Dŵr Cymru Welsh Water

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Water Resources

September 2018

Dŵr Cymru Welsh Water

Contents

Executive summary

Driver for investment

Investment in Water Resources assets is driven by our need to manage a supply of raw water of expected, consistent and manageable quantity and quality to meet our customer expectations for drinking water and our legal duty to supply drinking water under the Water Industry Act 1991.

We prepare and consult on a Water Resources Management Plan (WRMP) and a Drought Plan every 5 years. The WRMP identifies forecast shortfalls in our supply against demand balances over the long term and sets out the actions we need to take to resolve these. Our Drought Plan sets out how we would respond operationally to a drought event more severe than that we have assessed in or WRMP. Taken together these plans highlight the need for greater resilience within our supply systems.

In our Water Trading Prospectus we make it clear that we are willing to trade with other water companies and with third parties – we already have more than 20 bulk water trades in place, the most significant of these by volume is the Elan Valley bulk supply, where we export more than 100,000 Ml per year to Severn Trent, for it to supply its customers in Birmingham.

We believe water trading can play a part in supporting the economy, as long as it is done in a sustainable way. We support the position set out by the Welsh Government that water trading must benefit Wales and the people of Wales, and not jeopardise our own business and the customers we serve. We must ensure we meet new environmental obligations in AMP7, as identified through Natural Resources Wales' Water Resources and Water Quality National Environment Programmes (WR NEP and WQ NEP) and the Environment Agency's Water Industry National Environment Programme (WINEP). These environment programmes outline the improvements we need to make to comply with new or amended environmental legislation and identifies investigations needed to inform, in an evidence led way, potential investment requirements in subsequent AMP periods.

In addition we have a statutory requirement to ensure that the Dams we own are maintained, meet current legislation and meet current best practice. In recent year's climate change and a move to a more risk based assessment approach has led us to increase our activities in this area so that the risk of failure and potential subsequent loss of life is reduced to a minimum of those seen as best practice within the worldwide and UK Dam Safety industry.

The Drinking Water Inspectorate (DWI) approach to drinking water safety plans (DWSP), which is itself a risk based approach, supports our approach to managing deteriorating raw water quality. We have shown that there are inherent risks associated with all our raw water supply catchments, DWSPs have highlighted a cluster of catchments within the Brecon Beacons. In response to this identified need to manage the deteriorating quality we have created our Water Source approach, which develops catchment management options that cross the whole of our operating area, as the first line in the company's defence to ensuring clean, wholesome water for all.

The investment

We propose to invest £80.98 million during AMP7 to maintain and enhance our water resources. We have identified £8.50 million of efficiencies within this plan.

The breakdown of our proposed investment is shown in Table 1. Extensive customer engagement was undertaken, together with consultation with our internal and external stakeholders. Performance and investment options were reviewed with our Water Resources, Water Assets, Finance and Regulation teams, and by our Executive team.

Programme of work	AMP7 Base Investment	AMP7 Enhancement Investment	Total AMP7 Investment
Catchments		£27.824m	£27.824m
Water Resources NEP		£6.184m	£6.184m
WRMP and DP		£31.826m	£31.826m
Abstractions	£7.006m		£7.006m
Bulk Meters – Abstraction	£0.875m		£0.875m
Trunk mains Intake and source	£1.029m		£1.029m
Water Pumping Stations Intake and source	£4.487m		£4.487m
Water Resilience		£1.751m	£1.751m
Total programme	**£13.397m**	**£67.585m**	**£80.982m**

Table 1: Water Resources Investment programme for AMP7

Delivering for our customers

This work will meet the following customer promises:

Safe, Clean water for all: Provide clean, safe water for all our customers while maintaining service.

Safeguard our environment for future generations: By working with others to protect and enhance the environment we can ensure improvements are sustainable for future generations to come.

A better future for all our communities: A more integrated approach to water resources management planning and environmental improvements will improve the natural environment for people, and help communities create a better future for themselves.

Delivering for the future

In Welsh Water 2050, we identified a number of future trends which will impact on the way we operate now and in the future. Our proposed investment for water resources will ensure that we can continue to meet the service requirements of our customers in AMP7 while carrying out research into the impact from these future challenges. The main trends driving this investment are:

Change in customer expectations: Customer expectations are likely to change dramatically with a desire for a more personalised service and control over their use of services and less tolerance of service outages. This will particularly be the case for business customers.

Demographic change: Population growth will lead to increased water demand in certain areas and an ageing population may lead to more customers in vulnerable circumstances. However, opportunities will emerge to develop a more diverse age profile in the workforce.

Climate change: Climate change will result in more extreme rainfall events, which could lead to an increased risk of flooding and pollution. Drier hotter summers are projected, which could result in water supply deficits and the potential for increased water demand.

Environmental change: Invasive species, land use change and an increased risk of environmental pollution may lead to a reduction in water quality and biodiversity. However, co-operative approaches for the delivery of enhanced ecosystems services could lead to better environmental outcomes.

Protecting essential infrastructure: Our ageing assets (and those of our energy providers) present significant issues with reliability and resilience.

Policy and regulatory change: Changes in policy and regulation are expected due to the UK leaving the European Union, devolution and changing quality standards; this creates uncertainty, but provides the opportunity for us to help shape future policy.

Delivering our Strategic Responses

In Welsh Water 2050, we set out to deliver 18 Strategic Responses. This investment will contribute primarily to the following Strategic Responses:

Strategic response 1: Safeguarding clean drinking water through catchment management – Management at catchment level to improve raw water quality and reliability.

Strategic response 2: Enough water for all – Managing how we treat and supply drinking water, along with customer demand, in order to mitigate expected future water supply deficits.

Strategic response 14: Supporting ecosystems and biodiversity – Promoting ecosystem resilience and enhancing biodiversity while carrying out our water and sewerage activities.

Strategic response 16: Cleaner rivers and beaches – improving our assets to do our part to help achieve 'good' environmental status for our rivers, lakes and coastal waters for our customers to enjoy.

Achieving our measures of success

In AMP7 we will continue to measure our performance against our Measures of Success (MoS)/Performance commitments. This investment will contribute to achieving the following MoS/Performance commitments:

Strategic Response	Measures of Success	Narrative	2017-18 Outturn	2019-20 Target (AMP 6)	2024-25 Target (AMP 7)
1. Safeguarding clean drinking water	Wt7 Water catchments improved	The number of our Water Treatment Works with catchments designated as requiring Safeguard Zones under the Water Framework Directive	1	23	18
2. Enough Water For All	Ft1 Risk of severe restrictions in a drought	Percentage of the population the company serves, that would experience severe restrictions in a 1-in-200 year drought.	4.42%	4.42%	0%
14. Supporting ecosystems and biodiversity	Wt7 Water catchments improved	The number of our Water Treatment Works with catchments designated as requiring Safeguard Zones under the Water Framework Directive	1	23	18
16: Cleaner rivers and beaches	En6 Km of rivers improved	The length (in Km) of river improved as a result of our action (cumulative within an AMP) {contribution from water resources plan}	36	562 {412}	418 {124}

Table 2 Strategic Response and Measures of Success

1 Delivering our customer outcomes

Need for investment

The key drivers for this investment are to meet:

- Our legal duties under the Water Industry Act 1991 and the Water Act 2003 together with our appointment to provide water and sewerage services to customers in Wales and Herefordshire
- Our requirements to publish a Water Resources Management Plan (WRMP) and a Drought Plan (DP).
- Our environmental obligations, as identified through Natural Resources Wales' Water Resources and Water Quality National Environment Programme (WR NEP and WQ NEP) and Environment Agency's Water Industry National Environment Programme (WINEP). Our environmental regulators programmes outline the improvements we need to make to comply with new or amended environmental legislation and identifies investigations needed to inform, in an evidence led way, investment requirements in future AMP periods. We remain committed to minimising our impact on the environment.

Any schemes driven from this investment provide for the needs of future generations to support the aims of the Wellbeing and Future generations (Wales) Act.

There are two investment streams which contribute to this water resources investment case: Maintenance and Enhancement.

The assets covered by this investment case ensure that sufficient good quality water is available to supply our treatment works and therefore our customers, whilst meeting our environmental obligations.

Views of our customers and stakeholders

We have undertaken extensive consultation with customers through our PR19 preparation programme, including our Welsh Water 2050 strategy consultation held in the summer of 2017, which engaged with 19,980 of our customers. The WRMP consultation during 2017 and 2018 engaged with customers, regulators and other interested stakeholders. A detailed description of the methodology and outcome of all our customer consultation is included in our main Business Plan submission.

Our customers expect that the level of service they receive should not fall as a result of future population and economic growth. Our proposed investment will maintain existing levels of service in the face of growth and deliver an investment programme to meet identified risks and deliver solutions at the required time.

Our Strategic Responses "Safeguarding clean drinking water by working with nature" and "Cleaner Rivers and Beaches" ranked high for both customer and stakeholder importance. This suggests support for our catchment management approach in general. It supports approaches to reduce pollution within our rivers to improve water quality from our operations and consequently enable treatment facilities to receive a more expected, consistent and manageable quality of raw water.
The Strategic Response "Enough Water for All" rated high in both the customer and stakeholder consultation on importance of the Strategic Responses and shows support for our strategies in our WRMP and DP.

Benefit for our customers

Our customers through our consultation process decide on the level of service they want to pay for, relating to periods of dry weather predominately. The level of service that we commit to is that our customers on average will not experience more than one temporary use ban (formally called hosepipe ban) every 20 years and no more than one non-essential use ban every forty years. This level of service sets the expectations contained within our long term plans.

The plans align with strategies from all areas of the water business and provide reassurance to our customers, our environmental regulators and to

Defra and Welsh Government that customers will not experience issues with their supplies during events of a similar magnitude and frequency as the agreed level of service.

These strategies include:

- Reducing the volume of leakage on our system and our customers' network
- Providing support to customers to reduce their demand through water saving devices
- Providing reassurance that our environment will be managed sustainably for our future generations
- Providing facilities for our customers to engage with our countryside without detriment to our supplies of drinking water
- Ensuring that bills remain stable and affordable.

These strategies ensure that the customer level of service does not deteriorate and ensures customers' benefits are secured.

2 Investing now and for the long-term

Future challenges

Our Welsh Water 2050 strategy identifies future trends (external factors) over the next 30 years and how these could impact on our service and our customers. The most significant trends in terms of water resource are set out below.

Climate Change

We have already seen that our climate is becoming more variable. More extreme events are likely to occur i.e. droughts and floods. For example, hotter drier summers can lead to higher demand for water.

Demographic change

The rate of population increase in our area as a whole is relatively stable at about 0.3% per year. However, even this rate will drive development of 43,700 new households, which will need to be connected to our water supply. The need to provide new supplies can add stress to our networks.

The average growth rate disguises the fact that some areas are growing whilst others are shrinking. The population of Cardiff, for example, is projected to grow by 25% between 2016 and 2036, whereas Blaenau Gwent's is set to fall by 6% over the same period. Having a resource capable of reacting to these shifts will require us to look at a conjunctive use system approach to enable zones to be more resilient.

Changes in customer expectations

Changing customer and societal expectations may require us to provide a completely different service to our customers. It is known that the current model of supply and demand has limitations when climate change is factored in. The company will carry out research into customer behaviour and reaction to change to understand our customers' needs and expectations in the future.

Protecting essential infrastructure

Industrialisation and urbanisation in parts of our region led to the rapid construction of water supply infrastructure in the late 19th and early 20th century. A growing number of physical assets constructed during this period are expected to reach or exceed their design life within the next 30 years.

Land Use change

Land use change within our catchments has altered the quality of raw water and changed the way water interacts with its surroundings. This land use change impacts on our water treatment works ability to supply consistent and reliable wholesome water.

Policy and regulatory change

Changes to policy and the political arena have been highlighted recently due to BREXIT. How the EU agricultural funding system supports current farmers will change, which will provide risk and opportunities for our catchment management activities.

Legal duties

The water resources business must have regard to legal duties which include, but are not limited to, the following:

- The Water Act 1991 as amended by the Water Act 2003
- The Water Industry Act
- Welsh Governments Water Strategy for Wales (2015)
- Water Framework Directive and other environmental regulations
- WRMP Directions
- Drought Plan Directions.

Our legal duties cover a wide range of directions and guidance and include meeting the requirements of our environmental regulators, our

financial regulators, our drinking water regulator, CCWater, and both UK and Welsh governments. However, we are aligning our proposals with the aims of Well-being of future generations (Wales) Act 2015.

Our water environment programme is driven by a variety of environmental legislation, which sets obligations for us to meet and are summarised in the following paragraphs:

Water Framework Directive

Heavily Modified Water bodies (HMWB)

Under the Water Framework Directive, water bodies designated as Heavily Modified Water bodies (A/HMWB) need to achieve Good Ecological Potential (as to achieve Good Ecological Status would impact on the use of the water body).

A number of water bodies are designated as heavily modified due to the presence of our impounding reservoirs upstream.

For a WR HMWB to achieve Good Ecological Potential (GEP):

- All required mitigation measures need to be in place to achieve GEP, in addition to other physio-chemical and relevant biological elements also being at good status.
- If required mitigation measures are not cost beneficial (not part of the cost beneficial bundle of measures for the catchment) then the HMWB cannot be at GEP and will have a less stringent objective set.
- If a mitigation measure would have a Significant Adverse Impact on Use (SAIOU) then it is not required and the HMWB can still achieve GEP.

Habitats Directive

The Habitats Directive was brought into UK law through regulations that

- provide for the designation of “European sites” (Natura 2000 sites);
- afford protection of “European protected species”;
- provide for the adaptation of planning and other controls for the protection of such sites; and
- Impose a statutory requirement to deliver improvement schemes.

Under the Habitats Regulations, ‘competent authorities’ i.e. any Minister, government department, statutory authority, public body, or person holding public office, have a general duty, in the exercise of any of their functions, to have regard to the EU Habitats Directive. As the designated competent authority for Wales, Natural Resources Wales is required to ensure that its ‘permissions’, such as abstraction licences have no adverse effect on the ‘integrity’ of the Special Areas of Conservation (SAC) and Special Protection Areas (SPA) that form part of the pan-European network of Natura 2000 sites.

As a competent authority ourselves, we must have regard to the requirements of the Habitats Directive so far as they may be affected by the exercise of our functions.

Drinking Water Protected Areas (DrWPA)

Under the WFD, Article 7.1 requires the designation of Drinking Water Protected Areas (DrWPAs) for surface waters. DrWPAs are "all bodies of water used for the abstraction of water intended for human consumption providing more than 10m3 a day as an average or serving more than 50 persons; and those bodies intended for such use" and for groundwater “all productive water bodies” are designated.

The main aim of Article 7 of the WFD is for a DrWPA to avoid deterioration in water quality and to avoid an increase in the level of purification treatment required in the production of drinking water.

Barriers to Fish

We have some water resource assets that may be causing a barrier in a river, preventing fish from migrating further upstream. We need to understand where these are, their impact and which ones we need to remove to provide the most benefit to rivers.

Conservation Drivers

Wildlife and Countryside (W&C) Act 1981 (as amended by Countryside and Rights of Way (CRoW) Act 2000)

The W&C Act requires statutory undertakers (including water companies) and public bodies to take reasonable steps, consistent with the proper exercise of their functions, to further conservation and enhancement of the flora, fauna or geological or physiological features of Sites of Special Scientific Interest (SSSIs).

Invasive Non Native Species (INNS)

This driver identifies investigations and schemes to deliver the new Invasive Alien Species regulation and strategy for INNS, focussing on the pathways of introduction and spread. There is a need to understand the key pathways of spread of INNS on assets and catchments, and how those pathways of spread can be mitigated.

The Eels (England and Wales) Regulations 2009

The Eels Regulations established measures for the recovery of the stock of European eels requires European member states to prepare Eel Management Plans to describe the current status and highlight management actions. The regulations specifically require that the Eel Management Plans consider eel passage as part of the solution in addressing declining eel stocks.

Natural Environment and Rural Communities (NERC) Act 2006

The NERC Act places a duty on every public authority (including water companies) to have regard, so far as is consistent with the proper exercise of its functions, to the purpose of conserving biodiversity. We need to take account of this duty, through action on discharges to meet water quality requirements, or through land management schemes

Planning for the future

Long-term planning

Our WRMP is based on a long term planning approach that covers a minimum of 25 years into the future. The plan assume that management activities are carried out on all assets within the plans and that no loss of capacity or deliverability occurs within the planning timescale.

Our investment in Catchments is an expanding part of our business and is developing into an area that requires interventions over a long period, with change being monitored to identify behavioural, societal, environmental and political change over time. The timescale for fully realising change and benefits is still uncertain and climate variability influences may mean that understanding these changes will take time to unravel.

In planning our water environment programme we apply the following principles:

- Good evidence and value for money
- Identify innovative approaches to unlock better solutions for the environment
- Customer Support.

Building on progress

AMP6 Progress

We have delivered against each of our strategic objectives from PR14 and have prepared strategic investment plans that support our vision as part of Welsh Water 2050. The main deliverables are:

- Developed Welsh Water 2050 including supporting Strategic Response initiative plans
- Implemented a Risk based approach to asset management
- Established Water Source as a formal tool to communicate our evidence based collaborative approach to catchment management
- Driven the Brecon Beacons Mega Catchment (BBMC) approach by founding a steering group which includes regulators, third sector and local land managers

- Improved our understanding of our catchments by delivering investigations, trials and research.
- Delivered both river flow and quality benefits to the environment through delivery of our environmental obligations, supporting 412km of river improved
- Delivered two strategic Plans - Water Resources Management Plan and Drought Plan
- Delivered environmental assessments to support the Drought Plan
- Provided 2 additional boreholes as required by DWI notice at two abstraction sites.

Water Environment Programme - Catchments

During AMP6, we have already started to radically shift our approach to water quality protection upstream into our catchments, as well as focussing on the removal of key pollutants in our water treatment works.

Our AMP6 catchment investigations programme is currently producing a catchment characterisation assessment of all our catchment areas. For each investigation this includes risk mapping, groundwater modelling, raw water quality assessments, geology and soil assessments, and land use management assessments amongst others.

In order to improve our monitoring, and move towards a more predictive approach, we have developed WaterSource, our evidence-based, collaborative approach to catchment management, which will help us meet current and future challenges to protect our drinking water sources both now and for years to come.

Interventions within our catchments during this period include our Weed Wiper Trial, dissemination of good practice for pesticide use and management through our PestSmart programme, peatland restoration, fenland restoration, tree planting and the installation of stock exclusion fences.

Figure 1: Weed Wiper Trial

Research and innovation have been fundamental to our approach in AMP6. We are working closely with academia to drive the new research required to better understand our catchment hazards, and the risk they pose to raw water quality, along with the risk posed by future stresses such as climate change. This has included two fellowship positions with the Natural Environment Research Council within the catchment team, funded PhD research programmes and membership of other joint industry initiatives. These will form the basis of catchment management plans to drive activities in the future.

River Regulation

ADD TEXT a number of our reservoirs we have a legal requirement to make releases which help support the downstream environment. It's important to ensure the pipework and associated valving is maintained in good condition to achieve this.

Water Resource Management Plan and Environmental Programme

The management of water resources is a continuous process for the company and includes management of the water within our reservoirs, rivers and groundwater's plus the physical assets themselves.

During AMP6 we have developed our water resource modelling capability through acquisition of the Aquator software. This allows us to better represent our water supply systems and enhance

their operation. The full outcome of this change will be seen within the WRMP 2024.

We have improved efficiency at 3 of our South East Wales abstraction sites, namely the Nant y Bwlfa, the Nant Bodwigiad and the Nant Clydach to maximise the water available and ensure that water can be prioritised for the environment. We have prepared designs for 3 further sites in the South West in readiness for future capital maintenance. Further work relating to the "fitness for current and future purpose" of our water resources assets will continue during AMP7.

We have constructed 1 fish pass and installed 6 fish screens and carried out additional investigations to support potential AMP7 requirements.

We have delivered 15 eel investigations to develop sound evidence relating to the absence and presence of Eels within the environment.

We have carried out WFD HMWB investigations for 16 waterbodies assessing the impact of our reservoirs to develop investment requirements for AMP7.We carried out the required environmental investigations which will support the development of our next Drought Plan for 2020.

We have delivered outcomes based on the Habitats Directive at Talybont and Usk to enable enhanced releases at these reservoirs to support the environment downstream.

We have continued to improve our reservoir refill scheme to reintroduce a previously unused reservoir in the centre of Cardiff to provide an alternative supply to industrial customers.

We have continued to improve our hydrometric capability by installing monitoring equipment at a further 43 sites during AMP6.

Leakage reduction and water efficiency

We have repaired leaks on two of our raw water transmission mains, reducing the need to abstract water and improving efficiency of leakage identification.

Other leakage and water efficiency activities are discussed as part of the network plus business plan.

Historical expenditure

Figure 2 shows our investment from AMP5 to AMP7, with AMP5 and AMP6 at outturn costs and AMP7 investment at post-efficiency. During AMP5, investment which includes expenditure to balance supply and demand, was £28m. Due mainly to investment driven by our water resource environment programme AMP6 investment was £74m. We are proposing to invest £72m, after making efficiencies, in water resources during AMP7 to further advance our Catchment Management approach.

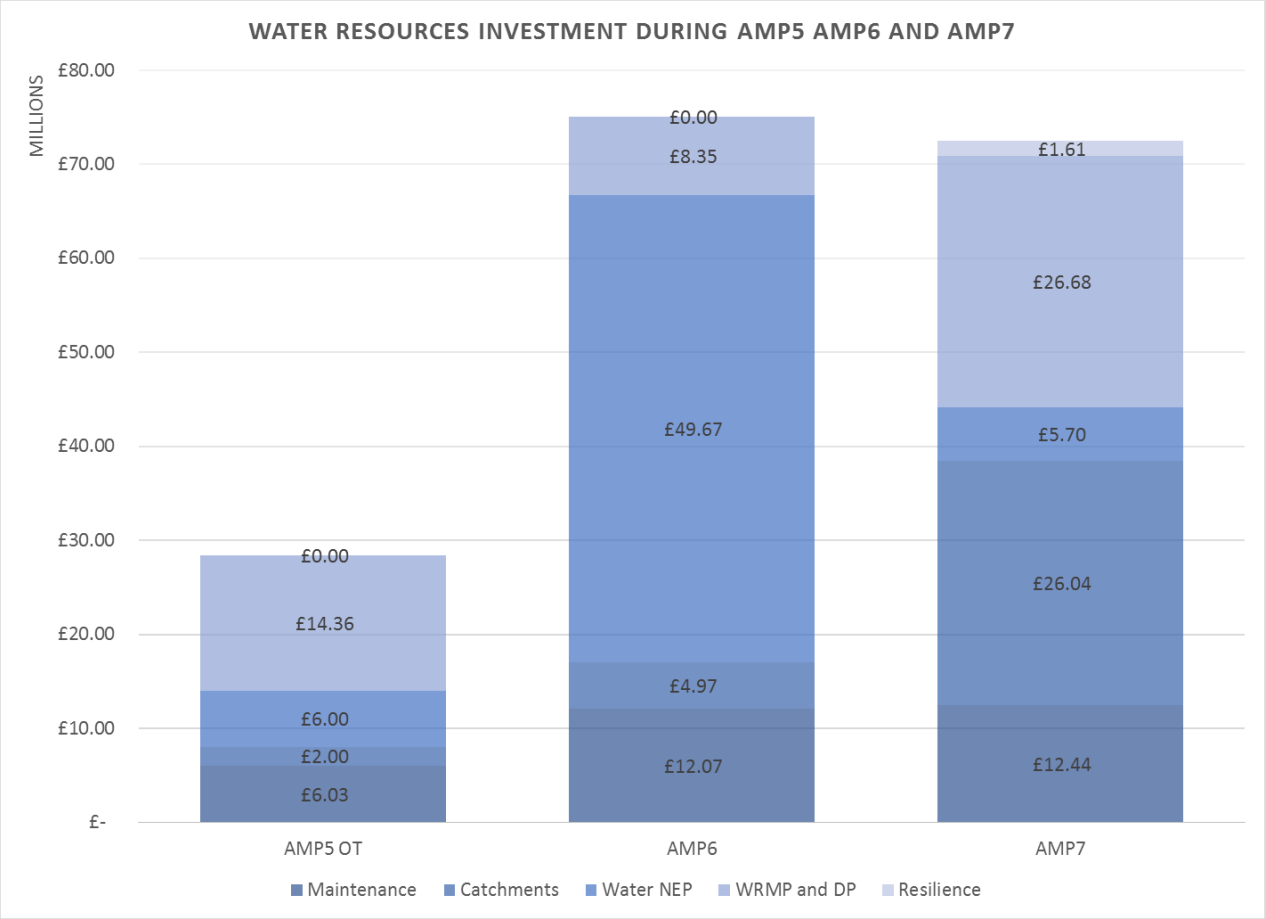

Figure 2: Water Resources Investment AMP5 to AMP7

3 Options

This case is built using a risk and need based approach and applies to the management of our assets and to third party assets.
The following section describes the investment considered for AMP7.

Background

This investment has been derived using a top down approach combined with a bottom up approach to investment planning. This approach indicates the level of investment the company is willing to invest based on historical spend. The bottom up approach then provides reassurance that the investment is at an appropriate level for the near future.

While developing our investment options, it was established early on that we need to increase our level of knowledge on our water resource assets. The programme has been developed to increase the understanding of our assets and provide planned capital expenditure for the highest known 'at risk' sites.

We looked at a number of investment needs including:

- General maintenance of physical assets,
- Data collection for regulatory requirements,
- Investment to provide two of the companies statutory required plans i.e. WRMP and DP,
- Schemes driven by WRMP,
- Environmental monitoring and assessment of schemes developed as part of the drought Plan,
- Obligations driven by our environmental regulators
- Schemes to mitigate deteriorating raw water quality which ensure compliance with the water framework directive.

High-level options appraisal

We have developed high-level options and carried out an assessment for investment to both maintenance and enhancement allocations of this investment case.

Maintenance

Three high-level option categories were considered in the development of the maintenance investment allocation for this case:

- **Option 1**: Do nothing
- **Option 2**: Maintain expenditure based on historic programme scale costs
- **Option 3**: Increase investment to meet additional strategic needs and customer support.

Further detail on these options is provided below:

Option 1 - Do nothing: do nothing in AMP7 and defer any interventions until AMP8 or later.

Option 2 - Maintain expenditure at historic investment level: Use the AMP6 expected outturn as the level of block investment per annum. Continue maintenance expenditure at a similar level to AMP6.

Option 3 – Increase investment to meet additional strategic needs and customer supported benefit: Use the AMP6 expected outturn as the initial investment as per option 2 and increase investment to provide additional strategic schemes to meet either Welsh Water 2050 strategies or to fund schemes to meet our measure of success.

Enhancement

Water Resources Management Plan

To obtain a preferred set of solutions that resolves the supply demand imbalances identified in the WRMP19, we follow a robust process that is compliant with regulatory guidance and best practice, is thorough in its approach of possible options, and take full account of external and internal engagement. The key principles of our decision making process are:

- Conduct detailed customer and stakeholder engagement to understand their views and preferences for our options
- Undertake a detailed options appraisal process, including SEA/HRA and WFD assessment, to

generate a set of costed, feasible supply side and demand side options

- Utilise the UKWIR Industry Standard "Economics of Balancing Supply and Demand" (EBSD) methodology to generate the 'least cost' plan
- Review against Welsh Government objectives as set out in the Environment (Wales) Act, Water Strategy for Wales and Future Generations Act
- Ensure our options are aligned with our PR19 priorities, our 2050 vision and our Biodiversity Plan.

Water Environment Programme – Water Resources

We have pursued a pro-active approach to development of the water resource aspects of our water environment programme, working jointly with NRW and EA, with regular meetings being held to discuss PR19. This approach enables us to challenge and influence our environment programme at each step of its evolution, producing a robust programme that meets our environmental obligations whilst ensuring the best outcomes for both our customers and the environment.

Our water resource obligations are included in the WR NEP3 and WINEP3.

Water Environment Programme – Catchments

We abstract water for water supply from 120 catchments covering an area of almost 11,000km2. Land within these catchments is subject to a variety of land use types and management practices. We have limited land holding across our catchments and hence have little or no control on land activities such as stock management, tree planting and harvesting and the use of chemicals including pesticides, fertilisers or nutrients. These land use activities can present a risk to raw water quality and present treatment challenges at our water treatment works.

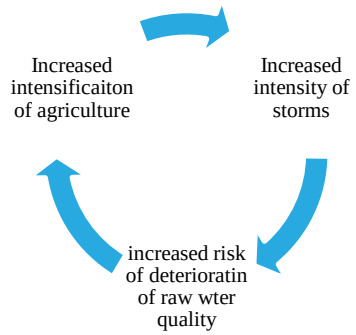

Figure 3: Intensity feedback loop

Drinking water regulations are likely to tighten regarding the presence of pesticides and fertilisers in drinking water.

To address the risk to raw water quality through catchment management we looked at the following options:

- Controlling land management through land purchase.
- Incentivising of our preferred land use management practices through the creation of a payment incentives mechanism.
- Influencing land management by stakeholder engagement and targeted government interventions

Controlling land management through land purchase.

To purchase all land in our catchments would require investment of over £21 billion, not including the costs required to manage the land once purchased. It is neither feasible nor practical to pursue the wholesale purchase of catchment land. We will continue to explore this option for sites where there may be opportunities in the future to purchase land at high risk sites.

Incentivising of our preferred land use management practices through the creation of a payment incentives mechanism.

Development of payment incentives mechanisms are still at an immature position so we cannot yet include investment for them as an option for

catchment management. Building on stakeholder relationships made in AMP5 and AMP6 we will look to pilot development of payments incentives mechanism as part of the wider BBMC programme, to assess the validity of using this approach in future AMPs.

Influencing land management by stakeholder engagement and targeted government interventions

AMP6 has concentrated on setting up the forum in which to operate, such as our Water Source Annual Event, Brecon Beacons Mega Catchment Stakeholder group and Taste and Odour Industry Working group. It will be these fora that will enable us to jointly, with other key stakeholders, like WG, NRW, NFU, Rivers Trust etc, deliver benefits to the environment and our treatment processes in AMP7 and beyond.

A program of catchment characterisation has also taken place. This includes Reservoir Modelling, Groundwater Data collection and a trial to deploy Chem Catchers (mobile raw water quality sampling monitors) on the Rivers Teme and Teifi, and in Whitbourne a study into the use of metaldyhyde and quinmerac to provide risk mapping of 'hot-spot' areas.

There have also been small trials such as the Weedwiper project and installations of reservoir mixers to start to produce a portfolio of solutions for application to other catchments which have the same characteristics. A Pesticide disposal scheme was also trialled in 6 catchments. Tree planting has taken place to see if overland flow is reduced and whether landslips can be managed. A larger scale trial was also carried out to understand the most appropriate monitoring equipment that could be deployed at a catchment scale, the outcomes learnt from this process can enable a suite of standardised specifications to be installed.

The main body of work during AMP6 was to address the NEP to investigate water quality deterioration in our catchments. The initial catchment characterisations from these investigations point to the potential designation of 23 catchments as safeguard zones.

From this learning in AMP6 we have developed a programme of investment for AMP7 to prevent deterioration of raw water quality at these 23 potential safeguard zones. The increase in investment from AMP6 to AMP7 shows the transition from catchment investigations and pilots to catchment activities.

The Environment Agency has included one catchment in the WINEP3. The other catchments are in Wales and are currently included by Natural Resources Wales in the Water Quality NEP4.1, but are identified as unconfirmed (Programme cannot be developed before a policy decision or basic evidence of impact has been developed). Our AMP6 WQ NEP drinking water protected area investigations have developed catchment characteristics, but sampling is still to be completed in order for these AMP6 WQ NEP outputs to be agreed with NRW. These obligations are forecast to be completed in line with AMP6 WQ NEP requirements by March 2020, providing the basic evidence of impact that is required by the WQ NEP.

In addition to investment for the 23 safeguard zones we have identified a need to take a landscape scale approach to catchment management for our Brecon Beacons Mega Catchment. Around half of the water we abstract for drinking on a daily basis comes from the Brecon Beacons. There is a need to ensure that the raw water entering our treatment works is of an expected, consistent and manageable quality. Robust catchment management for this area will build resilience into the water supply components downstream, increasing our ability to react, respond and recover from events.

Water Resilience

As part of our Welsh Water 2050 approach to resilience we will undertake feasibility studies into the long term resilience of our raw water supply systems and the associated resilience of the linked Water Treatment Works and distribution mains to develop a programme of changes over the 30 year planning period that will satisfy the strategies of:

- Operating an optimal number of our WTW's
- Reducing the number of separate water resource zones

- Reducing the risks associated with a WTW receiving a supply of water from a single source.

We have identified the River Wye as a priority location to carry out these investigations and feasibility studies to understand how we can provide sound evidence to identify potential investment for major capital delivery schemes in subsequent AMPs. Initial assessment indicated the WTW's supplied from the river Wye showing the greatest risk and have led to this area being prioritised for this analysis.

Assessment

Maintenance

Our customers have expectations of level of service. Option 1 would result in an increased risk of non-compliance with permits and an increased risk of customer supply restrictions. This option of do nothing is also not compatible with a best practice asset management approach, which is based on risk assessments and deterioration modelling. The risk based approach at present indicates that the majority of assets are within the unknown or high risk area. This means that "Option 1 – Do nothing" is not considered to be tenable.

Investment in this area of the business has been limited in previous AMP cycles. The extensive risk capture approach undertaken during AMP6 is only the initial step to a more robust risk based approach to asset management and therefore further work is required to enable a more substantial block of investment to mitigate this risk.

Option 3 would involve increasing investment above AMP6 levels without sound evidence.

Our preferred option is Option 2, as it will allow us to increase our asset risk information and knowledge in AMP7, tackle our highest risks and use the knowledge built in AMP7 to produce an investment plan in AMP that starts to move from reactive to proactive interventions.

Enhancement

Our customers value the natural environment and expect a certain level of service. Obligations identified by our regulators are to meet regulatory duties.

To meet both these drivers our preferred option for water resources enhancement investment is as follows:

- Deliver the schemes identified in WRMP 2019
- Produce updated WRMP and DP in AMP7
- Implement water resources environmental obligations as agreed with NRW and EA.
- Carry out catchment management activities for 23 high risk catchments.
- Landscape level management for the Brecon Beacons Mega Catchment
- Investigate resilience for supply from the River Wye.

4 Preferred option

There are two investment streams which contribute to this water resources investment case. They are activities required to deliver maintenance of current assets and those to provide enhancement to our water resources service.

Preferred option Maintenance

The total investment proposed to undertake maintenance activities is £13.397m. This investment is presented in Table 3.

Programme of work	Programme Investment
Abstraction	£7.006m
Bulk Meters	£0.875m
Trunk Mains	£1.029m
Water Pumping	£4.487m
Total Post Efficiency	£ 13.397m

Table 3: Water Resources Maintenance Investment

This investment has been derived using a block allocation approach based on Option 2, which is to continue with the current level of investment.

Assets which have been identified for maintenance activities during AMP7 include our highest priority intakes, our boreholes that are at greatest risk of producing deteriorating raw water quality or are greater than their asset whole life expectancy and replacing a number of abstraction meters to ensure their continued performance and compliance with NRW best practice guideline.

The following sections provide additional information relating to the block allocations:

Water Resource Abstractions

We propose to invest £7.006m during AMP 7. This investment is required to maintain the operability of a number of our raw water abstraction assets. This investment will deliver the highest priority risks associated with 'Enough water for all' and protecting our critical water supply assets ensuring a continued supply of water.

Water Resource Abstraction is made up of blocks of investment which have been split into 4 main areas; Surface water, Groundwater, Hydrometry and Investigations to plan future investment needs. Each block has followed a risk capture approach encompassing all known assets using our Investment Manager system. Investigations at site or the use of deterioration modelling was undertaken to prioritise the highest risks. These sites were then taken forward for solution planning and costed using the unit cost database. They are prepared as a batch of schemes ready for further risk and value and gateway governance approval.

Bulk meters –Abstraction

The investment to deliver replacement meters, at a number of identified sites is proposed to be £0.875m

Flow meters located at abstraction points on trunk mains are named bulk meters. The aim of bulk metering is to provide an accurate view of the flow of water into and across the network or pipelines and for the measurement of water abstraction for compliance with abstraction licencing. The measurement of water abstraction is undertaken to meet statutory requirements from our environmental regulators Natural Resources Wales and the Environment Agency.

The objectives of the investment programme are to maintain the current bulk metering asset stock through replacement, ongoing maintenance and refurbishment of existing meters and flow loggers. This is a similar level of investment to AMP6.

Raw Water Mains Trunk Mains – Intake and source

Our investment relating to raw water mains at intakes and sources is proposed to be £1.029m

Our raw water mains asset stock is on average exceeding its expected asset life. Figure 4 summarises the average age of the raw mains asset base by material type. This analysis describes both Water Resources and Raw water distribution mains but highlights that investment is needed within this area. We currently expect the majority of our ferrous pipeline assets to last about 100 years

which highlights a risk particularly for our large diameter raw water pipelines.

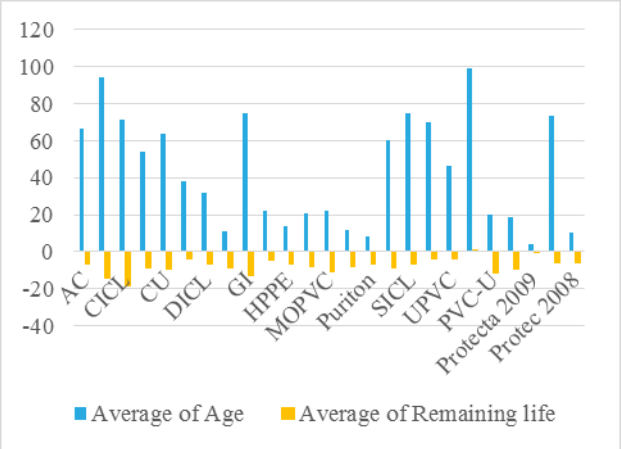

Figure 4: Raw mains age and residual life analysis by material

The raw water maintenance programme will review the condition of raw water mains and where required undertake more detailed condition assessments, repair and replace mains as well as valves and other ancillaries. The programme of work will be delivered as part of the raw water distribution mains programme to ensure efficiencies relating to delivery.

Raw Water Pumping Stations – Intake and Source

The investment proposed to maintain Raw Water intake and source pumping stations is £4.48m. The proposed programme is outlined in Table 4 and will consist of capitalised maintenance projects.

Programme	Budget
WPS – PCM for Raw Water Pumping Stations	£3.940m
WPS – RCM for Raw Water Pumping Stations	£0.547m

Table 4: Raw Water Pumping Stations Investment

In the last AMP the vast majority of work done on water pumping stations has been based on a reactive work programme, which has been demonstrated to be detrimental to the company's performance for compliance.

Costs have been increasing year on year demonstrating that the issues with the reactive model is that more assets will deteriorate at a higher rate than can be repaired, which will mean potentially lower costs in Year 1 but the cost goes up exponentially the more time goes on and the assets get worse. Figure 5 shows what the company has spent over 10 years from 2005 to 2015 on reactive maintenance on all water pumping station assets looking at the mechanical and electrical issues as well as instruments and control and finally the civils work. This trend demonstrating that there has been significant increase in spends for reactive working on these assets over this ten year period.

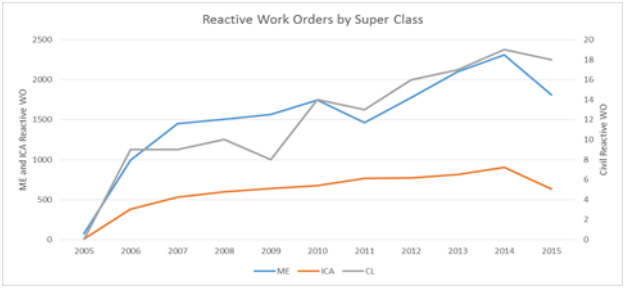

Figure 5: Spend over the last 10 years

Figure 6 demonstrates that if we continue on the course we are currently on we would create an exponential curve of failures which would be difficult to recover from and also shows that our projected spend for this programme would indicate in the region of 2 failures a year, but if we were to reduce the programme slightly we would likely have 5 failures a year.

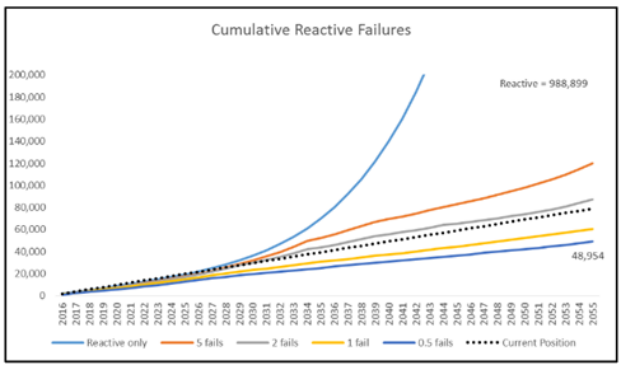

Figure 6: Cumulative reactive failures

Figure 7 shows the process that was used to come up with the programme for AMP 7, The process has enabled a change to a more proactive programme of work being developed but allows an element for reactive small scale repairs to manage the change to a planned asset programme going forward.

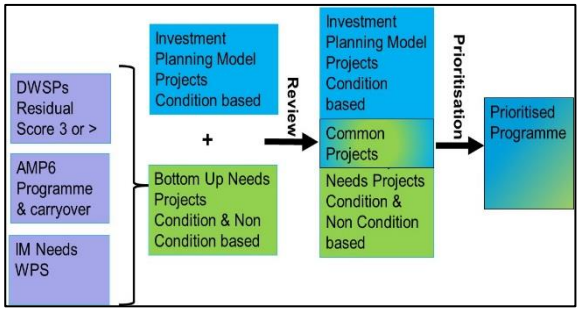

Figure 7: Process used to produce the programme for WPS

The programme of work will be delivered as part of the raw water pumping stations programme to ensure efficiencies relating to delivery.

Preferred option Enhancement

It is proposed to invest £67.585m for our water environmental programme, water resources management plan and drought plan. The proposed programme is shown in Table 5.

Programme of work	Programme Investment
Water Environment Programme - Catchments	£27.824m
Water Environment Programme - Water Resources	£6.184m
WRMP and DP	£31.826m
Resilience	£1.751m
Total programme (pre-efficiency)	**£ 67.585m**

Table 5: Water Resources Enhancement Investment

Water Environment Programme - Catchments

We propose to invest £27.824m during AMP7. This investment is to deliver programmes, schemes and trials using catchment management principles to deliver raw water quality improvements, environmental improvements and obligations and to help ensure there is no deterioration from our activities under the Water Framework Directive.

Catchment solutions are required to manage the impacts from deteriorating raw water quality. This investment case considers how drinking water protected areas, which are designated under Water Framework Directive Article 7, are monitored to ensure that raw water quality is not deteriorating and when deterioration has been found or trends indicate that deterioration is probable, identifies which measures are to be put in place to halt or reverse that deterioration.

Catchment management is still a new approach in comparison with traditional civil engineering schemes. Solutions are considered to be a program of measures and can include collaborative working, catchment modelling, mitigation measures, research and additional investigations, and innovative opportunities to tackle and manage emerging threats. The benefits from such an approach are still developing and outcomes may take more than one AMP cycle to come to fruition. This approach will deliver improvements to the environment and will provide a more stable raw water supply which in time will reduce treatment costs required to maintain a consistent water quality for supply.

Our approach will deliver bespoke measures using a programme of trials and then scaling up to catchment level and landscape level projects that meet this approach. The Brecon Beacons Mega Catchment programme is our first venture into a landscape scale management approach and the benefits of such an approach have been seen in other countries such as the Catskills Mountains in the United States, which supplies unfiltered water directly to New York City with huge treatment benefits due to not needing the filtration stage at the treatment works.

Our investment in AMP7 will deliver improvements to our measure of success “water catchments improved”. The outcome from this investment is to support the proposed 23 designated safeguard zone and to limit the designation to 18 safeguards zones by 2024-25.

This investment case has been split into 3 categories as detailed in Table 6. The first is to meet our obligations identified in the WINEP in England totalling £0.8m. The second to further the understanding of drinking water protected areas in Wales that are not yet designated as safeguard zones totalling £17.3m and a separately funded block allocation to target improvements for our Brecon Beacons Mega Catchment programme, which totals £9.7 million.

Programme of work	Programme Investment
Catchments	£17.30m
WINEP	£0.79m
Brecon Beacons Mega Catchment	£9.73m
Grand Total	**£27.82m**

Table 6: AMP7 Catchments Programme

The catchment programme across Wales has been built from a top down approach using a cost model based on AMP6 project costs. This has been compared with a bottom up approach. The preferred plan has been built from a project level approach using costs based on schemes delivered during AMP6.

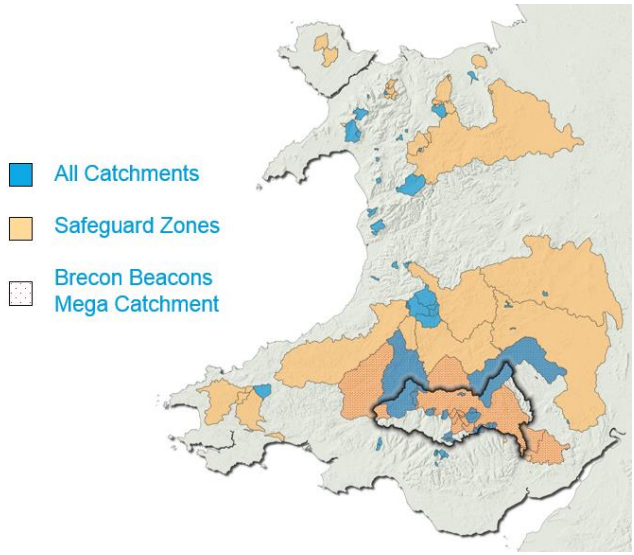

Figure 8: Our Catchments

The preferred plan for AMP7 will provide campaigns delivered across our operating area to change behaviour relating to pesticides, nutrients and animal husbandry. Efforts will be further targeted at 33 catchments of which 16 are likely to be designated as Safe Guard Zones as identified in Figure 8. These catchments are currently included by Natural Resources Wales in the Water Quality NEP4.1, but identified as Red. Our AMP6 WQ NEP drinking water protected area investigations have developed catchment characteristics, but sampling is still to be completed in order for these AMP6 WQ NEP outputs to be agreed with NRW. These obligations are forecast to be complete in line with AMP6 WQ NEP requirements by March 2020.

Our BBMC programme contains 7 potential SGZs and a further 10 catchments that are not forecast to be designated as safeguard zones during AMP6. The BBMC approach also includes an element of stakeholder engagement and information sharing which brings the parties together to benefit the environment of the BBMC as a whole.

Water Environmental Programme – Water Resources

The investment proposed for our environmental obligations related to water resources is £6.184m and the programmes are listed in Table 6.

Programme of work	Programme Investment
WFD HMWB	£1.81m
GW and Eel screen investigation	£0.32m
Barriers to fish and INNS	£1.62m
Abstraction Reform	£2.43m
Total	££6.18m

Table 7: Water Environment Programme - Water Resources

WFD Artificial/Heavily modified water bodies

The HMWB program will look at 5 water bodies in South East Wales and 1 water body in North Wales. Three of the sites will investigate and deliver an increased sediment availability scheme to improve habitat availability. The other three sites will look at improving the river flows below our assets.

This programme will support 124km of river improvement.

Groundwater and Eel screen investigations

Groundwater and Eel screen investigations will be carried out at two sites on the River Teme. The

Groundwater investigation will develop an impact assessment relating to the hydrological impact of our abstraction at Leintwardine. The eel screen investigation will assess whether the current screen in place is fit for eel regulations at our Whitbourne intake.

Barriers to Fish and INNS programme

The Barriers to Fish program will look at two programme level investigations and solutions at the highest priority sites from the 29 sites identified by NRW across Wales.

The initial investigation will carry out an assessment of the schemes delivered during AMP5 and AMP6 to ensure they are still fit for purpose and are still being effective.

The second investigation will look to identify further sites that may be causing a barrier to fish migration for mitigation during AMP8.

Mitigation work to improve migration at the highest priority low cost sites from the 29 specified sites by NRW.

The programme of work will prepare a framework for the continued delivery of solutions at the remaining cost beneficial sites during AMP8.

The INNS program will look at the impact of transferring raw water from one source of supply to another and to ensure the minimum risk possible for the transfer of INNS.

Abstraction Reform

The DEFRA / Welsh Government driven abstraction reform will develop over the next few years. We need to fully understand the impact of this reform. Initial meetings between NRW and ourselves have indicated the potential for a number of our abstraction points to require capital interventions to meet the new permitting process.

Water Resources Management Plan and Drought Plan

We propose to invest £31.826 million during AMP 7. This investment is to deliver:

- Schemes identified within the draft Water Resources Management Plan 2019 (dWRMP2018)
- Update the environmental assessments for the Drought Plan
- Provide support to the development of the next Water Resources Management Plan and next Drought Plan.

This investment will deliver a positive supply/demand balance across the region by the end of AMP7 that will protect our customers from the risk of supply shortfall over the 30 year period to 2050 covered by the draft WRMP 19. The full details can be found in the draft Water Resources Management Plan 2019 in Appendix 1.

Table 8 provides a breakdown of investment linked to WRMP and DP

Programme of work	Programme Investment
Pembrokeshire WRZ	£13.90m
Tywyn Aberdyfi WRZ	£7.66m
Vowchurch WRZ	£7.14m
WRMP production	£2.39m
DP production	£0.74m
Total	**£31.83m**

Table 8: Breakdown of investment linked to WRMP and DP

Pembrokeshire water resource zone

This scheme is to alter the type of pumps at our Canaston bridge intake so that a more efficient release can be made at Llys y Fran which ensures that all of the release is abstracted.

Tywyn Aberdyfi water resource zone

Creation of a new river intake with a new raw water main to Penybont WTW to mitigate the risk of the existing stream sources being unable to provide the required supplies during a severe drought.

Vowchurch water resource zone

We have assessed the susceptibility of the Vowchurch zone to severe droughts using an 'extreme value' statistical analysis and this indicates that the zone is not likely to be resilient to a drought event that might be seen in only 1 in every 200 years. Our plan is therefore, to lay a main between our Hereford and Vowchurch zones to improve the situation.

The revised draft WRMP19 will be submitted to Welsh Government by the 14 September, setting out how we have addressed the consultation responses received on the Draft Plan. Subject to a satisfactory review, we are expecting direction to publish the Final Plan by February 2019.

Water Supply Resilience

We propose to invest £1.751 million during AMP 7. This investment is to deliver a feasibility study into the long term resilience of the River Wye abstractions and the associated resilience of the linked Water Treatment Works, as described within Welsh Water 2050. Currently Hereford has only one source of supply, a pinch point in our supply system.

The proposal looks at how the river system can support the area more efficiently while providing additional benefits such as reducing the number of water resource zones and number of water treatment works while still achieving a cost neutral impact on energy consumption.

5 Cost Efficiency and Innovation

Cost efficiency

We are proposing to deliver £8.5m of cost efficiencies under this investment programme, as shown in Table 9.

We will deliver these savings by challenging our Capital Delivery Alliance partners to improve efficiency and by maximising opportunities to innovate.

Programme of work	Proposed programme total budget
Total programme (pre-efficiency)	**£80.98m**
Total programme (post-efficiency)	**£72.48m**

Table 9: AMP7 Pre and Post Efficiency Investment

Innovation and Research

We will continue to explore any opportunities to deliver cost savings through innovation.

We will continue to carry out a considerable amount of research into the area of catchments and the environment due to the emerging nature of the discipline. The research and innovation approach has been to decide on a topic and then to trial solutions. AMP7 will see greater delivery of trials and widening scopes of work to repeat trials in differing conditions. When put together these trial and delivery steps will deliver greater understanding of our pressures on the environment, how we can reduce them and how we can sustainably manage a supply of raw water of expected, consistent and manageable quantity and quality to meet our customer expectations.

Our approach to resilience and WW2050 is considered as innovative as it draws together different modelling approaches found within WRMP and networks and combines with introducing multi staged treatment works for low, normal and high volumes.

Partnering and co-creation

Working closely with our partners is essential to the way we work now and in the future.

The current collaborative nature of our regulators allow us to drive innovation within the guideline approach, e.g. WRMP and DP guidance, not just as consultees to the plans but as an integrated voice within the development process.

Our approach within the BBMC had collaboration as one of the main aims and objectives at its inception and this approach has to include integrated stakeholders in partnership to deliver the greater good for the environment that in turns provides customers, communities and visitors with a sustainable society and environment within which to live, work and play.

We aim to undertake this work in partnership with customers, communities, stakeholders, regulators and governments. It is vital that we work with individuals, groups and regulators as the environment that we take water from and return water to, is a cycle that influences and impacts on each of our customers and the service that we can provide.

Our 2050 strategy highlights opportunities for co-creation through identifying partners for each of our programmes of future work.

6 Value for money and affordability

Impact on customer bills

We understand the importance of balancing the need for investment with the affordability of our bills. We believe our investment will help to deliver the level of service our customers and regulators expect, and represents an optimal approach for sustained long term improvement.

Value for money

We recognise the need to demonstrate value for money in everything that we do. In arriving at the proposed investment we have considered many differing asset management tools and models.

Within this investment both reactive and planned approaches have been considered. The move to a more risk based approach using a stable investment will allow more reactive investment during the early years moving to more proactive investment in later years. This principle is shown in Figure 9. The same principle can also be used to explain differences in base and enhancement expenditure in a similar way. The aim for this investment is to improve the current level of proactive investment.

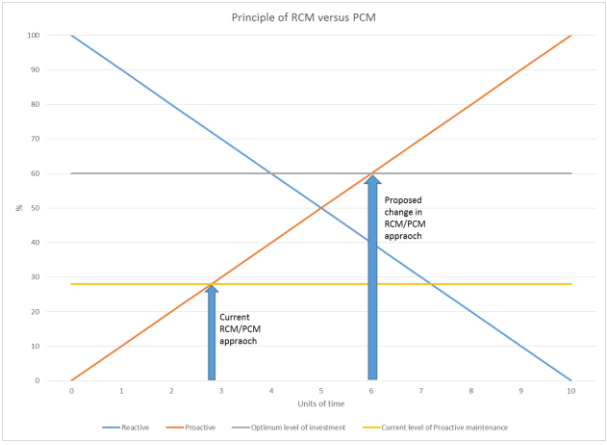

Figure 9: Diagrammatical representation of approaches to reactive and planned capital maintenance

The benefit realised by using a planned approach to investment will aid the reduction in costs to customers in the long term by reducing the size of reactive solutions carried out on a piecemeal basis.

As outlined in the previous section of this document, we will also seek to ensure value for money by promoting innovation throughout delivery, by learning lessons from the trials we have delivered to date, and by working closely with our partners to encourage best practice and incentivising efficiency.

7 Delivery

Procurement

The programmes will be managed by our operations team staff with support from the water assets team and through our capital alliance for largescale capital delivery schemes.

The programme of work will incorporate a number of framework procurements which ensure efficiency and cost savings.

Direct procurement is not considered appropriate for this investment due to the variable project scope at category level.

Programme

The investment programmes for each category have been constructed following a risk based approach.

A secondary programme has been prepared that provides answers or research outcomes to aid the appraisal of risk.

Risk mitigation and customer protection

Our Water Resources investment relates to assets that are required to abstract and deliver supplies of raw water to our treatment works. The risks associated with this area of the business are:-

- Changes to the regulation of our business
- Changes to the environment through climatic variability
- Changes to customer demand and behaviour

Customer are consulted during each plan whether this be WRMP, DP or business plan and customers and stakeholders responses are fully taken into account. The intrinsic nature of consultation and response allows the business to reflect and ensure that investment is carried out where our customer preferences indicate.

The approach being considered for all Water Resources assets is to manage the asset for the current situation with a progression to a more robust and resilient supply of consistent quality and quantity of drinking water. This approach provides a more stable investment and will lead to ensuring customers receiving the quality and quantity of drinking water they expect now and into the future.

8 Assurance

Governance

The level of investment has been agreed by the Dŵr Cymru Executive. It has included review meetings with department Heads of service and through regular Water Assets team meetings. In addition the investment has been reviewed and authorised by the Price Review project board which has been chaired by the Managing Director of Water Services.

Governance during the AMP7 process will use the Gateway approval approach. Governance of these schemes is provided by our Capital Programme Board (CPB) which meets monthly. Papers are submitted for key decisions on significant individual schemes.

Cost assurance

The proposed total expenditure has been derived on a combination of outturn costs of AMP6 projects and average costs from projects undertaken during AMP5 and 6. In addition, civil engineering projects have been calculated using the Unit Cost Database approach.

As more investigation and research type programmes are delivered a greater assurance will be obtained regarding the unit cost of these types of programmes.

Strategic Response	Measures of Success	Narrative	2017-18 Outturn	2019-20 Target (AMP 6)	2024-25 Target (AMP 7)
1. Safeguarding clean drinking water	Wt7 Water catchments improved	The number of our Water Treatment Works with catchments designated as requiring Safeguard Zones under the Water Framework Directive	1	23	18
2. Enough Water For All	Ft1 Risk of severe restrictions in a drought	Percentage of the population the company serves, that would experience severe restrictions in a 1-in-200 year drought.	4%	-	0%
14. Supporting ecosystems and biodiversity	Wt7 Water catchments improved	The number of our Water Treatment Works with catchments designated as requiring Safeguard Zones under the Water Framework Directive	1	23	18
16: Cleaner rivers and beaches	En6 Km of rivers improved	The length (in Km) of river improved as a result of our action (cumulative within an AMP)	36	562	418

Table 10: Measures of Success

Customer consultation assurance

Our customers want the current levels of service to be maintained as identified through our customer engagement processes and our customer challenge group. Our programme of investment has been created to provide a continued level of service that delivers to that end and allows for additional properties to be supplied.

Measures of Success

Our targets for improvement in our Measures of Success over AMP7 are shown in Table 10.

The investment in this area will benefit the following measures of success.

- Wt7 water catchments improved. The work being carried out will improve the current understanding of the candidate safeguard zones to allow designation of the 22 locations that we suspect to be deteriorating quality. The investment will also enable the company to improve 5 of these sites so that they will be de-designated.
- Ft1 Risk of severe restrictions in a drought. The investment will provide a scheme that proves an improvement to the 4% of customer that currently experience a risk during a 1 in 200 drought event.
- En6 km or river improved. The length (in Km) of river improved as a result of our action (cumulative within an AMP)

Future assurance

We will provide assurance that investment is being spent in the most cost beneficial way, meeting our customer expectations by reviewing its scope and outcome against the WW2050 principles, WRMP strategies and Price review goals.

We have strong governance procedures for the planning and delivery of our capital investment. Our Board will continue to provide the high level overview and governance to ensure that we deliver these outcomes in the interests of our customers.

References

WRMP

DP

WINEP

NEP