and screenings handling asset standards.
- Minimum requirement of maceration of imported sludge cake.
- Grit removal compliant with current grit removal asset standard.
- Upstream tankage is compliant with sections 5.1 and 5.2.
- Sludges are screened (see Section 5.4).
- Start up and shut down slop diversion is provided by centreless screw.
- Conveyors for decanting centrifuge applications.
- Separate conveyor / discharge point for each centrifuge provided.'

Longer hours can be:

- 'Up to 16 hours per day 7 days per week on sites processing more than a total of 2250tDS/y (100,000PE) by centrifuge, GBT or drum.
- Up to 8 hours per day, 7 days per week on sites processing less than 2250tDS/y. In this case, units shall be designed to treat all sludges in 16 hours per day 7 days per week where one stream is out of service.'

Clause 48 states that 'The volumetric throughput of sludge processing equipment shall be designed on either:

- maximum flow at that point in the process (as defined by process mass balance).
- 20% greater than the agreed average flow, to be decided by the CST. Where a sludge flow or tank volume is specified elsewhere in the standard, it shall be used as the design figure in preference to the provisions.'

For existing assets and their operational capacity, the peak processing capacity a single unit can physically achieve, either by supplier performance testing or actual operational testing is used. 20% is subsequently removed from this figure to define the operational capacity. The 20% allowance is usually built into new build projects or practically used to define expected real day to day processing rates.

This figure has been defined from operational practice to allow normal day to day operations to be achieved through lowering the risk and probability of process failures due to high loading levels. Instrumentation and sludge solids variability mean that operation of sludge processing plant equipment at peak throughput rates derives a risk of process overloading and subsequent mechanical and electrical equipment failure.

These outputs are collated into our bioresources headroom model, which tells us how much operational capacity there is compared to production, and is used as a business as usual asset planning data capture tool. It is updated upon when new capital scheme is completed and as a result of asset planning investigation.

We will continue to search for innovative approaches to optimise the availability and use of capacity, and provide flexibility in operational delivery. We will ensure that demand and supply are better understood. This will form the basis of the methodology of our daily, weekly, monthly and annual sludge production, treatment and disposal planning. A full explanation of this is given below.

Operational Treatment Capacity

The operational treatment capacity of our Bioresources business is defined across a set methodology for the 13 anaerobic digestion sites and 1 advanced anaerobic digestion site.

We have a good understanding of all existing and new build digester treatment vessels, allowing a set treatment capacity to be defined and used in planning. This understanding

is in the form of asset standard parameters based on actual performance and vessel sizes based on actual design and measurement.
The parameters below parameters are used to define operational treatment capacity:

- Total liquid volume of each digester vessel.
- A 90% working volume of the total to represent ‘dead’ mixing zones.
- A retention period of 16 days.
- A feed solids ratio of 5.5%

These outputs are collated into our bioresources headroom model to give the output of total site and total regional operational treatment capacity.

Resilience

In recent years, events beyond our control, such as floods and fire damage, have caused catastrophic failure and unplanned outage to key sludge treatment assets. When such events have happened, for instance the Boxing Day 2015 floods, prolonged outage has meant that we have had no alternative but to utilise expensive third-party disposal routes. In response to this, a key part of our strategy is the development of a resilience model.

We have developed a resilience model to simulate various scenarios of unplanned and planned outage and how we would respond. The model estimates the probability of events occurring within a scenario, with events based on historical experiences and future risks. These are calibrated with operational teams.

The impact and benefits of the planned investment programme have been applied to the probability assessment. Such investments include:

- Capital maintenance to improve reliability.
- Improved operational maintenance and repair focus.
- Securing efficient emergency contracts through the market.
- Closure of incinerators to improve regional reliability.
- Provision of flood protection at sites vulnerable to flooding, such as Huddersfield WwTW, to improve resilience.

Once the benefits were applied, the model predicted that to a 95% confidence there will be a 4% shortfall over AMP7. We have utilised a 3TTDS value to plan for unplanned outage and built this into our capacity planning.

Table CMI2 shows the annual feed (sludge production) from our modelling. The annual growth between 2020/21 and 2024/25 is driven by population projections and is linear. The quality programme takes effect in 2025/26 and drives a 21,030 tds increase in that year. Our investment plan recognises a capacity need to address this increase, as reflected in our Bioresources cost adjustment claim.

Table CMI2 – summary of sludge production 2020-2025

	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
Annual Feed (TDS)	152,739	153,664	154,589	155,513	156,438	177,468

Annual Sludge Production Forecasting

As part of our preparation for AMP7 we are implementing an SAP integrated business planning and production monitoring “Plan to Manufacture” process. Within our SAP system we will represent all sites with thickening systems, dewatering systems and STFs, including Wastewater Network Plus price control thickening systems. The planned sludge production to be treated at each of these assets, referred to as ‘demand’ will be met by a ‘supply’ of planned asset capacity. Sludge from the smaller wastewater treatment works will be aggregated into an import of unthickened sludge at a thickener, dewaterer or STF. Sludge from thickeners can be forwarded on to dewatering site or treatment site. Sludge from dewatering sites can be sent to third parties or to treatment sites. The modelled connectivity of assets in the price review will be captured in the 5-year plan.

We will create an annual operating plan based on revised assumptions, such as changes to the delivery of the capital programme, operational outage or compliance risk, where changes to either the forecast demand for sludge or the available supply of assets will be captured. We will be using a new part of this system, ‘KAM’, to capture our asset capacity, assumptions about downtime for capital schemes are captured. Variance from our 5-year plan will be apparent at each stage of planning.

Each month, we will review actual performance against the plan. We will know where demand was higher and lower than planned, where supply of assets was greater or less than planned and the cost performance of each asset, for example which assets are making beneficial use of biogas or how effectively dewatering is occurring.

Each week, we will create a short-term plan for delivery. This will take into account short-term reactive outage of assets, planned changes in capacity from any capital

schemes, weather impacts and individual WwTW performance. This will be used to influence the short-term delivery routing and planning of tankering and sludge cake movements and the volumes of sludge recycled by third parties. Each plan will create a process order. for each of the sites.

The process order will show how much sludge is planned to be treated at each asset, the volume of chemicals that should be consumed, the liquor volume that should be produced and how much electricity should be consumed and generated. The actual quantities of each of these will be captured daily and used to close the process order in SAP. This will enable us to track how well we are delivering to our plans. We are setting up appropriate service level agreements between the Wastewater Network Plus price control and Bioresources price control, so that it is clear where the performance of one business unit is affecting the other.

This will increase the daily review of our data sets, speeding up the identification of measurement issues, improving clarity on where and when any estimation is required and identifying opportunities to maximise the use of available capacity.

By capturing reactive capacity outage through ‘KAM’, we will be able to identify and prioritise maintenance on capacity outage.

Recording sludge production

At sludge treatment centres we have dry solids instruments and flow meters. We separately measure liquid imports and cake imports from indigenous sludges. Some sites do not have dry solids instruments, as sampling has proven to be more reliable.

For some flows, we derive the flow we need to report from other flow meters through mass balances, for instance adding parallel flows together or subtracting flows, as is standard engineering practice. This is appropriate where, for example, we can significantly reduce the number of instruments or avoid retrofitting or installing instruments in difficult locations.

Some sites do not have flow meters to monitor imported sludge. For these sites we take manual readings from each load, such as the volume of the tanker and the percentage dry solids of the sludge in the tanker. These are summed to derive the daily totals. This is a small proportion of our sludge. Over time flow monitors will be installed at all sites. This work will be completed by the end of year 1 in AMP7.

Some smaller sites, primarily Wastewater Network Plus price control thickening sites, do not have telemetry. For these, manual readings of flow meters and/or dry solids probes are collected daily.

We provide the following appendices in support of this response:

- YKY.CMI.A1-1 PR19 Appendix 8g - WINEP Technical appendix
- YKY.CMI.A1-2 Appendix 8m - BIO
- YKY.CMI.A1-3 PR19 Sludge Strategy Q&G output Issue 8
- YKY.CMI.A1-4 Sludge Treatment Facility (STF) Asset Standard V11
- YKY.CMI.A1-5 Stantec Bioresources Cost Adjustment Claim Review of Sludge Forecasting Methodology

YKY.CMI.A2

A summary of the fixed and variable costs for capital and operating expenditure is provided in Table CMI3, this is detailed and evidenced further on an individual subjective basis. All capital expenditure is evidenced as fixed cost and the operating costs have been reviewed in detail to establish whether they are fixed or variable.

Table CMI3 Summary of fixed and variable costs for capital and operating expenditure.

Capital Expenditure	Fixed %	Fixed £m (AMP7)	Variable %	Variable £m
Maintaining the long-term capability of asset ~ infra	100%	£0m	0%	£0.0m
Maintaining the long-term capability of asset ~ non-infra	100%	£106.4m	0%	£0.0m
Other capital expenditure ~ infra	100%	£0m	0%	£0.0m
Other Capital expenditure ~ non-infra	100%	£66.20	0%	£0.0m
Operating Expenditure - Sludge Transport	**Fixed %**	**Fixed £m (AMP7)**	**Variable %**	**Variable £m**
External Sludge Tankering	0%	£0m	100%	£1.4m
Fuel	0%	£0m	100%	£0.9m
Fleet maintenance and management	100%	£0.5m	0%	£0.0m
General & Support Expenditure	100%	£1.0m	0%	£0.0m
Other contracted services	100%	£0.2m	0%	£0.0m
Staff Costs	100%	£2.3m	0%	£0.0m
Operating Expenditure - Sludge Treatment	**Fixed %**	**Fixed £m (AMP7)**	**Variable %**	**Variable £m**
Chemicals	0%	£0m	100%	£3.7m
Fleet and Fuel	94%	£2.5m	6%	£0.1m
General & Support Expenditure	100%	£2.5m	0%	£0.0m
Maintenance	100%	£3.5m	0%	£0.0m
Other Contracted Services	100%	£7.3m	0%	£0.0m
Staff Costs	100%	£8.6m	0%	£0.0m
Power (including income)	8%	-£0.1m	92%	-£1.4m
Local Authority rates	100%	£1.3m	0%	£0.0m
Operating Expenditure - Sludge Disposal	Fixed %	Fixed £m (AMP7)	Variable %	Variable £m
EA Charges	100%	£0.3m	0%	£0.0m
General & Support Expenditure	100%	£0.5m	0%	£0.0m
Other Contracted Services	100%	£0.1m	0%	£0.0m
Sampling Costs	100%	£0.6m	0%	£0.0m
Sludge Disposal contract	77%	£3.4m	23%	£1.0m
Sludge handling costs	100%	£2.4m	0%	£0.0m
Staff Costs	100%	£0.4m	0%	£0.0m

The summary of this analysis for operating expenditure has been applied to line 1 of BIO4 (PAYG), and the capital expenditure percentage allocation has been applied to the remaining lines of section A in BIO4.

Capital Expenditure

Our assessment of capital costs is that they would not fluctuate annually should our sludge volumes vary on a 'short run marginal cost' basis. Capital expenditure does vary annually, but this is due to variations in the asset life expiry of large value assets, and the construction of new assets. For example, our digestor refurbishment programme relates to the timing of the adoption of the technology. Capital expenditure decisions are made based on a longer-term strategy and consider the balance of needs of future years. Therefore, this type of expenditure would not be impacted by any variation in short-term changes in volumes. This has resulted in all capital costs being categorised as fixed costs.

To evidence this we reviewed all the capital schemes in the APR associated with bioresources for 2017/18, none would have changed due to the impact of 'short run' volume changes. Examples of the capital schemes included in the 2017/18 APR include the following (it should be noted that some of these are part year effect as the projects span through a number of financial years):

- Knostrop STF Sludge Strategy – a project to build a new anaerobic digestion plant at Knostrop (value for 2017/18 is £25.3 million) and is therefore a fixed cost.
- 2015-20 Bradford Esholt No 2 STF Flood Reinstatement – a project to reinstate assets impacted from the floods of December 2015 (value for 2017/18 is £3.8 million). This is therefore a fixed cost.
- 2015-20 - Dewsbury STF Digestor Upgrade – a project to upgrade the existing digestors as they have reached the end of their asset life (value for 2017/18 is £2.6 million). This is therefore a fixed cost.

The above costs form a basis for the categories of PR19, detailed below. Given that the above (APR 2017/18) are all allocated as fixed costs this has formed the basis of allocation for PR19 costs. A summary table showing this is in Table CMI4 below.

Table CMI4: Bioresource capital expenditure by fixed and variable allocation

Capital Expenditure	Fixed %	Fixed £m (AMP7)	Variable %	Variable £m
Maintaining the long-term capability of asset ~ infra	100%	£0m	0%	£0.0m
Maintaining the long-term capability of asset ~ non-infra	100%	£106.4m	0%	£0.0m
Other capital expenditure ~ infra	100%	£0m	0%	£0.0m
Other Capital expenditure ~ non-infra	100%	£66.2	0%	£0.0m

Operating Expenditure

Operating expenditure differs to capital costs in that their categorisation does vary between fixed and variable depending on the nature of the costs and the procurement method. As this can differ in business areas, a thorough review was carried out for each upstream service for bioresources including sludge transport, sludge treatment and sludge disposal. This review was based on actual costs reported in the APR 2017/18. A summary of the review for each upstream service is detailed below:

Sludge Transport

The costs within the APR 2017/18 for sludge transport have been reviewed and shown in table below.

Table CMI5: Bioresources sludge transport operating expenditure by fixed and variable allocation

Operating Expenditure	Fixed %	Fixed £m (AMP7)	Variable %	Variable £m
External Sludge Tankering	0%	£0m	100%	£1.4m
Fuel	0%	£0m	100%	£0.9m
Fleet maintenance and management	100%	£0.5m	0%	£0.0m
General & Support Expenditure	100%	£1.0m	0%	£0.0m
Other contracted services	100%	£0.2m	0%	£0.0m
Staff Costs	100%	£2.3m	0%	£0.0m

Most of our sludge transport is insourced and as such, most costs are fixed. To determine and evidence the accuracy of our calculations, we describe each area of Table CMI5 and their fixed and variable costs associated with this upstream service:

- External tankering is only used when we experience additional volume above our internal fleet capacity. This is procured separately for each journey and is therefore variable cost.
- Fleet and fuel (for internal vehicles) – we own the tanker fleet, which is procured through capital expenditure. Fuel volume varies dependant on volumes and journeys made and is therefore variable cost.
- Fleet maintenance and management is scheduled on a timed basis, as a result this does not vary with volume moved, and is therefore a fixed cost.
- General and support expenditure mainly consists of salaries and business support fixed cost, for example IT, finance and human resources, and is therefore all fixed cost.
- Other contracted services – these costs are associated with contracted tanker movements for small sites which cannot be serviced with our internal tanker fleet. They are contracted annually at a fixed price and are therefore fixed cost.
- Staff costs – tanker drivers are paid contractual overtime. External tankers are used when internal sludge transport capacity is fully utilised, and as a result staff costs are fixed.

Sludge Treatment

The costs within APR 2017/18 for sludge treatment have been reviewed and shown in table below

Table CMI6: Bioresources sludge treatment operating expenditure by fixed and variable allocation

Operating Expenditure	Fixed %	Fixed £m (AMP7)	Variable %	Variable £m
Chemicals	0%	£0m	100%	£3.7m
Fleet and Fuel	94%	£2.5m	6%	£0.1m
General & Support Expenditure	100%	£2.5m	0%	£0.0m
Maintenance	100%	£3.5m	0%	£0.0m
Other Contracted Services	100%	£7.3m	0%	£0.0m
Staff Costs	100%	£8.6m	0%	£0.0m
Power (including income)	8%	-£0.1m	92%	-£1.4m
Local Authority rates	100%	£1.3m	0%	£0.0m

Our sludge treatment costs are mostly internal and are mainly fixed, however some elements are incremental and variable. To determine and evidence the accuracy of our

calculations, we describe each area of Table CMI6 fixed and variable costs associated with this upstream service:

- Chemicals – the main chemical used in sludge treatment is polyelectrolyte which is included as part of the sludge treatment process and dependant on the volume of sludge treated. Due to this all of chemical costs are variable.
- Fleet and fuel costs are primarily associated with operators on site and their fleet costs. The fleet costs are all classed as fixed where related to monthly fixed fleet charges, with an element of the fuel costs classed as variable costs dependant on the volume of sludge moved.
- General and support expenditure mainly consists of salaries and business support fixed cost, for example IT, finance and human resources.
- Maintenance costs will not fluctuate with short term volume variations as this maintenance is required regardless of the throughput of the assets and scheduled on regular basis. This is not major maintenance, for example, major overhauls of assets, it includes statutory maintenance. These costs are required regardless of short run volume variances and are therefore fixed.
- Other Contracted Services include mitigation costs and reactive failures of sludge treatment assets. These mitigation costs continue year-on-year, albeit impacting different assets within sludge treatment. Given these costs are incurred every year they are classified as fixed costs.
- Staff Costs are fixed and include sludge treatment management roles. They are proportioned accordingly for co-located waste sites.
- Power Costs within the sludge treatment upstream service, income is a credit associated with recycled obligation certificate payments. The costs for electricity and heating oil, including income are dependent on the volume of sludge treatment. Assets treating a lower volume of sludge do not generate electricity and, as a result, require more electricity consumption. So, these costs are mostly variable, however having reviewed our unit price arrangements there are standing charges associated with this which are fixed. The fixed costs for power are standard charges for electricity and equate to 8% of the total costs. The remainder of costs are all variable.
- Local Authority Rates, for waste water treatment works, including sludge treatment assets are calculated using rateable value. These costs are determined by the VOA and are fixed at the beginning of the revaluation period. They do not change with sludge volume and are therefore fixed.

Sludge Disposal

The costs within the APR 2017/18 for sludge disposal have been reviewed and shown in Table CMI7.

Table CMI7: Bioresources sludge disposal operating expenditure by fixed and variable allocation

Operating Expenditure	Fixed %	Fixed £m (AMP7)	Variable %	Variable £m
EA Charges	100%	£0.3m	0%	£0.0m
General & Support Expenditure	100%	£0.5m	0%	£0.0m
Other Contracted Services	100%	£0.1m	0%	£0.0m
Sampling Costs	100%	£0.6m	0%	£0.0m
Sludge Disposal contract	77%	£3.4m	23%	£1.0m
Sludge handling costs	100%	£2.4m	0%	£0.0m
Staff Costs	100%	£0.4m	0%	£0.0m

Our sludge disposal costs are detailed below:

- Environment Agency Charges are associated with permits for key sites and are paid annually, therefore these costs are fixed.
- General and Support Expenditure mainly consists of salaries and business support fixed cost, for example IT, finance and human resources.
- Other Contracted Services are associated with deployment fees. Sludge disposal requires a landbank on an annual basis, it is an ongoing annual cost and is therefore fixed.
- Sampling Costs are contracted out through a fixed contract which is managed by a third-party provider, so these costs are fixed.
- Sludge Disposal Contract, these costs are all contracted out to a third-party provider on a fixed contract. The contract is determined at the beginning of the financial year following a forecast of volumes, which determines a unit price. Whilst this can be classed as a variable unit price it is worth noting that if volumes reduce the contracted unit price would increase due to the fact that the contractor would still require to cover their fixed costs such as staff and trucks. We have carried out a review of this contract, as a result 23% of the contract costs are classed as variable.
- Sludge Handling Costs are associated with loading staff required at various sites where sludge is disposed. This is a contracted-out activity and a fixed cost resource is required throughout the day for the loading of tankers.
- Staff Costs are fixed and include management roles.

YKY.CMI.A3

We provided a timeframe for delivery of the DWMPs in Appendix 15c of our September 2018 business plan submission (Appendix YKY.CMI.A3-1). Our programme was set to publish (prepare and consult on) the first DWMP by December 2022 as per Defra guidance and the Water UK Industry Outputs Timeframe. We note that this IAP action states a prepare and consult date of Summer 2022, 6 months earlier than the date set by Water UK. We commit to reviewing our programme by the end of August 2019.

The following sections are excerpts from Appendix YKY.CMI.A3-1 and highlight our existing programme. The full details of our DWMP delivery timeframe can be found in Drainage and Wastewater Management Plans (Appendix YKY.CMI.A3-1).

Timetable of Activities

The following gannt charts detail, how we are aligning our internal DWMP notional timeline, with the wider industry.

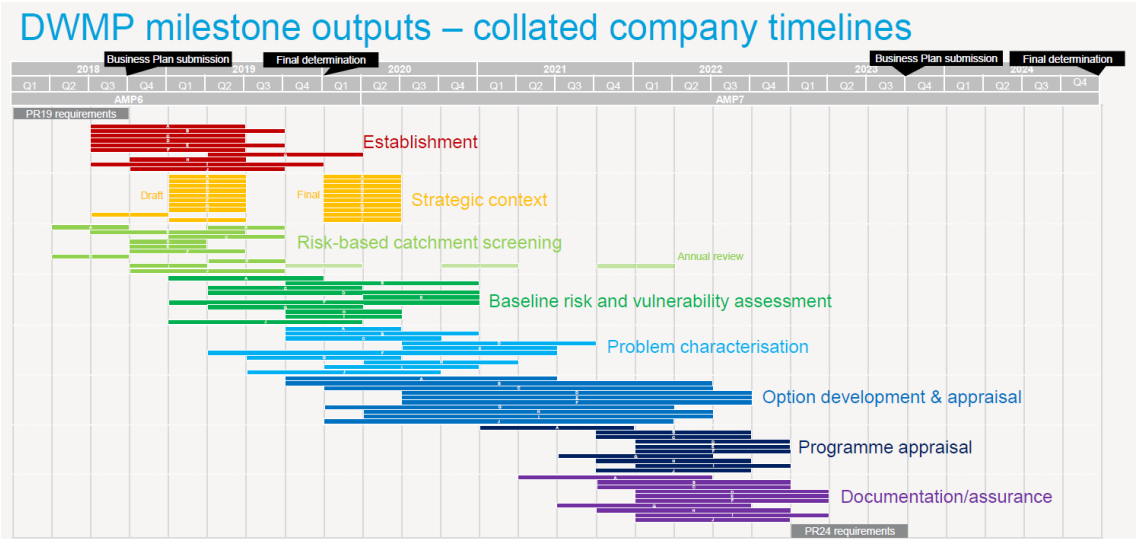


Figure 4 - DWMP Industry Milestone Outputs (WaterUK, 2018)

Yorkshire Water Preliminary DWMP Delivery Timeline

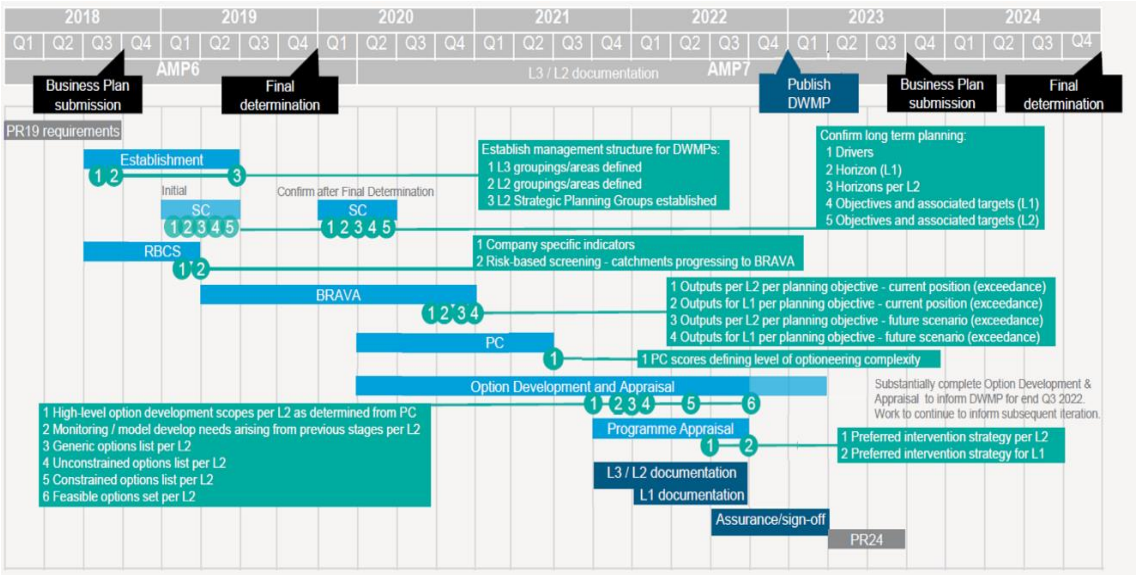


Figure 5 – Yorkshire Water Preliminary DWMP delivery timeline

Key Yorkshire Water Target Dates

Table 1 – Preliminary DWMP Activity Schedule

Activity	Start	Complete
Establish Management Structure for DWMPs	End of Q3 2018	End of Q2 2019
Define Strategic Context	End of Q4 2018	End of Q2 2019
Risk based Catchment Screening	End of Q2 2018	End of Q1 2019
Publish initial BRAVA risk assessment	End of Q1 2019	End of Q4 2020
Problem Characterisation	End of Q1 2020	End of Q2 2021
Option development & appraisal	End of Q1 2020	End of Q3 2022
Programme appraisal	End of Q3 2021	End of Q3 2022
Document & assure DWMP	End of Q3 2021	End of Q3 2023
Publish 1st DWMP		End of Q4 2022

Note: Dates based on draft DWMP Methodology

DWMP Progress to Date

We have undertaken the initial phase of implementing the DWMP through defining the Level 2 and Level 3 Tactical Planning Units (TPUs) within our company area. These tasks have been carried out simultaneously with the risk based catchment screening process (Q2 of 2018, ahead of target). The process defined 17 Level 2 areas containing just over 600 Level 3 (WwTW catchments) areas. Following the DWMP guidance, the Level 2 boundaries are broadly aligned with river basin district catchments, taking into consideration the relevant Drainage Area Zones (DAZs). This alignment between

DWMPs and Strategic Drainage Management Plans (SDMPs) in turn aids the discussion of strategic issues. Significant urban areas were assigned their own separate Level 2 Area. Please see Figure 6 showing the latest version of our Level 2 Areas.

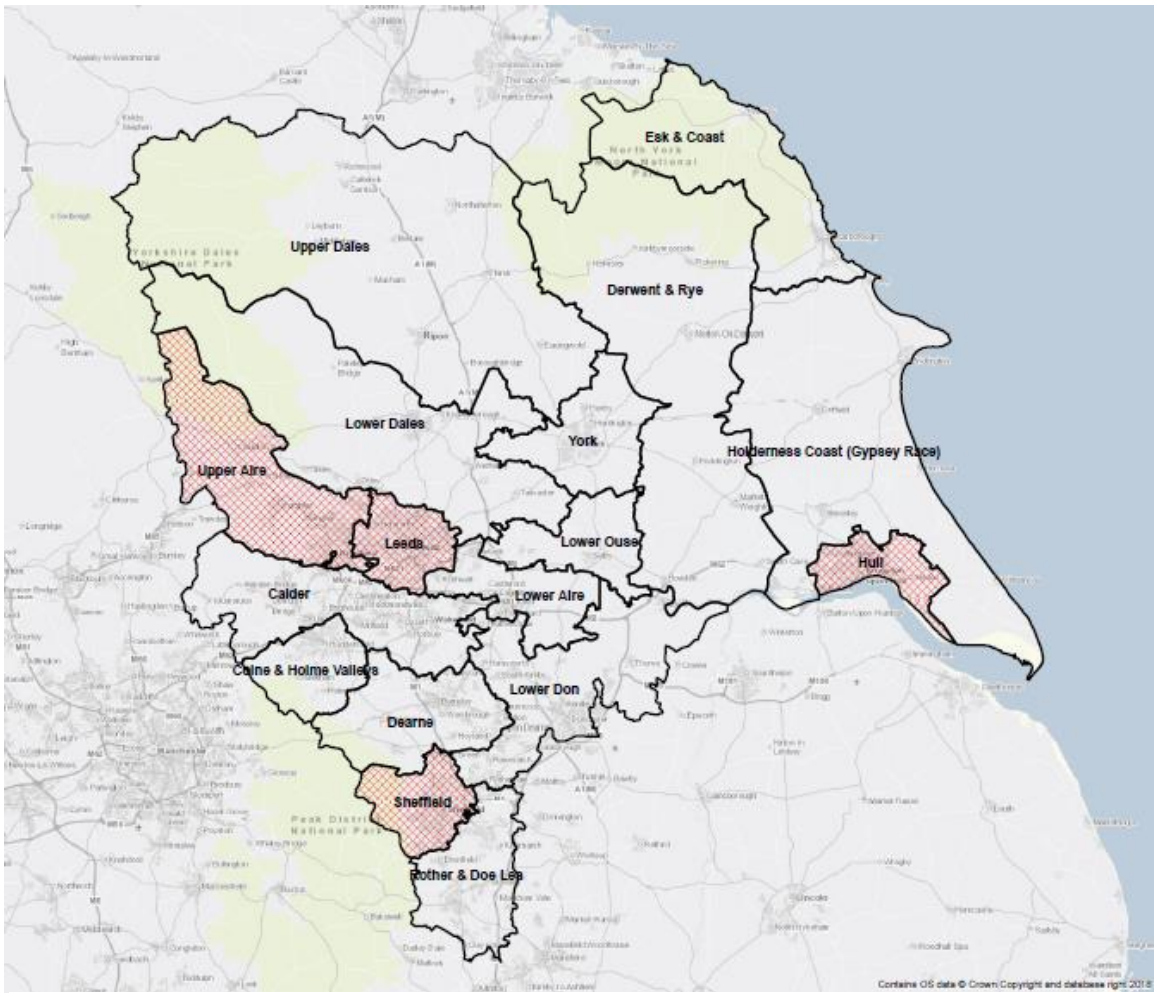


Figure 6 - Yorkshire Water – Level 2 Strategic Planning Areas (Hatched Areas represent pilot SDMP studies)

We have implemented the risk-based catchment screening process, primarily using GIS routines and spatial analytics, to produce a preliminary set of results, following the draft DWMP methodology. The draft results, produced at the end of Q2 2018 will be updated and finalised following the final dissemination of DWMP guidance in Q3 2018. The process of developing the screening criteria relied upon feedback and correspondence between the WaterUK consultants, water companies and other stakeholders, which we have been actively involved in and shaping, through the WaterUK DWMP Project Steering Group. The results are currently in the process of being drafted into outputs that will be used for stakeholder engagement, in the format of Level 2 and Level 3 portfolios.

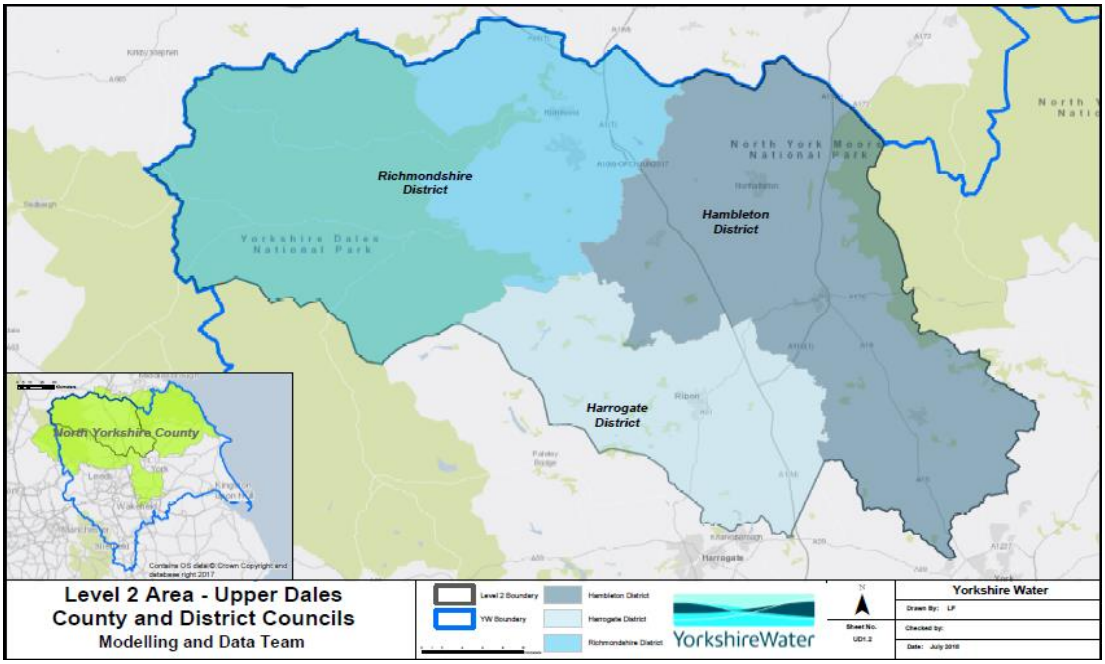


Figure 7 - Example of Level 2 Stakeholder Portfolio (data obtained through open government license)

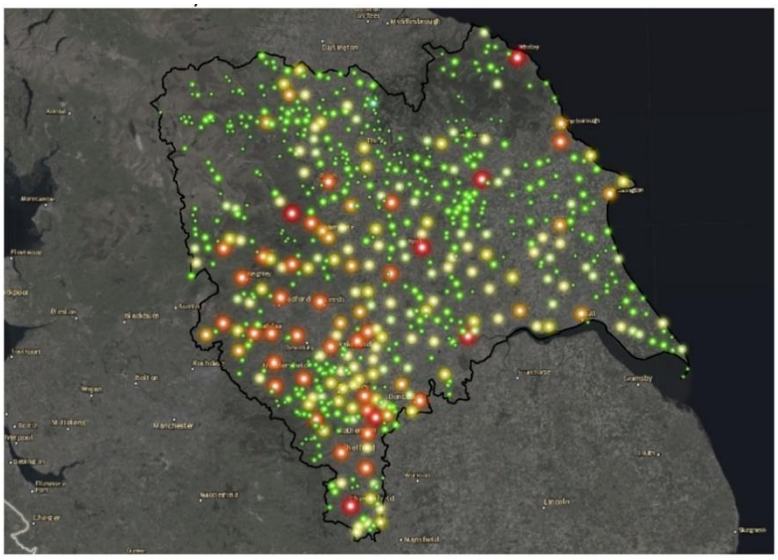


Figure 8 - Preliminary DWMP Risk Based Catchment Screening Outputs

Following the final DWMP dissemination event (5th September 2018), we intend to progress catchments through to the Baseline Risk And Vulnerability Assessment (BRAVA) on a risk-based priority approach based on population and indicator scores from the initial screening process. This is in line with current industry practice from the Drainage Strategy Framework and Sewer Risk Management, as indicated in Figure 9.

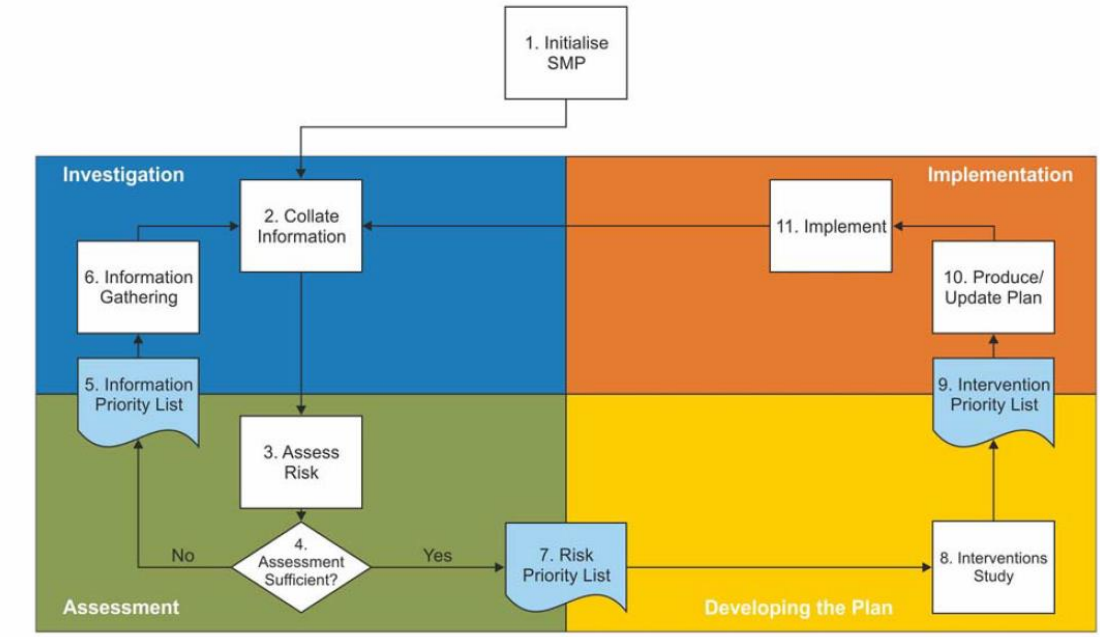


Figure 9 -Sewer Risk Management Approach (WRc, 2013)

We provide the following appendices in support of this response:

- YKY.CMI.A3-1: Appendix 15c - Drainage and Wastewater management plan

YKY.CMI.A4

We will add text to our bid assessment framework clearly stating that commercially sensitive data will be treated as confidential. The revised version will be published on the Yorkshire Water website by 15 July 2019. The following text will be added to the Bid Assessment Framework;

- Commercially sensitive information provided by third parties as part of their bid submission will be treated as confidential.
- The team responsible for the evaluation of third-party bids will determine if the proposed solution will be implemented, included as a feasible option in the next WRMP options appraisal or is not viable. To avoid conflicts of interest, during the bid assessment period the in-house Water Resource Planning team will not have access to commercially sensitive information provided by third parties.
- Third party bid submission forms (Appendix 1 of the YW BAF) should be sent to watermarkets@yorkshirewater.co.uk. Access to this inbox will be limited to the team responsible for processing the bids. If required, we will enter into confidentiality and non-disclosure agreements with third party bidders. To determine the feasibility of the bid we may need to appoint consultants and specialists externally who will be bound by the same agreements as Yorkshire Water.
- Any information we publish on bids received and why they were determined as viable or not will be at a high level and not compromise commercial confidentiality.
- We are required to publish each iteration of the WRMP including information on options and the appraisal process to determine a solution to any supply-demand deficit. This will include consideration of third-party options. Any commercially sensitive information relating to these options will be redacted before publishing.
- This Bid Assessment Framework is designed to align with procurement laws and regulations, which will always take precedence where relevant. As a water company we are bound by the Utilities Contract Regulations 2016. This will be most relevant to demand management proposals including leakage as the regulations do not generally apply to the procurement of water resources.

YKY.CMI.A5

We have revisited and reassessed our application of the qualifying criteria for DPC and assured our approach through working with our Strategic Planning Partner, Stantec. The outcome of this revised process confirms that no schemes that were planned to progress qualified for a DPC approach. However, the process highlighted that should a previously discounted alternative option proceed – a single new build WTW as opposed to two separate WTW refurbishments at Sladen Valley and Oldfield - it would qualify for consideration, albeit under the guidance threshold criteria of £100 million whole-life totex.

This potential scheme was progressed to a value for money (VFM) assessment using the technical expertise of ICS consulting. The VFM study concluded that the two-site option with in-house delivery was most likely to deliver the highest value for our customers. The assumed efficiency and financing cost benefits of the DPC option were not sufficiently high to offset the higher costs of the combined site option and the additional costs created from delivery through a DPC delivery model.

This section details our response to the sub-actions identified in ‘Yorkshire Water: Direct procurement for customers detailed actions’ and is supported by the appendices laid out in Table CMI8. Further to this we have updated the DPC narrative that formed part of our September 2018 submission (Appendix YKY.CMI.A5-4).

Table CMI8 Sub action with supporting appendices

Sub-action	Appendix
A summary of the key elements of the Water Treatment Works New Sites Bundle schemes particularly focusing on the Sladen-Oldfield options. This should include all of the relevant scheme information including but not limited to the key deliverables.	(Appendix YKY.CMI.A5-1) A report authored by our Strategic Planning Partner, Stantec - Review of DPC Opportunities
A summary of the projected scheme costs clearly identifying the costs for each phase of the scheme by year. These should clearly identify the incremental costs to Yorkshire Water.	(Appendix YKY.CMI.A5-2) Projected scheme costs by year for the Water Treatment Works Investment Bundle
An economic analysis of the scheme including a Net Present Value analysis using the standardised assumptions provided in Table A. This analysis should clearly identify any additional benefit to customers of progressing this scheme as two separate schemes as detailed in Yorkshire Water's plan outside of DPC compared to the delivery of a new works at Oldfield under DPC.	(Appendix YKY.CMI.A5-3) A report authored by Partner, ICS Consulting - DPC Review – Value for Money Modelling

A summary of the key elements of the Water Treatment Works Investment Bundle.

This section summarises the main deliverables of the Raw Water Deterioration and Taste and Odour Water Treatment programme. Full details of this programme are set out in our Drinking Water Quality DWI Submission (Appendix YKY.CMI.A5-5, September 2018 submission). The deliverables detailed here represent the proposed schemes only, as set out in the Drinking Water Quality DWI Submission (Appendix YKY.CMI.A5-5). DWI notices are currently at draft stage and under review by the DWI. Completion dates for each of the schemes will be agreed as part of this review. Appendix YKY.CMI.A5-1 provides a report from our Strategic Planning Partner, Stantec who we commission to support us with this process.

Chellow Heights WTW

Overview

Chellow is a highly strategic asset, with a current maximum output of 175Ml/d. It is the sole source of water to much of the City of Bradford, with only limited support from other systems. It is a large and complex site, with much of the infrastructure not designed for the regulatory requirements of the 21st century. A significant number of assets are life expired and pose risks to the reliability of supply in the event of failure. In addition, deterioration of the raw water quality in respect of organic colour, now risks compliance with standards or regulatory requirements. The proposed PR19 scheme addresses both new quality obligations and resolves other risks to enable the quality investment to perform satisfactorily. In addition, the delivered scheme would incorporate significant base maintenance investment to improve the overall resilience of the site.

Key Deliverable

Removal of Dissolved Organic Carbon (DOC).

Proposed solution

An ion-exchange process, designed for DOC removal (for example, MIEX) to treat the full flow to site from the Nidd aqueduct (~100Ml/d). This will be located where the existing control room building stands. This location is critical as all the Nidd aqueduct raw water mains enter the site in the north central area.

A new control room will be constructed adjacent to the old "Alum House".

The sulphuric acid and PAC dosing systems currently in the basement and alongside the existing control room building will be relocated to the north edge of the site in separate buildings.

A new MCC building will also be constructed to the west of the existing building to replicate the existing MCC units for the "west" electrical supplies.

The polyelectrolyte system in the existing building will be re-created in two separate units:

- one to house and dose polyelectrolyte for the clarifiers (and an option to also dose the lamellas) which will be located to the west of the lamella units.
- a second to dose polyelectrolyte to the sludge clarifiers on the east of the site.

A new access road will be installed to this second polyelectrolyte unit.

The hypochlorite storage tanks will also be relocated with a new dosing kiosk, approximately south-west of the lamellas.

The lime system will be replaced as it is life-expired. (A temporary caustic soda dosing unit will be required during the replacement activity).

Finally, the inter-stage pumps (Rapid Gravity Filter (RGF) to manganese contactor) will be increased in size to allow 207 Ml/d throughput to the manganese contactors.

Oldfield WTW

Overview

Oldfield WTW is an aging asset, with a current maximum output of 12Ml/d. It is one of the supplies to the Keighley area to the west of Bradford, with only limited support from other systems. It is a complex site, with much of the infrastructure not designed for the regulatory requirements of the 21st century. A significant number of assets are life expired and pose risks to the reliability of supply in the event of failure. In addition, deterioration of the raw water quality in respect of organic colour now risks compliance with standards or regulatory requirements. The proposed PR19 scheme addresses both new quality obligations, and resolves other risks to enable the quality investment to perform satisfactorily. In addition, the scheme also incorporates significant base-maintenance investment to improve the overall resilience of the site, and aid recovery from failure.

Key Deliverable

Removal of Dissolved Organic Carbon.

Proposed Solution

Construction of a new 12 Ml/d WTW including clarifiers, rapid gravity filters, manganese removal and sludge thickeners.

New run to waste system including storage tank, pipework and pumping.

Demolition of entire old WTW at Oldfield.

Installation of new 12 Ml/d ion exchange plant and pumping station on the site of existing manganese contactor and washwater buildings.

Replacement of 4,100m of 400mm diameter main.

Refurbishment / replacement of Ponden raw water pumping station.

Construction of a new contact tank.

Sladen Valley WTW

Overview

Sladen Valley WTW is an aging asset, with a current maximum output of 12Ml/d. It is one of the supplies to the Keighley area to the west of Bradford, with only limited support from other systems. Deterioration of the raw water quality in respect of organic colour now risks compliance with standards or regulatory requirements. The proposed PR19 scheme addresses both new quality obligations and resolves other risks to enable the quality investment to perform satisfactorily. In addition, the scheme also incorporates significant base-maintenance investment to improve the overall resilience of the site, and aid recovery from failure.

Key Deliverable

Removal of Dissolved Organic Carbon.

Proposed Solution

Installation of a 12 Ml/d ion exchange plant.

Enhancement of the existing DAF coagulation process.

Embsay WTW

Overview

Embsay WTW is designed to supply a maximum of 24 Ml/d. It typically treats 18 Ml/d and is in the Yorkshire Dales National Park. It is the sole supply for most of the Western Dales, Skipton, Grassington and Barnoldswick. If the site fails approximately 10% of demand can be supplied from the adjoining Keighley WSS. Embsay is the only remaining Pennine WTW not to have manganese contactors. Manganese is therefore removed on the RGFs with prior chlorine dosing and pH adjustment. This increases the risk of DBP/THM formation, although THMs are minimised in distribution by chloramination.

Key Deliverable

Additional removal of manganese from the Nidd Aqueduct and Embsay IRE inlets, and new chlorine contact facilities.

Proposed Solution

Improved filtration by providing 2nd stage of filtration with 5 contactors and new clean water backwash tanks for RGFs and Manganese contactors, complete with new clean water backwash tank and pumps.

A new dual compartment contact tank and relocation of associated chemical dosing, sampling lines and instrumentation.

A new run to waste system comprising a tank, pipework and pump.

Fixby WTW

Overview

Fixby WTW was commissioned in 1992, with a current maximum output of 30Ml/d. It is one of the supplies to the Wakefield area to the south east of Leeds, but also supplies a significant local area, with only limited support from other systems.

Deterioration of the raw water quality in respect of organic colour now risks compliance with standards or regulatory requirements. The proposed PR19 scheme addresses both new quality obligations and resolves other risks to enable the quality investment to perform satisfactorily. In addition, the scheme also incorporates significant base-maintenance investment to improve the overall resilience of the site and aid recovery from failure.

Key Deliverable

Additional removal of solids, after coagulation and DAF, by means of additional RGF process capacity

Proposed Solution

Installation of additional RGF.

A new dirty wash-water handling process and separation of exiting wash-water and run to waste pipework to prevent cross-contamination.

Replacement of the existing raw water and chemical mixing tank.

Tophill Low WTW

Overview

Tophill Low WTW is a significant production asset within the Hull (Leven) Water Supply System (WSS) and is capable at full output of supplying around half the city's needs for water. It is mainly supported by the larger groundwater source, Keldgate WTW, but with a major connection to the Yorkshire Water Grid via Raywell CRE – which provides support for resilience purposes. It is a large and complex site, with infrastructure of a range of ages, most latterly having had nitrate removal by ion exchange installed during AMP5.

Key Deliverables

Removal of algal by-products, improved removal of oocysts, and improved disinfection facilities

Proposed Solution

New GAC contactors.

Refurbishment of the existing RGFs

A new contact tank.

Enhanced/new wash-water handling process.

Alternative options for Sladen Valley and Oldfield

Several different options have been reviewed to arrive at the chosen solutions at Oldfield WTW and Sladen Valley WTW.

Table CMI9 details the Whole Life Cost (WLC) for Oldfield WTW and Sladen Valley WTW and the alternative option which is a combined works. These costs include the additional base maintenance costs required to enable the enhancement associated with this scheme.

Table CMI9 – WLC for Oldfield WTW, Sladen WTW and combined works

Site	Chosen Solution WLC (£m)	Alternative Solution WLC (£m)
Oldfield WTW	£ 35,281,583.39	£ 66,209,985.24
Sladen WTW	£ 20,672,879.87	

Write off values at Sladen Valley WTW are a significant reason for not choosing to decommission this site in favour of a combined works. It has been determined the value of this to be £3.7m. This is largely associated with assets which have a long asset life particularly the civil structures. Conversely much of the mechanical and electrical equipment on site, particularly that associated with the DAF clarifiers has reached its asset life and needs intervention.

At the time of our submission to the DWI the WLC difference between our chosen solutions and the combined solution for Oldfield and Sladen were marginal. The option to combine Oldfield WTW and Sladen Valley WTW was not selected as the solution developed did not provide the required level or operational resilience that could be offered by two separate sites. Without significant network reinforcement the combined works would not be able to sustain the level of outage as that of the two works before customers were impacted.

Following our business plan submission, we have enhanced the combined solution scope to a position where it would provide the same level of resilience as the two chosen schemes. This increase in scope included additional network storage, mains replacement and an increase in the size of the MIEX plant to 24Ml/d.

The increase in scope has made the combined works the significantly higher WLC as is shown in Table CMI9. We also have concerns regarding the feasibility of building the combined works solution at the proposed location (existing Oldfield WTW site) due to the availability of land at the site and impact on adjacent properties.

At the time of developing options for submission to the DWI the assumption was made that only 50% of the flow would need to pass through the ion exchange plant for the combined solution. This was a marginal decision based on the notion that the raw water currently treated at Sladen WTW is less coloured than that at Oldfield WTW. This raw

water when transferred to Oldfield WTW would not need to be processed by the ion exchange plant given the proposed construction of the new works. Through further development of the combined solution we have subsequently decided that a MIEX would be required for the full flow of the works, the cost for which are included in the WLC analysis in Table CMI9.

Projected scheme costs by year for the Water Treatment Works Investment Bundle

Appendix YKY.CMI.A5-2 provides a summary of the projected scheme costs clearly identifying the costs for each phase of the scheme by year and clearly identify the incremental costs to Yorkshire Water.

The schemes in the Water Treatment Works bundle represent the water quality improvement programme which is not yet agreed with the DWI. As such the expenditure profile of these schemes has been calculated using average delivery durations from schemes with similar deliverables and costs. Estimated completion dates have been used for this analysis as completion dates have not been formally agreed.

An economic analysis of the scheme including a Net Present Value analysis.

We have provided an economic analysis of the scheme including a Net Present Value analysis using the standardised assumptions provided in Table A. This analysis clearly identifies any additional benefit to customers of progressing this scheme as two separate schemes as detailed in our plan outside of DPC compared to the delivery of a new works at Oldfield under DPC. Appendix YKY.CMI.A5-3 provides a technical reported provided by ICS consulting who supported us with this process.

We provide the following appendices in support of this response:

- YKY.CMI.A5-1 A report authored by our Strategic Planning Partner, Stantec - Review of DPC Opportunities
- YKY.CMI.A5-2 Projected scheme costs by year for the Water Treatment Works Investment Bundle
- YKY.CMI.A5-3 A report authored by Partner, ICS Consulting - DPC Review – Value for Money Modelling
- YKY.CMI.A5-4 – Revised version of our Direct Procurement for Customers (Chapter 11, p.82-85, our PR19 Plan)
- YKY.CMI.A5-5 – Appendix 14a Drinking Water Quality DWI Submission (September 2018)

YKY.CMI.B1

Collaboration is key to our culture; our 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 to us and has helped develop a core skill of learning from others.

In Chapter 10 of our PR19 plan we described our innovative use of the six capitals model. One of the six capitals is intellectual capital, which focuses on knowledge, emphasising how important sharing and learning are to delivering the best results for our customers. One of our key themes for business transformation is becoming a 'learning organisation', which covers all aspects of learning, from colleagues, regulators and peers, and draws on examplars from other industries and geographies.

In addition to learning from others, we recognise the importance of helping others learn from us. Where we have included proposals for enhanced performance (and underperformance) incentives in our PR19 plan it is important that we articulate our plans, to share the knowledge of how we achieve exceptional levels of performance. This ensures that other companies can benefit from our insights, so that their own customers can rapidly receive the same benefits as our customers in Yorkshire. Our approach has two broad stands:

Knowledge sharing publications

- Where we have developed a major new initiative, we work with national water industry working groups and beyond to share our learning and facilitate debate. A recent example of this approach is the Water Resilience in Yorkshire report we published in August 2018 (Appendix YKY.CMI.B1-1).

Direct working with others

- Publications are a way of communicating efficiently with a wide audience, but there is a need to work directly with others to increase knowledge transfer. We collaborate as a matter of course. We routinely work with other water companies, our supply chain, regulators, others in the infrastructure sector, academic institutions and local authorities.

We have openly shared what we have learnt widely and for the purposes of supporting others to learn. We have delivered globally ground-breaking insight into the circular economy approach to resource management, centred on at Esholt WwTW in Bradford. The learning from this programme, is being used as a foundation case study of an MSc

course sponsored by CIWEM and delivered through Exeter University. This learning is open to all and will be delivered by Yorkshire Water colleagues.

We have increased our awareness of the benefits that can be gained through working collaboratively with our customers to co-create solutions. The following case study explains how we have worked with customers, communities and others stakeholders to solve frequent sewer blockages by helping our customers to change their behaviours with respect to disposal of fats, oils and grease to sewer.

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 reaffirm our commitment to continue to work with others in the sector, to share learning and ensure that customers nationally benefit from a collaborative programme of research to address common issues. We have included examples of where we are actively working across the industry. The list is by no means exhaustive, but designed to give confidence that we continue to commit to a collaborative approach to common issues:

- We collaborate with others through multiple UKWIR and Water UK projects, where we contribute financially and with resource to lead specific projects.
- Our Innovation Manager is a member of the leadership Board for the Water TWENTY65 Group based at Sheffield University. This is an EPSRC funded collaboration with four universities and representation from all the UK WaSCs.

- We have commissioned an Energy Innovation Centre to deliver an ‘open innovation’ approach, this has resulted in the rapid delivery of a low-cost sewer sensor to the market. We have recently opened this approach up; Thames Water has expressed an interest.
- We are working 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. We have delivered efficiencies through building offsite in a controlled environment and in larger numbers. We will work collaboratively with the other companies to share business knowledge, designs and processes, and work to standardise asset standards across the three organisations.
- 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 conferences.
- We convened the inaugural meeting of Water Resource North, to promote regional water resources planning, promote knowledge sharing, and to meet national expectations of regulators for a contribution to national water resource resilience planning. Through Water Resources North, five strategic cross-boundary studies are to be undertaken. These involve a combination of companies, who will share resources, knowledge and benefits understanding. This collaborative coordinated approach removes the need for each company to undertake individual studies.

We provide the following appendices in support of this response:

- YKY.CMI.B1-1 Appendix 12b - Water Resilience in Yorkshire

YKY.CMI.C1

Whilst we have made positive and sustainable strides to build strong foundations over the current AMP, we acknowledge that there is further opportunity to embrace a culture of innovation, continuous learning and collaboration at Yorkshire Water. In response to Ofwat's IAP feedback and implied actions in this area, we are providing further demonstration of the progress we have made. We will continue this drive throughout AMP7 and beyond.

In many situations the catalyst to deliver performance improvement is a distortion or imbalance in the interrelationship between people, process and ambition. If the three are in equilibrium, there is little need or pressure to change. We believe we have created this distortion in practice with the level of ambition we have established in the past year and looking forward. For example, in setting stretching goals for the AMP7 period for leakage, interruptions to supply, internal sewer flooding and pollution performance. This ambition requires us to act differently and re-evaluate the systems and approaches we use. In this section, we will describe the improvements we have made and the early results being realised.

Space and authority for colleagues to think and behave differently.

In our PR19 plan we described our intent to create an environment where enabling transformation and innovation becomes our norm, providing colleagues with space and authority to think, behave and act innovatively to drive positive change. We have some great examples of where this is already happening, although we recognise we can do more to scale and embed what we have already started.

In July 2018, we created a Transformation Community, which meets monthly. In this community colleagues at multiple levels from across the business come together, consider and understand some of our biggest business challenges, share their ideas, develop these and take them back to their business areas to pilot and implement potential solutions (a test and learn approach). This group does not have any joining criteria other than being open minded, willing to try new things and empowered to make a difference. Membership is not mandatory and we use our digital capabilities, such as Microsoft Teams, to keep colleagues who cannot attend regularly involved and able to contribute.

Creating the Transformation Community has not only engaged colleagues in a different way than before, but it has led to key skills development and empowered group

members to take ownership of change in their respective business areas. Feedback from the colleagues involved in the community and some examples of the work they have led can be found in YKY.CMI.C1-1.

Rewarding innovative thinking and implementation.

Our PR19 plan People and Culture sub-section referenced our colleague recognition process which rewards the amazing work our colleagues do every day in thinking differently, working collaboratively and driving continuous improvement. We recognise that this process was not explained fully in our PR19 plan and we did not share some of the great award submissions that have come through. A description of the process and criteria for nomination and an example of one of the successful submissions can be found in YKY.CMI.C1-2.

Developing our expert improvement coaches to enable a learning environment

We have several continuous improvement teams across the company who have been working together over the past two years to create a common sense of purpose and a Yorkshire Water Method for approaching and implementing improvements. We have founded this method on our Business Process Management (BPM) framework and external best practice, such as systems thinking and Lean Six Sigma. As with BPM, this capability is not about having a huge team of change project managers and analysts who undertake improvements on behalf of teams; but rather works shoulder-to-shoulder with teams to coach them through a process of learning, understanding and designing improved ways of undertaking their work.

With wider benefits such as improved colleague engagement, morale and skills development, this way of approaching the learning organisation – being prepared to learn about the work we do in a more holistic way and providing a platform for teams to create and implement ideas – has already started to deliver and is being deployed across our upper quartile programmes.

YKY.CMI.C1-3 contains case studies of key projects, an outline of the evolution of our BPM strategy and the development of our improvement coaches.

As well as continuing to develop our capability, we are working Professor Bob Garrett, who is one of the foremost thought leaders in creating ‘Learning Organisations’. Professor Garrett is continuing to work alongside key colleagues, such as our Transformation Partner, and our executive leadership team to undertake learning reviews in a different way and embed a culture of continuous learning. We are currently

focusing our efforts on key strategic change programmes to ensure we capture areas of opportunity for future programmes. Learning from past events, performance, and failures is not new to us; we run post-project lessons learnt and incident reviews as a matter of course. We aim to continuously learn from our activities and the environment within which we operate to prevent the bigger failures that can sometimes occur.

Taking Open Data to the next level

As described in our PR19 plan, achieving a state of 'Transparency by Default' is central to our ambitions. We have previously described our Open Data work, however there is an opportunity to do more with transparency. Rather than seeing transparency as simply focused on the 'openness of our data', we have identified the potential to drive exceptional outcomes through the application of Open Innovation Principles.

We intend to use our Open Innovation Playbook Appendix YKY.CMI.C1-4 and its decision tree as a mechanism to guide colleagues on the best way to problem solve and access the right skill-set and solutions effectively. This strategy will build on our current R&D, Supply Chain and Cultural innovation strategies, and will be led by our Transformation Team.

Since our submission, we are now the first in our industry to join 'The Collective', a global Open Innovation Forum led by Open Assembly, an arm of Harvard University in the USA. This is the foremost thought leadership in Open Innovation and includes members such as NASA, Accenture and GE, amongst others. A description of our involvement in The Collective and its purpose can be found in Appendix YKY.CMI.C1-5.

Delivering Customer and Environmental Benefit

Building upon relationships and the principles described above, we are now able to demonstrate the value we are creating based upon the analytical skills and knowledge we are nurturing in our people and the culture of innovation we continue to develop.

Case Study – Open data hackathon

In May 2018 we hosted an open data hackathon in partnership with Data Mill North which focused on open data solutions to enhance leakage performance. We released a large volume of operational data for the event.

The 2-day event had over 50 attendees, including a cross section of colleagues, partners, data scientists and data enthusiasts from our customers base, all focusing on delivering data science solutions to improve performance. Attendees formed themselves into teams. At the end of the hack, teams presented their findings. One identified solution – to create a digital fingerprint from acoustic logger sound files to target background leakage, as opposed to new burst events – was adopted and is currently being developed further.

We have developed this idea into a project, working with six data science companies and a cross-business working group. The project is 2 months into the delivery phase and aims to deliver a software solution to assist background leakage identification. It will be deployable by the end of 2019. Current estimations predict that implementing this software system, using the 40,000 acoustic loggers currently being deployed across Yorkshire, will result in a sustained circa 10Ml/d leakage reduction.

Case Study 2 – Sewer network management programme

In December 2017, we engaged Add Strategy to work with us to deliver an 8-month staged programme to inform a novel approach to sewer network management and visibility.

Phase 1, “unpacking the problem”, consisted of an Ideas Lab. 150 people attended, including a cross-section of colleagues and individuals from partner and non-partner supply chain companies and the Environment Agency. Our ambitious performance improvement targets were stated and ideas from the collective were developed and collated. The challenge to supply chain was to think differently, how they could work together to deliver solutions where the whole was greater than the sum of its parts.

Phase 2 consisted of a data hack. Performance data was released for ideas to be tested against, allowing data driven innovation and developing actionable insights.

Using outputs from the first two phases, phase 3 was a design sprint; a rapid technology development process encouraging a collaborative approach to the development of new solution concepts.

This initiative resulted in the articulation of a concept that has secured £450,000 project funding to deliver the first stages of a SMART Wastewater Network. Specific output from the Add Strategy partnership has contributed to the procurement process to secure sensor, telemetry and analytic technologies. The programme of delivery is expected to inform £2 million investment over the next year to demonstrate the benefits of a systemic approach in reducing network escapes, reducing impact on our customers and the environment. We are actively investing in the outputs of this initiative.

Our next step is to take learning from our data releases and case studies and deliver an Open Innovation initiative on reducing per capita consumption. We plan for this initiative to involve participation from colleagues, partners and customers, and not just those with data skills.

Allowing Innovation to run through our core and demonstrate co-creation

Since submitting our PR19 plan we have started work on our vision and values to ensure they capture our ambition for PR19 and beyond, enabling colleagues to see how their work contributes and that we have values that drive future desired behaviours. Early work on values has flagged that colleagues feel that curiosity and being brave is key to what they want to see. There is much more colleague engagement to do on this before we roll it out, however the drive to be more innovative, enabling idea generation and empowering colleagues to lead improvements, is coming across strongly.

We intend to link our new reward strategy to the values and behaviours that are developed, as well as company performance. This will make the 'how' much stronger in our culture. Early plans for this can be found in Appendix YKY.CMI.C1-6.

Our People and Innovation

Whilst we have exciting initiatives progressing to transform our approach, we should recognise and elaborate upon our current position which did not come through strongly enough in our PR19 plan. Referring to chapter 10 and initiatives explained in the price control chapters, it is important to emphasise how the case studies we described were conceived. Nearly all were conceived and developed by innovative colleagues. Their technical capability, understanding and desire to improve the service and value we deliver to customers, enhance the environment and do the best job they can, culminated in some sector significant projects:

- Living With Water Partnership, Hull.
- Humberstone Bank Farm (let on the basis of "farming beyond nature").
- Six Capitals and Total Impact approach to investment.
- Integrated Resource System Circular Economy programme, Esholt.
- Societal recovery of FOG to prevent sewer blockages, Bradford.
- Digital approach to customer engagement.
- Upland Catchment Management.
- Planting of one million trees.
- Anaerobic Digestion Genetic Research with the University of York.

Further, incrementally beneficial case studies previously described, such as zero interruptions, UAV drones, increasing sewer capacity and design standards are all colleagues-driven ideas.

Where we have partnered with technology providers, the desire to deliver difficult solutions because they yield maximum benefit is driven by colleagues. The SAP S/4 HANA platform and Advanced Thermal Conversion Gasification (ATC) case studies, both high risk of delivery, high return solutions, are good examples.

Innovation Risk

Our approach to risk is clearly stated by the Board in several contexts. In terms of innovation, the budget is expected to return no implementable benefit from 50% of the investment. If it is more, we consider we are not taking enough risk, but we learn when we 'fail'.

Expanding on the statement in our PR19 plan section on ATC demonstrates this. Over ten years, we invested over £20 million in delivering a thorough, technologically and commercially viable blueprint to deploy this technology. Demonstrated at commercial scale, it delivers four times the electricity than AD for the same sludge throughput and is carbon negative. We have recognised that we are not equipped to commercialise the technology, as we do not have the business strategy, technical nor commercial skills. We are selling the technology to be deployed commercially by an appropriate company. If we were afraid of failure, we would have ceased development of the technology as technologically or commercially non-viable. Instead, we are proud to have delivered this asset type and released it for commercialisation so that it is available to all UK companies and their customers, not just those in Yorkshire. Once sold, this approach will be communicated.

The learning we have gained from the ATC programme is significant:

- Align the business to common understanding of risks and opportunities, in both what we are bettering and how we deliver it.
- Communicate to and involve all colleagues.
- Create momentum and maintain it.
- Build in processes to stop or adapt projects to changing business strategy.
- Establish a business lead who is vested in the output implementation.

These are now embedded in our innovation process.

Innovation Investment and Leverage

Our AMP6 innovation budget is significant. It was built from the bottom up using clear articulation of our known risks and opportunities, applying our significant experience of creating and administering programmes of research and development. We have taken the same approach in building our AMP7 programme with one exception. We have a stated aim of delivering the programme using 50% leverage from grants and collaboration, exposing our customers to half the cost with all the benefit. With appropriate skills resource, we are confident that we can achieve this from our experiences in AMP6.

We secured just under £1 million from DECC in the delivery of the ATC programme. Our work with the University of York on delivering exceptional optimisation of the AD process at a genetic level of biochemistry is supported to just under £0.5 million by the Royal

Society. Working in collaboration with European colleagues from industry and academia on upland catchments managed for water quality and carbon sequestration has levered over £10 million in research knowledge. We have contributed our expertise to projects exposing our colleagues to significant professional and personal development opportunities.

With our renewed and enhanced approach to innovation, we anticipate using this investment to its greatest potential, returning service and value to our customers.

Indications of Culture Change Through Process Change

Vocal and common observations by the industry supply chain are that water industry procurement and asset engineering processes inhibit innovation. In Yorkshire Water both these areas perform in accordance with a stated appetite for risk in procurement regulations, process safety and asset resilience. We evidence that whilst we are not taking on more risk, by engaging in a different way we can begin to adopt innovations more rapidly and safely.

Innovation link to Supply Chain

Our Procurement and Contract Management teams are now arranged into a category management structure. In this structure colleagues that source new contract arrangements and manage existing arrangements sit together in specific spend areas such as Operational Assets and Information Technology. These category areas are aligned to colleagues in the Innovation Team with regular category steering groups in place to ensure an holistic approach. For each spend area a category strategy is in place with many stakeholders being consulted in its creation. The focus of these strategies is to have a forward view of external trends and opportunities alongside internal goals, with a view to guiding the work of buyers. Innovation in the relevant market is an important part of these category strategies and looks to ensure that the intended approach to an area of spend is utilising the best of breed of current technology and is using innovative commercial models.

To ensure we engage effectively and meaningfully with the supply chain, we are active members of the Future Water Association, we regularly work with British Water and hold focused sessions with potential suppliers.

Innovation has been a key driver of our AMP7 contracting arrangements. We have the decision to reduce our reliance on a small number of very large organisations and move to a suite of contracts with smaller organisations. This approach is intended to bring us

closer to innovators in the industry and take ownership of engaging the wider supply chain. Innovation and collaboration with the supply chain are key evaluation factors in selecting our partners for AMP7 and beyond.

Asset and engineering standards are common tools to ensure asset safety, resilience and value. These standards and their guardians are often seen as blockers to deployment of innovation. To engage differently and productively, engineering colleagues have partnered with the Pump Centre to host and deliver a second engagement conference; New Horizons Delivering Efficiency & Performance into AMP7. Beyond hearing of new technologies, the aim is to communicate business requirements and what we can and cannot accommodate, build relationships, introduce a more tactical approach to applying technology and innovative design, all to deliver efficiency and performance. This a big step for our business.

Our use of partner organisations to scout for and evaluate appropriate technologies is now embedded in readiness for AMP7. Isle Utilities, Bluetech and the Energy Innovation Centre offer similar but different models. We are working with them all to test which approach provides the highest value to us and therefore our customers. This accelerates our approach to learning from others, demonstrated by our relationship building outside of the UK, for example Ireland. Enterprise Ireland and Irish Water are close colleagues with open sharing of knowledge akin to those relationships we have with the majority of UK water companies.

Collaboration

Whilst we have not historically communicated it well, we collaborate as a matter of course with other water companies and the supply chain. Our next step, through Open Innovation, we plan to collaborate with our customers.

From an innovation perspective, we believe in focused and appropriate collaboration. Whilst as an industry we have common issues, we frequently have issues for different reasons, so collaborating with companies with similar issues for similar reasons makes absolute sense. Attempting un-targeted collaboration where perceived common issues transpire not to be common is highly unlikely to deliver solutions that can be implemented. We should also not confuse collaboration with commercial relationships.

We regularly co-create relationships with innovative suppliers and build option ideas for the supply chain to deliver. Even if there is no follow on co-contracting, the fact that the

creation was a collaboration is the most valuable element. This is pretty much a continuous activity but is largely invisible. There are regular and open exchanges of views and experiences especially in the R&D Innovation area and between technical specialists.

As described above, our most innovative and transformational project areas are truly collaborative, delivering mutual value. Frequently society, not just customers, benefits by design.

We provide the following appendices in support of this response:

- YKY.CMI.C1-1 - Case Study -Transformation Community
- YKY.CMI.C1-2 - Case Study - Colleague Recognition
- YKY.CMI.C1-3 Case Study - Improvement Capability
- YKY.CMI.C1-4 Appendix 10b - Open innovation
- YKY.CMI.C1-5 Case Study - The Collective
- YKY.CMI.C1-6 Culture and Reward

YKY.CMI.C2

In our September 2018 PR19 submission we set out our plan to trial Wholesale initiatives and Retailer incentive schemes and to review which of the approaches presented best value for customers. Ofwat stated in its IAP documentation that it welcomed our approach but stated that we did not provide sufficient detail. The purpose of this section is to provide detail of the planned initiatives.

Managing property data effectively is important for accurate and complete billing. Ensuing that Gap Sites and Voids are managed appropriately means that our allowed charges are levied correctly to the right customers, ensuring fairness to all and contributing towards affordable customer bills.

The development of the business retail market provided us with an opportunity to cleanse and analyse our data in more meaningful and detailed ways than previously, including the differentiation of gap sites and vacant premises. Our previous approach to Gap Sites and Voids needs to adapt so that it is fit for purpose for the business market.

Although the business market is nearly two years old, the most effective way of managing Gap Sites and Voids in the market is still unclear. Rather than deciding on a solution now, our approach is to gather evidence by trialling new ways of working during 2020/21, with a view to implementing a new approach from April 2021.

Managing Business Gap Sites

Managing Gap Sites along with the related service connection and property data in the market is a Wholesale responsibility. We have access to both residential and business asset and property data, which provides us with a rich data source.

An industry reporting mechanism has yet to be established to give a true picture of normalised comparative performance. If a company has historically performed well on Gap Sites, then there will be less opportunity to discover more Gap Sites in the future. A company that has performed poorly on Gap Sites in the past will have more opportunity to discover more in the future. We therefore do not feel it would be appropriate to set a target for Gap Sites.

To understand the opportunity for identifying Gap Sites, we conducted a pilot in the Wakefield region, which is approximately 7% of premises in Yorkshire. We used a third-party data services provider to generate Gap Site leads against our property database,

which were then investigated to ascertain whether they were true Gap Sites. The pilot identified 17 Business Gap Sites, all of which were small businesses. This small number of Gap Sites identified gave us confidence that Gap Sites have been well managed historically but there is still some opportunity for improvement.

Based on the findings of the pilot, as stated in our September 2018 submission, we plan to trial a Wholesale proactive initiative and a Retailer incentive scheme.

Wholesale initiative

As with the pilot area, we will work in partnership with a third-party data services provider to generate Gap Site leads which will be investigated to ascertain whether they are valid and then registered in the market. The third-party data services provider will use various data inputs, including our own property database and data from other water companies, Ordnance Survey, Google, Companies House, marketing agencies, Equifax, and the Valuation Office Agency. We will undertake a project to replicate this pilot for the entire Yorkshire region and the leads will be investigated and actioned by 31 March 2020. We will embed this new process into our ways of working from 1 April 2020.

Retailer incentive initiatives

Although we have our own initiative to identify Gap Sites, we believe that it may be useful to have a Retailer Gap Site incentive scheme. In our PR19 research with Retailers they told us that although incentive schemes were not a high priority for them, they welcomed the introduction of incentive schemes. There are different ideas from Wholesalers which may lead to a choice of different incentive schemes with differing terms and conditions. In Ofwat's State of the Market Report, published in 2018, Ofwat drew attention to market friction leading to increased costs for Retailers. One of the examples of market friction was inconsistent approaches by Wholesalers causing additional complexity. Therefore, we do not believe that it is in the interest of the market to have multiple Wholesaler incentive schemes with differing terms and conditions.

We believe a successful incentive scheme should pass two tests:

1. The scheme should be simple and accessible for Retailers.
2. It should be cost neutral or the costs should be outweighed by the benefits.

For simplicity of use for Retailers, the scheme should be a national Retailer scheme, which Wholesalers opt into if they choose. We will work in collaboration with other Trading Parties to form a group with a view to establishing a national Retailer incentive scheme.

We have already proposed and agreed with other Wholesalers that a group will be established. We will pilot an incentive scheme during 2019/20 and will then evaluate whether the second test can be met. If this test is met, then we will implement the incentive scheme in 2020/21.

Managing Business Voids

Managing Voids (also known as vacant premises) is a Retail activity along with the responsibility of managing the premise occupancy field in the market. Retailers are best placed to do this as they manage the relationship with the Business customer. However, we have challenged ourselves as a Wholesaler to do more with respect to managing Voids. We believe that we have a role to both support Retailers and hold them to account.

Table CMI10 shows the percentage of premises that are vacant as a proportion of total premises. This data was reported by MOSL during 2017/18.

Table CMI10 Business industry vacancy performance

Company	Vacant premises %
North	
Northumbrian Water	14%
Severn Trent Water	13%
United Utilities	18%
Yorkshire Water	14%
South	
Anglian Water	6%
South West Water	6%
Southern Water	10%
Thames Water	15%
Wessex Water	3%

Source: Market Operator Services Ltd (MOSL)

Table CMI10 shows that there is a clear North South divide in vacancy rates. Yorkshire, as with other regions in the North, suffers from a stagnant property market and greater than average deprivation, and has historically experienced a large decline in traditional industries such as manufacturing. As there are regional demographic reasons for these differences, a comparative target would not be an effective means of improving Void performance. The issue is not the comparative number of Voids – it is rather the number of premises recorded as empty but that are occupied and receiving services in each region.

Since the market opening we have seen the number of vacant premises increase from 14% to 16% in our region. Although MOSL has not provided recent comparative information, we are aware from discussions in industry forums that other Wholesalers are also experiencing a deterioration in performance. We are also aware that in the Business water market in Scotland, an unintended consequence was that the number of vacant premises increased. We have undertaken some sample checking on vacant premises and have found a significant number of these appear to be occupied. Based on the lessons learnt from Scotland and our own investigations, we believe that more needs to be done to manage the number of vacant premises.

As with Gap Sites we plan to trial a Wholesale proactive initiative and Retailer incentive scheme.

Wholesale initiatives

As a Wholesaler our Void management powers are limited. The market codes state that Retailers are responsible for managing vacant premises and only Retailers can update the occupancy flag in the Central Market Operator Systems (CMOS). We are, though, able to challenge Retailers on the vacancy status of premises. Our approach is to begin by supporting Retailers to help them do the right thing. If this approach is not successful, we will challenge Retailers in phases to create incentives for them to manage vacant premises effectively. In parallel with this we will work with other Trading Parties on other market initiatives to improve vacancy performance.

Our detailed void management process:

- We will investigate all consumption on vacant premises every month where the meter size is greater than 30mm and will notify Retailers of occupancy and provide evidence.
- We will investigate a random sample of other vacant premises every month using third-party data services and will notify Retailers of occupancy and provide evidence.
- Where a Retailer does not acknowledge that the premises are occupied or provide a satisfactory explanation, we will utilise the vacancy challenge process in accordance with the market codes.

In addition to this we will:

- Establish a new administrative charge in the Wholesale Charges Scheme 2020/21 which may be levied to Retailers where a vacant premise is identified by us as being occupied.
- Consult with Retailers regarding the introduction of charges for consumption on vacant premises.

We are already working collaboratively with other Trading Parties to review the market code vacancy process with a view to improving market performance. We have proposed the formation of a new vacancy group to be governed by the Panel and have requested this is included in the Market Performance Operating Plan (MPOP). MOSL has confirmed that it has been included in the draft MPOP plan for 2019/20.

Retailer incentive initiatives

As Retailers are obliged to manage vacant premises, it is counter intuitive that they should be rewarded for identifying that vacant premises are occupied. The experience from the Scottish market has shown that a Retailer incentive scheme for vacant premises does not necessarily deliver the best outcome for customers.

Currently there is not a joined-up approach to vacant premise Retailer incentive schemes. There are different ideas from Wholesalers which may lead to a choice of different incentive schemes with differing terms and conditions. In Ofwat's State of the Market Report, published in 2018, Ofwat drew attention to market friction leading to increased costs for Retailers. One of the examples of market friction was inconsistent approaches by Wholesalers causing additional complexity. Therefore, we do not believe that it is in the interest of the market to have multiple Wholesaler incentive schemes with differing terms and conditions.

We believe a successful incentive scheme should pass two tests:

1. The scheme should be simple and accessible for Retailers.
2. It should either be cost neutral or the costs should be outweighed by the benefits.

As with Gaps Sites we feel that the preferred option would be to create a national scheme, which Wholesalers could opt into if they choose. We have proposed and agreed with other Wholesalers that an industry group will be established to create a national scheme.

We will pilot an incentive scheme during 2019/20 and will then evaluate whether the second test can be met. If this test is met, then we will implement the incentive scheme in 2020/21.

Reporting on our performance

In the first quarter of 2020/21 we will publish a report on our website on the outcome of the trials and the next steps we will be taking. We will then report annually to provide an update on our performance.

YKY.CMI.C3

Background and Approach

In the development and implementation of the competitive non-household retail market, we applied a pragmatic approach that ensured the opening of the market was as seamless an implementation as possible for participants and all our customers, including households.

It is important to us that the non-household retail market, from its implementation and throughout its maturity, does not negatively impact our customers, despite the significant change that the competitive market brought to the industry.

We aim to continue to be fully compliant with the obligations of the market rules and promote the effective functioning of the market. We are proud of the level of provision of our wholesale services to the variety of non-household retailers now operating within our region, and those that will operate in the future.

At the time of our PR19 plan submission in September 2018, we remained a vertically integrated wholesaler and non-household retailer. Since then we have progressed with our divestment strategy and confirmed the planned sale of the retail customer portfolio of our business, Yorkshire Water Business Services.

Under this structural reality, we developed robust processes and procedures to achieve effective functional separation and comply with the needs of the market, our licence and the Competition Act.

We do recognise that as the competitive market matures cost efficiencies and new or improved services may result to benefit participants in the market, or beyond for participants in non-contestable markets.

As the market implementation settles and we scrutinise our own process and procedures we believe there may be some efficiency opportunities identified.

To achieve an effective market implementation and operate successfully and compliantly as a wholesaler, we created two new teams, Wholesale Service Desk and Market Operations. These teams focus on delivering and managing the competitive market transactions, providing day to day market services to the non-household retailers and ensuring the accuracy of the data provided to the Market Operator.

Over the short to medium term, our costs to deliver wholesale services have increased since the market opened. However, as processes become more embedded we are looking at how these can be optimised for both service and cost.

We have been one of the best performing wholesalers in the non-household retail market from the outset[3]. We have achieved this sustained position through the application of a continuous improvement approach, a focus on data accuracy and a detailed understanding of the market mechanisms. We will not seek to simply reduce costs at the expense of service provision quality and the accuracy of the core market data we are accountable for.

Improvements and Innovations.

Our approach to identifying lessons and seeking innovation and improvement is evidenced by our work improving market data and how we perform against the Market Performance Standards (MPS) measures (see Figure CMI1). The Market Operations team have worked with teams and colleagues across the business to identify the end-to-end journey of key market related data. Numerous problem-solving team building sessions have been held to review day to day activities and processes to analyse impacts and consequences on MPS performance.

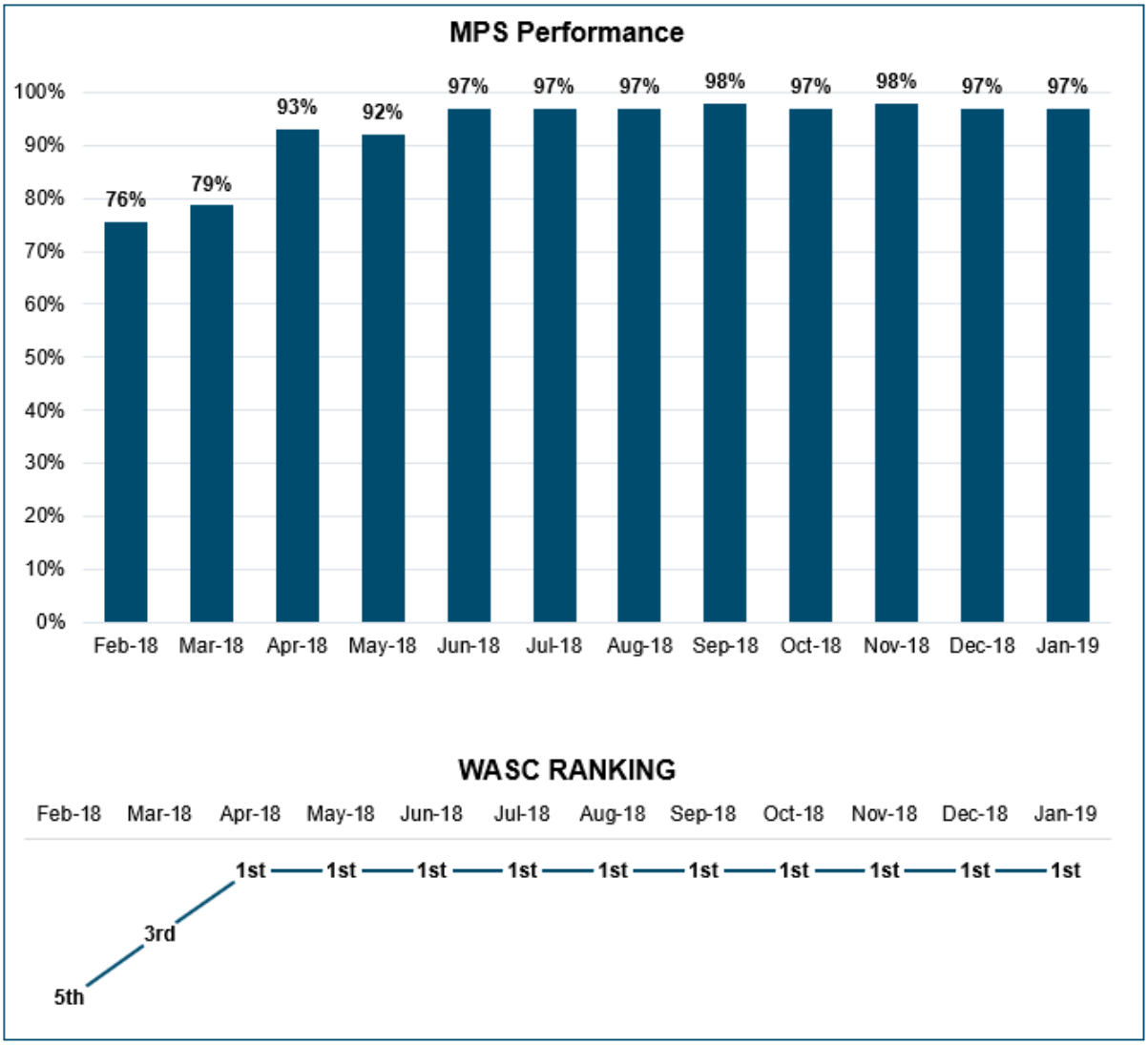
Several improvements have been made that have delivered a sustained frontier MPS performance over the period, as measured against the WaSCs.

Importantly although the business teams in Developer Services and Metering are not themselves accountable for the market data being kept up to date, by feeding back the results post-implementation of improvements, we are widening our understanding of the impact many ‘wholesale’ activities can have on our market performance and our services to retailers.

We have also addressed internal system designs to segregate non-household new connections in work queues so that data updates are identified and processed within market required SLAs.

[3] https://www.mosl.co.uk/market-performance/details/41/market-performance-by-wholesaler-201819

Figure CMI1. Summary of Yorkshire Water MPS performance



We have delivered specific training for our Market Operations and Wholesale Service Desk teams relevant to their roles in the market and recruited to specific posts that are responsible for seeking and making improvements. For example, our Data Manager in the Market Operations team works closely with all retailers in our region to help iron out issues and ensure data in the Central Market Operator System is to a high standard.

Bilateral Service Improvement Project

One area we are currently exploring is the management of service requests from non-household retailers to our metering field teams and partners, to identify any legacy issues that could be addressed to streamline our processes, whilst remaining complaint to the market rules and delivering the outputs that retailer need.

The bilateral service improvement project is in a feasibility stage and has identified several areas that will be investigated. Improvements are expected to either reduce

costs and/or improve the service experience for retailers and end customers. The preliminary issues and opportunities include:

- Multiple work hand-offs and inconsistencies in process between the Wholesale Service Desk (who receive the requests for action from NHH retailers), the household retail contact centre, metering administration teams and our service partners in the field.
- Varied compliance with, or understanding of, internal service levels between the household retail contact centre and metering teams.
- Inconsistent contact paths from our household retail contact centre to metering administration teams, compared to bilateral forms used for non-household work requests.
- Operating hours for internal hand-offs.
- Opportunity to improve technical knowledge of the Wholesale Service Desk team.
- Opportunity to improve reporting and standardisation of processes to minimise number of hand-offs and improve success rates.
- Recognition that improving the service response and effectiveness for the non-household market should not be to the detriment of services delivered on behalf of household retail.

The benefits achievable from this improvement project through standardisation of internal service levels and adoption of best practice have not yet been quantified. In terms of qualitative benefits, we expect to deliver a higher proportion of work requests actioned within service levels helping customers and/or retailers.

Although we are unable to say with certainty that these issues would not have been explored in order to improve the customer experience, the current drive to deliver improving services to non-household retailers and their end customers has led the business to investigate. The inconsistencies between our work management end-to-end processes of similar activities between household and non-household is more apparent. Non-household wholesale processes are effectively acting as comparators for some of our legacy household wholesale processes.

Compliance and Working with Stakeholders

As part of our implementation and business readiness for the non-household retail market opening, we developed and rolled out cross-company a training and education

package explaining the role of markets and the role of the Competition Act along with best practice. We continue to adapt and use this training to keep our teams up to date. The Compliance Team also run regular audits of operational and back office teams to ensure their procedures and performance remains complaint to the market rules and legislation. The skills and experience of the Compliance Team has grown greatly since the opening of the retail market, and they are providing their expertise and insight in support of our work on other contestable markets, from new connections to water resources.

We regularly engage with non-household retailers and other wholesalers to discuss performance and market related issues. We have client relationship managers working closely with the retailers to identify and address any persistent or material issues they face. We also support retailers with water efficiency advice and support retailers in their engagement with its business and public sector customers. We are an active member of the Retailer Wholesaler Group and are currently supporting the groups work on advancing the availability of meter reading services to retailers to help remove any potential barriers to entry.

To date we have not identified any service innovations or efficiencies within the non-household retail market from outside Yorkshire Water.

Should we identify lessons and innovations and achieve benefits in service and/or cost to serve from our initiatives and projects, in the non-contestable wholesale sector we will look to collaborate with other wholesalers where there are benefit to an effective and functioning market for customers.

YKY.CMI.C4

The following section details how we have been progressing our markets approach to Bioresources since our September 2018 business plan submission. Over 75% of our plan was market tested pre-submission and we are committed to pursuing a markets-based approach to the provision of services within Bioresources to drive value for our customers.

Within the last few months, we have carried out market testing for further functions within the new boundaries of Bioresources, including transport of liquid sludge and raw cake. We have assessed the market viability of this option and are currently pursuing a tender process with interested parties. We have also progressed the delivery of a key area identified in our plans, the use of biogas. We have tested the market to try and establish a market owned and operated gas to grid plant at our Hull WwTW.

Realising our markets plan - activity over the last 12 months

During the current AMP we are delivering the final stages of our Organic Change strategy, which will replace all our incineration capacity and deliver approximately 45,000 tds of anaerobic digester capacity. By mid-2020, we expect all our assets to be operational and optimised, but until then we will continue to rely on third party contracts to deliver sludge disposal.

As examples, over the last 12 months we have exported sludge to the following WaSCs:

- Approximately 414 tds to Severn Trent Water via tanker and truck.
- Approximately 220 tds to Anglian Water via truck.
- Approximately 130 tds to Northumbrian Water through an informal arrangement via tanker and truck.

We are in negotiations with United Utilities to set up contracts for tanker and truck movements and have recently received requests to import truck loads to Knostrop WwTW. However, we have not yet accepted any imports as we are commissioning the site and our internal production is still exceeding treatment availability. This situation is forecast to change later in 2019.

The future

Market testing transport

The market testing carried out prior to our September 2018 submission highlighted both sludge transport and treatment as areas of potential efficiency. Following this exercise,

which considered sludge transport and treatment, we have looked to market test the transport of both tankered sludge and trucked sludge, initially we have engaged with three national logistics providers. All have highlighted a potential cost saving. This exercise was based on a limited data set to provide an operation comparable to the scale of our movements.

Subsequent engagement across the haulage sector and within the utilities industry has also identified potential cost savings when compared to our current in-house operation.

There are several contractual strategies that will allow us to maximize efficiency and build a long-term partnership to deliver compliance, service and value.

The first of these strategies will be through the employment of a seven plus three-year contract to cover AMP7 and AMP8. This will allow a provider to factor in a full fleet renewal policy, with contractual year on year cost reduction targets to reduce risk and provide a lower rate of opex to us. Through an effective fleet renewal policy, a logistics provider will be able to significantly reduce the maintenance and repair costs we hold within the LGV fleet by up to 33%. This can be achieved through increased investment and innovation in vehicles which will demonstrate a net saving across the AMP.

Using a single provider, we will be able to combine the truck movements (currently operated by third party) and our in-house tankered sludge movements. This will offer savings because of the increased scale of integrating these operations. Whilst we carry out most of the volume movements of tankered sludge in-house, around 15-20% of volume movements are carried by a framework of nine contractors. This is operated as ad hoc volume and attracts a high premium that averages to around 30-40% greater cost than moving with in-house fleet.

Using the expertise of a third-party logistics provider, whose focus is on successful transport will add value to the services we provide in-house that are seen as an historical cost. This will provide a range of benefits such as better driving style, decreased fuel consumption, reduced reliance on ad hoc volume subcontractors, improved delivery windows and better fleet utilization across multiple contracts, among other opportunities to reduce cost and overall environmental impact.

Use of biogas

Our September 2018 submission set out how we plan to utilise experts to introduce improved approaches and technology, including outsourcing of thickening and dewatering processes, market delivery of sludge treatment capacity, as required and biogas management at a few priority sites.

We have since started to implement these plans. In October 2018 we initiated a procurement process for a third party owned and operated gas to grid facility at Hull WwTW.

We selected gas to grid because there are associated Renewable Heat Incentives (RHI) which are favourable, the project must be delivered within tight timescales to achieve these. We prioritised Hull WwTW as our pilot site as recent site optimisations and planned refurbishment mean that Hull WwTW will soon have a regular surplus of biogas, which will have to be flared given there is no capacity in the local electricity network to export power. Gas to grid would provide an alternative outlet for our biogas, with plenty of capacity in the gas network to manage this increase.

As part of this procurement we offered the market the opportunity to manage and utilise its biogas at Hull WwTW as part of a design, build, finance, operate and maintain contract, where appropriate risk for the gas to grid business would sit with the expert contractor and risk around providing the biogas within agreed volumes and quality parameters would sit with us. This agreement would function as a gas sales contract, where the expert commits to buy our biogas, combined with a land lease on which the third party would build and run its gas to grid site, removing any need for investment by us.

To try and hit the milestones required for achieving the RHIs available on gas to grid at present, we also initiated a planning application and dialogue with Northern Gas Networks, the local infrastructure provider.

We received twelve expressions of interest in October 2018, with five of the submissions passing the first competency-based stage of our procurement process in November 2018. Site visits took place in December 2018 and January 2019 and two bids were subsequently received prior to the 14 January 2019 deadline.

Unfortunately, neither passed all elements of the procurement scoring criteria. We believe part of the reason for this was the tight timelines within which bidders were

required to pull together a submission as a result of the RHI milestones. We have since completed a lessons learned review session and are in the process of providing feedback to bidders.

Having tested the market through this procurement exercise, we believe interest in this type of over-the-fence agreement does exist. We intend to reassess alternative technologies in the market, as the RHI deadline is no longer achievable, and revisit our procurement process. We intend to return to the market later this year with a slightly longer procurement process, informed by key learning from this project.

Other market lots

Our September 2018 submission also featured thickening and dewatering and sludge treatment. We are progressing thickening and dewatering option, developing what a design, build, finance, operate and maintain service of this nature may need to look like. We need to understand how this may sit alongside other bioresource initiatives, for instance our bespoke maintenance programme. We intend to spend the several months gathering asset information and defining the parameters of the service we require, before going to market with the first lot later in 2019.

The other significant market opportunity is providing future capacity requirements. As can be seen in our IAP response Bio1 table, we propose that a significant amount of sludge goes to third parties in the future. We will be talking to neighbouring companies and other providers to secure these services. In addition, once the WINEP programme has been confirmed, should we need to build new capacity, we will engage the market to secure the most cost-effective ways of delivering what is required.

YKY.CMI.C5

Each year within the Annual Performance Report we have sought to improve the transparency of our corporate and financial structures by expanding and improving the information we present to customers. We transparently explain the whole business securitisation and the incorporation of the Cayman Island companies including their UK tax residency.

Ofwat's company monitoring framework assessment in 2017 Ofwat observed "*The company has provided a particularly accessible governance section in its report and the information provided on directors' remuneration was very clear and comprehensive. It has also provided an exceptional level of clarity in setting out its group structure and describing the function of the different companies within the group. The level of detail provided and its accessibility will help increase the confidence which stakeholders have in the board leadership and governance of the company.*"

In the 2018 APR we built on the 2017 report, acknowledging the potential for poor perception of the Cayman Island companies, and signalled our plans to replace them with a replacement UK incorporated and tax resident company. Through that process we transparently set out how the Cayman Island companies related to Yorkshire Water and what the improved structure would be once the liquidation had occurred. We completed the implementation of this activity in August 2018 and will be reporting this to customers in the 2019 APR.

Recognising it is important for customers and stakeholders to have confidence that our financial structure continues to be resilient in providing essential services, the structure is stress tested through our risk management and long-term viability assessments. This process incorporates:

- The long-term financial projections of meeting our obligations.
- Forecasts in key financial indices.
- A severe but plausible assessment of risks.

This results in a prolonged financial exposure greater than anything we have experienced, which is then tested within the corporate financial model. The results consistently demonstrate that we do not reach any of the financial covenants set down within the whole business securitisation, meaning that the Board is able to conclude that there is reasonable expectation that we will be able to continue to operate and meet our liabilities over the period of the assessment.

The outcome of these assessments is presented transparently within our APR so that customers and stakeholders can have a clear understanding of the corporate and financial structure, the risks the organisation faces and, importantly, that we maintain our financial resilience, which in turn leads to long term resilience of services.

We remain committed to maintaining clear and accessible around our corporate and financial structures and how they maintain long-term resilience. We will seek opportunities to continue improving our presentation and engagement with customers, so they can continue to have confidence in the delivery of resilient services.

Securing cost efficiency

YKY.CE.A1

Given the scale and complexity of this action, our response is provided in the dedicated ‘IAP Response YKY.CE.A1: Securing cost efficiency’ document. Here you will find our detailed evidence base and third party commissioned work to support our response.

YKY.CE.A2

This section provides responses to the action under the following format:

1. Clarification of which expenditure figures are capex, opex or totex.
2. Clarification of the addition and impact of the omitted Clayton West scheme of value £15 million (Totex is now £593.5 million was £578.5 million in our original submission for amber status schemes).
3. Provide tables clarifying line by line which schemes serve multiple obligations at single or multiple sites.
4. An explanation of discrepancies between the river lengths used in our calculations and those entered in WINEP3.
5. A breakdown of the apportionment of the revised £593.5 million (was £578.5 million in original submission) between the lines (capex and, if appropriate opex) in business plan tables WS2 and WWS2.

1. Clarification of Expenditure

We have used the efficient totex unit rate for all expenditure quoted in Section 3.12, Appendix 8g of our September 2018 submission (Appendix YKY.CE.A2-2), in our unit cost modelling and in this report. The quoted expenditure refers to totex after all our efficiencies have been applied.

During the reconciliation exercise it became apparent that the £15.2 million Clayton West WwTW scheme was omitted from the original consideration of amber schemes. This is a Sanitary Improvement-Continuous Discharge transfer scheme for the WINEP driver 'WFD_Imp BOD&DO&AMM' for all the site outfalls. Hence the £578.5 million totex originally presented in Appendix 8g should now read £593.5 million. The impact on the unit cost adjustment models is discussed in Section 2.

2. Unit Cost Adjustments

We have now included the scheme in the analysis and propose that the unit cost adjustment for Sanitary Improvement-Continuous Discharge transfer is updated from £3.4m/km, as stated in Appendix 8g, Tables 3.12 and 3.6 of our September 2018 submission, to £3.6m/km. The change is summarised in Tables CE1, CE2 and CE3 below and shows a comparison of the effect of including the Clayton West WwTW scheme in the calculation of the unit cost adjustment factors for Sanitary improvement - Continuous Discharge transfer (WFD_IMP G) schemes.

Table CE1 – September 2018 submission, Appendix 8g, Table 3.12 (2 schemes)

Sanitary improvement - Continuous Discharge transfer (WFD_IMP G)	Cost (£m)	LORI (km)	Unit cost (£ per km)
Bentley Mill	3.48	1.30	2,678,473
West Bretton	3.06	0.75	4,077,437
Total (and median unit cost)	**6.54**	**2.05**	**3,377,955 (A)**
		Estimation Total (£m)	6.92
		Difference (£m)	0.38
		Difference (%)	5.81

Table CE1 shows our original unit cost adjustment model of £3.4m/km.

Table CE2 - Unit Cost Rate (A) applied to 3 Schemes (Clayton West WwTw included)

Sanitary improvement - Continuous Discharge transfer (WFD_IMP G)	Cost (£m)	LORI (km)	Unit cost (£ per km)
Totals with Clayton West	21.74	5.76	
		Estimated Total (based on unit rate(A))	19.46
		Estimate vs Actual (£m)	-2.28
		Difference Estimate vs Actual (%)	-10.50

Table CE2 shows the impact of applying the original unit cost model to all three schemes (Bentley Mill, West Bretton and Clayton West WwTWs). This underestimates the total cost by 10.5%.

Table CE3 - Revised unit cost factor calculation with Clayton West (3 Schemes for Unit Cost)

Sanitary improvement - Continuous Discharge transfer (WFD_IMP G)	Cost (£m)	LORI (km)	Unit cost (£ per km)
Bentley Mill	3.48	1.30	2,678,473
West Bretton	3.06	0.75	4,077,437
Clayton West	15.00	3.71	4,053,908
Total (and median unit cost)	**21.54**	**5.76**	**3,603,273 (B)**
		Estimated Total(based on (B) unit rate)	20.75
		Difference Estimate vs Actual (£m)	-0.79
		Difference Estimate vs Actual (%)	-3.7

Table CE3 recalculates the unit cost model including Clayton West, demonstrating improved accuracy with a difference of -3.7%. It shows the approach we have taken to

address the original omission. The result is a change in the unit cost adjustment for Sanitary Improvement-Continuous Discharge Transfer from £3.4m/km to £3.6m/km.

3. Reconciliation Between Obligations, Schemes and Cost Models

For the purposes of this clarification, a 'scheme' is a costed single solution at a site or catchment designed to deliver one or more obligations. Each specific WFD/UWWTD scheme has been designed using an outline design approach with costing of individual pumping and screening systems and tanks, for example, using our cost models and according to the specific site and obligation parameters, where feasible.

The reconciliation of the 179 amber obligations to schemes, sites and costs is complicated by the following issues:

- Some WFD obligations require a more stringent level of performance than UWWTD.
- A single scheme can serve several sites or a catchment.
- A site can have several different schemes, for example, flow monitoring, phosphorus removal and transfer of discharge location.
- 4 of the 179 amber obligations are not currently required.

To resolve these issues, we have reassessed and improved our mapping of obligations to schemes and costs. We have retained the original costs split for phosphorus removal between UWWTD and WFD obligations at 70% and 30% respectively. The resulting mapping allows flexible cost reporting by driver type, obligation, scheme, site and compliance date.

The 179 amber obligations are now assigned to 118 Schemes at 115 Sites and 7 general/catchment locales as detailed in the following tables.

The 119 'obligations' figure stated in table 3.5, Appendix YKY.CE.A2-2 should reference 119 'schemes' and has been amended as follows:

- Omission of the Clayton West WwTW scheme (119+1=120 schemes).
- Revised count of HMWB schemes, from 7 schemes serving 7 obligations to 6 HMWB schemes serving 7 obligations (120-1 schemes=119).
- Single WFD_ND scheme that had two obligations at Worsborough WwTW has been merged with the phosphorus scheme (UIM2#P obligation). Please refer to Appendix YKY.CE.A2-1 Section 1.1.

Based on the above corrections, table 3.5, Appendix YKY.CE.A2-2 of our September 2018 submission is amended as shown in Table CE4.

Table CE4 – Amended version of Table 3.5, Appendix YKY.CE.A2-2

Driver	Description	ORIGNAL		IAP CHANGE	
		Number of ~~obligations~~ (Schemes)	Q cost in Plan (£m)	Number of ~~obligations~~ (Schemes)	Q cost in Plan (£m)
U_IMP5	Flow driver - Waste Water Treatment	1	9	1	9
U_IMP6	Storm Tank capacity - Waste Water Treatment	21	15	21	15
WFD_ND	No Deterioration of the Water Course - Biological Oxygen Demand	1	5	**0**	**5**
WFD_IMP M	P improvement to Moderate ecological status	2	7	2	7
WFD_IMP G	P improvement to Good ecological status*	24	65	24	65
U_IMP2 and WFD_IMP G,M	P removal combination (UWWTD SA(e) and WFD M,G)	35	375	35	375
WFD_IMP G	Sanitary improvement - Intermittent discharge	3	39	3	39
WFD_IMP G	P removal through transfer of discharge	3	6	3	6
U_IMP2	P removal through Sensitive Area (eutrophication) - SA (e) designation	12	44	12	44
WFD_IMP WRHMWB	Heavily Modified Water Bodies	7	2	**6***	**2***
WFD_IMP_Fish	Fish Passage	6	5	6	5
NERC_IMP1	White Claw Cray Fish	1	0	1	0
DrWPA_ND	Catchment Partnership	1	0	1	0
WFD_IMP G	Sanitary improvement - Continuous Discharge transfer	2	7	**3****	**22****
Total		119	578	**118**	**593**

**No cost change, miscount on number of HMWB schemes*

***Additional £15m for Clayton West*

Table CE5 summarises the totex costs of the schemes delivering the amber status obligations by category and includes a site count. Table CE5 also reconciles these improvements and corrections against table 3.5, Appendix YKY.CE.A2-2. It clearly references section links to Appendix YKY.CE.A2-1 of this submission, which reconciles in detail the relationship between each scheme, site and the 179 amber obligations.

The 179 obligations are assigned to 118 schemes at 115 sites and 7 general/catchment projects. A single scheme may serve several sites (for example, a block scheme for monitoring) and a site may contain several schemes.

Subsequent to this reconciliation, Table CE6 and Table CE7 present updates to tables 3.6 and 3.7, Appendix YKY.CE.A2-2.

Table CE5 - Summary of scheme types and totex costs delivering amber obligations

Summary of Scheme Types and TOTEX Costs delivering Amber Obligations					Reconciliation against Table 3.5, Appendix 8g WINEP Technical			
IAP Submission Appendix 1 Reference	Scheme Type (Amber)	No of Obligations	No of Schemes (No of Sites)	TOTEX Amp 7 (£m)	Driver	Description	ORIGINAL ~~Obligations~~ Schemes	IAP CHANGE Schemes
1.1	P-Removal#UWW only (WFD ND obligations align to the Worsborough P scheme)	11	9 Schemes (9 Sites)	26.66	U_IMP2	P removal through Sensitive Area (eutrophication) - SA (e) designation	12	12
					WFD_ND	No Deterioration of the Water Course - Biological Oxygen Demand	1	0*
1.2	P-Removal#WFD Transfer Solution	3	3 Schemes (Ingbirch,Kirk SM,BishopWilt)	5.65	WFD_IMP G	P removal through transfer of discharge	3	3
1.3	P-Removal#WFD only	26	25 Schemes (25 Sites)	70.86	WFD_IMP M	P improvement to Moderate ecological status	2	2
					WFD_IMP G	P improvement to Good ecological status*	24	24
1.4	P-Removal#WFD&UWW	82	39 Schemes (39 Sites)	400.36	U_IMP2 and WFD_IMP G,M	P removal combination (UWWTD SA(e) and WFD M,G)	35	35
	Sub Total	**122**	**76 Schemes (76 Sites)**	**503.53**		**Sub Total**	**77**	**76**
2.1	U_IMP5-Flow to Full Treatment (Increase)	1	1 Scheme (Amber=Ripon STW)	7.6	U_IMP5	Flow driver - Waste Water Treatment	1	1
2.2	U_IMP6-Storm Tank Capacity WWT	21	1 Block Scheme (but 21 Sites)	15.26	U_IMP6	Storm Tank capacity - Waste Water Treatment	21	21
	Sub Total	**22**	**22 SubSchemes (22 Sites)**	**22.86**		**Sub Total**	**22**	**22**
2.3.1	WFD_IMP Sanitary Improvs (BOD/AMM)-Continuous Discharge Transfer (West Bretton-UPM Dearne Reach 2 Scheme)	2	1 Scheme (1 Site West Bretton)	3.05	WFD_IMP G	Sanitary improvement - Continuous Discharge transfer	2	1
2.3.2	WFD_IMP Sanitary Improvs (BOD/AMM)-Continuous&Intermitt Discharge Transfer/ SPS CSO (Bentley UPM)	3	1 Scheme (1 Site -Bentley)	3.48	WFD_IMP G	Sanitary improvement - Continuous Discharge transfer	*(included above)*	1
2.3.3	WFD_IMP Sanitary Improvs (BOD/AMM)-Continuous & Intemittent Discharge Transfer (Clayton STW - UPMDearne Reach 1 Scheme-NonTypical Scheme)	2	1 Scheme (Clayton West)	15.04	WFD_IMP G	Sanitary improvement - Continuous Discharge transfer	*(missed Clayton West Scheme)*	1
2.3.4	WFD_IMP Sanitary Improvs (BOD/AMM)-Intermittent Discharges	9	3 Schemes (7 CSO & 1 STW Sites)	39.35	WFD_IMP G	Sanitary improvement - Intermittent discharge	3	3
	Sub Total	**16**	**6 Schemes (11 Sites)**	**60.92**		**Sub Total**	**5**	**6**
3.1	WFd_IMP Fish Passage	6	6 (6 Sites)	2.58	WFD_IMP_Fish	Fish Passage	6	6
4.1	NERC_IMP White Clawed Crayfish River Conservation Project	1	1 (General Study)	0.046	NERC_IMP1	White Claw Cray Fish	1	1
5.1	WFD_IMP Heavily Modified Water Body Scheme(HMWB)	7	6 (5 Catchments)	3.27	WFD_IMP WRHMWB	Heavily Modified Water Bodies	7	6
6.1	DrWPA_ND Catchment Partnership Support	1	1 (General Study)	0.25	DrWPA_ND	Catchment Partnership	1	1
	Sub Total	**15**	**14 Schemes (6 Sites+7 Other)**	**6.15**		**Sub Total**	**15**	**14**
7.1	DEFUNCT or Deferred OBLIGATIONS				** WFD ND scheme included as P scheme for Worsborough*			
	AMP 6 Skipton STW UWW-P Scheme Underway- -Obligation Stands	1	No AMP7 Costs 1 scheme 1 site NOT Counted	0				
	Pickering STW Solution-*Deferred until AMP 7 UPM Investigation Complete*	2	NOT COUNTED-1 Scheme 1 1 Site 2 Obligations	0				
	Replaced by 7YW300070 (was Sanitary Improvs (BOD/AMM)-Intermitt Discharges)	1	NOT COUNTED- 1 Obligation.	0				
	Sub Total	**4**	*Schemes Not Counted*					
	Grand Total	**179 Obligations**	**118 Schemes (115 Sites+7 Other)**	**593.46**			**119**	**118**

Table CE6 shows the amendments to the number of schemes as presented in this document. It is an updated version of Table 3.6 and Table 3.17, Appendix YKY.CE.A2-2.

Table CE6 – Amended version of Table 3.6 and 3.17, Appendix YKY.CE.A2-2

WINEP item (amber status only)		ORIGINAL Number of ~~obligations~~ schemes	IAP CHANGE Number of ~~obligations~~ schemes	ORIGINAL Total cost (£m) (Quality only)	IAP CHANGE Total cost (£m) (Quality only)	ORIGINAL Total output	IAP CHANGE Total output	Proposed Output unit	ORIGINAL Unit cost (£)	IAP CHANGE Unit cost (£)
P removal	UWWTD (U_IMP2/ WFD_IMP G,M)	47	47	306.59	306.59	390	390	km (LORI)	616,675	616,675
	WFD (WFD_IMP M/ WFD_IMP G/ WFD_IMP G,M)	61	61	183.62	183.62	485	485	km (LORI)	339,470	339,470
	Transfer Scheme (WFD_IMP G)	3	3	6.39	6.39	4	4	Kg/day (load)	1,581,221	1,581,221
Sanitary improvement (Intermittent discharge) (WFD_IMP G)		3	3	39.22	39.22	59,000.00	59,000.00	M^3 (storage)	725	725
Sanitary improvement - Continuous Discharge transfer (WFD_IMP G)		~~2~~	**3**	~~6.54~~	**21.54**	~~2.05~~	**5.76**	km (LORI)	~~3377955~~	**3,603,273**
Fish Passage (WFD_IMP_Fish)		6	6	2.72	2.72	64.55	64.55	km (LORI)	41,398	41,398
Flow driver - Waste Water Treatment (U_IMP5)		1	1	8.59	8.59	231.98	231.98	m^3 (storage)	37,024	37,024
Storm Tank capacity - Waste Water Treatment (U_IMP6)		21	21	15.21	15.21	3,992.46	3,992.46	m^3 (storage)	8,886	8,886
Heavily modified water bodies (HMWB) (WFD_IMP WRHMWB)		~~6~~	**6**	3.49	3.49	39.9	39.9	km (LORI)	103,878	103,878
White Claw Cray Fish (NERC_IMP1)		1	1	0.05	0.05	1	1	km (LORI)	47,379	47,379
Total (amber status only)		151[1]	**152**[1]	572.42	587.42					

[1] This is not the same as number of schemes in Table 3.5 because the 35 WFD and UWWTD combined schemes have been split out to develop a unit rate for WFD and UWWTD

Table CE7 shows the amendments to the number of schemes with amber obligation as presented in this document. It is an updated version of Table 3.7, Appendix YKY.CE.A2-2. Importantly, it shows the 154 schemes quoted by Ofwat in IAP action YKY.CE.A2 should be 155 schemes.

Table CE7 - Amended version of Table 3.7, Appendix YKY.CE.A2-2

Other schemes*		ORIGINAL Number of obligations	IAP CHANGE Number of Obligation	ORIGINAL Total cost (£m)	IAP CHANGE Total cost (£m)	Category
Scheme 1	Little Don Catchment Scheme - Environmental assessment (Investigation)	1	1	0.17	0.17	WFD_IMP WRHMWB
Scheme 2	Catchment partnership support	1	1	0.25	0.25	DrWPA_ND
Scheme 3	Worsborough (WFD no deterioration)	1	1	5.66	5.66	WFD_ND
Total (amber status only) including other schemes		154	**155**	578.5	**593.5**	

Table CE8 - Summary of totex cost apportionment to amber driver codes by compliance date

YW-Driver Code with #Parameter (AMBER)	31/03/2023	31/03/2024	22/12/2024	31/03/2025	Grand Total	% OF Grand Total by Driver
Urban Waste Water						
U_IMP2#P				£287,959,247	£287,959,247	48.5%
U_IMP5				£7,597,303	£7,597,303	1.3%
U_IMP6	£4,548,593	£4,034,663		£6,680,751	£15,264,006	2.6%
Water Framework Directive Treatment						
WFD_IMP(m)#P			£19,470,785		£19,470,785	3.3%
WFD_IMP(g)#P			£195,572,842		£195,572,842	33.0%
WFD_IMP(g)#Amm			£35,560,513		£35,560,513	6.0%
WFD_IMP(g)#Amm&BOD&DO			£21,573,682		£21,573,682	3.6%
WFD_IMP(g)#BOD			£4,319,909		£4,319,909	0.7%
WFD Fish&HMWB						
WFD_IMP_FISH			£2,533,721		£2,533,721	0.4%
WFD_IMP_WRHMWB			£3,311,067		£3,311,067	0.6%
NERC&DRWPA						
NERC_IMP1				£46,351	£46,351	0.01%
DrWPA_ND			£250,000		£250,000	0.04%
Grand Total	**£4,548,593**	**£4,034,663**	**£282,592,520**	**£302,283,651**	**£593,459,426**	**100.0%**
% Of Grand Total by Year	**0.8%**	**0.7%**	**47.3%**	**51.1%**		

Table CE8 shows the totex costs apportioned to each driver group by compliance year. It should be noted that, as described in item 2, page 44, Appendix YKY.CE.A2-2, the implementation of WFD_Imp drivers for phosphorus still requires the spend allocated to the urban wastewater driver for phosphorus (U_IMP2).

4. Explanation of discrepancies between the river lengths used in the company's calculations and those entered in WINEP3.

Our length of river improved performance commitment, measuring 767.63km, is documented in our September 2018 submission (PR19 bespoke performance commitments, 04, Appendix 19c Length of River Improved). It differs from the total WINEP river length improved, measuring 809.91km, for several reasons as referenced in Table CE9.

Table CE9 – Length of river improved Yorkshire Water comparison to WINEP calculation approach

YW Approach	WINEP Approach
Includes only YW improvements in calculations.	Includes contribution from all sectors required to meet an environmental objective. This also means that where cost-benefit analysis is performed, passing CBA is more likely.
Where several determinands contribute to a length improved, each determinands contribution to length improved is counted separately.	It is not entirely clear from the Environment Agency guidance whether separate determinands are classed as separate river length improvements or whether they are aggregated.
WFD[1] in class improvements are counted[2] as well as WFD class improvements.	Only WFD class improvements are counted.
Does not include obligations that have been mutually agreed to be removed from WINEP, for example, Pickering WwTW storm tanks and CSO.	Includes obligations that have been mutually agreed to be removed from WINEP, for example, Pickering WwTW storm tanks and CSO.
Only includes improvements to watercourses.	Includes improvements to and 'protected' watercourses, for example, standstill requirements for chemicals. (WFD_NDLS_CHEM2).

[1]Water Framework Directive
[2]Subject to a *de minimis*

We sought the Environment Agency's method and/or audit trail and have been provided with a short internal guidance document 'Completing the WINEP spreadsheet supplementary guidance: Environmental outcomes, 08/11/2107 (sic)' and some overarching principles that were applied to site specific decisions. We do not have any details regarding those discussions. It is possible that there may be more differences in the methods used by ourselves and the Environment Agency but, without the Environment Agency's detailed approach, we are unable to provide an in-depth analysis of the different numbers.

5. A breakdown of the apportionment of the Amber Obligation Costs between the lines (capex and opex) in business plan tables WS2 and WWS2.

WS2 - Wholesale water capital and operating enhancement expenditure by purpose.

Table CE10- Breakdown of amber schemes in business plan table WS2

A	Enhancement expenditure by purpose ~ capital	Original Table Sum 20-21 to 2024-25	WS2 Amber Obligations 2020-2025 (£m)
1	WINEP / NEP ~ Making ecological improvements at abstractions (Habitats Directive, SSSI, NERC, BAPs)	8.125	0.046
3	WINEP / NEP ~ Invasive non-native species	7.651	
5	Improving taste / odour / colour	16.821	
6	Meeting lead standards	12.340	
8	Supply side enhancements to the supply/demand balance (dry year annual average conditions)	0.340	
11	New developments	10.500	
12	New connections element of new development (CPs, meters)	30.141	
13	Investment to address raw water deterioration (THM, nitrates, Crypto, pesticides, others)	60.140	
15	SEMD	0.655	
17	WINEP / NEP ~ Drinking Water Protected Areas (schemes)	17.237	0.250
18	WINEP / NEP ~ Water Framework Directive measures	9.707	5.720
21	Metering (excluding cost of providing metering to new service connections) for meters requested by optants	22.997	
24	Drought Management Plan	1.700	
26	Leakage Reduction - UQ	131.917	
27	Reduction in Interruptions to Supply - UQ	2.946	
39	**Total water enhancement capital expenditure**	**333.217**	**6.016**
B	**Enhancement expenditure by purpose ~ operating nep**	**Original Sum 20-21 to 2024-25**	**Amber Obligations 2020-2025 (£m)**
40	WINEP / NEP ~ Making ecological improvements at abstractions (Habitats Directive, SSSI, NERC, BAPs)	0.152	
44	Improving taste / odour / colour	0.193	
52	Investment to address raw water deterioration (THM, nitrates, Crypto, pesticides, others)	0.929	
56	WINEP / NEP ~ Drinking Water Protected Areas (schemes)	6.265	0.079
57	WINEP / NEP ~ Water Framework Directive measures	0.070	0.046
65	Leakage Reduction - UQ	118.050	
66	Reduction in Interruptions to Supply - UQ	5.622	
78	**Total water enhancement operating expenditure**	**131.281**	**0.125**

WWS2 - Wholesale wastewater capital and operating expenditure by purpose

Table CE11 Breakdown of amber schemes in business plan table WWS2

A	Enhancement expenditure by purpose – capital		Original WWS2 Sum 20-21 to 2024-25	Amber Obligations 2020-2025 (£m)
1	First time sewerage (s101A)	£m	0.968	
2	Sludge enhancement (quality)	£m	66.011	
7	WINEP / NEP ~ Flow monitoring at sewage treatment works	£m	19.707	
9	WINEP / NEP ~ Schemes to increase flow to full treatment	£m	6.095	7.60
10	WINEP / NEP ~ Storage schemes at STWs to increase storm tank capacity	£m	81.731	15.26
11	WINEP / NEP ~ Storage schemes in the network to reduce spill frequency at CSOs, etc	£m	60.901	60.83
12	WINEP / NEP ~ Chemicals removal schemes	£m	12.240	
13	WINEP / NEP ~ Chemicals monitoring / investigations / options appraisals	£m	2.256	
15	WINEP / NEP ~ Groundwater schemes	£m	0.264	
16	WINEP / NEP ~ Investigations	£m	8.018	
18	WINEP / NEP ~ Nutrients (P removal at activated sludge STWs)	£m	347.385	348.02
19	WINEP / NEP ~ Nutrients (P removal at filter bed STWs)	£m	128.894	118.39
20	WINEP / NEP ~ Reduction of sanitary parameters	£m	3.951	
22	NEP ~ Discharge relocation	£m	5.685	5.60
25	New development and growth	£m	38.716	
26	Growth at sewage treatment works (excluding sludge treatment)	£m	67.335	
27	Resilience	£m	28.729	
28	SEMD	£m	0.285	
30	Reduce flooding risk for properties	£m	41.440	
37	Pollution - UQ	£m	23.399	
38	Internal Flooding - UQ	£m	10.326	
41	WINEP / NEP ~ No Deterioration in Sanitary Parameters	£m	4.590	
42	UWWTD Investigations…add nep filter	£m	35.899	
47	Total wastewater enhancement capital expenditure	£m	994.825	555.70

B	Enhancement expenditure by purpose - operating nep		Original Sum 20-21 to 2024-25	Amber Obligations 2020-2025 (£m)
48	First time sewerage (s101A)	£m		
49	Sludge enhancement (quality)	£m		
50	Sludge enhancement (growth)	£m		
57	WINEP / NEP ~ Storage schemes at STWs to increase storm tank capacity	£m	0.182	
58	WINEP / NEP ~ Storage schemes in the network to reduce spill frequency at CSOs, etc	£m	0.103	0.100
65	WINEP / NEP ~ Nutrients (P removal at activated sludge STWs)	£m	12.060	12.881
66	WINEP / NEP ~ Nutrients (P removal at filter bed STWs)	£m	22.926	18.589
67	WINEP / NEP ~ Reduction of sanitary parameters	£m	0.830	
69	NEP ~ Discharge relocation	£m	0.049	0.047
72	New development and growth	£m	0.101	
73	Growth at sewage treatment works (excluding sludge treatment)	£m	0.303	
84	Pollution - UQ	£m	18.161	
85	Internal Flooding - UQ	£m	4.383	
94	Total wastewater enhancement operating expenditure	£m	59.098	31.617

Total WS2 and WWS2 (Amber Obligations)	*£m*		***593.458***

We provide the following appendices in support of this response:

- YKY.CE.A2-1 Appendix 1 Schedule of schemes and sites for WINEP obligations
- YKY.CE.A2-2 PR19 Appendix 8g - WINEP Technical appendix

YKY.CE.A3

We proposed an operational enhancement investment of £6.056 million to meet obligations under the Environment Agency WINEP Drinking Water Protected Areas driver to reduce the risk to water from agriculture, in particular from pesticides and sediments. This expenditure has been removed through Ofwat's enhancement assessment.

£1.46 million of the investment was directly associated with metaldehyde and has been removed from our IAP response. The planned investment was for the substitution of metaldehyde containing products through the WINEP obligation detailed in Table CE12.

Table CE12 – WINEP product substitution trial obligation

WINEP ID	Regulatory Date	WINEP Obligation Title
7YW200142	22/12/2024	Roll out of targeted product substitution trial (Irton metaldehyde) into new targeted hot spot areas in SUNO, Esk and Hull catchments.

The proposed expenditure has been removed from our business plan as the removal of metaldehyde from the market means that product substitution is no longer appropriate.

The remaining operational expenditure in this driver is associated with other Drinking Water Protected Areas WINEP obligations and can be grouped into two distinct areas:

1. Lowland catchment measures (see Table CE13)
2. Nitrate catchment management

Table CE13 – WINEP lowland catchment measure obligations

WINEP ID	Regulatory Date	WINEP Obligation Title
7YW200126	31/03/2022	Ruswarp - Esk catchment
7YW200140	22/12/2024	CSF officers Yorkshire wide all parameters
7YW200141	22/12/2024	Catchment Partnership support
7YW200143	22/12/2024	Innovative equipment hire

While these include areas that are affected by metaldehyde (for which the investment is now removed) the planned catchment initiatives address a wider spectrum of parameters in order to prevent and mitigate deterioration in the quality of our drinking

water sources. These activities build on investigations undertaken during the current AMP, distributing benefit across a wider area within our drinking water river catchments.

The residual risk from metaldehyde in soils and the wider range of pesticide risks to water quality will still need to be managed. This approach has been agreed with the Environment Agency as we confirm the activities within WINEP. We set out how we are managing this process with both the DWI and Environment Agency below.

We are now drafting revised Undertakings as required to be consistent with DWI guidance in 'Information Letter 03-2018', which contains the following:

……."Consequently, we propose to write individually to the affected companies, early in the New Year, to initiate submission of revised Undertakings. We propose no changes to the guidance provided previously, i.e. the revised Undertakings may: extend completion in achieving compliance beyond the current end date of 2020, to no later than 2025. cover metaldehyde only; for Undertakings including other parameters (apart from total pesticides), revised Undertakings or completion reports for the other parameters will be requested; cover the same water supply zones as existing Undertakings. Any extension of the geographical area covered requires justification and individual discussion with the Inspectorate; include steps to manage metaldehyde contamination of raw water in conjunction with other stakeholders through the processes required to implement the reauthorisation; include an annual progress reporting step each January starting in January 2020;

It is our expectation that the revised Undertakings will focus primarily on catchment management and operational activities to achieve compliance and mitigate risk. We expect these measures to continue during and beyond the transition period, until evidence is available to close the Undertakings. I would like to take this opportunity to emphasise that our source to tap approach to risk mitigation is not altered by this decision about one substance. Water companies are expected to develop and maintain comprehensive catchment management activities to deal with the ongoing, challenges from climate change, land use and other causes of raw water deterioration."

We also note the content of 'Regulatory Information Letter - Jan 19' from the Environment Agency to water companies:

"We anticipate the restrictions will result in decreasing metaldehyde levels in raw water supplies preventing the need for water company investment in costly additional

treatment. However, whilst the effectiveness of the restrictions are assessed Defra have confirmed that PR19 metaldehyde measures must remain on the WINEP. You should continue with all existing and planned metaldehyde catchment measures. Catchment investigations that cover metaldehyde alongside other substances of concern should also continue.

Future reviews of the 'At Risk' substances in Drinking Water Protected Areas (DrWPAs), undertaken by the Environment Agency in conjunction with yourselves, will provide evidence confirming whether the restrictions have been effective and metaldehyde levels have declined. Where metaldehyde is confirmed as no longer 'At Risk' in a DrWPA the Environment Agency will review the need for the PR19 scheme. This will be undertaken in consultation with the DWI regarding any relevant metaldehyde Undertakings."

Based on our pilot metaldehyde product substitution trials during AMP6, we believe that the current level of metaldehyde within soils means there will be significant risk of failure for several years following the removal of metaldehyde from the market. We will be proposing to the DWI an extension of the current Undertaking to March 2025. There are no funds allocated to metaldehyde risk in our DWI submission for PR19. In dialogue with both the DWI and Environment Agency we only included funding within WINEP, for both the specific line on metaldehyde product substitution and those lines aiming to reduce pesticide and other risks in general. It is clear that most of the risks continue, as the active ingredients are not subject to removal from the market, and that there will be a significant but diminishing risk from metaldehyde over the AMP7.

We have discussed this proposal with the Environment Agency WINEP office and they are in agreement with this approach. Our approach is also consistent with DWI guidance.

The remaining operational enhancement funds associated with the Drinking Water Protected Areas driver relate to listed nitrate catchment management schemes, detailed in Table CE14.

Table CE14 – WINEP nitrate catchment management scheme obligations

WINEP ID	Regulatory Date	WINEP Obligation Title
7YW200001	22/12/2024	Armthorpe
7YW200002	22/12/2024	Littleworth
7YW200003	22/12/2024	Highfield Lane
7YW300055	31/03/2022	Highfield Lane
7YW200077	22/12/2024	Bridlington safeguard zone catchment engagment scheme
7YW200078	22/12/2024	Haisthorpe safeguard zone catchment engagement scheme
7YW200079	22/12/2024	Burton Agnes safeguard zone catchment engagement scheme
7YW200080	22/12/2024	Cranswick safeguard zone catchment engagement scheme
7YW200081	22/12/2024	Elmswell Wold safeguard zone catchment engagement scheme
7YW200082	22/12/2024	Etton safeguard zone catchment engagement scheme

We provide the following appendices in support of this response:

- YKY.CE.A3-1 DWI Information Letter 03-2018
- YKY.CE.A3-2 Regulatory Information Letter - Jan 2019

Aligning risk and return

YKY.RR.A1

On 7 February 2019 and 21 February 2019 we queried the action YKY.RR.A1 using Ofwat's post IAP questions from actions process. We believed the methodology we had followed in our PR19 submission in September 2018 resulted in gross margin increases for wastewater 5-50ML users in 2020-21, resulting in average forecast bills to increase by 0.92%, therefore not more than the 1.0% cap. As part of the IAP query process, on 21 February 2019 we provided Ofwat with the methodology that we had followed and the associated analysis to confirm this.

On 27 February 2019 Ofwat replied to our response and methodology, stating: '*Thank you for your analysis of compliance with the Supplementary Cap, drawing on our published Supplementary Cap worksheet. We agree that your method of assessment conforms to that in the worksheet and that the resultant revenue movement is not more than 1% of the average customer bill. We expect you to confirm this in your 1 April submission.'*

As a result, it is not necessary to re-profile the increase in this year as the cap was not breached.

We provide the following appendices in support of this response:

- YKY.RR.A1-1 post-IAP form_questions on actions - Ofwat response - 20190227
- YKY.RR.A1-2 Supplementary-Cap-worksheet-final
- YKY.RR.A1-3 YKY retail margins and PR16

YKY.RR.A2

Please see our completed action tracker.

YKY.RR.A3

We have taken the opportunity to review the comments made against the ratings information submitted in Chapter 13 of our PR19 plan. We note that the Moody's Baa2 rating has been referenced for the actual corporate structure. This rating represents the corporate family rating for Yorkshire Water and was included in our submission to be consistent with our past APRs and our recent response to the ring-fencing consultation.

The corporate family rating takes account of the covenant and security package for our financing arrangements but does not consider any specific debt protection measures for Class A bonds, which are rated Baa1. Class A bonds and other pari passu indebtedness (together Class A debt) forms the majority of our debt portfolio and is expected to be the main source of debt to fund future investment.

We have confidence that we are able to raise new Class A and Class B debt given our successful track record since our securitised financing structure was implemented in 2009. Management of key credit ratios against covenants are regularly reviewed to ensure that we meet our obligations and to provide the ongoing assurance that debt obligations can be serviced and future requirements can be funded. Using this financing structure, we have been able to maintain access to a number of different sources and have raised debt in public and private markets as well as bilaterally.

Following the Board's decision to reduce gearing to below 70%, we would expect this to be viewed favourably by the agencies that rate Yorkshire Water due to the anticipated improvement in credit metrics used by each of them.

We have provided an additional Board statement to confirm this view in our response to actions YKY.CA.A1 - YKY.CA.A3.

Accounting for past delivery

YKY.PD.A1

For each AMP we plan and build a high-level programme of sites to be released for sale. We review and update the programme annually and it is approved by our Board.

The process that we follow to derive the land sales forecast is shown below.

- Step 1: Review the existing land bank
- Step 2: Identify potential sale opportunities
- Step 3: Assess the value of the potential sale
- Step 4: Assess the ability to sell the land
- Step 5: Progress with viable opportunities

The land sales forecast for 2018/19 and 2019/20 is included within the 2018/19 programme which was approved in March 2018.

YKY.PD.A2

PR14 Outcome delivery incentives: Yorkshire Water is required to demonstrate how the underperformance payments through poor performance are being spent on improvements (per its PR14 ODIs specification) over and above what would otherwise be invested.

As part of our PR14 submission on underperformance payments, referred to as penalties, we consulted with customers about the form that these penalties should take. Customers were not generally in favour of refunds to their bills, particularly for 'small' amounts, and expressed a preference for us to reinvest in services. The only exception to this was for the Stability and Reliability (S&R) Factors. Where the penalty value was equivalent to £10 or more per customer (for the revenue control), we considered whether to invest the value of the penalty or refund customers in Year 1 of the following AMP.

It was agreed that our penalty would take two parts:

a) If we did not achieve a performance commitment we would rectify the performance at our own expense in the following year or within three years for the long term S&R factors.

b) We would invest the penalty value in the area of service failure within three years (the funding coming from shareholders, for example from reduced dividends or equity injection).

Paragraph (a) does not apply to performance commitments that have been changed from that agreed with customers and the Forum and are more challenging than that proposed in the June 2014 Business Plan.

We are currently forecasting to earn underperformance payments for WA3: Drinking Water Contacts. This ODI does not qualify for the first part of the penalty, as the target has changed.

Our early review of actual performance against targets in the current AMP identified areas where we needed to improve service to either meet or exceed industry upper quartile performance levels. Considering this, our Board agreed a plan to reinvest the outperformance we were targeting within the review period to support improved performance in five areas of the programme:

- Leakage.
- Water supply interruptions.

- Drinking water quality.
- Internal sewer flooding.
- Pollution.

Our plan required £230 million of totex investment over the remaining years of the AMP. The proposed reinvestment consisted of potential customer bill refunds and company outperformance to be returned to our owners. It was presented to the Forum for review and approval and was subsequently approved by our Board in November 2017.

The approval of this investment was reflected in our PR14 reconciliation, which identified that for the current AMP we would outperform within wholesale wastewater by £94 million and underperform by the same value in wholesale water, resulting in a neutral outperformance position.

WA3: Drinking Water Contacts

Please note that forecast performance has deteriorated compared to our September 2018 (App27) submission and has been included here for completeness. This forecast will be formally updated in our response to action YKY.PD.A3, which is due for submission by 15 July 2019.

Table PD1 – WA3: Drinking Water Contacts performance and ODI figures

WA3: Drinking Water Contacts		Units	Actual	Actual	Actual	Forecast	Forecast
			15/16	**16/17**	**17/18**	**18/19**	**19/20**
Performance	PR14 FD	No.	10131	8120	6108	6108	6108
	PR19 Submission	No.	10007	9093	8100	7400	7200
	Latest Forecast	No.	10007	9093	8100	8100	7800
Over/Under performance Payment	PR19 Submission	£m	-	-	(6.57)	(4.26)	(3.60)
	Latest Forecast	£m	-	-	(6.57)	(6.57)	(5.58)

Table PD2 – WA3: Drinking Water Contacts PR14 submitted and determined targets

WA3: Drinking Water Contacts		Units	Target	Target	Target	Target	Target
			15/16	**16/17**	**17/18**	**18/19**	**19/20**
Performance	PR14 Submission	No.	8701	8759	8835	8921	9015
	PR14 Final Determination	No.	10131	8120	6108	6108	6108

As displayed in Table PD1, our 2017/18, 2018/19 and 2019/20 performance and forecasted performance does not meet the agreed target, therefore earning an underperformance payment. However, using only the funding originally requested, Table PD2 shows that we are on track to meet the original target in our PR14 submission.

Having reviewed the investment required to reduce the number of Drinking Water Contacts to the target of 6,108, we consider that over £70 million of additional mains rehabilitation investment would be necessary to begin to make an improvement. This information was presented to our Board Investment Committee, which agreed that it did not meet the our cost benefit criteria for progression, especially when considered alongside other investment areas, for example leakage, that require additional funding within the water programme.

Although we will not achieve the target of 6,108, we have reduced the number of Drinking Water Contacts from 12,143 at the start of the AMP to 8,100 by the end of Year 3. In our original PR19 plan we forecast fewer contacts in 2018/19 however, current year performance has been affected by extreme weather events and our decision to re-direct flushing resources and investment to target the significant increase in mains bursts. We strive to further reduce Drinking Water Contacts by the end of the AMP by continuing the flushing programme and further mains rehabilitation.

To date we have flushed 14,961km of mains. This equates to 2,213 DMAs out of approximately 2,800. By the end of the AMP we estimate that we will have flushed between 20,000 and 22,000km, equating to 64-71% of the network.

The outperformance against PR14 Final Determination totex in this area has been reinvested to target leakage improvements.

It should provide totex cost of Yorkshire Water cost for each eligible intervention for WC2 and 'SB3: solutions delivered by working with others' performance commitments for 2015-16, 2016-17 and 2017-18 and forecasts for 2018-19 and 2019-20.

Our WC2 & SB3: Solutions delivered by working with others performance commitments account for the number of intervention solutions delivered by working with agencies, organisations or individuals. Our outperformance payment incentive rate for the associated ODI is 5% of the average totex we have invested in solutions delivered by working with other interventions for each intervention above the target.

We calculate any associated outperformance payments for this ODI as follows:

- Average cost of all interventions delivered within the year multiplied by 5% (this gives the reward per intervention above target).
- Total interventions in the year minus the target number of interventions (this gives the number of interventions above target).
- Reward per intervention multiplied by the number of interventions above target (this gives the total outperformance payment).

We split this outperformance payment between WC2 and SB3 proportionately based on the totex related to water and wastewater schemes.

On this basis we calculated the following outperformance payments in our PR19 submission:

Table PD3 – Outperformance payments in our PR19 plan

ODI	Units	Actual	Actual	Actual	Forecast	Forecast
		15/16	**16/17**	**17/18**	**18/19**	**19/20**
WC2: Solutions delivered by working with others	£m	0.0002	0.0000	0.0545	0.0133	0.0589
SB3: Solutions delivered by working with others	£m	0.0002	0.0008	0.0365	0.0075	0.0000

This is a difficult performance commitment to forecast as our understanding of which partnership schemes will come to fruition in any one year can change rapidly and some schemes can be assessed as ineligible post-completion. We have now updated our PR19 forecast for Years 4 and 5 as displayed in Table PD4.

Table PD4 - Forecast ODI payment WC2 and SB3 – Solutions delivered by working with others

ODI	Units	Actual	Actual	Actual	Forecast	Forecast
		15/16	**16/17**	**17/18**	**18/19**	**19/20**
WC2: Solutions delivered by working with others	£m	0.0002	0.0000	0.0545	0.0018	0.0461
SB3: Solutions delivered by working with others	£m	0.0002	0.0008	0.0365	0.0080	0.0000

The interventions that we included in our PR19 plan are displayed in Table PD5. Please note, all completed interventions are audited and agreed with our external auditor Jacobs (formally known as Halcrow) annually.

Table PD5 – Solutions delivered by working with others interventions included in PR19 submission

Year	Project	Totex Costs	Clean or Waste	Completed
2015/16	Grimwith	10,000	Water	Oct-15
2015/16	Nidderdale	4,684	Water	Jan-16
2015/16	Pennywort	5,000	Water	Jan-16
2015/16	Goole	14,000	Waste	Jan-16
2016/17	Howdale Rd	9,875	Waste	May-16
2016/17	Neville Grove	8,000	Waste	Jun-16
2016/17	BabFAS	6,250	Waste	Jun-16
2016/17	Fairburn Dr	15,000	Waste	Aug-16
2016/17	Nidderdale	2,074	Water	Mar-17
2017/18	Rufforth	10,000	Waste	Sep-16
2017/18	Milton St	7,500	Waste	Mar-17
2017/18	The Calls	300,000	Waste	Mar-17
2017/18	Falding St	25,000	Waste	Mar-17
2017/18	Runswick Bay	422,743	Waste	Apr-17
2017/18	Rotherham	1,400,000	Water	Apr-17
2017/18	Nidd	47,409	Water	May-17
2017/18	Brookfoot Mills	119,500	Waste	Sep-17
2017/18	Kingsway	20,000	Waste	Sep-17
2017/18	Todmorden mesh	14,713	Waste	Sep-17
2017/18	Malton	53,366	Waste	Oct-17
2017/18	Nidderdale	6,000	Water	Mar-18
2018/19	Church Lane	150,000	Waste	Forecast
2018/19	Anlaby	15,000	Waste	Forecast
2018/19	Jefferson Drive	20,000	Waste	Forecast
2018/19	Great North Road	30,000	Waste	Forecast
2018/19	Wiske	60,000	Water	Forecast
2018/19	Esk	100,000	Water	Forecast
2018/19	Gosforth	46,000	Water	Forecast
2018/19	NERC student	110,000	Water	Forecast
2018/19	Pennine Prospects	20,000	Water	Forecast
2018/19	Fish passes	45,000	Water	Forecast
2019/20	YINNS	86,000	Water	Forecast
2019/20	Moorlife	1,000,000	Water	Forecast
2019/20	Wharfe	50,000	Water	Forecast
2019/20	Pentland Peat	800,000	Water	Forecast
2019/20	Sustainable Futures	200,000	Water	Forecast
2019/20	Swinton	120,000	Water	Forecast
2019/20	PenninePeAt	96,000	Water	Forecast
2019/20	Mussels	2,500	Water	Forecast

Our forecast for Years 4 and 5 has since developed and is displayed in Table PD6.

Table PD6 – Solutions delivered by working with others interventions revised forecast

Year	Project	Totex Costs	Clean or Waste	Completed
2018/19	Hultimate	122,000	Waste	Forecast
2018/19	Experience Community	6,250	Water	Forecast
2018/19	Gosforth	46,000	Water	Forecast
2018/19	Riverholme	2,500	Waste	Forecast
2018/19	Thuscross	28,500	Waste	Forecast
2018/19	Reeds for Results (Tophill Low)	33,000	Waste	Forecast
2018/19	Otterly amazing	7,000	Waste	Forecast
2018/19	Wild Trout Trust	23,000	Waste	Forecast
2018/19	Moss Brook	5,500	Waste	Forecast
2018/19	River Seven	8,000	Waste	Forecast
2019/20	Moorlife 2020	100,000	Water	Forecast
2019/20	YINNS	86,000	Water	Forecast
2019/20	Catchment officers	500,000	Water	Forecast
2019/20	Dearne Valley	50,000	Water	Forecast
2019/20	Wharfe	50,000	Water	Forecast
2019/20	Fish passes	45,000	Water	Forecast
2019/20	Wiske	60,000	Water	Forecast
2019/20	Pentland Peat	80,000	Water	Forecast
2019/20	NERC student	5,000	Water	Forecast
2019/20	Swinton YPP PhD	120,000	Water	Forecast
2019/20	Esk	100,000	Water	Forecast
2019/20	PenninePeat	96,000	Water	Forecast
2019/20	NY Moors INNS	40,000	Water	Forecast

YKY.PD.A3

Please see our completed action tracker.

YKY.PD.A4

Please see our completed action tracker.

YKY.PD.A5

We have made changes to the 2015/16 and 2016/17 data as we do not agree with the figures provided by Ofwat. We provide our calculations and reasoning below.

Data for 2015/16

Qualitative score

The qualitative score for 2015/16 in cell G12 should be 63.56 not 63.33 (F_Inputs, Cell J166).

This is derived according to the definition for line 5 that is [(S-LS)/(HS-LS)] x WS

S = qualitative survey annual average score.
LS = minimum survey score possible (set at 1).
HS = maximum survey score possible (set at 5).
WS = survey weighting (set at 75).

The correct figure for S is 4.39

Quantitative score

The quantitative score in cell G15 should be 118.46 not 114.56 (F_Inputs, Cell J167).
This is derived according to the definition for line 6 that is [(unwanted phone contacts x 1) + written complaints x 5) + (escalated written complaints x 100) + (CCWater investigated complaints x 1000)] / (connected household properties /1000)

Unwanted phone contacts = 186,538
Written complaints = 7,190
Escalated written complaints = 441
CCWater investigated complaints = 1
Connected household properties = 2,258,857

Data for 2016/17

The quantitative score in cell H15 should be 115.24 not 115.00 (F_Inputs, Cell K167).
This is because historically Table 5b asked for the number to be reported to zero decimal places, whereas cell 3D requires it to two decimal places.

Forecast trajectory

We recognise that SIM is in the process of being replaced by C-MeX and that we will be in transition in 2019/20. This includes a different scoring mechanism for unwanted

contacts and the contact survey. We have therefore elected to use our forecast SIM scores for 2018/19 and 2019/20 as the basis for the table.

Performance in 2018/19 predicts a score in the region of 83.5 points if our business plan numbers for Q4 are achieved.

YKY.PD.A6

Introduction

The actual values included in table 2I of the APR do not reflect the categories of income, grants and contributions that were included within our PR14 Wholesale Price Controls, either within the 'Wholesale allowed revenue build up' or the 'Wholesale allowed revenue adjustments' shown on pages 23 and 36 of our company-specific appendix for PR14.

We discussed the issue with Ofwat's APR reporting team in 2015/16 and 2016/17 and Ofwat was unable to amend the table. Ofwat instructed us to complete the tables following the guidance and to then report our true position against the Wholesale Price Controls within the narrative accompanying table 2I, with an explanation as to why table 2I was incorrect.

The issue with the calculation for Wholesale Water Price Control performance is as a result of 2I of the APR including connection charges (s45) receipts within the 'grants and contributions', these were not included within the Yorkshire Water PR14 Wholesale Water Price control.

Up until 2015/16 we reported the income from connection charges (s45) as revenue and not as capital grants and contributions. To reflect our accounting treatment at the time of PR14 we submitted a forecast in table W9 – 'Wholesale revenue projections for water service'

The forecast from table W9 was used to calculate the 'Income from other sources' values which were excluded from our 'Wholesale allowed revenue build up' section of the Wholesale Water Price Control. Therefore, the forecasted revenues for (s45) were excluded from our Wholesale Water Price Control.

The issue with the calculation for Wholesale Wastewater Price Control performance is as a result of the amendment of the guidance for table 2I in 2017/18 of the APR to include sewer adoption fees (s104) within the third-party revenue line, this was not included within the Yorkshire Water PR14 Wholesale Wastewater Price control.

Within PR14 we submitted a forecast for sewer adoption fees (s104) income in table 'S9 - Wholesale revenue projections for wastewater service'

The forecast from table S9 was used to calculate the 'Income from other sources' values which were excluded from our 'Wholesale allowed revenue build up' section of the Wholesale Wastewater Price Control. Therefore, the forecasted revenues for sewer adoption fees (s104) were excluded from our Wholesale Wastewater Price Control.

WS13 - Background to adjustment

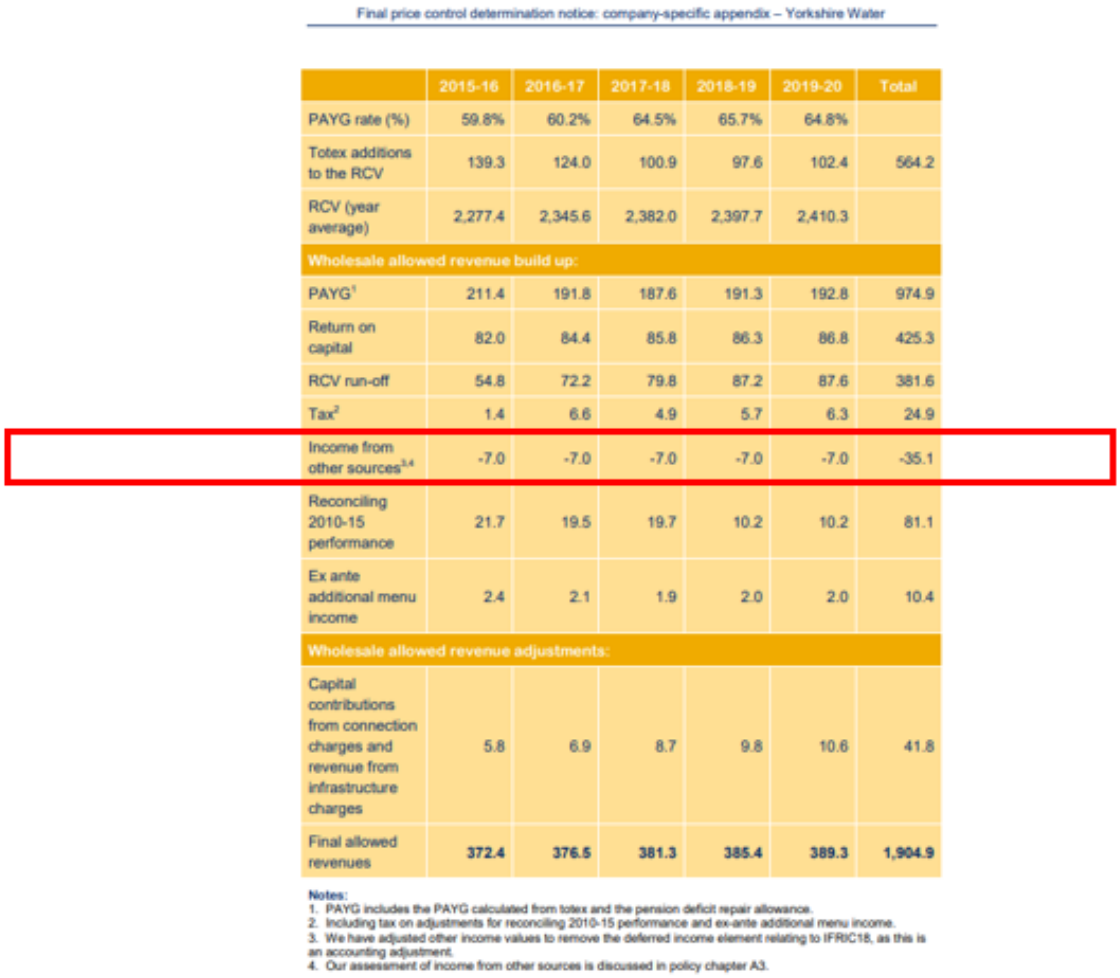
PR14 wholesale water price control

Up until 2015/16 we reported the income from connection charges (s45) as revenue and not as capital grants and contributions.

Within the PR14 price review submission the income from connection charges (s45) was reported in table 'W9 - Wholesale revenue projections for water service' within line 8. A copy of the submission from December 2013 has been attached, this was not amended in any updated submissions Figure PD1.

Figure 1 shows the income from other sources within table W9 used in the Final Determination to adjust the revenue building blocks, this was shown on page 23 of our Final Determination, therefore the income from connection charges (s45) were removed from the Wholesale Water Price Control.

Figure PD1 W9 - Wholesale revenue projections for water service Final Determination December 2013



Final price control determination notice: company-specific appendix – Yorkshire Water

	2015-16	2016-17	2017-18	2018-19	2019-20	Total
PAYG rate (%)	59.8%	60.2%	64.5%	65.7%	64.8%	
Totex additions to the RCV	139.3	124.0	100.9	97.6	102.4	564.2
RCV (year average)	2,277.4	2,345.6	2,382.0	2,397.7	2,410.3	
Wholesale allowed revenue build up:						
PAYG[1]	211.4	191.8	187.6	191.3	192.8	974.9
Return on capital	82.0	84.4	85.8	86.3	86.8	425.3
RCV run-off	54.8	72.2	79.8	87.2	87.6	381.6
Tax[2]	1.4	6.6	4.9	5.7	6.3	24.9
Income from other sources[3,4]	-7.0	-7.0	-7.0	-7.0	-7.0	-35.1
Reconciling 2010-15 performance	21.7	19.5	19.7	10.2	10.2	81.1
Ex ante additional menu income	2.4	2.1	1.9	2.0	2.0	10.4
Wholesale allowed revenue adjustments:						
Capital contributions from connection charges and revenue from infrastructure charges	5.8	6.9	8.7	9.8	10.6	41.8
Final allowed revenues	**372.4**	**376.5**	**381.3**	**385.4**	**389.3**	**1,904.9**

Notes:
1. PAYG includes the PAYG calculated from totex and the pension deficit repair allowance.
2. Including tax on adjustments for reconciling 2010-15 performance and ex-ante additional menu income.
3. We have adjusted other income values to remove the deferred income element relating to IFRIC18, as this is an accounting adjustment.
4. Our assessment of income from other sources is discussed in policy chapter A3.

As income from connection charges (s45) was not received as capital contributions it was not included within our PR14 submission on table W3 and therefore the forecast was not included within the Wholesale Water Price Control.

APR reporting Table 2I

In 2015/16 we changed our accounting treatment from recognising the income from connection charges (s45) as revenue to the inclusion of them as capital grants and contributions.

We contacted Ofwat's APR team in 2015/16 and explained the change in our accounting treatment and the impact that this movement had on reporting an accurate performance figure against the PR14 Wholesale Water Price Control within the new Table 2I.

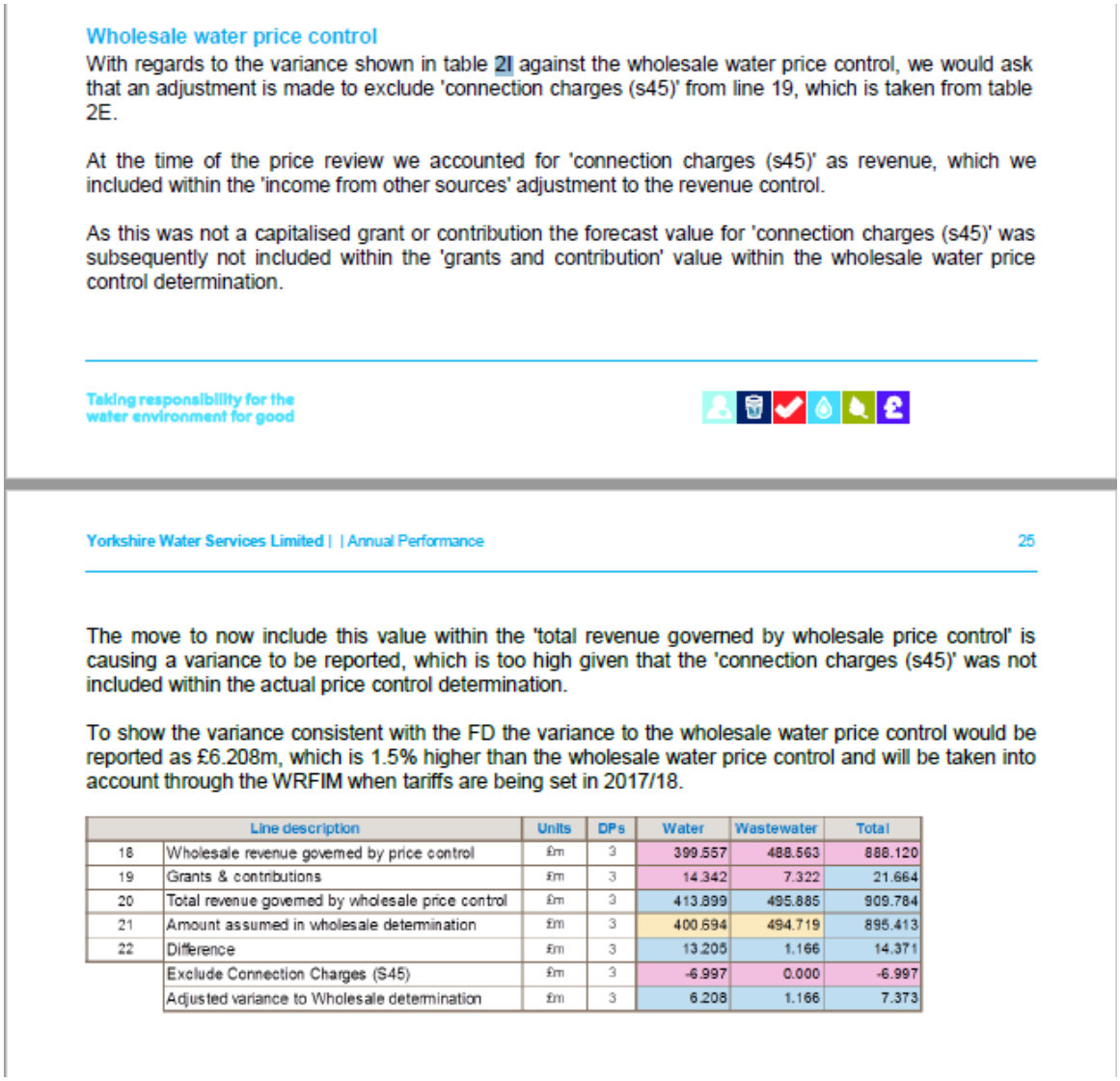
We discussed the following options with Ofwat's APR team to resolve the issue in relation to reporting grants and contribution against a price control that did not include them:

1. Change the Wholesale Water Price Control to include the forecast for connection charges (s45) income.
2. Deviate from the APR methodology and exclude the connection charges (s45) capital grants and contributions from Table 2I.
3. Include an amended workings and narrative with the submission of Table 2I to explain why the performance shown was incorrect.

The third option was chosen by the Ofwat's APR team, and we were given the assurance that table 2I would be reviewed and amended to allow us to report our true performance within the table in the 2016-17 APR.

Figure PD2 provides the narrative from pages 24 and 25 of our 2015/16 table 2I submission:

Figure PD2 – Extract from our APR 2015-16 Table 2I



Wholesale water price control

With regards to the variance shown in table 2I against the wholesale water price control, we would ask that an adjustment is made to exclude 'connection charges (s45)' from line 19, which is taken from table 2E.

At the time of the price review we accounted for 'connection charges (s45)' as revenue, which we included within the 'income from other sources' adjustment to the revenue control.

As this was not a capitalised grant or contribution the forecast value for 'connection charges (s45)' was subsequently not included within the 'grants and contribution' value within the wholesale water price control determination.

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The move to now include this value within the 'total revenue governed by wholesale price control' is causing a variance to be reported, which is too high given that the 'connection charges (s45)' was not included within the actual price control determination.

To show the variance consistent with the FD the variance to the wholesale water price control would be reported as £6.208m, which is 1.5% higher than the wholesale water price control and will be taken into account through the WRFIM when tariffs are being set in 2017/18.

	Line description	Units	DPs	Water	Wastewater	Total
18	Wholesale revenue governed by price control	£m	3	399.557	488.563	888.120
19	Grants & contributions	£m	3	14.342	7.322	21.664
20	Total revenue governed by wholesale price control	£m	3	413.899	495.885	909.784
21	Amount assumed in wholesale determination	£m	3	400.694	494.719	895.413
22	Difference	£m	3	13.205	1.166	14.371
	Exclude Connection Charges (S45)	£m	3	-6.997	0.000	-6.997
	Adjusted variance to Wholesale determination	£m	3	6.208	1.166	7.373

In 2016/17 when the tables were released for the APR submission we noted that the amendments to the tables had not been made and were advised by Ofwat's APR team that we needed to follow the same process as in 2015/16 and include a commentary to explain the correct performance. Figure PD3 provides an extract from our 2016/17 APR Table 2I submission.

Figure PD3 provides and extract of the 2016-17 APR submission – page 87

Table 2I shows a difference of £13.5m within the wholesale price control between actual revenue recovered and revenue assumed at the final determination.

This variance includes £7.3m of grants and contributions for 'connection charges (s45)', which were not included within the PR14 wholesale water revenue control. This is included as other income due to the accounting treatment adopted. This was agreed with Ofwat.

As the 'connection charges (s45)' grants and contributions cannot be removed from 'Line 21 - Total revenue governed by wholesale price control' for technical reasons, the table below has been included to show the difference against the final determination after adjusting for the accounting differences.

This adjustment shows a total variance of £6.2m to the wholesale price control.

This method of disclosure has been agreed with Ofwat and Table 2I will be amended for the 2017/18 Annual Performance Report submission to allow companies to include the adjustments within the table.

In 2017/18 the updates to the tables were not delivered, we therefore continued with the previous disclosure method. Figure PD4 provides an extract from our 2017/18 APR commentary.

Figure PD4 Extract from page 147 of our 2017-18 APR submission

Wholesale price control adjustments

Table 2I calculates the difference within the wholesale water and waste water price control between actual revenue recovered and revenue assumed at the Final Determination.

However, due to inconsistencies between the categories of revenue and capital contributions which we are asked to report by Ofwat within table 2I and those which were included within our price controls at the Final Determination leads to an incorrect level of variance being reported within line 2I.26.

The table below captures the adjustments that we are required to make to allow the actual revenues and capital contribution to be compared against our Final Determination on a consistent basis. This method of disclosure has been agreed with Ofwat.

				Water	Wastewater	Total
2I.19	Wholesale revenue governed by price control	£m	3	414.395	508.575	922.969
2I.20	Grants and contributions	£m	3	15.639	8.104	23.743
2I.21	Total revenue governed by wholesale price control	£m	3	430.034	516.679	946.712
	Less: third party revenue line 2I.7 (s104)				-1.798	-1.798
	Less: capital contributions connection charges s45			-7.566		-7.566
	Total revenue governed by wholesale price control - adjusted			422.468	514.881	937.348
2I.22	Amount assumed in wholesale determination	£m	3	426.374	520.775	947.149
2I.23	Adjustment for the in-period ODI revenue	£m	3	0.000	0.000	0.000
2I.24	Adjustment for WRFIM	£m	3	-6.894	-1.310	-8.204
2I.25	Total assumed revenue	£m	3	419.480	519.465	938.945
2I.26	Difference - adjusted revenue	£m	3	2.988	-4.584	-1.597
	Difference - adjusted revenue	%		0.71%	-0.88%	-0.17%

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The adjustment for wholesale water is:

- Reduction of £7.6m of grants and contributions for 'connection charges (s45)', which were not included within the PR14 wholesale water revenue control

The adjustment for wholesale wastewater is:

- Reduction of £1.8m of third party revenue for s104 income, this was a reporting change made by Ofwat in this APR document, this revenue was not included within our final determination.

Wholesale water price control

The actual wholesale water revenue, after the adjustments, recovered for 2017/2018 is £422.5m compared to that assumed at the Final Determination of £419.5m, a difference of £2.9m – 0.71%.

The difference will be taken into account through the wholesale forecasting revenue incentive mechanism (WFRIM).

Wholesale waste water price control

The actual wholesale water revenue, after the adjustments, recovered for 2017/2018 is £514.9m compared to that assumed at the Final Determination of £519.5m, a difference of (£4.6m) – (0.88%)

The difference will be taken into account through the wholesale forecasting revenue incentive mechanism (WFRIM).

Reconciliation of non-household wholesale revenue

The guidance for the APR 2018 states that the value of wholesale water revenue and non-household wastewater revenue, shown on tables 2G and 2H respectively, should tie back to the total non-household wholesale revenue shown on table 2I.

However, since the opening of the non-household retail market on the 1 April 2017 customers have chosen to no longer receive their retail services from Yorkshire Water,

Monitoring Financial reporting

We also discussed the impact of the amendment we required for table 2I with the team within Ofwat responsible for producing 'Monitoring Financial Resilience' for 2015/16. They updated the numbers within the Wholesale Water Revenue performance to reflect the amended version of our performance, excluding the connection charges (s45) from our reported grants and contribution to reflect the position that the PR14 Wholesale Water Price Control did not include this for Yorkshire Water.

In 2016/17 we again contacted the Ofwat team and were given assurance that Ofwat had used the amended values.

In 2017/18 the responsibility for production of the report changed within Ofwat. The report currently shows no entry for our performance against the Water Price Control and this has been agreed to be updated to reflect the outcome of this PR19 action.

WWS13 - Background to adjustment

PR14 wholesale wastewater price control

Within the PR14 price review submission, the income from sewer adoption fees (s104) was reported in table S9 'Wholesale revenue projections for wastewater service' within line 8. Figure PD5 provides an extract of the submission from December 2013, which was not amended in any updated submissions.

Figure PD5 shows income from other sources within table S9 used in the Final Determination to adjust the revenue building blocks, this is shown on page 36 of our Final Determination, therefore the income from sewer adoption fees (s104) was removed from the Wholesale Wastewater Price Control.

Figure PD5 – S9 Wholesale revenue projections for wastewater services Final Determination December 2013.

Table A3.9 Yorkshire Water's wholesale wastewater allowed revenue (£ million)

	2015-16	2016-17	2017-18	2018-19	2019-20	Total
Totex	387.9	387.7	387.7	387.7	387.7	1,938.5
PAYG rate	46.6%	43.6%	45.2%	50.5%	61.3%	
Totex additions to the RCV	207.1	218.7	212.3	192.0	150.1	980.2
RCV (year average)	3,114.6	3,178.4	3,242.7	3,305.2	3,364.9	
Wholesale allowed revenue build up:						
PAYG[1]	186.8	174.9	181.2	201.6	243.5	988.0
Return on capital	112.1	114.4	116.7	119.0	121.1	583.4
RCV run-off	143.6	154.7	147.8	131.4	91.3	668.8
Tax[2]	0.0	0.2	0.2	0.1	1.0	1.5
Income from other sources[3,4]	-1.2	-1.2	-1.2	-1.2	-1.2	-5.9
Reconciling 2010-15 performance	13.2	13.3	13.4	11.0	11.0	62.0
Ex ante additional menu income	0.2	0.2	0.2	0.2	0.2	1.2
Wholesale allowed revenue adjustments:						
Capital contributions from connection charges and revenue from infrastructure charges	5.0	5.8	7.3	8.1	8.8	35.0

APR reporting Table 2I

In our 2015/16 and 2016/17 APR we included the sewer adoption fees (s104) in line with Appendix 1 of the RAG 4.05 and 4.06 guidance within the third-party services category and not within the Principal services. Figure PD6 provides an extract from the RAG for information.

Figure PD6 Extract from Appendix 1 of the RAG

Appendix 1: Income categorisation

	Retail appointed	Wholesale appointed			Non-appointed
		Income governed by price control	Income not governed by price control		
Principal services	Retail tariff income (for households and non-households) from water, foul sewage, surface water and highway drainage, trade effluent services and special agreements (including potable water, foul and trade effluent). Income from providing developer information and the administration of new connections (eg dealing with s45 connection charges). Income from meter reading commission.	Wholesale tariff income (for households and non-households) from water, foul sewage, surface water and highway drainage, trade effluent services, including special agreements. Developer contributions (should exclude any retail administration income); • Infrastructure charges • Requisitions & self lay • s45 connection charges (These may be recognised in the accounts as income, netted off capital expenditure or capitalised.) Electricity generation from appointed assets, income should be entered as a negative operating cost.	Management of protected land Recreational use of protected land eg • Rambling • Forestry • Rental income from appointed assets eg ○ mobile telephone masts on water towers, ○ wind turbines and solar panels on land at treatment works.		Non water/ wastewater services eg; • Billing commission • Garage services • Rental income from non-appointed properties • Property searches • Introducer revenue from plumbing and drainage insurance Tankered waste; • Haulage; • Reception; and, • Treatment.
Third party services		Non-potable water (which are not a bulk supply)	Rechargeable works; - Fluoridation - Fire hydrant maintenance - Fire hydrant installation - Charges for repair of damage to company assets by another party - Charges for building over company assets - Charges for installation of a meter on an unmetered supply (non-household) - Fee for trade effluent consent revision - "Non-primary" charges to retailers under WSL regime - Provision of plan information of underground infrastructure - Charges for flow and pressure testing of a customer supply - Meter testing - Relocation of a household meter - Installation of a meter with a data logger to a previously unmeasured	Excluded charges; - Bulk supplies - Stand pipes and water tanks - Water cleansing - Charges for reception and disposal of waste - Unmeasured cattle troughs - Unmeasured building water supplies - Unmeasured supplies by water tankers - Unmeasured farm taps - Reservoir operating agreements - Unmeasured supply hereditaments - Diversions[1]	Rechargeable work where the appointee is not a statutory supplier. Use of land for water supply beyond duties imposed by WIA91 eg • Water skiing/sailing, • Fishing, • Bird watching permits, • Restaurants/ visitor centres.

1 Income from diversions are not listed as an excluded charge under licence condition B, however for reporting purposes they should be treated as if they were excluded charges. This will not have an impact on revenues ultimately received by the companies under WRFIM since where companies did include this income in their business plans it should be offset by a corresponding cost, hence there will be no impact.

In 2017/18 we noted the amendment to appendix 1 in RAG 4.07 (see Figure PD7 for information) and moved the sewer adoption fees (s104) to table 2I, however as evidenced above this income although forecasted within PR14 was excluded from the Wholesale Wastewater Price Control.

Figure PD7 Extract from Appendix 1 of the RAG 4.07

Appendix 1: Income categorisation

	Retail appointed	Wholesale appointed			Non-appointed
		Income governed by price control	Income not governed by price control		
Principal services	Retail tariff income (for households and non-households) from water, foul sewage, surface water and highway drainage, trade effluent services and special agreements (including potable water, foul and trade effluent). Income from providing developer information and the administration of new connections (eg dealing with s45 connection charges). Income from meter reading commission.	Wholesale tariff income (for households and non-households) from water, foul sewage, surface water and highway drainage, trade effluent services, including special agreements. Developer contributions[1] (should exclude any retail administration income); • Infrastructure charges • Requisitions & self lay • s45 connection charges • s104 sewer adoption fees (based on 2.5% of the construction cost) Electricity generation from appointed assets, income should be entered as a negative operating cost.	Management of protected land Recreational use of protected land eg □ Rambling □ Forestry □ Rental income from appointed assets eg ○ mobile telephone masts on water towers, ○ wind turbines and solar panels on land at treatment works.		Non water/ wastewater services eg; • Billing commission • Garage services • Rental income from non-appointed properties • Property searches • Introducer revenue from plumbing and drainage insurance Tankered waste; • Haulage; • Reception; and, • Treatment.
Third party services		Non-potable water (which are not a bulk supply)	Rechargeable works; - Fluoridation - Fire hydrant maintenance - Fire hydrant installation - Charges for repair of damage to company assets by another party - Charges for building over company assets - Charges for installation of a meter on an unmetered supply (non- household) - Fee for trade effluent consent revision - "Non-primary" charges to retailers under WSL regime - Provision of plan information of underground infrastructure - Charges for flow and pressure testing of a customer supply - Meter testing - Relocation of a household meter - Installation of a meter with a data logger to a previously unmeasured	Excluded charges; - Bulk supplies - Stand pipes and water tanks - Water cleansing - Charges for reception and disposal of waste - Unmeasured cattle troughs - Unmeasured building water supplies - Unmeasured supplies by water tankers - Unmeasured farm taps - Reservoir operating agreements - Unmeasured supply hereditaments - Diversions[2]	Rechargeable work where the appointee is not a statutory supplier. Use of land for water supply beyond duties imposed by WIA91 eg • Water skiing/sailing, • Fishing, • Bird watching permits, • Restaurants/ visitor centres.

1 These may be recognised in the accounts as income, netted off expenditure or capitalised.

2 Income from diversions are not listed as an excluded charge under licence condition B, however for reporting purposes they should be treated as if they were excluded charges. This will not have an impact on revenues ultimately received by the companies under WRFIM since where companies did include this income in their business plans it should be offset by a corresponding cost, hence there will be no impact.

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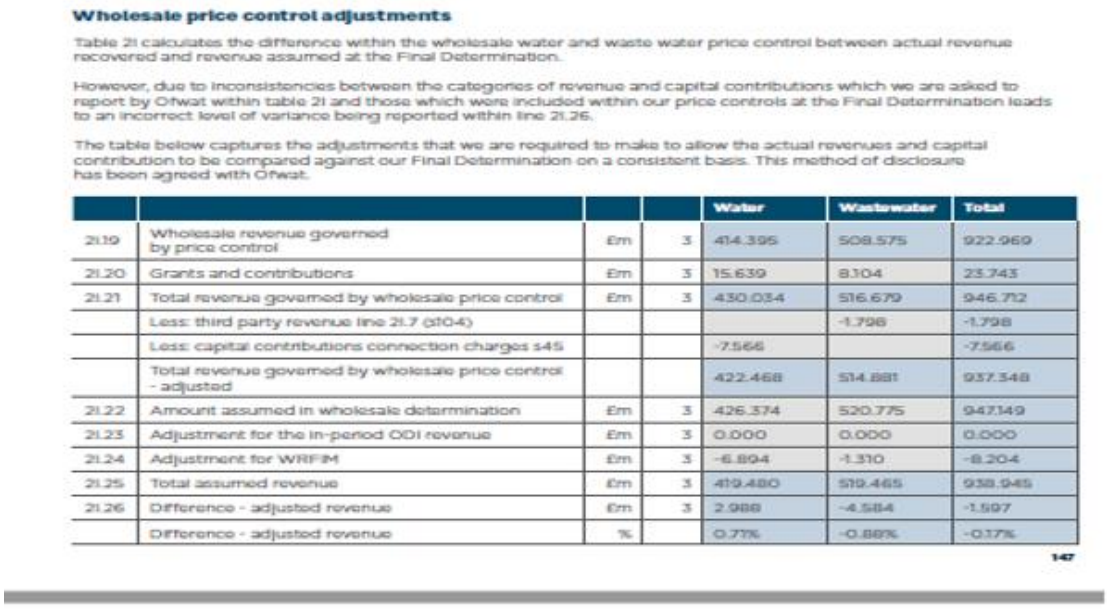
We followed the precedent that had been set for the Wholesale Water Price Control performance and followed the guidance to complete table 2I and showed the actual performance within the commentary. Figure PD8 provides the extract from our 2017/18 APR.

Figure PD8 – Extract from page 147 of our APR 2017/18



Wholesale price control adjustments

Table 21 calculates the difference within the wholesale water and waste water price control between actual revenue recovered and revenue assumed at the Final Determination.

However, due to inconsistencies between the categories of revenue and capital contributions which we are asked to report by Ofwat within table 21 and those which were included within our price controls at the Final Determination leads to an incorrect level of variance being reported within line 21.26.

The table below captures the adjustments that we are required to make to allow the actual revenues and capital contribution to be compared against our Final Determination on a consistent basis. This method of disclosure has been agreed with Ofwat.

				Water	Wastewater	Total
21.19	Wholesale revenue governed by price control	£m	3	414.395	508.575	922.969
21.20	Grants and contributions	£m	3	15.639	8.104	23.743
21.21	Total revenue governed by wholesale price control	£m	3	430.034	516.679	946.712
	Less: third party revenue line 21.7 (s104)				-1.798	-1.798
	Less: capital contributions connection charges s45			-7.566		-7.566
	Total revenue governed by wholesale price control - adjusted			422.468	514.881	937.348
21.22	Amount assumed in wholesale determination	£m	3	426.374	520.775	947.149
21.23	Adjustment for the in-period ODI revenue	£m	3	0.000	0.000	0.000
21.24	Adjustment for WRFIM	£m	3	-6.894	-1.310	-8.204
21.25	Total assumed revenue	£m	3	419.480	519.465	938.945
21.26	Difference - adjusted revenue	£m	3	2.988	-4.584	-1.597
	Difference - adjusted revenue	%		0.71%	-0.88%	-0.17%

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The adjustment for wholesale water is:

- Reduction of £7.6m of grants and contributions for 'connection charges (s45)', which were not included within the PR14 wholesale water revenue control

The adjustment for wholesale wastewater is:

- Reduction of £1.8m of third party revenue for s104 income, this was a reporting change made by Ofwat in this APR document, this revenue was not included within our final determination.

Wholesale water price control

The actual wholesale water revenue, after the adjustments, recovered for 2017/2018 is £422.5m compared to that assumed at the Final Determination of £419.5m, a difference of £2.9m – 0.71%.

The difference will be taken into account through the wholesale forecasting revenue incentive mechanism (WFRIM).

Wholesale waste water price control

The actual wholesale water revenue, after the adjustments, recovered for 2017/2018 is £514.9m compared to that assumed at the Final Determination of £519.5m, a difference of (£4.6m) – (0.88%)

The difference will be taken into account through the wholesale forecasting revenue incentive mechanism (WFRIM).

Reconciliation of non-household wholesale revenue

The guidance for the APR 2018 states that the value of wholesale water revenue and non-household wastewater revenue, shown on tables 2G and 2H respectively, should tie back to the total non-household wholesale revenue shown on table 21.

However, since the opening of the non-household retail market on the 1 April 2017 customers have chosen to no longer receive their retail services from Yorkshire Water,

YKY.PD.A7

Please see our completed action tracker.

YKY.PD.B1

Please see our completed action tracker.

YKY.PD.B2

Please see our completed action tracker.

Securing confidence and assurance

YKY.CA.A1, YKY.CA.A2 & YKY.CA.A3

The Board provides this statement in support of its April business plan submission. In line with guidance it has not restated the entire statement from September, but has responded to the specific actions contained in the 'Securing confidence and assurance detailed actions' document.

Long term business resilience

The Board has ensured that customers' priorities and expectations for long term whole business resilience in the round, including operational, corporate and financial resilience, have been incorporated into the development of the plan, through a systematic and comprehensive risk assessment. The Board assures that the interventions within the plan will manage resilience in the long term.

The Board sets out within the plan the established governance and assurance process that will ensure delivery of resilience in the round over the short and long term. The Board is confident that its governance and assurance processes will ensure that the outcomes and benefits of the plan are sustainable and efficient and will maintain long term resilience in the round 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 assures that all investment, including large investment projects, is robust and deliverable and an assessment of options has taken place to ensure the company is delivering the best solutions available to customers.

The Board confirms that investment proposals have been subject to optioneering and optimisation as set out in the plan. All large investment projects have been option tested in detail using our expert engineering Asset Solution partners to ensure efficiency, reliability and deliverability for customers.

Returns, risk and financeability

The Board assures that both notional and actual capital structures remain financeable in the long-term, and that key financial ratios are at a level that retain sufficient headroom to maintain investment grade ensuring that resilience and customers interests are maintained in the short and long term.

The steps taken to provide this assurance are:

- Identification of the internal and external risks associated with delivering the plan.
- Estimation of the additional expected monetary value that would be incurred by the Company, in the event that the risks materialised.
- Testing the financial resilience of plan including the materialised risks against key financial ratios necessary to ensure financeability, maintain investment grade, and secure services to customers, society and the environment.

Board Assurance Statement
Signed on Behalf of the Board of Yorkshire Water Services Limited

Signed: K SMITH

Name: KATHY SMITH

Position: COMPANY SECRETARY

YKY.CA.A4

We will include the default sharing mechanism as set out in 'Putting the sector in balance'. In response to this action we have revised our approach to sharing financial outperformance with customers. The statement below replaces the 'Sharing outperformance with customers' sub-section of our PR19 plan (p.108-109).

Sharing financial outperformance with customers

This section explains how we will meet the new requirements from Ofwat to share the deemed benefits arising from the way in which we are financed. Further details can be found in appendix 13h.

The new sharing mechanism will cover two areas:

- The amount of debt that we carry as a proportion of our overall value, our gearing. Ofwat has stated that companies with gearing beyond a certain level (70%) must share the benefits deemed to be associated with 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.

In line with Ofwat's IAP feedback, any benefits arising from these two areas will be shared with customers in the form of a bill reduction from April 2025.

We have shared this revised approach with the Forum who are supportive of the approach.

Element 1 – calculation of the deemed financial outperformance associated with higher gearing

As explained earlier in this chapter, our intention is to reduce gearing to below 70% before the end of the first financial year (i.e. March 2021). In the event that Yorkshire Water were to have gearing above the 70% trigger level in the default mechanism at any financial year-end in the price control period, the deemed 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. Any resulting benefit will be shared 50-50 with customers as a bill reduction from April 2025.

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 shared with customers in the form of a bill reductions from April 2025.

We provide the following appendices in support of this response:

- YKY.CA.A4-1 Appendix 13h - Financial Outperformance Sharing Mechanism
- YKY.CA.A4-2 Revised Chapter 13 of our PR19 plan
- YKY.CA.A4-3 Appendix 13e IAP - Financeability analysis - Appointee
- YKY.CA.A4-4 Appendix 13f IAP - Financeability analysis - Price controls
- YKY.CA.A4-5 Appendix 13g of our PR19 plan

YKY.CA.A5

We confirm that we are committed to adopting all the expectations on dividends for 2020-25 as set out in 'Putting the sector in balance'.

We confirm that our new dividend policy, as set out in our PR19 plan, commits to the following, in accordance with 'Putting the sector in balance':

- A base yield of up to 5% (based on the company's actual financial structure) which is in accordance with the amount set out in 'Putting the sector in balance'.
- We will adjust our base dividend to reflect and recognise company performance and delivery to customers, in particular performance above or below that assumed in the determination of price limits.
- We will adjust our base dividend to take account of employee interests such as pension contributions.
- We will undertake a full financial resilience review before the payment of any dividend.
- We will be transparent about the payment of dividends and will clearly detail within our APR how the dividend has been calculated and how this relates to our performance.

Clear Board commitment to publish detail on dividend policies in the APR and to signal changes to stakeholders

Our Board commits that our APRs in the period 2020-25 will transparently set out our dividend policy and how dividends declared or paid relate to that policy. If we make any changes to our dividend policy it will be clearly signalled to stakeholders in our APR.

Commitment to transparency about how the dividend policy in 2020-25 takes account of obligations and commitments to customers for the dividend policy that is applied in 2020-25 and when determining dividends.

Our base dividend (calculated based on a yield of 5%) is founded on the successful delivery of our commitments to customers included within our PR19 plan. Payments above this level will only be made where there is demonstrable outperformance.

As stated in the dividend policy in our PR19 plan we have committed to adjust our base dividend to reflect and recognise the following:

- Gearing in excess of Ofwat's current notional level of 60%.
- Company performance and benefit sharing from service and efficiency performance, particularly performance beyond or below that assumed in the determination of price limits.

- Continuing need for investment of profits in the business to maintain financial resilience.
- Funding of employee interests, such as pension contributions.

Update on the steps we are taking to fully meet the expectations as set out in putting the sector in balance position statement.

We believe that the dividend policy set out in our PR19 plan, together with the additional clarifications provided in this document along with our Board commitment enables us to fully meet the expectations set out within Ofwat's 'Putting the sector in balance' position statement.

We provide the following appendices in support of this response:

- YKY.CA.A5-1 Revised Chapter 13 of our PR19 plan
- YKY.CA.A5-2 Appendix 13e IAP - Financeability analysis - Appointee
- YKY.CA.A5-3 Appendix 13f IAP - Financeability analysis - Price controls
- YKY.CA.A5-4 Appendix 13g of our PR19 plan

YKY.CA.A6

We are committed to adopting the expectations on performance related pay for 2020-25 as set out in 'Putting the sector in balance'. In response to this action we have developed a statement to precede the Executive variable pay, Annual performance reward and Long-term incentive plan (LTIP) sub-sections of our September 2018 submission (pages 29-30). We include the statement below.

Senior Executive Pay

Introduction

The Board has in place an executive remuneration policy that ensures management is incentivised to deliver service for customers, society and the environment in the short and long term.

We are committed to adopting the expectations on performance related pay for 2020-25 as set out in 'Putting the sector in balance'. The Board has in place an executive remuneration policy that ensures management is incentivised to deliver exceptional service for customers, society and the environment in the short and long term. The steps the Board will take to fully meet the expectations set out in Ofwat's 'Putting the sector in balance' position statement are:

- To continue to publish the detail of its policy as part of its Annual Performance Report.
- To set out the incentivisation mechanism clearly and transparently in the Annual Performance Report.
- To signal the reason for any changes to the policy and how they are in the best interest of customers for the period 2020-25 and
- To publish the update to its executive remuneration policy for the period 2020-25 in 2020 when it has been finalised.

The detail of the executive pay policy is defined under the following headings.

We provide the following appendices in support of this response:

- YKY.CA.A6-1 Appendix 4c - Senior executive pay - updated for IAP response

YKY.CA.A7

Please see our completed action tracker.

YKY.CA.A8

Please see our completed action tracker.

YKY.CA.B1

Please see our completed action tracker.

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