

# Appendix 9

## Submission to DWI

Long term risk management of drinking water quality

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# Long term risk management of drinking water quality

## 1.0 Overview

This statement is in response to the long term planning guidance and provides assurance that our risk assessments include a long term view, highlighting our consideration of any significant new future risk mitigation measures relating to the quality of drinking water supplies.

Our aim is to meet all water quality obligations and exceed them where our customers want us to in a way that is demonstrably cost effective and contributes to the wider policy aims in Wales. We will continue to improve our understanding of our assets and the changing world around them so that we make timely interventions to adapt to future challenges and requirements. To achieve this, our long term plan has three key strands:

- Maintaining water quality improvements made to date and ensuring they are consistent and reliable across our Wales licence area (e.g. maintaining the manganese removal processes and maintaining the focus on mains cleaning activity).
- Working towards the most sustainable solutions to further improve our performance for the given characteristics in our region. These include:
  - Continuation and development of our catchment approaches to manage the risk from pesticides, herbicides, point and diffuse pollution on all our water sources to avoid both water quality failures and also the need for additional chemical treatment. Also to understand and maximise the opportunities to improve service, such as how catchment management can be used to improve taste and odour.
  - Improving resilience by better managing and safeguarding our raw water sources to ensure we are always utilising the best quality and most sustainable sources (includes improved management of run off in our upland catchments and improvements to deal with seasonal effects such as algal blooms).
  - Minimising the need for and impact of chemical dosing – this includes developing and delivering our long term strategy to reduce lead in drinking water (ultimately removing the need for phosphate dosing) and reducing turbidity (by further optimising and where possible reducing chemical treatment).
  - Reviewing the treated water storage system to optimise resilience benefit with water quality risk.
- Collaboration to create a planning and delivery approach that seeks to maximise the wider benefits. This includes both internal collaboration (e.g. to align lead and leakage strategies to get the best long term solution) and external collaboration (e.g. to work with others on our reservoir maintenance programme to deliver greater wellbeing benefits for wider society for a much reduced marginal cost.)

We are continuing to manage short and long term risks to ensure we identify the most cost effective way of providing the consistently high quality drinking water that our customers expect now and in the future. This document sets out the approach we are taking and how we have combined our approaches to understand risks in both our north Wales region and Powys.

In response to our analysis of the long term risks to water quality we have identified two areas where we consider additional funding will be required for us to manage the risks. These are set out in section 4. The statutory requirements for compliance have not changed which means that under Regulatory Accounting Guidelines they cannot be classed as water quality enhancements. We are therefore not seeking formal support, but instead hope that the evidence will be sufficiently compelling for you to commend our cost adjustment claims in your Final Decision Letter.

## 2.0 Context

### 2.1 Statutory requirements and policy ambition

#### Welsh Government

The Water Strategy for Wales and the Strategic Priorities and Objectives Statement to Ofwat set out the Welsh Government’s expectations. The most relevant expectations relating to drinking water quality include:

1. Effective long term planning to maintain the current high standard of public drinking water quality. This should include customer acceptability as well as wholesomeness. In section 4.4 there is a specific expectation that “we must aim to keep exposure to lead as low as reasonably practicable...”
2. The use of innovation to drive improvements or reduce costs, particularly through the use of catchment approaches.
3. Achieving sustainable management of water resources and in doing so to seek solutions which deliver wider benefits to society and the environment, where this is justified by sound evidence.
4. The Wellbeing of future generations Act allows us greater scope for making decisions and investing now to ensure we are operating sustainably for the benefit of future generations.

#### Water Supply (Water Quality) Regulations

There have been no confirmed changes to the current water quality standards and therefore in all but one case our long term plan seeks to identify the most cost effective solutions to maintain compliance with the current standard. The one exception relates to the our planned response to the Water Strategy for Wales by taking action to prepare for the tightening of the lead standard, which is likely to come into force by 2030.

### 2.2 Current performance and monitoring

We are on track to deliver all of the AMP6 performance commitments and the underlying measures that form part of our internal reporting and management of risks demonstrate stable performance. This consists of a three tier KPI scorecard. Examples of the measure on the Water Quality KPI scorecard are set out in table 1 below.

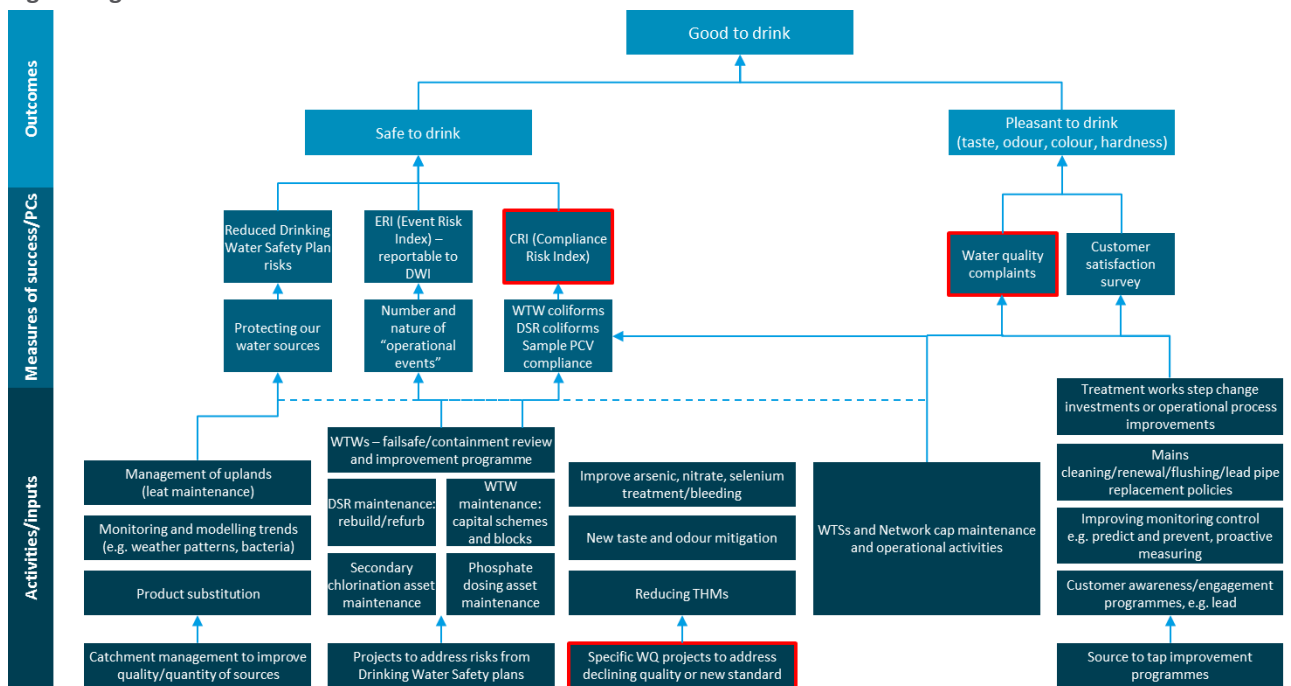
**Table 1: Water Quality KPI scorecard metrics**

Governance level	Measures used
Level 1	Mean Zonal Compliance (PC) Discoloured water contacts (PC)
Level 2	Service Reservoir integrity testing (turbidity, iron, manganese) TIM Index % Completion of water quality related capital programmes (e.g. Legacy rebuild)

Level 3	% completion of shut down testing
	% completion of control/ telemetry improvements to improve SR turnover
	% completion of PRV maintenance
	% completion of agriculture fittings inspections

We are continuously testing and improving our understanding of the factors that drive the outcomes our customers want. The driver tree in figure 1 below illustrates our knowledge of the levers and factors that we are building into our monitoring regime and factoring into our long term plans in order to achieve consistently high quality drinking water.

Figure 1: good to drink driver tree



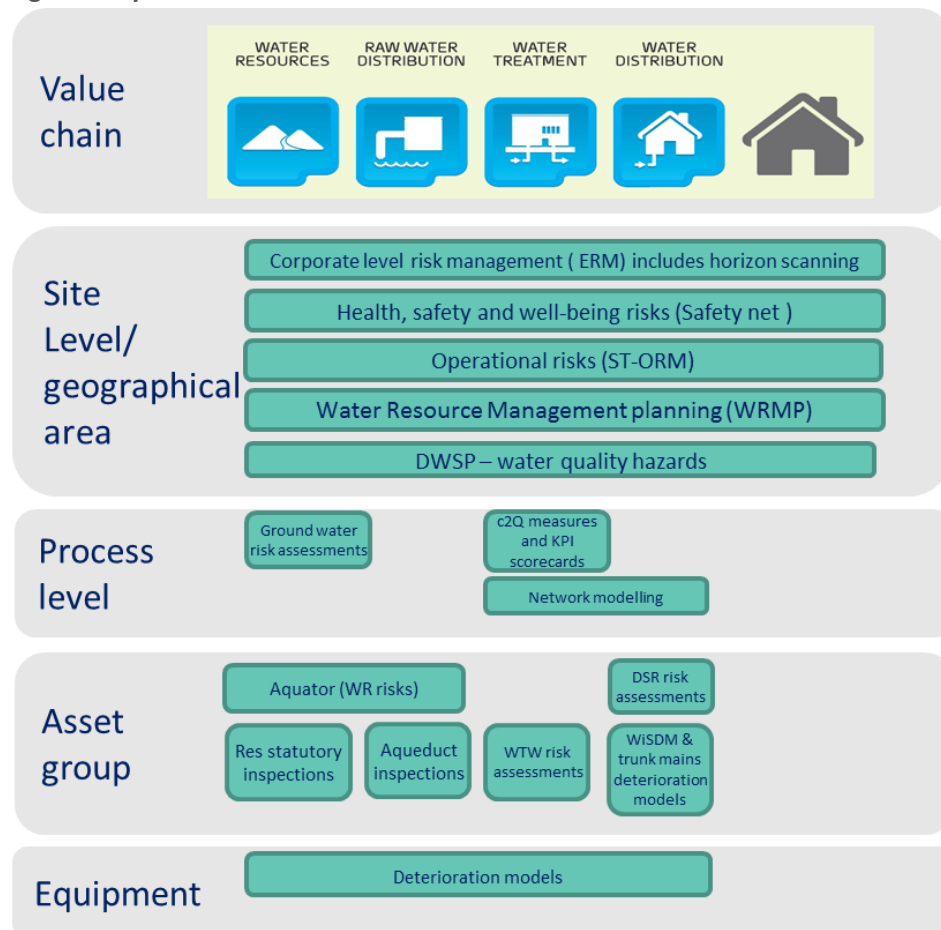
We will be reporting fully on our 2017/2018 performance in the Annual Performance Report in July 2018, but the relevant performance highlights include:

- The Legacy WTW upgrade is complete and we have cleaned (combination of hard flushing and ice pigging) 156 km of mains in order to recover from the deteriorating trend in discoloration.
- MZC for 2017 is 99.97% for DVW and 99.98 for Hafren Dyfrdwy.
- CRI has reduced from a peak of 17 earlier in AMP6 to provisional assessment of zero for 2017
- We haven't had any WTW coliform failures.
- Regulatory samples showed that we have achieved 100% compliance of the lead standard (at 10ug/l) in 2016 and 2017

### 3.0 Risk assessment and resilience

We have a range of well-established tools that help us understand, track and, where necessary, drive improvements to ensure we deliver high quality, resilient source to tap service now and in the future. A summary of each of these tools and the key risks we are managing is provided below. Figure 2 illustrates how all of these tools fit together to help us establish an understanding of the overall system risk.

Figure 2 key risk assessment tools



### 3.1 Water Resource Management Plan (WRMP)

We published the draft WRMP for Dee Valley (DVW) in January 2018 and the Severn Trent (STW) one covering Powys in December 2017. We are combining them into a Hafren Dyfrdwy WRMP for the final version. Our water resource modelling approach forecasts the supply demand balance over a 25 year period, taking into account possible changes driven by population changes, climate change, abstraction regime, environmental impact and potential changes in raw water quality. The dWRMP in both areas forecasts a surplus in the next 25 years. But we must not be complacent and it is important to consider the close relationship between availability and quality of raw water. Table 2 below sets out the areas where they overlap and how our short, medium and long term plans seek to manage the risk and exploit opportunities.

There is currently no interconnectivity between Powys and our north Wales area and it is not needed to maintain supply demand balance for the next 25 years, but as we combine the plans we will be investigating the potential resilience benefits this could have and what water quality implications would need to be managed.

**Table 2: WRMP risks that are linked to drinking water quality**

Short term	Medium term	Long term
Maintaining the upland catchments, specifically the leats to ensure controlled and maximised surface water runoff and increase resilience by reducing the significant reliance on the river abstraction.	Catchments to control/ reduce taste and odour complaints	How to manage the predicted increase in salinity of the river Dee driven by climate change
Improving our understanding of the level of drought resilience currently provided and the level needed to ensure long term security of supply	Maintenance of manganese removal treatment processes	How to manage divergence in population changes (growth in our urban areas and decline in some of our rural areas)
Potential use of floating solar panels at reservoirs where algal blooms prevent all year round utilisation.	As part of water trading scenarios we need to better understand the WQ impact of blending and more frequent changes in blend and origin.	How to ensure an appropriate level of drought resilience in light of climate change predictions
	Addressing resilience and better establishing risks and control measures of our ground water abstractions	Consideration of the broader role of our upland areas and the contribution to wider goals (such as the planting and management of trees to improve carbon sequestration and to provide more diverse and therefore resilient ecosystems)
	How to manage the impact of land use changes (e.g. driven by changes in agricultural policies)	

### 3.2 Drinking Water Safety Plans (DWSP)

DWSPs are the key risk management tool - they are used to identify risks to water quality from source to tap, learning from events or near misses and mitigating identified risks in a timely, effective and efficient manner. We are currently combining the DVW and STW (Powys entries) plans to get a full picture for Wales.

Over multiple AMP cycles we have invested in our assets and established processes and training programmes to better understand, quantify and reduce the risk of failure. This approach will continue to be at the heart of managing drinking water quality risks. The following areas are highlighted as they illustrate the importance of having a long term, risk based plan to help us establish the most appropriate time to invest to balance risk and affordability.

#### Raw water deterioration

We have several challenges regarding raw water deterioration that our long term plan seeks to manage – where necessary using treatment solutions, but in the long term through catchment management approaches.

Since 2009 we have seen significantly increasing risks posed by manganese which is naturally occurring in all of our surface water sources. This resulted in a significant increase in the number of discolouration complaints. During AMP6 we have carried out interventions to reduce the risk, but even if we sustain the improvements in discolouration we still have work to do to reduce complaints about drinking water quality (discolouration, taste and odour) to the levels achieved by other water companies. Our short term plan includes maintenance of the manganese removal processes and continuation of the mains cleaning activity and extension into our Powys region. Our long term plan includes development of our catchment approaches to address long term challenges:

- Investigation and collaboration with research bodies to establish the role catchment management can have on taste and odour (specifically the control of geosmin and methyl isoborneol (MIB)).

- Improved understanding through collaborative approaches to model the potential impact of land use changes and how catchment management approaches can be used to find cost effective solutions.
- Continuation of our collaborative approach through the River Dee Trust.
- Improved understanding of the impact of changes in weather patterns on raw water. Specifically how more significant summer rainfall events observed over the last 10 years is linked to pesticide levels and how that is also linked to colour changes.
- Potential to use catchment approaches to our upland sources to improve both quantity and quality of the water feeding into our raw water reservoirs.

#### **Assets/ sites too critical to fail**

Our long term plan seeks to maximise learning from the industry on how best to manage the risk and improve resilience of assets that are too large or important to fail. This includes sources, treatment and distribution assets. In the short term our plan focuses on improvements to the level of monitoring and control of these assets and in the medium to long term seeks to find the optimum mix of resilience responses (e.g. improved reliability, redundancy etc). This is a challenge in relation to our particular topography and population density and how we ensure we identify cost effective ways of providing resilience.

#### **Trunk and distribution mains**

We are continuously seeking to better integrate our distribution operation and maintenance strategy (DOMS) with our DWSPs. This overlaps with our long term approach to managing assets too critical to fail, but also assets that we can't easily take out of service to either inspect or maintain.

We have very well establish deterioration models that enable us to understand what mains activity (e.g. replacement, refurbishment, cleaning) would be needed to deliver specified service in a wide range of parameters relating to our infrastructure assets. Our long term plan seeks to combine our mains renewal strategy for minimising bursts and therefore supply interruptions with the need to maintain the water quality benefits achieved through the relining activity completed in the first three AMPs following privatisation. Our long term plan also seeks to identify and apply innovation that detects and reduces leakage whilst also giving us information about (or even improving) the integrity of the pipe lining or need for cleaning.

#### **Maintenance requirements**

For the past three price review periods DVW have carried out either significant maintenance or major rebuilds of their treatment works. Going forward our maintenance plans will seek to take a more targeted approach to minimise the peaks in investment, but it is not possible to avoid peaks in investment entirely. This is due to a having a large proportion of long life assets within a small overall programme – just one major maintenance issue drives a peak in investment. In the short to medium term the key water quality maintenance requirement is on distribution service reservoirs to maintain both the structural integrity and improve the operational performance (e.g. turnover, storage capacity, run to waste functionality etc). This is set out in more detail in section 4.2 below.

## **4.0 Focus for next five years**

In response to paragraph 5.3.3 of your guidance, this submission includes more detail on two aspects of our PR19 Plan that relate to investment that could be classed as new measures that are beyond routine provisions.

1. There are several aspects of our PR19 plan which will contribute to improved performance, driven by customer preferences or comparative regulation on customers' behalf. However, the only water quality parameter that we are proposing to go beyond the current standard is for lead in drinking

water. We are proposing a package of work which will be the first phase of a long term plan to work towards a lead free Wales.

2. At a total expenditure level (totex) maintenance investment is broadly flat, however at individual asset level our maintenance programme does consist of a series of “one-off or lumpy” maintenance interventions. The main component of our maintenance programme affecting water quality relates to the proposed service reservoir maintenance. This investment is required to address emerging structural issues and to improve the overall system resilience.

Appendices 1 and 2 include the current evidence cases to support the need for these two areas. We are developing the options and our final PR19 plan will set out the full evidence. We welcome your views before we submit the final case to Ofwat on 3<sup>rd</sup> September.

## 4.1 Towards a lead free Wales

The need to act is underpinned by four pieces of evidence:

- Meeting the Welsh Government’s Water Strategy for Wales and prospective changes in standards (likely to be in place by 2030) and contributing to the Well-being of Future Generations (Wales) Act 2015.
- Independent evidence concludes that there is no safe standard for lead in drinking water. This evidence has been the catalyst for other countries worldwide to tighten the lead standard in drinking water.
- Our customers’ and stakeholders’ support for this service enhancement.
- We have analysed current performance data which shows that current treatment solutions will not be enough to meet the tighter standards.

Reducing lead from drinking water is a long term problem and cannot be solved in an affordable way in the next five years. We will continue with the current phosphate dosing strategy to protect our customers to the existing standard and additionally we are developing proposals for a twin track approach to:

- Increase lead communication and supply pipe replacement by taking action in the highest risk areas immediately (schools, nurseries, hospitals and also lead hotspot areas).
- Work collaboratively with others to drive multiple benefits and develop solutions to reduce the cost and inconvenience to our customers.

We remain committed to our membership of the Water Health Partnership for Wales and the principles of working in collaboration to improve and protect public health related to drinking water in Wales.



## 4.2 Supply resilience

The need for investment is driven by three key factors:

- Ensuring the structural integrity of the DSRs to maintain water quality, particularly to prevent water ingress (and therefore contamination), complying with the Water Supply (Water Quality) Regulations 2010.
- Reducing the risk of asset failure to prevent customer loss of supply and to prevent asset failure which could lead to flooding, for two assets. This includes complying with the Reservoir Safety Act 1975 and the Flood and Water Management Act 2010.



- Maintaining sufficient storage in the distribution network for resilience purposes should upstream or downstream assets fail. This is particularly important in parts of the system where the distribution network has no or limited interconnectivity.

We have applied industry recognised good practice for establishing a prioritised ranking of the risk of water quality failures or supply interruptions across our asset base.

We are seeking to find the most cost beneficial combination of solutions, identifying the optimum balance between risk and affordability. This includes identifying opportunities to deliver multiple benefits. Due to the distinctive rurality and topography of the company's location, in most cases the most cost beneficial way of ensuring appropriate resilience is to enhance DSR reliability. We are, however, considering the cost benefit of other options, such as interconnectivity.

## **5.0 Long term impacts and priorities**

We have made an assessment of the main drivers facing the industry over the coming decades and their potential impacts on various asset categories.

This assessment is included as appendix 1

Whilst there is a fair degree of subjectivity in the assessments, we consider this will be a useful tool to help us shape our long term plans and to prioritise those areas where we will gather more information to develop appropriate strategies.

Completion of the integration process will ensure we have a complete and comparable understanding of risk and how that is changing between our north Wales area and Powys.

Our emerging plan will then be internally assured so that the newly formed Hafren Dyfrdwy Board can satisfy themselves that we are meeting all of our statutory obligations, delivering service that our customers expect in a sustainable and efficient way and in a way that is reflective of the wider policy ambition of the Welsh Government.

We will continue to monitor performance, assess risk and prioritise investment to ensure we are delivering the high water quality standards that our customers deserve and expect now and in the future.

We are committed to being completely transparent with our customers, the representative bodies (specifically the customer challenge group (CCG)) and our regulators and we will continue to report on our performance and hold ourselves to account for delivering consistently high quality water.

**Appendix 1**

**Assessment of the extent to which each driver will influence our future investment plans for each asset category**

Driver	Asset category - in investment plans																					
	Catchment		GW Boreholes		Raw water abstraction and WTW pumping		Water Treatment Works GW		Water Treatment Works Surface		Strategic Network (WTWs to DSRs)		Distribution Service Reservoirs		Distribution Pumping		Customer Network		ICA&Telemetry - source to tap		Our People	
	2025	2050	2025	2050	2025	2050	2025	2050	2025	2050	2025	2050	2025	2050	2025	2050	2025	2050	2025	2050	2025	2050
Customer expectations	3	2	3	2	3	2	4	3	4	3	2	3	2	2	1	1	4	2	2	1	3	3
Asset Condition	3	2	3	2	3	3	4	3	4	3	2	4	4	3	2	1	3	4	2	4	3	3
Population Growth / Demand	2	3	3	2	3	3	2	2	3	3	4	2	1	1	1	1	2	2	2	3	3	3
Climate Change / extreme weather	2	3	3	3	3	3	3	2	3	3	4	2	1	1	1	1	3	3	3	3	3	3
Pollution (historic lag & future)	3	2	1	1	2	2	4	2	3	3	2	1	1	1	1	1	2	1	2	2	3	3
Environmental obligations e.g. WFD	3	2	3	2	3	2	2	2	3	1	2	2	1	1	1	1	2	1	2	2	3	3
Security inc. Defra's PSG 2020 & EU NIS directive	2	3	3	2	2	2	3	2	4	2	4	2	4	2	2	2	2	1	4	3	3	3
DWQ Regs: EU DWD Chlorate	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	4	3	2	1	1	1
DWQ Regs: EU DWD Lead	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	4	4	2	1	2	1
DWQ Regs: EU DWD Turbidity	2	1	2	2	2	2	4	2	3	2	1	1	1	1	1	1	2	1	2	1	2	1
Policy: Water Strategy for Wales and Wellbeing of Future Generations act	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	1	1	3	3
Technology	2	4	2	3	2	2	3	2	2	4	2	3	3	3	2	2	3	3	3	3	4	3
People skills/availability	3	2	4	2	2	2	3	2	3	3	3	2	3	2	2	2	3	2	3	4	3	2

**1 = low influence; 4 = v high influence** By influence I mean what I can see in the Reg Plan constraints and what I think the delivery plan will be in AMP7 i.e. what we will have to do in later AMPS

**nb.no drivers have a "very low" influence on investment**

low	med	high	v high
1	2	3	4
green	yellow	amber	red

**Assessment for current period through to 2025, and also for period from 2025 to 2050.**

**Differences to STW England Plan:**

- WFD risks decreased on GW, as not the same RSA pressure in Wales
- SW pollution risks increased to 3 for River Dee risks
- Lead and chlorate risks at WTW reduced as no OSEC and mainly phosphate dosed
- Asset condition risk increase for ICA as DVW systems catch-up required
- Water Strategy and Wellbeing policy drives more of a catchment approach, a greater focus on a lead free Wales and commitment to our people in terms of a developed workforce

