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By email: [redacted]

6th January 2022

Dear Ofwat,

PR24 and beyond: Long-term delivery strategies and common reference scenarios

We welcome the opportunity to respond to Ofwat's discussion document for PR24: "PR24 and beyond: Long-term delivery strategies and common reference scenarios". We welcome the focus on the long-term as we know it is vital for our customers and the environment to take a holistic long-term strategic approach. We particularly welcome the early publication of Ofwat's expectations for what companies should include in their long-term delivery strategies as part of their submission for PR24, as well as the early sight of the proposed long-term delivery strategy data tables.

Throughout the process of developing the PR24 approach, our concern has been that Ofwat will overly focus on the process of economic regulation, which could lead to incremental decisions which do not fit with our customer and stakeholder expectations or our long-term strategy. Our view is that the proposed approach provides an opportunity for better long-term planning which helps to explore consensus and trade-offs, but also, if applied too mechanically - a risk of a complex data collation exercise which does not achieve this goal in its application.

We do not believe that the latter complex outcome is Ofwat's intention, but the proposal is overly focused on the regulatory process of setting prices through data collection, perhaps missing the opportunity for the strategic debate and understanding that was not obvious at the end of the PR19 process. What we have in this consultation is an attempt to establish common analysis, for things that are inherently uncertain. The approach suggested is an important and welcome development in water regulation but it feels overly complex and at the same time overly constrained. In our view, how uncertainty is managed is not just about statutory obligations and enhancement expenditure, but holistic long-term plans that are likely to be specific to each company. With small changes to the scenarios and process proposed in the consultation, we see great value in the proposed approach.

The challenges raised in "Regulating for Consensus and Trust" and the proposals set out in the PR24 initial design consultation response explain the trade-offs faced. We subsequently set out specific process proposals, focused on identifying a suite of risk and return scenarios for the sector, in order to anchor the other building blocks of regulation on being able to assess company plans in the round. Looking across the range of PR24 and beyond consultations we are due to respond to early in 2022, we do not get a clear picture of how these methodologies will work together.

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For instance, the risk and return consultation suggests that our concerns about the potential skew that can arise from standardised incentives should be fixed at source, in the design of cost and outcome incentives. We agree. However, the base cost and outcome proposals suggest assumptions that past outcome improvements assumed within base, can be extrapolated out to 2050. Depending on application, this could increase the risk of skewed rather than balanced incentives.

Such assumptions affect the long-term delivery strategies. We disagree that the water sector can separate enhancement expenditure from the overall strategy which looks at totex and outcomes. At its simplest, the timing of enhancement expenditure then affects the future level of base expenditure – leakage being the most obvious example. We also disagree that local circumstances are not relevant to the adaptive pathways and should be left to separate company specific testing, although this point is also potentially a challenge to the underlying presumption that common performance commitments may have common performance levels.

Core adaptive pathway

The core-adaptive pathway concept is described in the discussion paper as "*The core pathway should describe the company's current preferred approach to achieve the ambition and vision*". However, following a note after a workshop this was not described as the central or most likely pathway, but the investment for short term and low scenarios, enabling work and no or low regrets options. If it is Ofwat policy that the water industry will only be planning for the short term and low risk scenarios then Ofwat should state and consult on this, but we do not believe that implication is intended. It is a contention that regulation is too short-term that is often stated as fact in the water industry, but this does not reflect our experience when well evidenced plans, supported by customer and stakeholder evidence, are presented. It is important to distinguish between ownership and outcomes, and the assessment of evidence on costs and incentives in long-term planning.

This is further confused by in the description in the consultation paper in relation to preparatory activities. In one description, the sentiment is that except for no or low-regret activities, investment should be put off in an adaptive pathway, with long-term delivery strategies anticipating change by funding preparatory and investigatory activities in support of this. We understand this principle, and the Cheddar TW trial as opposed to a full scheme at PR19 is an example of such an approach. However, the consultation later suggests planning activities are normally included in base expenditure, which is not the case for enhancements in practice, e.g. WINEP often includes investigations from one period that leads to future investment pathways. In a totex and outcomes framework, if we are going to separate enhancement, it would be simpler just to assume that enhancement allowance include preparatory work related to it, as normal accounting treatment requires.

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The critical trade-off implied here is that short term affordability has to be considered against long-term value for money. Our experience suggests this can only be seen in the context of a whole plan, and it is a retrograde step to see enhancement and statutory obligations separate to other factors affecting bills.

In our view, the business plan should be a central view, with adaptive pathways reflecting the potential impacts of the (by definition less likely) low and high scenarios. We also comment later on the inconsistency between the description of the purpose of the scenarios, and then Board assurance expectations for the subsequent long-term delivery strategy

We support the bill impact calculation proposed in the consultation, but also believe these impacts should be seen in context of the wider plan. Ofwat should also be clearer about the core-adaptive pathway and develop worked examples with companies of how this will be used in practice. We include an illustration of this for further discussion as part of our testing of the common scenario factors set out in the paper.

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Definition of base cost and performance

The early publications on PR24 process, including the customer research approach, were anchored around an early definition from Ofwat on what base cost and performance equated to. It is now not clear if this definition will change, and the suggested date of summer 2022 for confirmation is too late for draft Water Resource Management Plans and the development of adaptive pathways. The definition of the core adaptive pathway relies on a clear definition of base. We believe this lack of clarity undermines the approach to both the centralised customer research and long-term strategies, because it is critical to the PR24 methodology overall.

Common reference scenarios

The discussion at the December workshop was very helpful in terms of understanding the practical proposals, in particular the use of decision trees in considering whether the scenario factors result in an adaptive pathway being required. We make more detailed comments on the specifics of the scenarios later in this letter.

Our review of the scenarios has boiled down to one over-riding uncertainty – whether customer demand for water will reduce sufficiently, either supported by technology and data, or prompted or exacerbated by the impact of climate change. Other water service decisions resolve around this, and it is inherently uncertain. What we do know is that incentives on water companies to force (in particular through behavioural change) reductions in consumption can, counterproductively, reduce customer trust. We also know the social consequences of incentivising consumers to reduce consumption can have

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significant vulnerability and social consequences. And we also know that, faced with net zero, water policy has very little attention compared to the energy, transport and housing challenges that will affect consumer behaviour and water use.

The sensitivity of consumer behaviour to these future scenarios requires research and local plans and innovation, which are constrained by the overall centralised, top down, PR24 framework. This is an area for scenarios to help build consensus on, not to create an artificial distinction between long-term delivery strategies and wider uncertainty testing. It is not what we meant by adaptive planning in "Regulating for Consensus and Trust".

Conclusion
In response to the issues explored above, our suggestions are to:

- Revisit the definition of the core adaptive pathway to avoid it being seen as the minimal enhancement scenario and make it less critical that Ofwat will define base spend and common service levels for PR24 in sufficient time.
- Focus initially on qualitative assessment, such as through scenarios, encouraging description of how the alternative pathways have been formed.
- Allow for local variation in the scenarios
- Adjust the approach to allow for base cost impact to be considered

We have set our remarks and areas for clarity in response to the discussion paper in the pages overleaf. We note that Ofwat will set out a further iteration of the common requirements for long-term delivery strategies and the common reference scenarios in the PR24 draft methodology.

Whilst our response may appear critical at first glance, we do strongly support the approach Ofwat are taking in focusing on long term delivery strategies. If it is aligned to company plans owned by their customers and stakeholders, as we did before PR19 in "Bristol Water Clearly…", which included adaptive pathways for the customer outcomes linked to future factors, then we warmly welcome it. The outcome of our strategic planning was the social contract and public value concepts that we have developed precisely because this would avoid expensive enhancement investments or provide evidence and consensus that they were necessary.

It is this thinking and process that helped to develop a robust PR19 business plan, that was stretching and ambitious, but had the lowest enhancement investment in the industry as a result. This was recognised by the CMA in its review of PR19, when looking at cost allowances and outcome incentives in the round with risk and return – and supported by customer research evidence on the key areas of weather risk and per capita consumption.

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As a further contribution to the Future Ideas Lab, we have recently published a paper setting out an ODI research simplification approach that has relevance to the long term scenarios as well as PR24 customer research approach, which we believe are linked.

Yours faithfully,

[redacted]

Director of Strategy & Regulation

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Annex 1 - [redacted]nse

Overall

Timetable
This paper does not set out the timetable/ expectations for when the long-term strategy would need to be submitted. Our assumption is that these are submitted alongside the business plan i.e. on 2nd October 2023. We do however note the following statement from page 24 of the discussion paper:

"In 'Creating tomorrow, together', we stated that we are considering whether we can publish the improvements we expect from base funding early. It is unlikely that any such early publication will be in time for draft strategic planning documents in summer 2022, given it depends on the approach to assessing base costs at PR24.

"It will therefore be important for companies to develop their own forecasts of improvements expected from base expenditure to inform draft plans, and if we decide against early publication, final plans. We expect companies to set out clearly the improvements in performance expected towards each of the performance outcomes and metrics set out in the company's ambition. These performance improvements should be based on historical trends and expected future improvements and should consider expected changes in technology."

These statements indicate an expectation that companies will publish information before 2nd October 2023. Could Ofwat please clarify the timetable and by what it means by "draft strategic planning documents"? We think this is a reference to the draft Water Resource Management Plan, but there is insufficient time to reflect these long-term scenarios in the draft WRMP given the stage of development, as recognised elsewhere in the consultation.

Adaptive planning and pathways
We note the requirements set out in box 2 on pages 14 and 15 of the discussion paper.

We welcome the introduction of a process that places plans within a set of long-term scenarios. It is reasonable to expect enhancement investment decisions to be made in the context of a long-term adaptive strategy.

Likewise, we are supportive of adaptive planning and pathways where relevant to the company. It is right that companies should set out some of the options it will face for the long-term, and how companies plan to work with others to address shared challenges. with adaptive pathways it is important to recognise that the timing of the trigger points may themselves be uncertain. We do not therefore agree that "*these pathways contain clear decisions points, indicating when a decision needs to be taken about the right option to efficiently deliver long-term outcomes. At these points, pathways deviate from each other as*

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different sets of options are chosen. These choices should be informed by pre-defined trigger points." Adaptive planning is less mechanical than is suggested here.

Likewise, we note on page 5 the expectation that "*key enhancement activities across these areas [the strategic planning frameworks] should be expressed as adaptive pathways*".

Following the first set of long-term scenarios workshops, we suggested a SWOT approach may be easier and more meaningful to assess. We included an example of how this would work in practice. Having subsequently seen the consultation paper, we retain the view that this should be part of the explanation for whether the scenario factors Ofwat suggest impact a company plan, or are relevant to an adaptive pathway. Adaption requires an understanding of the current status, irrespective of the incentive frameworks.

Most important external factors	SWOT	Strategy priorities
Self healing networks Systems thinking and performance visualisation Local energy generation Electric vehicles	**Strengths** • Smooth transition to home working – robust IT platform **Weaknesses** • Size – business case for investment in technology **Opportunities** • Small enough to be agile with large strategic assets – testbed for innovation **Threats** • Aging systems, aging workforces	• Defining investment priorities • Focus on efficiency and customer service • Linking to innovation strategy • Quick adopter of business leading technology, but not at forefront • Upskilling staff

Furthermore, we note the statement on page 19 that: "*When considering whether options selected are best value, we mean taking into account environmental and social impacts over a suitable timeframe, in line with Ofwat's expectations for strategic planning frameworks for PR24, Ofwat's public value principles, and the WINEP options and appraisal guidance.*" This evaluation criteria appears to be narrowly focused on statutory considerations. Evaluating the long-term must be more than just consideration of national government plans and targets. Consideration of customer and stakeholder priorities should also be included as part of this identification.

Long-term delivery strategies

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Company[redacted]

We understand the importance of setting the context of a business plan and of the need to take people – customers, stakeholders and communities – with us on this journey.

We note Ofwat's recognition on page 5 of the discussion paper that "*some companies have continued to update their strategic direction statements (SDSs) since we required them at PR09; others have used different approaches to communicate their long-term ambitions and future plans.*" We also note that "*The long-term delivery strategies are not intended to replace these processes.*"

We believe we provided a clear line of sight between our long-term ambition, strategy, purpose and our PR19 business plan, and the action we have taken and reported on since through our social contract, performance reporting and resilience action plan. At PR19 Ofwat noted the role that our engagement with customers and stakeholders on long-term issues had in helping to ensure a clear line of sight to the outcomes in our plan. Although we understand the distinction Ofwat make between the long-term delivery strategies proposed and wider company strategies, we doubt customers and stakeholders will understand the distinction. We think Ofwat should allow more flexibility in how we approach the long-term delivery strategies to make this process easier to explain to stakeholders.

Bristol Water…Clearly is our latest long-term ambition document, which looks ahead to 2050.[1] Published in February 2018, it set out some of the options we faced for the long-term and how we planned to work with others to address shared challenges.

[1] Bristol Water…Clearly

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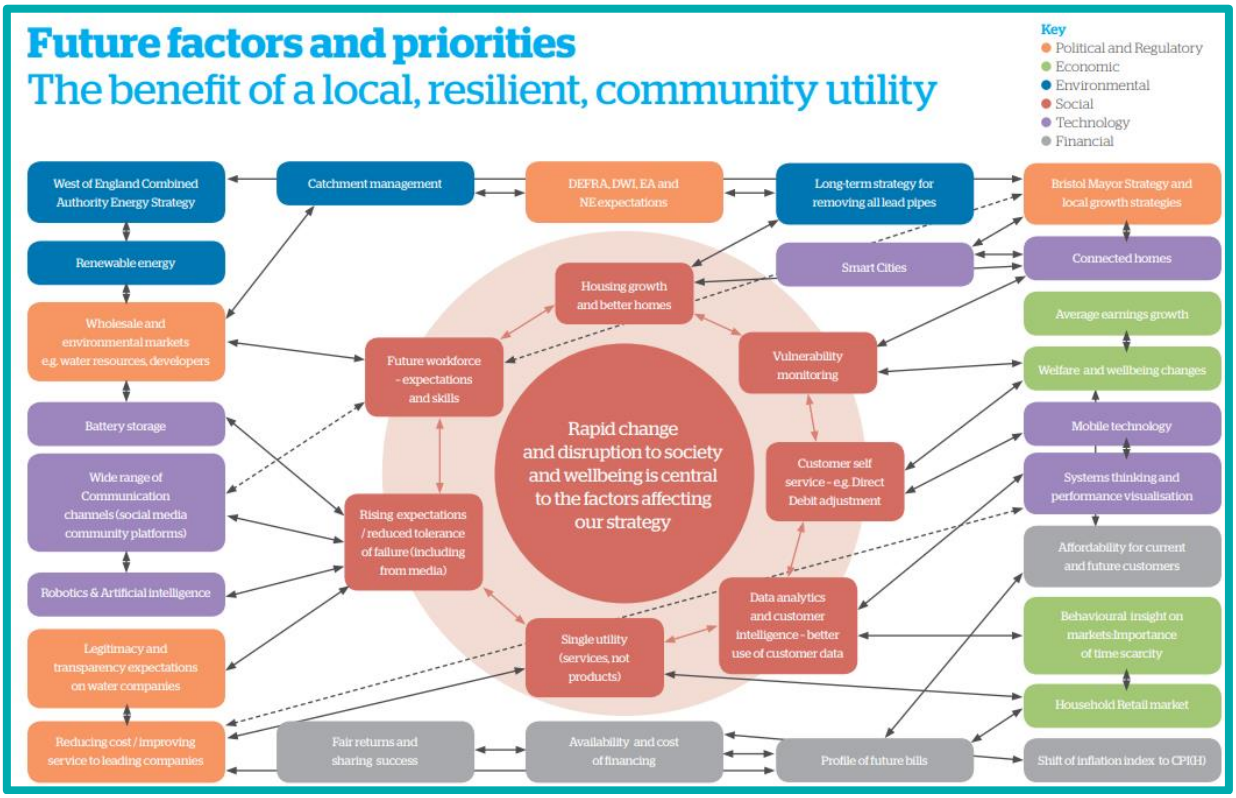

Extract from Bristol Water...Clearly – summary of future factors and priorities.

In order to deliver our long-term objectives and outcomes we need to build consensus and trust in long-term strategies. We therefore still have plans to publish a revised long-term ambition document in summer 2022. This will ensure that the conversations we plan to have with our customers and stakeholders on our long-term ambitions will not be overly focused on enhancement spending and strategic planning frameworks. The framing that we discussed with customers and stakeholders in advance of PR19 shares many themes, but has at its heart the difference between local impacts and national frameworks, and whether change is driven through markets or planning, the customer experience ultimately is the factor that most affects the adaptive pathway, even for statutory obligations.

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Long term future scenarios

Why our plans will change and adapt

We have set out our long-term ambition for how we see priorities for increasing the excellence of the experience we provide to customers, and how we also need to boost our work that supports local community resilience. The way we deliver our plans will change over time. In our view, and those of our stakeholders, we want to work in a way that reflects our role in the local community. This means we look to innovate through building local partnerships. An alternative approach would see the future for the water industry being driven by large companies operating through national markets, rather than through community based companies such as Bristol Water. For instance there may be situations where we have to reduce our costs or change services in response to national targets, which could delay some of our local objectives because of pressures on affordability. Based on our ambition, we are interested in your views on how we can balance our role in wider national markets with our local community focus. However, we need to focus on customer excellence in any event, irrespective of the markets and performance incentives we face as a company.

Increasing customer excellence

"Data driven national markets"

In the "data driven national market" scenario, services are delivered at a low cost efficiently by large, national based organisations who have a wider set of data. Risks are managed through national standards and centralisation of data. Competition for household customers with specialist wholesale service providers would be an example of this - with a range of choices (for instance bundled water and energy offerings).
In this scenario we would need to compete with other new entrants in providing services and choice in different ways.

"Choice of service for you and your community"

In this scenario better use of individual customer data and better information on utility networks allows choice of service for individual customers. Community issues are addressed through open data and predictive analytics allowing service providers to respond efficiently. Customers would have access to data on services to them and the community.
We would compete with others to provide a choice of service tailored to the needs of individual customers and communities.

Increasing focus on local community resilience

"One size fits all"

In the "one size fits all" scenario, short term cost pressures and affordability would mean that national standards would be set and there would be little opportunity to focus on local customer excellence (as opposed to service). Bills would be minimised in the short term, but long-term pressures on local resilience could emerge.
In this scenario we would be compared on a national basis, and may have less flexibility to address local issues.

"Focus on your community"

In this scenario we would focus initially on building a local infrastructure and partnership approach to deal with the environment and social challenges that face the Bristol Water region. We would focus on protecting the local environment, reducing consumption and leakage and investing to reduce traffic disruption. We would tailor our approach to each local community, rather than individual customer choice.
As costs may be higher initially compared to the data driven market or one size fits all scenario, we would also expand our range of social tariffs

Extract from Bristol Water...Clearly – summary of adaptive pathways given future scenarios.

We think we can build on this approach through illustrating what the adaptive pathways may be, and how they will be influenced by relevant external and internal factors. As in Bristol Water... Clearly, the Government's Strategic Policy Statement for the water sector is one of the factors specifically analysed and referenced. We agree with Ofwat, that there should be a clear and continuing line of site to company plans (incorporating long-term delivery strategies as the consultation more narrowly defines).

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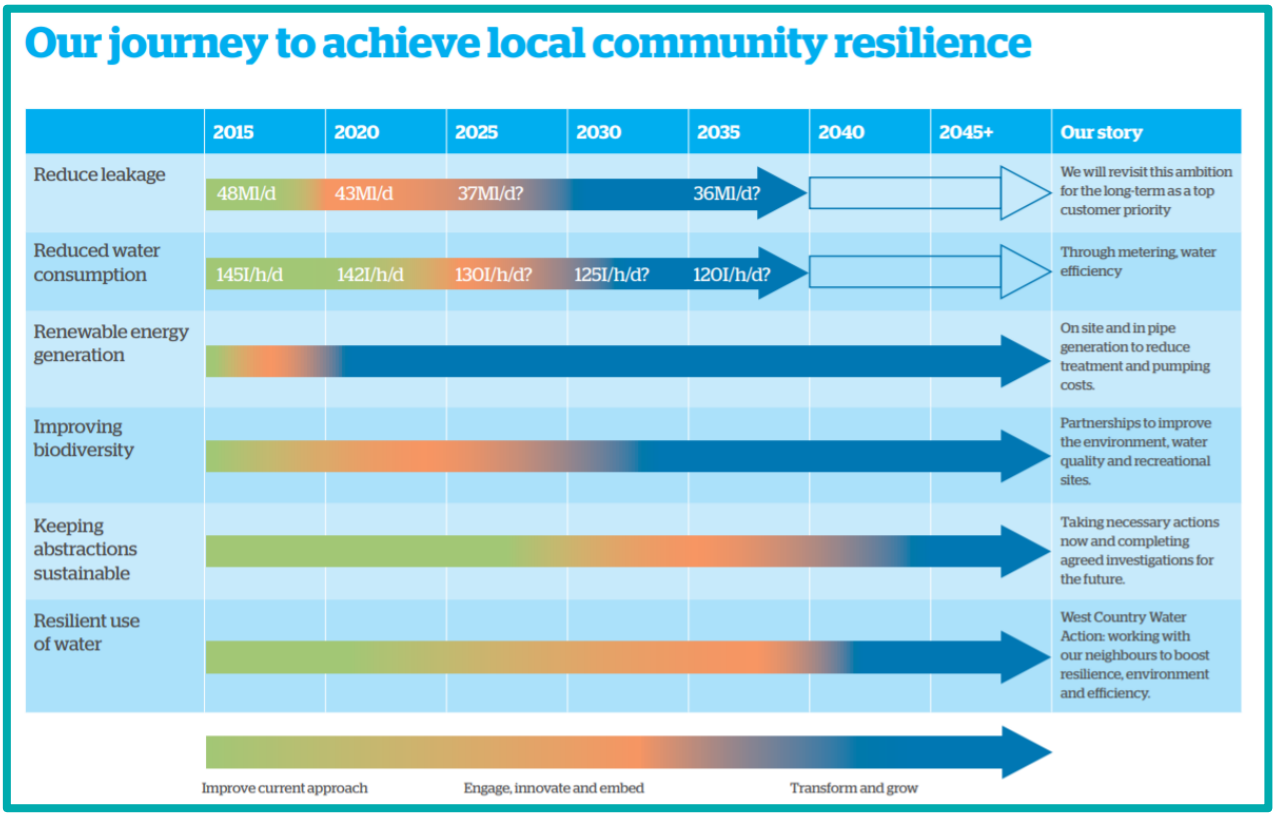

Extract from Bristol Water Clearly, 2018, illustrating individual journey pathways and where uncertainty resulted in a planning horizon that required further information.

Part of this process was to set out pathways for metrics and the initiatives we had planned that would influence them in the short- and long-term. Customer and stakeholder consultation focused on the timing of delivery, on the outcome promises and incentives this implied, but also on gaps in long-term planning that we would need to understand, from which derived the social contract concept. We find it difficult to constrain our strategic and adaptive planning away from the resilience and social contract transparency that were in our view part of adaptive planning.

This becomes harder when we look across the PR24 framework – part of this planning was built into our PR24 bespoke biodiversity index performance commitment – a clear signal of measuring net gain as part of an adaptive plan, to avoid reactive enhancement investment by letting the environment erode to the point at which statutory WINEP obligations kick in. All of our PR19 bespoke incentives had this perspective, with such innovation in the outcomes framework potentially lost for the future at PR24 (we will be making a similar point in response to the consultation on 'PR24 and beyond: Performance commitments for future price reviews'). The potential for future WINEPs of piloting local environment outcome destinations at PR24 should be part of the adaptive pathways.

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The Monitoring Plan

We note the various monitoring requirements the long-term delivery strategy, including the need to monitor the triggers for the alternative pathways. Ultimately delivery strategies will need to be defined in terms of outcomes and outputs, in the form of price control deliverables. Monitoring metrics can be helpful, but mostly as sub-indicators of the core components of how risk and return in the water sector is monitored and incentivised. For water quality and water resources, this is already clearly defined. For environmental measures we continue to support the use of adaptive outcomes, such as our use of a bioresource index and raw water quality measure. We also continue to believe that our PR19 proposal to measure resilience outcomes through a "population served by single supplies" is consistent with the statutory expectations on the water sector for resilience. Finally, we believe greater regard should be had to the link between drinking water safety plan hazard management and asset health management and resilience, with greater attention paid to the DWI's RARI (Risk Assessment Risk Index).

There is a balance to be had in the complexity of this reporting and assessment beyond the framework set out above. In Annex 7 of our response to PR24 and beyond: creating tomorrow together we set out a framework from Accounting for Sustainability we use to consider performance factors in terms of data availability and understanding of problems. This framework is important in avoiding delivery "blind spots", which is a key factor in resilience planning. A qualitative description of data and factors affecting performance are as important as data analysis – the key risk to technology and data being whether there are the skills and structure to act on this information, and that it is focused on delivery for customers. The factors that are least certain and vary the most, are the human factors, as was identified in *Bristol Water…Clearly.*

Board Assurance

We note on page 25 of the discussion paper that Ofwat will confirm its requirements for Board assurance of the long-term delivery strategy and the business plan in the PR24 draft methodology. Board ownership of long-term strategies and their understanding that we will continue to meet obligations for the long-term, and have sufficient resources to do so, are appropriate regulatory challenges and Board assurance sign-offs. However, we would ask Ofwat to consider the form of this assurance. The detailed Board sign-off expectations expected at PR19 cannot easily be used when applied to the adaptive planning information and the level of forward-looking uncertainty management Ofwat may expect.

The way it is currently proposed requires sign off for the long-term, that is dependent on Ofwat's regulatory decisions. For instance, is the Board signing off the plan, rather than the core adaptive pathway (which are different things according to the clarification in the consultation?). How can Boards sign off that the long-term delivery strategies will "*secures long-term affordability and fairness between current and future customers*" when Ofwat are

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defining the base level of service and outcomes for companies at PR24, but we cannot be sure in developing the long-term plans what these measures are, what degree of improvement (none, standard percentage improvement, or to a consistent performance level over some future period of time) or when information will be provided, if at all. The requirement for customer engagement may clash with the centralised research approach for PR24, which suggests that company customer research on long-term strategies should be carried out[2], but should be careful with overlaps on the common performance commitments. Given the key issues in the adaptive pathways we identified are water demand and leakage (which span base and enhancement) and are topics where the customer response and priorities are most uncertain, we struggle to rationalise how Ofwat's distinction between base and enhancement for the long-term delivery strategies (and Board sign-off of this) will work in practice.

Whilst we have disagreed with the approach Ofwat are taking in terms of how price control decisions are developed, we need consistency and realism in terms of the expectations and form of these Board assurance statements. Our call for early Board level strategic dialogue as part of the PR24 process will help avoid these apparent inconsistencies at this stage.

Data Tables

We note that the data tables are focused on enhancement spending (as they are linked to adaptive pathways that should reference the common reference scenarios).

We fully support the recognition that achieving net zero will require some enhancement investment above and beyond base level; we note the new lines (lines 26 and 27) on "reducing operational carbon emissions" and on "reducing embedded carbon emissions".

We note in section 5.1 of the "Assessing base costs at PR24" consultation that Ofwat suggests that there is a lack of evidence that net zero and climate change impacts could not be delivered from base costs and without any increase in capital maintenance. We do not comment on this here, other than noting the potential inconsistency as it illustrates the challenges in separating base and enhancement in long-term planning in a totex framework. Good long-term planning should recognise that enhancement expenditure could have a positive or negative impact on future base operating and maintenance costs, and this can affect an adaptive pathway.

Common reference scenarios

Parameters for common reference scenarios

[2] PR24 and beyond position paper: Collaborative customer research for PR24

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We note that the common reference scenarios focus on four material drivers of uncertainty around long-term enhancement spending: climate change, technology, demand, and environmental ambition. It may be difficult to consider these scenarios in isolation.

The discussion paper approach appears to us to mix up plausible assumptions for reference scenarios / presumptions of what is high quality with low probability – an adaptive plan should understand low probability/high consequence scenarios, otherwise it is not adaptable or resilient – that is after all what the water sector often has to manage, including when forecasting enhancement expenditure.

Whilst the paper references that these scenarios have been informed by engagement with the sector, the list of technological changes has expanded significantly following the industry workshops in Autumn 2021, which results in a potentially unfocused remit. Is there not a danger that the list is so broad that it could include almost anything? We were concerned that the focus on exogenous factors and matters outside of Government water policy (e.g. demand) would make the scenarios difficult to manage and understand. In practice, as the discussion paper recognises, technology is at least endogenous to the water sector, as even if an exogenous trend, how water companies use it is within our control. On the other hand, Ofwat assumes that consumer behaviour is endogenous to what water companies do, defining demand as one exogenous factor linked to population growth.

We are opposed to the insistence that common reference scenarios must be "national" and we do not agree with the statement on page 28 of the paper that "*regional or company-specific factors would not be appropriate.*" A long-term delivery strategy just focused on a national issue does not fit with the basis of future water resource or environmental planning. Whilst we can understand this from the perspective of the scenario factors, the adaptive pathway should be able to explain the local factors that, in combination with the common factor, result in the selection of adaptive pathway.

Appendix 7 of our response to "Creating tomorrow together" set out why we think local impacts of common scenarios should be part of adaptive planning. We have asked DEFRA to reflect regional and local strategies that affect the water sector within the Strategic Priorities Statement, reflecting a) the need for local and regional authority plans for the climate and ecological emergencies to carry weight; and b) to reflect the National Infrastructure Commission recommendation that economic regulators should consult with local and regional planning requirements.

Testing of approach

As part of our consultation response we have thought through how we may use the common reference scenarios in practice. We would be happy to explore this logic further with other companies, perhaps at a future workshop, as we have only considered the water

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service as [redacted] Our conclusion from this initial testing below is that there is significant value in long-term planning in the way the discussion paper suggests. However, we are not certain that the set of common scenarios are likely to be meaningful when making comparison between different companies, particularly if it is just based on enhancement expenditure pathways.

Our conclusions from this testing are:

- The high climate change scenarios are unlikely to make a difference to enhancement expenditure (it may do more significantly to future civils capital maintenance expenditure however). They may make a difference to future abstraction reductions, but there is unlikely to be sufficient information to assess this. The main impacts are therefore on the impact of temperature on consumer demand for public water supply and water in the environment, and the impact of temperature on ecology, which should drive the abstraction environmental destination. The scenario information appears to exclude the key factors of intensity and variability in events, which may result in a greater impact on the adaptive pathway but would not feature in the core plan.
- The low climate change scenario makes little difference given the uncertainty and potential. In general, the scenarios approach relies on trends that may suggest unwarranted certainty on cause and effect, when for climate change tipping points that require sufficient headroom to adapt and respond is needed, in both water resources planning and in defining the local environmental destination.
- Customer experience factors drive technology adoption, rather than enhancement expenditure. This is a standard cost to serve matter from other sectors, which you would normally expect to see in an adaptive plan.
- The difference between high and low technology scenarios is too narrow. e.g.
    - The difference between a smart water network in 2035 and 2040 is a marginal difference in cost and impact. The scenario description refers to risk-based maintenance, which is outside of the scope of the scenarios. Ultimately if we are assuming a least cost approach to delivering leakage and service levels, the choice of technology and timing is not an exogenous factor. The responses can be reduced to a single strategic question as to whether demand for water can reduce in the way that policy for water resource planning suggests it should. This is a critical uncertainty that is balanced in between technology and consumer behaviour.
    - Smart meter timing – the key adaptive pathway is not the technology adoption, but what it supports in terms of reducing demand for water. This is only in combination with other scenario factors.

- The high technology scenario suggests a higher risk of service failure and the need for non-digital back-ups. This would be avoided by companies not adopting this

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technology without suitable protection, as the risk of service failure would mean you would not adopt the technology in the first place – the adaptive pathway should avoid the circumstances. The low scenario suggests such risks are avoided. If the intention is to flex increased SEMD spend with high technology scenarios, we do not think the cost is separable as enhancement in this way.

- The scenario factors should consider policy responses in terms of lead and customer supply pipe adoption – these assumptions drive the leakage and water quality aspects. They also link to technology – our view of technology horizon is the in-line monitoring of water quality parameters, which changes the way water production and network risks are managed. Together with the technology aspects, this drives a service-cost relationship between leakage cost and performance.
- Technologies such as self-repairing pipes may have a short-term cost benefit, but this may be at the expense of long term asset health and resilience (e.g. compared to replacing pipes). Is this not base cost rather than enhancement?
- HGV and fleet factors (between 2040 and 2035) are minor aspects of base cost – we do not think they affect enhancement pathways, unless we assume that replacing fleet is an enhancement expenditure, which we do not think Ofwat intends.
- Open data does not on its own result in any change in adaptive pathway, unless the impact can be specified as a planning assumption. It merely affects the cost of achieving service standards. The potential for local infrastructure planning to be improved is a local factor specifically excluded in these scenarios, but is the key opportunity from open data, apart from base cost. Other than the uncertainty on delivery of demand reductions (cost and impact), there is little obvious impact on enhancement expenditure
- There is a key policy trigger point on water sector responsibility, which is different to whether costs are lower or higher for low carbon building materials. This is not something that can be predicted and requires standard assumptions on costs in order to be useful for adaptive planning. Even then, there is a question as to whether it should impact the timing of statutory obligation delivery. If we assume that for a global supply chain low or net zero concrete will not significantly be affected by the water sector, then this factor is merely a cost uncertainty (which to a significant extent may be reflected in CPIH, or in the potential frontier cost change). It may also be the case that Government policy is for each sector should deal with its operational and process emissions. The alternative pathway would be for the water sector to have specific embedded carbon targets that would mandate the use of zero concrete carbon in enhancement schemes, which would require Government policy to require the concrete supply chain to respond. As the scenarios currently stand, it is not clear how to interpret this factor as the outcome is not clear.
- The high and low demand scenarios repeat the pattern above – the key impact is on developer services expenditure which is excluded from the tables. The other impact is on reduction and consumer demand / PCC, which will affect the timing of water supply schemes. This factor however appears to be excluded from the scenario. This

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matters as assumptions on demand and supply affect the environmental destination / abstraction reduction and thus WINEP schemes.
- We do not have sufficient information to make a distinction between the low and high environmental scenario. This may be specific to Bristol Water, and may be informed by AMP7 investigations.

Based on our assessment, without being able to include local factors into the common scenarios it is possible that there is very little variation in adaptive pathways. As a result, we suggest the following amendments to the approach:

- to allow local drivers for adaptive pathways
- a single adaptive pathway for technology assumptions to test what might change in terms of enhancement expenditure
- a standard scenario that considers consumer demand behaviour that allows for the criticality of this assumption on the supply schemes to be assessed.
- Allow for the impact on base opex and maintenance impacts to be included

We show below an example adaptive pathway decision tree as to how we considered the scenario factors, and grouped the scenario factors into core and alternative pathways. In most cases the core pathway may not vary, other than understanding how the scenario affects base and maintenance costs so that the other adaptive pathways can be seen as responses. For instance, there will be a core adaptive pathway on leakage, water resource plans, PCC etc that the alternative pathways from the scenario factors need to be tested against. The numbers indicate the core and alternative pathways, which in this illustration are:

0 – Core adaptive pathway (the plan assumptions)
1 – The impact of higher demand (including earlier need for supply schemes)
2 – An alternative local pathway to the core scenario, considering wider resilience factors (changes from base with bespoke ODIs and price control deliverables)
3 – A technology pathway that has lower short-term cost, but may have lower long term resilience / asset integrity
4 – Water carbon responsibility goes beyond operational and process emissions, to the embedded carbon from other sector operational emissions, and this is assumed to affect enhancement decisions
5 – Testing the uncertainty of an unknown environmental destination, say in response to climate change on ecology, resulting in earlier need for supply side schemes.

These alternative pathways can also each reflect trigger points that may, on best value grounds, reflect a shift from one pathway to another.

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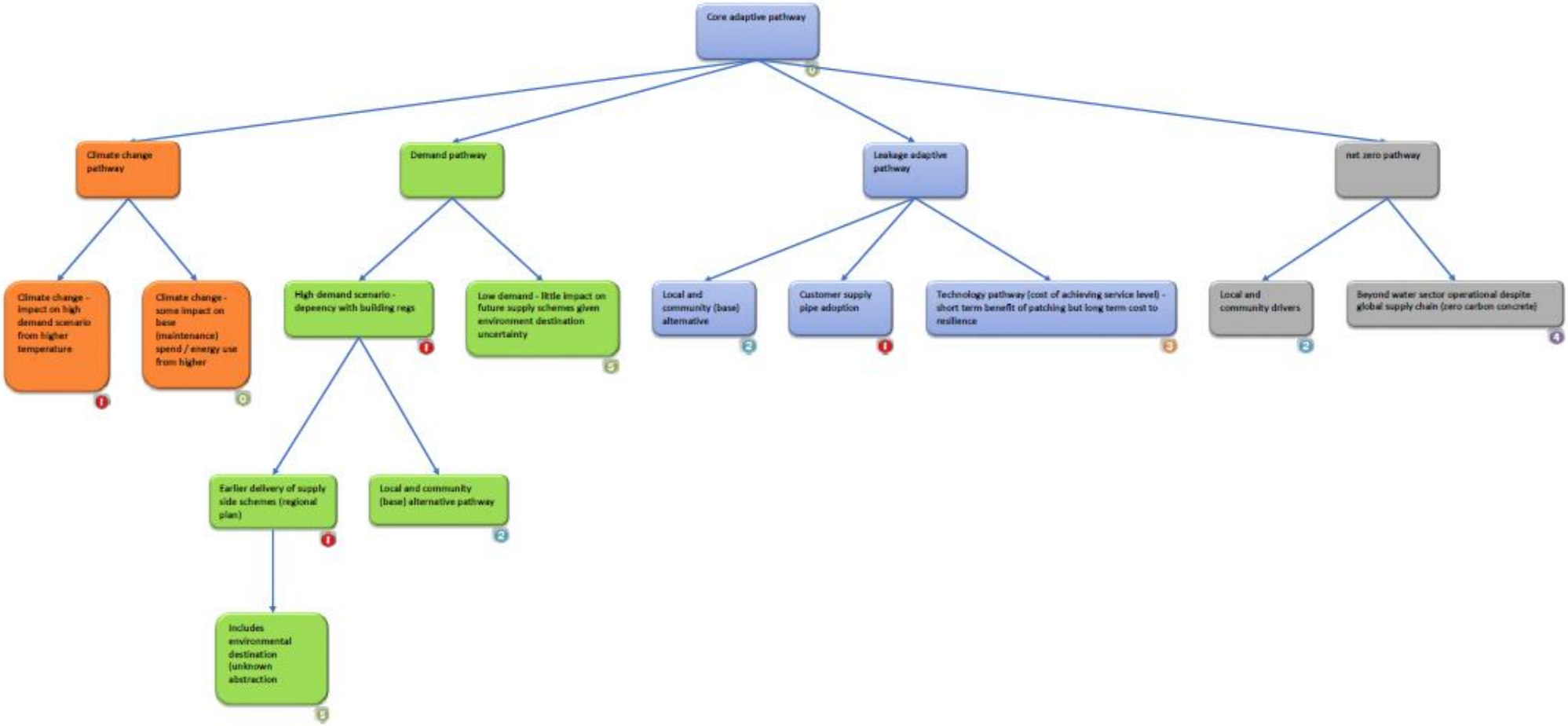

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