

Draft Water Resource Management Plan

Statement of Response

Prepared by the Water Resource Strategy team

17th September 2018

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Statement of Response

We published our draft Water Resources Management Plan (WRMP) in March 2018. We were pleased to have received comments on our draft WRMP from 6 different stakeholders. We have reviewed and responded to each of these and, where appropriate, we have used the feedback to update and improve our plan. While we have made some changes to our draft plan, we are confident that they do not materially alter the recommendations made in our draft WRMP.

This Statement of Response document follows a 12-week consultation process and includes:

- A summary of the key messages we received from our stakeholders.
- An overview of the improvements we've made to our WRMP both as a result of this feedback and better information becoming available in the interim.
- The impact of these changes on our plan.
- Supporting appendices with more detail where required.

We expect to publish our final WRMP in early 2019. In our final WRMP, we will take the opportunity to align the boundaries of Severn Trent Water and Dee Valley Water (now Hafren Dyfrdwy) to the national boundaries of England and Wales. We will also take the opportunity to improve the links between our WRMP and PR19 Plan which we submitted to Ofwat on 3 September 2018. These two regulatory submissions are aligned, with the PR19 Plan recognising the need to protect customers from the inherent uncertainty of long term forecasts and the transition to converged definitions for leakage and per capita consumption.

1. Summary of key messages from the consultation process

Our draft WRMP explained our long term plans to maintain secure water supplies to customers and ensure that we can accommodate the impact of population growth, drought, our environmental obligations and climate change uncertainty in order to balance supply and demand. We used our in-house expertise in hydrology, hydrogeology, ecology, engineering and economics to define and quantify risks and future supply / demand scenarios. In addition, we called on a number of specialist consultants and partners to help us develop the recommendations set out in the draft WRMP18.

We encouraged a wide range of stakeholders to respond to our draft WRMP. While we did not receive any objections to our supply and demand proposals, there were some important topics where stakeholders challenged us to do more for our final WRMP. Table 1.1 below summarises those topics into key themes, and sets out the action we have taken for our final WRMP. Each of these themes is covered in more detail in Section 3.

Table 1.1 - Key themes important to our stakeholders

Theme	Position in draft WRMP	Action we have taken	Materiality of changes we have made
Leakage reduction ambition	15% reduction over two AMPs – 7.5% by end of AMP7.	We've increased our leakage ambition to 15% reduction by end of AMP7, and 50% reduction over 25 years.	This is the largest change to our draft WRMP. We move from a 15% reduction over 2 AMPs to 50% reduction over 25 years.
Metering	We committed to continuing our previous WRMP approach of household metering being led by customer demand for the free meter option.	We have aligned our metering strategy with that of the Severn Trent supply area.	The change in metering approach equates to 100% metering penetration by 2035.
Drought risk	Following the Welsh WRMP guidance, drought risk assessment only considered worst historical drought.	We have addressed the requirement to consider our risk level for 1 in 200 droughts.	

As well as these key themes, stakeholders also asked us for more detail on a number of technical aspects of our planning and decision making. We provide more detail on these topics in Section 4 of this Statement of Response, and the additional narrative that will be included in our final WRMP publication. The main topics on which we provide additional technical detail are:

- Biodiversity and catchments
- Climate Change & uncertainty
- Customer engagement
- Decision making & assurance
- Demand forecast
- Resilience
- Trading

2. Aligning the WRMP and PR19 process

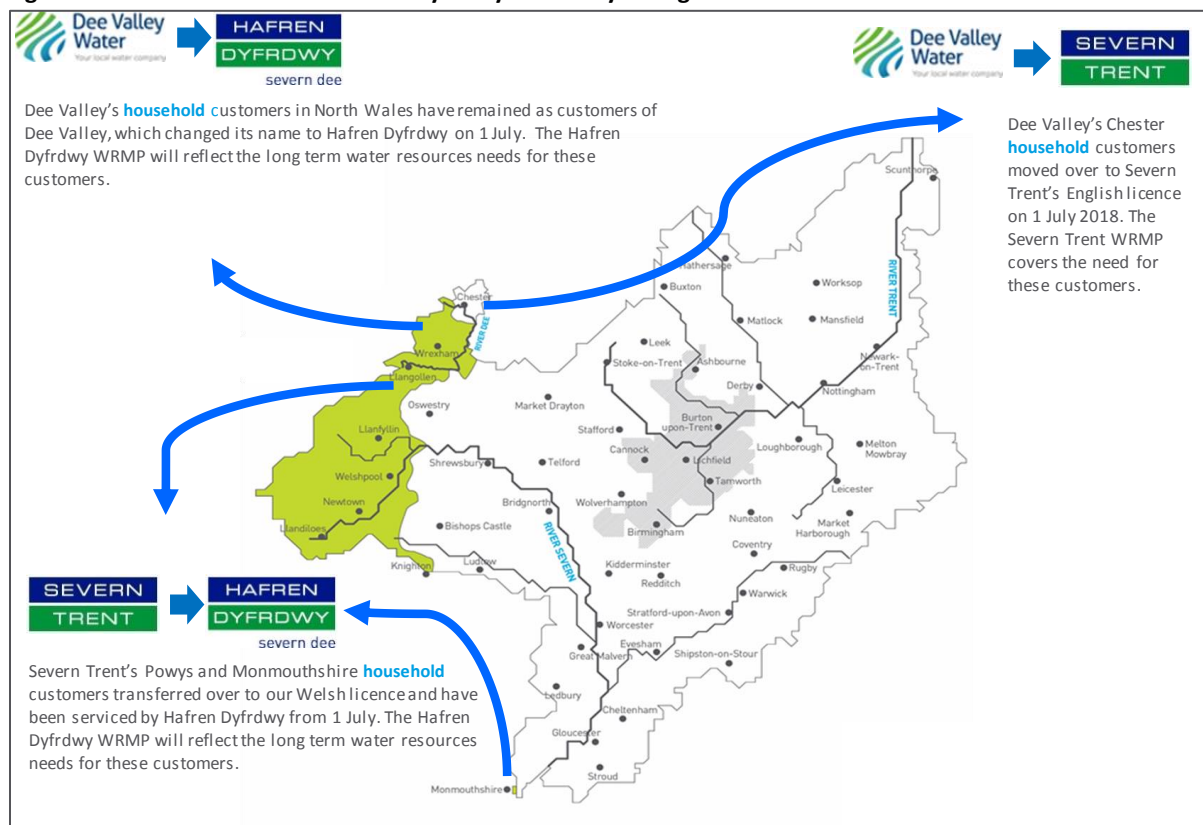
Alongside our WRMP, we have also been finalising our PR19 Business Plan which was submitted to Ofwat, our economic regulator, in early September 2018. Our PR19 Business Plan describes the long term investment requirements needed to achieve all of our water and waste-water performance commitments. There are important links between the WRMP and PR19 Business Plan and we have taken great care to make sure that any changes to our supply and demand proposals since we published our draft WRMP are reflected in both plans.

Impact of boundary changes

In February 2017, Dee Valley Water became part of the Severn Trent group. Earlier this year, Ofwat approval was received to align the boundaries of Severn Trent and Dee Valley Water to the national boundaries of Wales and England. In line with this approval, we launched Hafren Dyfrdwy on 1 July 2018 to serve our customers in Wales.

Figure 2.1 below shows how customers have moved between the two companies and how this impacts the final WRMPs which will be produced based on the new licences.

Figure 2.1 - Severn Trent and Hafren Dyfrdwy boundary changes



Both Hafren Dyfrdwy and Severn Trent customers should expect their respective WRMPs to uphold the requirement to ensure there is sufficient water to meet demand over the long term.

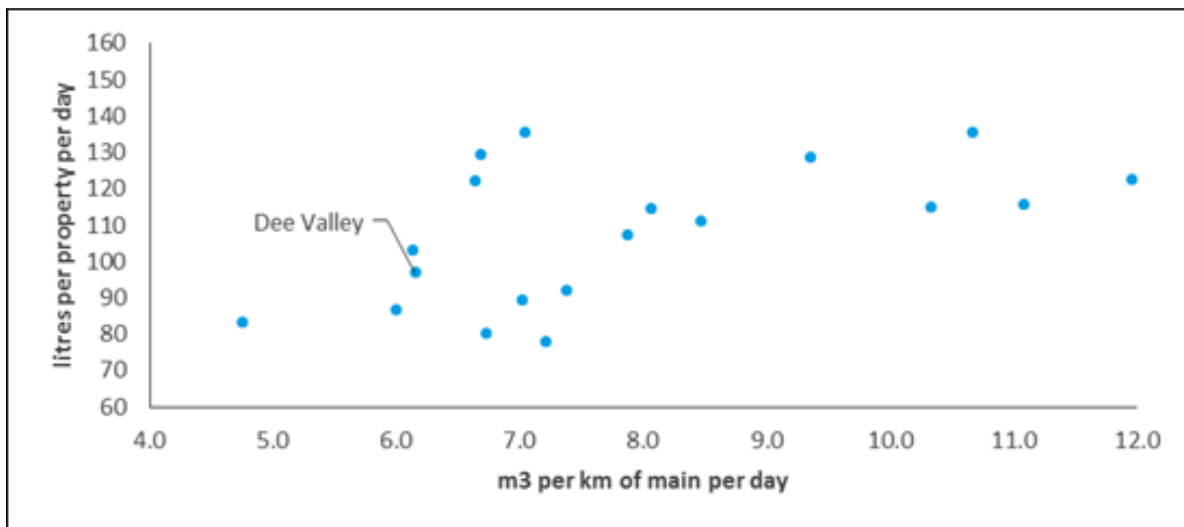
We recognise that the draft WRMPs were published based on the old licence boundaries with the subsequent consultations carried out on this basis. The final WRMPs will respond to feedback received on the new boundaries. This statement of response refers to consultation comments received on our Dee Valley Water draft WRMP. A separate Statement of Response has been prepared for consultation comments made on the Severn Trent Water draft WRMP.

Leakage reduction ambition

Ofwat and other key stakeholders have given a clear message to the water industry that they expect to see ambitious and innovative leakage reduction programmes in PR19. Despite our business plan including an extremely challenging performance commitment to reduce leakage by 15%, we have committed to delivering this step change in performance without any additional enhancement expenditure.

The performance commitment proposed is stretching and significantly beyond the sustainable economic level of leakage. All of the Hafren Dyfrdwy water resources zones are projected to remain in supply / demand balance surplus during the current water resources planning horizon. Furthermore, current performance compares well relative to the rest of the industry when analysed on both per km and per property basis. This is illustrated by the 2017/18 leakage performance in Figure 2.2 below.

Figure 2.2 - Comparative leakage performance (2017/18 shadow reporting data, TMS removed as an outlier)



Given our favourable supply / demand balance position and leakage performance, we did not consider it appropriate to mirror Ofwat's expectation of a 15% leakage reduction in our draft Water Resources Management Plan (WRMP) but instead proposed a performance commitment to reduce leakage by 7.5% in AMP7 and 15% by the end of AMP8.

The acceptability of this level of performance was tested with our customers. In our PC and ODI research we found that 71% of household customers, and 69% of non-household customers, found our proposed target acceptable. Our Willingness to Pay research indicated that whilst reducing leakage was a priority for improvement for household customers there was limited willingness to pay for leakage reduction. Some customers in our qualitative research discussions suggested that the target level may still be too high irrespective of our good comparative performance.

Ofwat and NRW provided comments on our draft WRMP that included a request to reconsider whether our initial target was stretching enough. Consequently we have listened carefully to stakeholders, customers and policy makers and have included a 15% reduction in leakage in AMP7 without proposing an enhancement in required Totex.

We consider that this is an incredibly stretching target given our relatively low levels of leakage compared to the rest of the industry and that this is additional activity that is not required to meet the supply demand balance. We have calculated that the attainment and maintenance of a 15% reduction in leakage performance using our existing technology and process is likely to cost a minimum of £0.1M in additional opex each year (based on our

leakage cost curves). We will strive to optimise the existing investment we are making in telemetry and instrumentation during AMP6 to deliver greater benefits than currently envisaged. We will also need to do more to integrate leakage into our business as usual activities. We expect this will provide opportunities for more efficient deployment of our leakage programmes.

Resilience in the round

Our customers expect us to deliver a reliable service 24 hours a day, 365 days a year, and to plan and take decisions that mean we can do this reliably into the future at a price that is affordable to pay.

They also expect us to be around for the long term and to operate in a responsible manner, both financially and with regard to corporate governance. The service we provide is necessary for life and, when encouraged to consider these issues, customers quickly express the view that a strong, reliable and responsible company is required to deal with these issues both now and for future generations.

The PR19 plan for Hafren Dyfrdwy recognises that, as a new company, we have a unique opportunity to take stock of the shocks and stresses that could affect our ability to provide services and to listen to and understand the expectations of our customers and stakeholders. This has allowed us to identify gaps between the level of resilience inherent in our business today and the optimum level to meet future needs.

Resilience of our water resources is key to ensuring that we deliver against our commitments to customer outcomes:

- Ensuring water is **good to drink**
- And **always there** when customers need it
- Do all of this in a way that not just protects but creates a **thriving environment**

Our final WRMP signposts to the PR19 'Resilience in the Round' chapter and the programmes of work for AMP7 and beyond which will support the long term resilience of our water resources.

3. Changes to our draft WRMP

3.1 Leakage

Leakage currently makes up 15% of the total amount of water we put into supply. In development of our previous Plan (WRMP14), we established there was no predicted supply / demand balance deficit during that planning horizon. As such, our WRMP14 held long term leakage levels constant at around 10MI/d.

In our dWRMP18, we proposed a more ambitious leakage target in recognition of views expressed by our customers and stakeholders. Throughout the consultation period, we heard that leakage was a key concern and that we should do more to reduce it. Indeed, Ofwat set an expectation that companies should reduce leakage by at least 15%. Based on our understanding of Regulators' policy expectations, stakeholder's views and consideration of how our wider PR19 improvement plans will deliver associated leakage benefits, our dWRMP set out a leakage reduction plan that achieves a 15% reduction by the end of AMP8. We felt that this presented a cost effective and sustainable long term solution that could be delivered through a variety of improvements such as innovative pipe and tank repair technologies, targeted pipe replacement and optimising water pressure on our network, without increasing expenditure on supply-side or demand-side options.

What our stakeholders told us:

Ofwat, Natural Resources Wales, Environment Agency and the Consumer Council for Water all challenged our proposal to spread the 15% leakage over two AMPs, feeling that this approach was not ambitious enough.

What we've done:

We have listened to stakeholders and policy makers and have included a 15% reduction in leakage in AMP7 with a straight line glide path from 2019/20 - 15% by end of AMP7; 29% by end of AMP8; 50% by 2044/45.

This is an incredibly stretching target. In our region, leakage reduction is not required to meet the supply / demand balance as our balance is currently in surplus; and this situation is not projected to change within the planning horizon. All of the additional activity to achieve the leakage reduction must be delivered within existing cash and affordability constraints that our customers have agreed to. We will be looking for ways of deriving multiple benefits from other investment areas, for example within our lead, pressure management and mains renewal plans. We believe the additional investment that we are making in 2018/19 and 2019/20 in monitoring, control, metering and systems will also help us target improvements in a cost effective way.

Work on the detailed leakage strategy will be completed by July 2019 and we will provide more detail on request to stakeholders after that date.

3.2 Metering

Previous Dee Valley Water WRMPs set out an ongoing approach to household metering that has been led by customer demand for the free meter option. To date, this has resulted in a meter penetration rate of 60% across the Wrexham and Chester Water Resource Zones (WRZs). In our draft WRMP, we proposed to continue this approach for AMP7 and beyond.

What stakeholders told us:

Natural Resources Wales, Ofwat and Environment Agency all asked for more clarity on our metering strategy, and how it would tie in with our demand management ambitions and the challenges of long term PCC reduction targets.

What we've done:

We see metering as key to delivering the long term demand reduction and lower Per Capita Consumption (PCC) ambition set out in the Welsh Government's Water Strategy for Wales and UK Government's 25 Year Environment Plan, as well as the ambition of our stakeholders and customers to use water wisely. As a result, we are including the introduction of proactive metering in our final WRMP for Hafren Dyfrdwy to align to the plans for the Severn Trent region. However, we are also mindful that, while Welsh Government recognise the role that metering has to play in encouraging reduction in consumption, they are also clear that any approach to metering would need to be delivered in conjunction with innovative charging structures in order to ensure that households with affordability issues are protected. We will need to work with them and other interested parties to develop a metering and demand management package that benefits and protects our customers while delivering reductions in water use.

Therefore, our current plan is for proactive metering to commence in AMP9. When assessing the benefits of a persuaded optant strategy (implementing metering through engagement and collaboration with householders), we have taken a precautionary approach to the demand management impact of an average 10% demand reduction. This is less than the 16.5% reduction reported by Southern Water, reflecting the fact that customers would not be forced to adopt measured charges. Our current thinking is that to secure the full benefits would require us to adopt an external metering policy and combine this with a policy of helping customers tackle supply pipe leakage on their properties.

Through both our trial in AMP6 and the yearly phase of the programme in AMP7, we will closely monitor meter installation rates and progress with the roll out. This will provide greater insight for implementation of our metering strategy in Chester WRZ in AMP9 and inform the plans for Wrexham and Powys. Based on current technology and processes, and the metering programmes of other water companies, either already delivered (93% Southern Water) or planned (95% Anglian Water), we believe that ambition beyond 95% is realistic, with innovation. A shortfall of 5% would only equate to a 4Ml/d deficit in our forecast demand savings, which, when spread across the Severn Trent region (where Chester WRZ now resides) would represent an increase of 0.4% on household demand, or the equivalent of 1.06 litres per household, meaning minimal impact in the Chester WRZ and our Severn Trent plan. We expect similar small impacts on the Wrexham WRZ and the Powys area (that was formally in Severn Trent's region). Given there is no supply deficit in the Wrexham or Powys areas, the impact on any shortfall in metering / demand management will be negligible. Close monitoring of the programme will allow us to continually assess the likely impact of metering shortfalls and develop further mitigation approaches. An example of a mitigation approach would be offering bespoke in-home audits, advice and devices including leak alarms for properties that we are unable to meter.

In developing our final WRMP, we will be separating our plans for England and Wales. Based on the views of customers and stakeholders we intend to align the metering strategies for the two plans, proactively installing meters in Wales and England. The Chester WRZ, which was part of our draft WRMP but will not be included in the final WRMP, will become part of our Severn Trent's WRMP. As there is no current or projected future supply / demand balance deficit in that zone, proactive metering will take place toward the end of the programme, in AMP9. Similarly, for customers in the Powys area who will be served our Welsh business, Hafren Dyfrdwy, along with former Dee Valley Water customers in the Wrexham WRZ, proactive metering will take place toward the end of the programme, in AMP9.

3.3 Drought Risk

A key change for WRMP19 is a greater focus on drought resilience and improving the links between WRMPs and Drought Plans. The problem characterisation exercise we carried out for the dWRMP identified that there was a level of concern regarding the future water resources situation for Wrexham and Chester.

Consequently, our approach to drought resilience was to test our plan using our baseline deployable output (DO) calculations which only include the drought scenarios observed in the historic records. We stated that we had planned our system so that it can withstand the drought patterns and severities observed over the last 89 years (with a suitable climate change allowance) without having to resort to the additional measures described in our Drought Plan.

3.3.1 Levels of Service

What stakeholders told us:

Ofwat, Natural Resources Wales and Environment Agency all challenged the robustness of our drought risk assessment, particularly in terms of the requirement to present the level of risk that we would have to implement restrictions. Following the dWRMP consultation period, Ofwat introduced a new metric which assesses the percentage of customer population at risk of experiencing severe restrictions (for example, standpipes or rota cuts as part of Emergency Drought Orders) in a 1-in-200 year drought, on average, over 25 years. This metric applies to all water companies, in England and Wales.

What we've done:

Although our draft WRMP included the annual average risk of a Temporary Use Ban (TUB) as 2.5% risk, we did not include the annual average risk of imposing an ordinary drought order, also known as a Non-Essential Use Ban (NEUB), or an emergency drought order (EDO). Table 3.1 below presents the annual average for three levels of water use restrictions across the planning period.

Table 3.1 - Annual Average Risk of Drought Restrictions for each AMP from 2020 to 2045

Drought Restriction	Our levels of services	2020-25	2025-30	2030-35	2035-40	2040-45
Temporary Water Use Ban	1 in 40 years (2.5% annual risk)	2.5%	2.5%	2.5%	2.5%	2.5%
Ordinary Drought Orders (Non-Essential Use Restrictions)	We do not anticipate the need for these	-	-	-	-	-
Emergency Drought Orders	We do not anticipate the need for these	-	-	-	-	-

The 1 in 40-year average risk for needing to implement Temporary Water Use Bans in our WRMP for the next period is consistent with the current (2013) Dee Valley Water WRMP. Our approach to NEUBs and EDOs also remains unchanged from the 2015-2040 WRMP which stated that Dee Valley Water “do not anticipate the need to introduce ordinary or emergency drought orders”. We are keen to highlight that no drought restrictions have ever been implemented in the Dee Valley Water region.

The text in our previous Dee Valley Water plan (WRMP14) stated below is still valid for the new WRMP:

“The River Dee is regulated by Natural Resources Wales according to the Dee General Directions: Normal General Directions and Drought General Directions (the ‘Directions’) under the D&C River Authority Act. Therefore Natural Resources Wales have statutory powers to change flows and abstraction rates in the river subject to the agreement of the Dee Consultative Committee. There are

no specific requirements for Drought Orders and no plans for Emergency Drought Orders associated with the Dee operational management.

The Directions specify the principles and detail under which the prescribed flows and abstractions must be reduced in a drought, more severe than the design drought; they stipulate measures that must be implemented as system storage crosses drought control curves.

Section 2.1.12 of the Directions states that companies must invoke a temporary use ban if they fail to achieve the reductions they are required to achieve within 7 days of the implementation date of the stage 2 cutbacks. Stage 2 cutbacks are envisaged once in forty years on average.

For a drought crossing the stage 3 control curve, all designated abstractors:

- Must introduce a temporary use ban (seasonally dependent).*
- Must make an application for a drought order to ban non-essential water use.*
- Make every effort to reduce demand on the Dee System by use of alternative sources.*

Section 2.1.12 of the Drought General Directions states that the stage 3 control curve has not been crossed in any of the historic drought sequences modelled.

Given that the ability to implement stage 2 cutbacks within 7 days of the implementation date is within our control, the only scenario in which a temporary use ban would be required is the crossing of the stage 3 control curve. Consequently we do not anticipate the need to impose any ordinary or emergency drought orders for supply-side actions.”

The Aquator water resource modelling that we carried out to quantify deployable output for the Chester and Wrexham WRZs includes the state of Dee General Direction Drought Stages for the full modelling period from 1927 to 2015. The state of these Drought Stages controls the maximum allowed abstraction at Bangor on Dee and the Dee at Chester; this includes the abstraction cutbacks required within 7 days of a Stage 2 situation. Our approach to modelling supports the above statement in our previous WRMP that a TUB would only be implemented under a Stage 3 situation and baseline deployable output has been calculated taking Stage 2 cutbacks into consideration. This results in no need for a TUB at Stage 2.

The annual average risk of drought restrictions does not vary across the planning period. Neither the Chester nor Wrexham WRZs have a projected future supply / demand balance deficit. Therefore, we assume that the risk of drought restrictions remains unchanged.

3.3.2 Drought Risk Resilience – Chester WRZ

What stakeholders told us:

The Environment Agency requested that the part of Dee Valley Water region transferred to Severn Trent should be tested for resilience to a 1 in 200 year drought.

What we've done:

In the Dee Valley draft WRMP we described how the problem characterisation exercise identified that there is a low level of concern regarding the future water resources situation for Wrexham and Chester. Consequently, our approach to drought resilience in draft WRMP was proportional to this problem characterisation- following a 'Risk Composition 1- conventionally tested plan' approach as defined in the UKWIR (2016) WRMP 2019 Methods – Risk Based Planning document. This means that the drought scenarios we used to test our plan included only those observed in the historic record which are included in our baseline deployable output

calculations. This baseline modelling period (1927 to 2015) captured a number of drought events including 1933-34, 1995-96 and 2010-2011.

Further work is needed to enable us to demonstrate that we are resilient to a 1 in 200 year drought in the Chester WRZ, and we will need to carry out the following steps:

- Step 1: Derive a synthetically generated series of river flow data for the Dee Valley catchment.
- Step 2: Estimate the river flow volume of a 1 in 200-year drought event using the inflow data used in the Dee Valley Water Aquator model and the River Dee Natural Resources Wales Aquator model – this known as the ‘target flow’.
- Step 3: Search the synthetic flow series derived in Step 1 for the ‘target flow’.
- Step 4: Input the ‘target flow’ data into the old Dee Valley Water Aquator model and the River Dee Natural Resources Wales (NRW) Aquator model.
- Step 5: Run the River Dee Natural Resources Wales Aquator model with the ‘target flow’ data to define what river abstraction ‘cutbacks’ would be imposed on the Dee Valley Chester WRZ.
- Step 6: Input the cutbacks information derived in Step 5 into the Dee Valley Water Aquator model.
- Step 7: Run the Dee Valley Water Aquator model for the Wrexham and Chester WRZs using the ‘target flow’ data and cutbacks data to define the deployable output of a 1 in 200-year drought.

Due to the nature of this work requiring input from multiple stakeholders including NRW and United Utilities, this may not be available in time for the Severn Trent final WRMP. If the work has not been completed in time for the final WRMP, Severn Trent have committed to providing this information during the WRMP annual review process.

4. Technical updates to our draft WRMP

4.1 Abstraction Incentive Mechanism (AIM)

Ofwat's February 2016 Abstraction Incentive Mechanism (AIM) guidelines state 'no water company wholly or mainly in Wales has proposed an AIM site, and the environmental information we currently have does not suggest there is a need for them to do so. We therefore expect the AIM guidelines will only apply to water companies wholly or mainly in England. However, if a water company wholly or mainly in Wales chose to volunteer an abstraction site for the AIM we would expect that company to follow the AIM guidelines.'

Our new Hafren Dyfrdwy company aligns to national boundaries and will be wholly in Wales. We have however considered our abstraction sites within Hafren Dyfrdwy to determine if we have any sites that we could volunteer for AIM. This is in line with Ofwat's PR19 final methodology Appendix 2.

The final methodology states that for PR19 there is an expectation that we utilise Natural Resources Wales' National Environment Programme (NEP) as a starting point for AIM site identification and selection. The Welsh NEP was finalised in March 2018. As evident from the NEP there are no identified sites where a reduction in abstraction will provide an environmental benefit. The only Water Resources NEP actions identified relate to eels and invasive non-native species (INNS). In accordance with Ofwat's AIM methodology, as no suitable AIM sites were identified through the NEP, we have examined our sites in greater detail to determine their suitability for inclusion in AIM.

Hafren Dyfrdwy has 8 abstraction sources. Table 4.1 below summarises these abstraction sources and outlines any existing mechanisms in place to ensure sustainability.

Table 4.1 - Hafren Dyfrdwy abstraction sources and existing mechanisms for sustainability

Abstraction source	Existing Sustainability mechanism in place	Details of mechanism
Abersychnant	Yes	Compensation flow to ensure flow in river does not reduce to less than 136.68 cubic metres per day, and to protect other licensed abstractors' rights
Nant y Ffith	No	N/A
Nant yr Crogfin (Pant Glas)	Yes	Transfer to impoundment reservoir which has a compensation regime
Oerog	Yes	Compensation requirement of 12.5% of flow from spring
Pendinas and Llyn Cwfyfnyw	Yes	Compensation regime requirement
Penycae	No	N/A
Twll	Yes	Dee General Directions
Ty Mawr and Cae Clwyd	Yes	Compensation regime requirement
Abersychnant	Yes	Compensation flow to ensure flow in river does not reduce to less than 136.68 cubic metres per day, and to protect other licensed abstractors' rights
Nant y Ffith	No	N/A
Nant yr Crogfin (Pant Glas)	Yes	Transfer to impoundment reservoir which has a compensation regime
Oerog	Yes	Compensation requirement of 12.5% of flow from spring
Pendinas and Llyn Cwfyfnyw	Yes	Compensation regime requirement
Penycae	No	N/A

The two sources that have no mechanism in place are both reservoirs. As such, it is not appropriate to reduce abstraction from these sources for the purposes of AIM as this will not have the desired flow improvements that Ofwat expect from their incentive mechanism. Reducing abstraction from a reservoir will not improve downstream flow as flows are regulated from impounding reservoirs regardless of the quantity of abstraction that takes place. The sources identified where there is a mechanism in place already have had this mechanism approved by Natural Resources Wales or the Dee Consultative Committee assisted by Natural Resources Wales. The Regulator has the opportunity to assess the need to amend any environmental/flow obligations as new environmental information becomes available, in conjunction with discussions with Hafren Dyfrdwy. As it stands the Regulator has not identified any site through the NEP requiring a mechanism in place to ensure sustainable abstraction. This means that AIM is inappropriate as an incentive to reduce abstraction to enhance surface water flows as they are already sustainable or have the mechanisms in place to ensure continued environmental protection.

Taking into consideration the information presented above, it is evident that AIM is not appropriate for any of our sources within Hafren Dyfrdwy and therefore no AIM performance commitment is being proposed for PR19.

4.2 Biodiversity and catchments

Since November 2015, a catchment management programme has been in place for the Dee Catchment, jointly funded by Dee Valley Water and United Utilities. Primarily this programme was driven by risks to drinking water quality from metaldehyde and other pesticides entering waterbodies within the catchment.

The programme funds two Catchment Advisors (CAs) - employed by the Welsh Dee Trust – to cover the Middle Dee and the Upper Dee catchments. Initially their key role was to engage with landowners, farmers and local pesticide suppliers with the aim of reducing the use of metaldehyde and other problematic pesticides in the catchment. They managed and promoted a number of initiatives to meet this aim including:

- Provision of subsidised MOTs for sprayers and weed wipers;
- A free weed wiper hire scheme and accredited sprayer and weed wiper operation training;
- Subsidised ferric phosphate slug pellets to encourage use of these as an alternative to metaldehyde pellets.

Interest in the various activities and offers has been high. The actual uptake in some cases has been quite slow but we have seen a gradual increase in both uptake and willingness to engage with the programme.

The CAs have developed a good working relationship with farmers across the catchment and have run several reed / pasture management events which enable the demonstration and sharing of best practice. In addition, the CAs regularly attend local agricultural shows and events to raise awareness of the programme and have developed a good network of contacts with local suppliers, agronomists and special interest groups within the farming community to share the messages.

We recognise the significant benefits that can be gained from the catchment management approach, both in terms of environmental improvements such as contributing to meeting Water Framework Directive (WFD) objectives, and in water treatment cost savings that can be passed on to our customers. Hafren Dyfrdwy will continue to work in partnership with United Utilities for the remainder of the current AMP (until 2020). We are also proposing to extend our investment in catchment management activities in the Welsh part of the Dee catchment, as well as looking for new opportunities in our Powys supply area, in the next AMP (2020-2025).

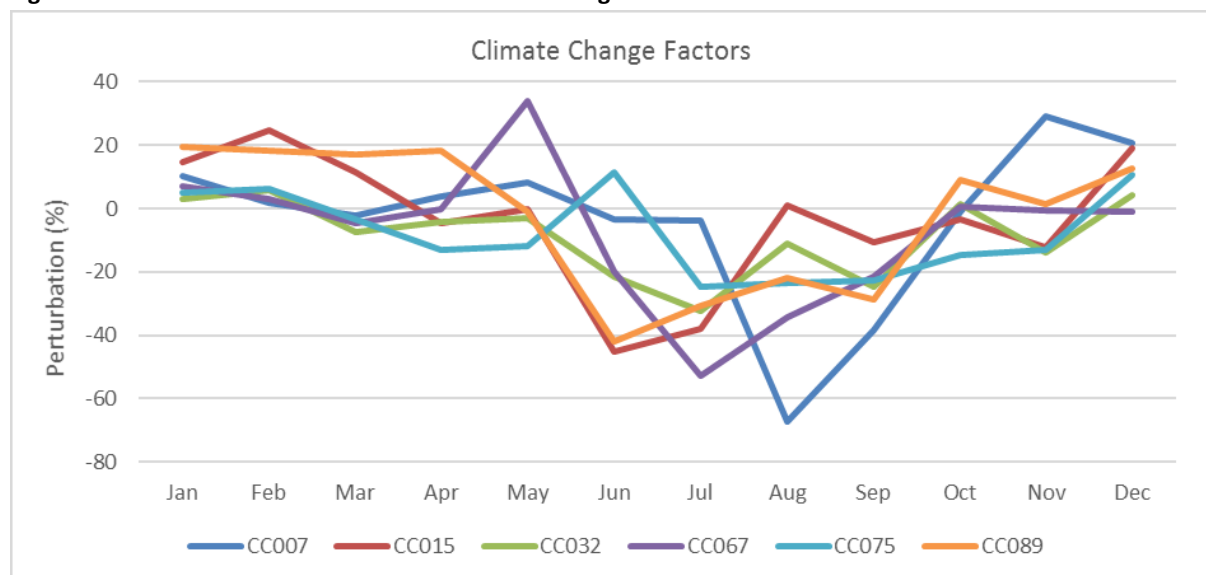
During the consultation of our draft WRMP, we received a comment regarding the use of regulatory measures when voluntary measures are insufficient to protect water sources and customer interests. Our CAs offer advice and guidance on legislative requirements when carrying out farm visits. However, our schemes are voluntary and are designed to enable farmers to go above and beyond good agricultural practice rather than specifically to meet regulatory requirements. Where there is evidence that voluntary measures are insufficient to meet these requirements, and all voluntary measures have been exhausted, then we will liaise with the appropriate regulators.

As stated in section 5 of our draft WRMP, we are looking to build on our catchment successes by expanding the offer to landowners and looking for additional partnership opportunities. We will continue to work with the partnership groups within the catchment to identify opportunities for collaboration and widening the benefits to the environment and local communities. We will continue to work with our neighbouring water companies and other partners to engage with policy makers within the Welsh Government and Natural Resources Wales (where appropriate) to seek improvements to regulation and policies which could adversely impact our catchment management objectives.

4.3 Climate change and uncertainty

During preparation of our draft WRMP we carried out an assessment of the potential impacts of climate change on both the Wrexham and Chester WRZs. Natural Resources Wales (NRW) tested 100 scenarios, based on the UKCP09 projections. They used six scenarios, sampled across the range of 100 scenarios, to generate climate change impacted versions of the abstraction tables from the Dee General Directions. We used these six scenarios to inform the climate change deployable output (DO) modelling. Monthly climate change factors were applied to the baseline inflows to the Dee Valley Water reservoirs previously generated using a resampling procedure. This created a perturbed time series of flows for each of the six climate change scenarios, and similarly, new time series for the NRW imposed cutbacks were created for each scenario. Figure 4.1 below shows the flow factors for the six climate change scenarios considered in our analysis.

Figure 4.1 - Flow factors for the selected climate change scenarios



As the Chester WRZ is 100% consumptive, the most efficient way to apply the reduction due to climate change was at the Dee Chester abstraction point. The cutback levels remained the same as included in the baseline run, as did the maximum allowable abstraction parameters.

The average DO of the Wrexham WRZ across the six scenarios was 50.7MI/d compared to a baseline DO of 51.2MI/d, implying a median climate change impact on DO of 0.5MI/d (0.53 MI/d in the peak month of July). We used this median impact to inform the reduction in baseline DO reported in the water resources planning tables for Wrexham WRZ.

The target headroom assessment used for our draft WRMP included an allowance for climate change based on the median climate impacts in the Wrexham WRZ. We have reassessed target headroom using wet (CC075) and dry (CC015) climate change projections provided by NRW as part of our original climate change modelling assessment. Under these scenarios the maximum reduction in baseline deployable output is 0.7MI/d (-1.3%), whilst the minimum reduction is 0.3MI/d (-0.6%). The headroom score is the same for all 3 scenarios, meaning that no change is required to the target headroom reported in the water resources planning tables.

4.4 Customer engagement

Since our draft WRMP was published we have continued our customer engagement programme, and the evidence we included in our PR19 submission is much more extensive than that included in our draft WRMP. Our customer engagement approach for our WRMP has been tailored taking into consideration the fact that, based on the supply and demand projections set out in this WRMP19, we believe that we will remain in supply surplus for the planning period. As such, we are not considering any 'supply-side options' (i.e. new sources or water trading). Therefore we have been proportionate with our customers' money and have not done research on topics such as supply-side solutions.

We have explored customer views on aspects of the WRMP, including leakage, resilience and water efficiency using a range of insight sources. We have also engaged stakeholders on topics such as catchment management. We have used research techniques ranging from deliberative research, co-creation, depths with customers in vulnerable circumstances, quantitative research including stated preference research and our regular customer tracker. We have also reviewed complaints data as many of the service issues in this outcome are amongst the top causes of complaints, including leakage. We've used a range of insight to understand our customers' views as demonstrated in Table 4.2.

Table 4.2 - Our approaches to understand our customer's views

Approach	Purpose
Customer needs research and co-creation	Improves our understanding of customers' needs especially when service failures occur, what is important to them, and how they might engage with our water efficiency messages.
Valuation research	Quantifies the importance of reducing leakage in the context of our other areas of service.
PC and ODI research	Explore customers' views of performance targets and incentives
Asset health and resilience deliberative research	Explores customer views on asset health and resilience through deliberative workshops with current and future customers, and depth interviews with non-household customers.
Insight from customer facing employees	Tells us what our customer facing employees feel are the most important and prevalent sources of customer dissatisfaction.
Customer tracker	Tracks customer satisfaction, value for money and other metrics over time, including deep diving into specific topics such as water efficiency.
Joint water trading research	Explore customer views on water trading – a joint project commissioned alongside United Utilities, Thames Water and Severn Trent. This included a sample of customers in Wales and a small sample of Hafren Dyfrdwy customers.
Operational insight	Expands our understanding of the causes of customer dissatisfaction using complaints and voice of the customer feedback.

Our customer insight programme tells us that customers and stakeholders want us to be more ambitious in our leakage and demand management thinking, and we believe that going forward we can better meet these expectations in an affordable way. We have listened to our customers and stakeholders and have adjusted our WRMP in the areas of leakage, water efficiency and catchment management as described in Table 4.3.

Table 4.3 - Adjustments to our WRMP in response to customer and stakeholder feedback

Area of our WRMP	Our response and adjustments
Leakage	We are proposing a 15% leakage target in AMP7, following feedback from customers and our Customer Challenge Group. This is a change from our initial proposal of a 15% target over 2 AMP periods (AMP7 and AMP8).
Water efficiency	We will work more closely with our customers to explore opportunities for increasing and understanding water efficiency and demand management messages.
Catchment management	We will build on our current catchment management programme and explore opportunities for achieving wider environmental benefits by working with landowners and other partners to encourage more sustainable working practices.

Further details of the findings from our research

A reliable supply of tap water is a basic customer expectation voiced in almost all the research that we have conducted. Our customer needs research shows that customers take their water supply for granted, and ensuring water is always there is a basic need that, once met, is not given much further thought. Our asset health and resilience research tells us that a customer’s previous experience with their water company when issues arise can reduce trust (if not dealt with well). However, in contrast, having a continuously reliable service does not necessarily improve or increase the level of trust.

Leakage

Our Willingness to Pay (WTP) research shows that reducing leakage is a priority for improvement for household customers, however the WTP valuation in Powys was zero for household customers. It may be that leakage is a high priority for customers, but they feel this should be funded by the company and not by themselves.

Reducing leakage also emerges as a top priority in the customer tracker survey, in the context of activities that we should be doing more of in order to protect or improve the natural environment. We established that 5% of customers in Powys, and 7% in Wrexham, said they had noticed leakage in the past year. This causes dissatisfaction, particularly when repairs are not undertaken efficiently. A sample of customer comments include:

“They fix it and then it bursts again and again and all the water keeps going in my garden.”

Household customer, Wales tracker, wave 4.

“It did not affect me, but water was running down the street for about two weeks before it was repaired.”

Household customer, Wales tracker, wave 4.

“[Dee Valley Water should] make sure that leaks are fixed quickly and give information about the leaks.”

Household customer, Wales tracker wave 4.

Our insight from customer facing employees also confirms that leakage is an important front of mind issue for customers, particularly as it attracts media attention, especially during hot weather. Our complaints data shows that leakage is one of the most common complaints that we receive.

In our [PC and ODI research](#) we found that 71% of household customers, and 69% of non-household customers, considered that our proposed leakage target was acceptable (the target presented in the research was a reduction of 7.5%). This was the lowest acceptability of all the performance commitments presented, and there were also significant differences between household customers in Powys and those in Wrexham. The qualitative discussion gives us some insight into why this is the case. Customers unanimously believed that reducing leakage is good, but felt that the current and target levels were too high, even if the water company is performing comparatively well. Conversely, some customers informed us that they considered our leakage reduction target to be stretching.

In the context of ODIs, reducing leakage was the top priority for outperformance beyond the target. We have listened to this feedback from customers, and to that of our Customer Challenge Group, and are now proposing a 15% leakage reduction in AMP7.

Customer views on water efficiency and per capita consumption

Our insight programme shows a mixed picture between customers actively saving water, and those who feel that water is “actually quite cheap, and used without thinking”. For example, in our willingness to pay research we asked customers to identify which of the following statements best reflected their views on the value of water. The responses we received are collated in Table 4.4.

Table 4.4 – Customer views of the value of water

Which one of the following statements best reflects your views on the water supplied at your home?	Powys (N=250)	Wrexham (N=255)
Water is a scarce resource and society should conserve its use.	39%	49%
Water is a free good, from the sky, and we people should not have to pay for it.	11%	8%
Water is actually quite cheap – we use it without ever thinking how much it costs.	50%	38%

Our [customer needs research](#) reveals that some customers are active ‘water savers’. Saving water for them involves a variety of practices such as installing water saving devices, using water butts and recycling dishwater and bath water. Motivations to be water efficient seem on the surface to be primarily driven by cost savings, yet some customers in Wrexham and Powys described being environmentally motivated:

"My main reason for conserving water is to keep the costs down"

Customer needs research, customer with health and well-being vulnerabilities.

"Generally we try to be careful with water because of the environment"

Customer needs research.

However, the majority of the workshop participants and customers visited at home were not actively doing anything to save water. These results need to be considered in context. The customer needs project was a relatively small scale qualitative piece of research, however these provide an interesting comparison to other sources of evidence. Some customers are surprised when they consider the amount of water people use on average per day, as noted by one customer:

"133 litres per person per day - good grief. If you think about 133 litre bottles of water stacked next to each other - that's a crazy amount!"

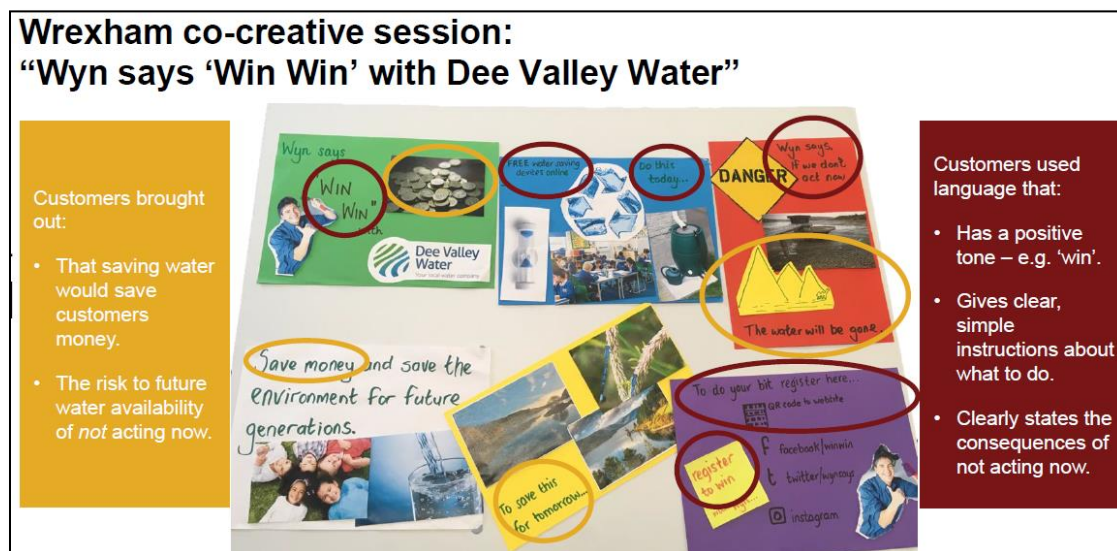
Customer needs research, Wrexham

There is an appetite for more engagement in this area. The customer tracker research told us that some customers would like to know more about how to reduce their water usage. There is also customer interest in us doing more to provide free water saving devices, as part of a range of activities that customers could carry out to protect or improve the natural environment. We identified that 52% of customers think we should be doing more to offer water saving advice to those on a water meter.

Our insight from customer facing employees tells us that, although not always front of mind, some customers want reassurance that we are protecting the environment and that there will be enough water to meet customer needs in the future.

Within the co-creation workshop we asked customers to work with colleagues to help design water efficiency messages. Figure 4.2 provides an example of one of these messages. Some of the things that resonated with customers were using tangible examples of water usage volumes (e.g. conversion of technical measures of water usage such as cubic litres/metres into the number of bathtubs of water) and giving simple instructions about what customers need to do to reduce their usage.

Figure 4.2 - Example of an output from our Co-creation workshop



Drought risk

We did not discuss drought risk with customers, since no improvement is required for this measure (we will maintain the current 0% of customers at risk of severe restrictions during in drought), and our stakeholders and employees tells us this is not a front of mind issue in Wales. Our joint research on water trading (with United Utilities, Thames Water and Severn Trent, which included a sample of customers served by water companies in Wales) informed us that customers do not expect drought to be something that will happen in Wales :

“It is a frightening thought that some areas might suffer from a severe shortage of water in such a short amount of time. It will not affect me personally in Wales but I have many friends living in areas that are facing problems in the future. It is a strange concept to think about water shortages in the UK.”

Water trading research, household customer in Wales .

“As far as concerns go, I do not have any as where I live there is no shortage of water and I doubt if there ever will be.”

Water trading research, household customer in Wales .

4.5 Decision making and assurance

4.5.1 Impact of company boundary change

Understandably, several of the consultation responses dealt with our New Appointments and Variation (NAV) application to Ofwat to change the company boundaries of Severn Trent Water and Dee Valley Water, and the impact this will have on the WRMPs for each company. Figure 2.1 in Section 2 shows the new boundaries of Severn Trent Water - which is now wholly based in England - and our new company, Hafren Dyfrdwy, which is wholly based in Wales.

Both Severn Trent and Hafren Dyfrdwy customers should expect their respective WRMPs to uphold requirements to ensure there is sufficient water to meet demand over the long term. We recognise that the draft WRMPs were published based on the old licence boundaries with the subsequent consultations carried out on this basis. The final WRMPs will respond to feedback received and will be based on the new boundaries.

4.5.2 Cost benefit analysis

In some of our consultation responses we were asked to provide a clear summary that concisely explains how, and by whom, the preferred portfolio was decided and the decision making method that we employed.

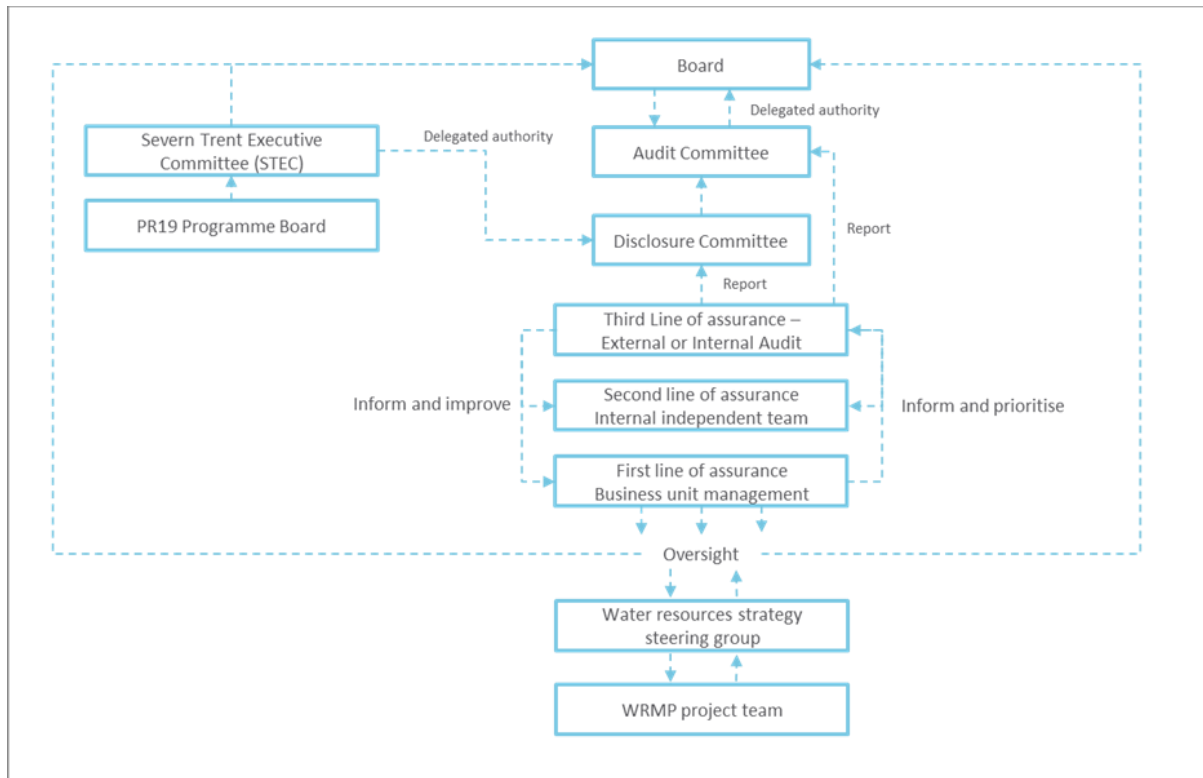
We followed the principles of the UKWIR (2002) Economics of Balancing Supply and Demand (EBS D) method to develop our unconstrained list of options and used a checklist to screen and rationalise the number of options being progressed further. However, we do not forecast a supply/ demand balance deficit in either Wrexham or Chester WRZs during the planning horizon. Consequently, no significant supply-side or demand-side options were proposed that required detailed financial modelling.

4.5.3 Governance and assurance

Throughout the development of our WRMP we have used a rigorous approach to ensure appropriate governance and assurance around our decision making.

Our Board's decision making and our public reporting to our customers and other stakeholders relies on sound information. We have established processes in place for ensuring risk-based assurance, using a three-lines of defence model with a clear delineation of accountabilities. Figure 4.3 illustrates the governance and assurance structure used in the decision making that informed our draft WRMP and our wider PR19 investment plan.

Figure 4.3 - Our draft WRMP governance and assurance structure



4.6 Demand forecast

While most aspects of our demand forecast were accepted by stakeholders, we were asked to clarify methodologies in relation to our per capita consumption (PCC) calculations.

The future trends in baseline PCC micro-components beyond 2030 was based on a number of elements. Firstly, the trend data for each appliance was sourced from:

- a) Defra's Market Transformation Programme (MTP) produced product summaries for various water using appliances in 2011. These provide predictions of water use for appliances and devices in 2030 for three scenarios:
 - Reference scenario (equivalent to baseline forecast).
 - Policy scenario (assuming more effective implementation and accelerated take-up of more sustainable products).
 - Early Best Practice (EBP) (which assumes a more positive impact than the policy scenario and an early take up of innovative water efficient products).

Source: <http://efficient-products.ghkint.eu/cms/product-strategies/subsector/domestic-water-using-products.html#viewlist>

- b) Severn Trent Water's Final Water Resources Management Plan 2014, Appendix B, Section B2.12 Forecast O, F and V assumptions
- c) Waterwise appliance volume per use trend data (for washing machines and dishwashers) for 1999 and 2003.
- d) Severn Trent micro-component data from 2015/16.
- e) WRc's reported micro-component data from 2002-2004.

We carried out a process of data interpretation and analysis on the trend data sources to provide us with sufficient data for the entire WRMP planning period. These form a series of assumptions that are bespoke to each PCC micro-component as described in Table 4.5.

Table 4.5 PCC Micro-component trend assumptions

Micro component	Source	Assumption
Water Closet (WC) flushing	a) and b)	The MTP Reference scenario data was used to establish a trend from 2030 to 2040. This was extrapolated at a constant slope for the remainder of the planning period.
Shower and baths	a)	Consumption volumes per day were assumed to plateau at the MTP reference scenario in 2030 and remain constant (on a flat level) over the remainder of the planning period.
Washing machines and dishwashers	c), d) and e)	The source data was used to establish a linear trend from 2000 to 2016. After this time, we assumed this trend would continue for baseline demand (essentially assuming that incremental changes in water saving would continue).

We also developed relationships (from various micro-component studies) between household occupancy and each of the following: WC flushing, shower use, bath use, tap use and washing machine use. Therefore the trends from 2030 onwards are developed in two stages:

- Firstly a trend is established based on technology and behaviour from the sources (a) to (e), for WC flushing, shower, bath, washing machine and dishwasher volumes.
- Secondly, this trend is modified by the relationships between occupancy and WC flushing, shower, bath, tap and washing machine use; and the changing occupancy per year in each zone.

4.7 Natural Capital

As a company we look for solutions which are the most environmentally beneficial. Incorporating natural and social capital into our decision making processes will allow us to quantify and compare the environmental and social benefits of each scheme. For our Welsh supply areas, we will consider how to incorporate this approach while contributing to the delivery of sustainable management of natural resources and the Welsh Government's well-being goals.

The working group for the UKWIR Implementing Ecosystem Service and Natural and Social Capital Accounting Approaches project, led by the consultants eftec, created a tool intended for water companies to incorporate Natural and Social Capital into PR19 business decisions and beyond. Severn Trent have commissioned eftec and Stantec, as experts in this area, to work with them on a number of case studies to investigate the practicality of this tool when applied to both PR19 and wider business decisions; we will work with our Severn Trent colleagues to identify any suitable Welsh case studies.

We are working closely with Natural Resources Wales and other key stakeholders to feed into the development of Area Statements which will provide localised evidence bases to enable us to prioritise our biodiversity activities during AMP7 and beyond. Where there are synergies to the natural capital approach, we will work with colleagues in Severn Trent to achieve common goals.

4.8 Resilience

We recognise that our draft WRMP focussed primarily on drought resilience, and that there are a much wider range of risks that have the potential to adversely affect our water resource assets. In addition, our PR19 plan includes a section on ‘Resilience in the Round’ and our final WRMP signposts to any planned works in AMP7 and beyond which will provide water resource benefits.

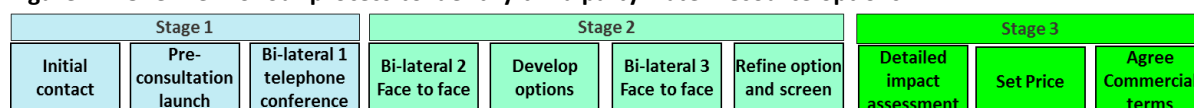
We have therefore expanded section A2.2.3 of Appendix A, titled ‘Resilience to flooding events’ in our draft WRMP, with a section discussing a wider range of issues with the potential to impact on resilience. The issues that we have considered further include:

- Response to pollution events on the River Dee**
 Our bankside storage reservoirs at Marchwiell, Wrexham and Boughton, Chester and treated water storage reservoirs at our Wrexham and Chester treatment works provide us with sufficient storage (for each WRZ), should we have to cease abstraction in the event of a pollution event on the River Dee. We are members of the Dee Steering Committee which oversees the DEEPOL notification system, providing early warning to abstractors of pollution events in the Dee catchment. Through our catchment management programme, we have actively engaged with a wide range of businesses who have the potential to negatively impact waterbodies through their activities, to help them identify best practice and advise on pollution prevention techniques.
- Ingress of saline / brackish water at our Chester intake**
 Our abstraction point in Chester is within the upper tidal limit of the River Dee. At periods of high tide, there is a significant risk of ingress of saline water. Our treatment works are not designed to treat this type of water and the saline water has a corrosive effect on metal over an extended period of time, damaging our pumps and significantly increasing maintenance costs. Therefore, the control room at our Chester site carry out daily checks of the tide tables and cease abstraction during periods when the tide is predicted to be above 9.5m, as measured at Gladstone Docks, Liverpool.
- Freeze-thaw events**
 We will consider the lessons learnt from the significant freeze-thaw event which occurred in March 2018 and the resulting actions that we need to be put in place. Any interventions that we implement which affect our water resource assets will be reported on in the annual WRMP review.

4.9 Trading

We used a three stage approach to identify third party water resource options as outlined in Figure 4.4. The approach covered both the potential imports and exports.

Figure 4.4 Overview of our process to identify third party water resource options



Stage 1 - communicate need and opportunities

We approached potential third party suppliers inside and outside of our region to inform them of the opportunities for water trading. To do this we used multiple channels to ensure the broadest involvement, for example:

- through our pre-consultation letter;
- by invitation to water resource management plan technical workshops in Wales;

Stage 2 - develop technically viable options

Following Stage 1, we met with all interested parties on a one to one basis to understand each other's specific needs and capability. We worked up options separately and then reviewed jointly to confirm option viability and that any risks were understood. We then carried out further feasibility to determine the outline costs and benefits in readiness for inclusion in our decision making process. We treated third party options in the same way as internal options in the screening approach.

Stage 3 - Agree which options to pursue and outline commercial and pricing arrangements

The outputs from our least-cost modelling exercise give a shortlist of options to be further reviewed between the draft and final version of our WRMP. During this time we will explore the commercial terms with our import and export partners.

We started this water trading engagement process in 2016 and completed the end of stage 2 by October 2017. As all our water resource zones are in supply surplus there is little opportunity for new imports. The outcome of the discussions were;

- Dŵr Cymru Welsh Water
 - No further imports are required over the resilience connection at Bretton (commissioned in 2018).
 - The viability of a small export from our Llanwrin source near Machynlleth to Corris is being assessed.
- United Utilities
 - No viable transfers were identified following analysis of opportunities around Chester and South Cheshire.
 - The opportunity to transfer the licence from our source at Plemstall to UU remains under investigation.
- Severn Trent
 - No viable transfers were identified following analysis of opportunities north Shropshire.

There are no current plans to trade water from Hafren Dyfrdwy. Should this position change we will consult fully with NRW and the Welsh Government.

4.10 WFD No Deterioration

When the Environment Agency issued their initial deterioration risk assessment on groundwater abstractions in September 2016, Dee Valley Water's borehole abstraction at Plemstall near Chester, was identified as having a potential impact on nearby waterbodies. In response, we put forward the proposal that we would seek a voluntary licence reduction to reduce the maximum daily abstraction to a sustainable level.

However, when the Environment Agency issued the Water Industry National Environment Programme version 3 (WINEP3) for Dee Valley at the end of March 2018, it confirmed that the abstraction had been re-categorised and the final sustainability driver would require us to investigate and undertake options appraisal for preventing deterioration of ecological status from flow pressures. Therefore, it has not been necessary to initiate any sustainability changes to the licence at this time, and it is now unlikely that any licence changes will be agreed until after March 2022, the deadline for completion of the investigation.

Natural Resources Wales (NRW) have not identified any of what are now Hafren Dyfrdwy abstractions in their WFD no deterioration investigations to date. We are not considering any new water supply-side options in our WRMP but we will consider to work closely with NRW to ensure that our current abstractions, and any other activities on or near vulnerable waterbodies, continue to support 'good' status and not pose a risk of deterioration.

5. Next Steps

This Statement of Response describes how we have taken account of stakeholder feedback on our draft WRMP. We have described in Section 3 how we have changed our draft WRMP in response to the feedback we received. This section also provides further detail of our approach and decision making that led us to make these changes.

We also received stakeholder responses asking us to provide more explanation of our methods, assumptions and decisions. These responses have not led us to change the recommendations made in our draft WRMP. We have provided detailed responses to these stakeholder requests in Section 4.

We now await confirmation from the Secretary of State that we have approval to publish our final WRMP. Once we receive this confirmation we will publish the full WRMP document along with accompanying data tables, incorporating the changes and additional points of detail described in this Statement of Response. We will also update the water resources Market Information data tables.

We expect to publish the final WRMP and accompanying information in early 2019.