Affinity Water

AFW140 Outline cases for support of the £8m allowance for Climate Change Adaptation

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1 Executive summary

Within the PR24 draft determination response, Ofwat has "allowed a sector wide enhancement uplift for companies to prioritise their biggest climate related risks"[1]. This 0.7% enhancement uplift equates to approximately an £8m increase in Affinity Water's portfolio of investments.

Our Climate Adaptation Report 2021 highlighted the need to invest to mitigate the impacts of Climate Change. This report is currently being redeveloped with consultation from Atkins and will be submitted to Ofwat early November 2024, and to Defra early December 2024.

With the removal of individual business cases aimed at improving resilience to Climate Change in the draft Determination, and the addition of the Climate Change Adaptation uplift, we propose to bring forward later investments planned within our long-term delivery strategy into AMP 8. This will bring forward the benefits to our customers, by protecting more of our highest risk sites from flooding earlier. The adjustments to the resilience investments are shown within Table 1.

Table 1 - Enhancement Resilience to Climate Change Investments Following Regulatory Changes to 0.7% Enhancement Uplift.

Scheme Name	Original Business Plan Submission (£m)	Requested Allowance Following Uplift (£m)	Delta (£m)
Flooding Alleviation	1.1	8.0	+6.9
Network Calming	8.8	0	-8.8
Single Points of Failure	5.1	0	-5.1
Total	15.0	8.0	-7.0

[1] Page 116, PR24 Draft Determinations Expenditure Allowances to Upload, https://www.ofwat.gov.uk/wp-content/uploads/2024/07/PR24-draft-determinations-Expenditure-allowances-to-upload.pdf

2 Introduction

Within the PR24 draft determination, Ofwat has "allowed a sector wide enhancement uplift for companies to prioritise their biggest climate related risks"[2]. This 0.7% enhancement uplift equates to approximately an £8m increase of Affinity Water's portfolio of investments.

As requested by Ofwat, we set out which schemes we will deliver with the additional cost allowance as part of our representation, including details of the specific schemes and why these have been prioritised.

These schemes are subject to the risks identified within our latest published Climate Change Adaptation Report 2021[3]. Although this report was published in 2021, Affinity Water, with support from Atkins, are in the process of updating this report. This report is refreshed ever 5 years, as requested within the Climate Change Act 2008. In each iteration we reassess the nature of climate change risks as they emerge and adapt our risk mitigations and investments accordingly. We are fully committed to investing the enhancement uplift on climate change adaptation that is not otherwise covered in base and have put forward the best value investments based on current information. However, given the emerging nature of climate risks, a degree of flexibility in the targeting of this expenditure within period will ensure customers receive the greatest protection of services possible for the investment.

[2] Page 116, PR24 Draft Determinations Expenditure Allowances to Upload, https://www.ofwat.gov.uk/wp-content/uploads/2024/07/PR24-draft-determinations-Expenditure-allowances-to-upload.pdf

[3] Climate-Change-Adaptation-report-2021.pdf (affinitywater.co.uk)

3 Climate Change Adaptation

Our Climate Change Adaptation report sets the basis for all our investments in adaptation for climate change. The mitigations of each risk are funded across base allowances and a range of existing enhancement drivers. Therefore, only a limited number of investments are potentially eligible for inclusion in the resilience uplift. A summary of the key risks and where mitigation measures will primarily be funded from is provided within Table 2.

Table 2 - Six Headline Risks from Climate Adaptation Report 2021 and the Mitigation Funding Cases.

Risk	Description	Mitigation Funding
1	Increase in demand due to higher temperatures throughout the year. Exacerbated during summer peak demand periods.	Water Resources Management Plan (WRMP).
2	Equipment and asset failure due to extreme weather events.	Security and Emergency Measures Direction (SEMD) Business Case
3	Increase in competition for, and price of, raw water imports.	WRMP
4	Reduced availability of ground and surface water due to drought.	WRMP
5	Outage due to flooding of sites.	Climate Change Adaptation.
6	Deterioration in raw water quality due to changes in rainfall and temperature, leading to the loss of sources.	Raw Water Deterioration Business Cases

These have then been cross-referenced, within Table 3, back to the National Climate Change Risk Assessment (CCRA) risks and the coverage documented. The relationship of these risks to the national CCRA risks is as follows:

- In1: Risks of cascading failures from interdependent infrastructure networks.
- In2: Risks to infrastructure services from river, surface water and groundwater flooding.
- In3: Risks to infrastructure services from coastal flooding and erosion.
- In4: Risks of sewer and surface water flooding due to heavy rainfall.
- In5: Risks to bridges and pipelines from high river flows and bank erosion.
- In8: Risks to subterranean and surface infrastructure from subsidence.
- In9: Risks to public water supplies from drought and low river flows.

Table 3 - Cross-reference between Affinity Water Headline Risks and the Related National CCRA Risks

Affinity Water Headline Risk	Related National CCRA risk(s)
01	In9
02	In1; In2; In5; In8
03	In1
04	In9
05	In2; In3; In4
06	In2; In3

Most of the risks that were identified within the climate change adaptation have schemes within our PR24 business plan to alleviate some of the risk.

The risks which will be targeted with the 0.7% uplift allowance are:

2. Equipment and asset failure due to extreme weather events.
5. Outage due to flooding of sites.

3.1 Climate Change Adaptation report updates

The next Climate Change Adaptation report is currently being updated by Affinity Water, with support from Atkins, and is due to be submitted to the Department for Environment, Food & Rural Affairs (Defra) in December.

Early indications from the risk identification process in the update highlights additional areas of future concern, which are likely to impact our customers without focused investments. Due to the next version of the report still being developed, individual schemes, designed to mitigate these risks for customers, have not yet been scoped and have not been included within these reports.

Examples of additional schemes that could be included within this uplift following greater scope development are:

- Cooling infrastructure, e.g., the cooling of buildings that contain pumps to prevent the risk of failure due to the increasing average temperatures within our area.
- Tree maintenance at sites with increasing risks of heavy winds.
- Energy resilience due to increasing risk of power outages within our region due to societal moves towards renewable energy.

4 Schemes funded through the resilience uplift

Within our 2024 business plan submission, we proposed three separate programmes of works to mitigate the impact of Climate Change and improve the resilience of our operations, which was requested as one of the highest priorities by our customers. Due to the response to these business cases following Ofwat deep dives, we have adjusted these to ensure that Ofwat's resilience business case expenditure criteria are met whilst maximising benefits against costs for customers. These adjustments also include the 0.7% enhancement uplift for Climate Change adaptation. These adjustments are highlighted within Table 4.

Table 4 - Adjustments to Enhancement Resilience Expenditure Including the Climate Change Adaptation Uplift.

Scheme Name	Original Business Plan Submission (£m)	Requested Allowance Following Uplift (£m)	Delta (£m)	Comments
Flooding Alleviation	1.1	8.0	+6.9	This was originally a reduced programme where most sites that need investment, we delayed in our long-term delivery plan but can now be appropriately addressed through the climate change mitigation uplift.
Network Calming	8.8	0	-8.8	This programme will now be funded through base allowances, with contributions from the leakage enhancement driver proportional to the leakage benefit delivered (through the pressure management optimisation activity)
Single Points of Failure	5.1	0	-5.1	The single points of failure business case will be covered by the climate mitigation uplift in base expenditure.
Total	15.0	8.0	-7.0	

4.1 Flooding alleviation

Within our PR24 business plan[4], we submitted an enhancement business case[5] of £1.1 million for flood alleviation. This business case was developed to mitigate the increasing risk of flooding, from fluvial, pluvial and groundwater causes.

This business case made up the next 5 years of investments but is a part of the larger long-term delivery strategy (LTDS) which covers our investment strategy over the next 25 years. A significant portion of the investments for flood alleviation were postponed until later AMPs.

With the removal of individual business cases aimed at improving resilience to Climate Change I the draft Determination, and the addition of the Climate Change Adaptation uplift, we propose to bring forward these investments to AMP 8. This will maximise the benefits to our customers across all generations, by targeting more of our highest risk sites for flooding earlier.

4.1.1 Prioritised schemes estimates

We prioritise flood alleviation projects at sites where water production is most vulnerable and where these assets are most critical in maintaining supply. This is based on both our dependency on these assets and the volume of water output they influence. Our schemes focus on protecting critical assets within our production sites to ensure reliable and safe water supplies. By safeguarding our assets from flood damage, we provide our customers with a consistent and uninterrupted water supply. This protection also ensures high-quality, safe drinking water by reducing the risk of contaminants entering our production and distribution systems. Our investments in flood mitigation ensure reliable water supplies during and after flood events, strengthening community resilience and supporting economic stability. Through our plans, we will keep our critical infrastructure operational and less prone to supply disruptions.

Our current scheme estimates show that, with the uplift in enhancement funding for Climate Change adaptation, we would be able to investigate our 30 highest priority sites, which would not be covered under usual base expenditure allowances.

These 30 sites are covered under two separate investment options:

- Critical Asset Mitigation, where we know the current risks of flooding at the site and how it would be influenced by Climate Change, and,
- Investigations and modifications, where we have early indications that Climate Change may have increase the flooding risk at the site, but the extent is not yet completely understood.

[4] AFW01 – Affinity Water Business Plan: https://www.affinitywater.co.uk/docs/PR24/Business_plan/AFW01.pdf
[5] Enhancement Investment Cases Part B, Pages 73-125: https://www.affinitywater.co.uk/docs/PR24/Appendices/AFW14-b.pdf

These estimates were developed for our flood alleviation long term delivery strategy, developed during the development of the 2024 business plan. The proposed investments are highlighted within Table 5.

Table 5 - Estimates for AMP 8 Enhancement Investments Using the Climate Change Uplift. Estimates Based on Investigations for the LTDS.

Expenditure Allowance	Investment Option	Number of Sites	Investment Estimate
Enhancement	Critical Asset Mitigation	24	£6,873,129
	Investigate & Modify	6	£1,060,000
	Total	30	£7,933,129

We will work with our framework partners to develop and deliver a scheme of flood alleviation works, which aims to maximise the benefits to customers to target these highest priority sites for flood alleviation.

4.1.2 Need for investment

Within the past 25 years, Affinity Water has experienced three prominent flooding events (2001, 2007 and 2014). On each occasion, the events caused severe distribution; damaged our above ground infrastructure; and led to a temporary loss of strategic water supplies.

In 2014, Affinity Water production sites were adversely impacted by flooding. We had to shut down our production sites due to critical asset damage, high bacteriological counts, and site inundation with sewerage contaminated waters. The impacted sites are summarised within Table 6.

Table 6 - Summary of Sites Impacted by the Flooding in 2014

River & Surface Water Flooding (Fluvial & Pluvial)	Groundwater Flooding	Access Issues Caused by Flooding Events	Water Quality Incidents Caused by Flooding Events	Lost Site Output Caused by Flooding Events
▪ Chalfont St Giles ▪ Chertsey ▪ Hughenden ▪ Springwell ▪ Denge ▪ (Observation ▪ boreholes) ▪ Essendon ▪ Hunton Bridge ▪ Sacombe ▪ Thaxted	▪ Chalfont St ▪ Giles ▪ Chertsey (4th ▪ Wellfield) ▪ Hughenden ▪ Springwell ▪ Denge (Iron) ▪ Amersham ▪ Bow Bridge ▪ Friars Wash ▪ Fulling Mill ▪ Holywell ▪ Kensworth ▪ Lynch ▪ Ottinge ▪ Well Head ▪ Worlds Wonder	▪ Chalfont St ▪ Giles ▪ Chertsey ▪ Codicote ▪ Drellingore ▪ Eastbury (Well 3) ▪ North Mymms	▪ Chalfont St Giles (raised bacteriological counts, contamination flowing through site in ▪ Misbourne) ▪ Denge (Iron) ▪ Broome (Nitrates) ▪ Chartridge (Nitrates) ▪ Kings Walden (Nitrates) ▪ Lighthouse (Turbidity) ▪ Lye Oak (Turbidity) ▪ Queens (Nitrates) ▪ Rakeshole North (Turbidity)	▪ Chalfont St ▪ Giles ▪ Chertsey (4th ▪ Wellfield) ▪ Hughenden ▪ Springwell ▪ Chartridge ▪ Codicote ▪ Essendon ▪ Sacombe ▪ Queens ▪ Worlds Wonder ▪ Broome ▪ Kingsdown

We conducted a Flood Risk Assessment for our production sites in collaboration with Jacobs, focusing on locations within our central operating region, excluding the Brett and Dour communities. The assessment identified which sites are at risk of fluvial and groundwater flooding and the extent of that risk.

For pluvial flooding, we conducted the analysis using the Risk of Flooding from Surface Water (RoFSW) maps, which were developed in 2014 by the Environmental Agency in collaboration with Lead Local Flood Authorities (LLFAs).

These investigations identified that extreme flooding events are a risk to 27% of our production sites (142 sites) as these sites either are in a river's flood plain, in an area that has a sensitive groundwater level, or where surface drainage systems are unable to deal with intense rainfall. 24 of our production sites are at risk of more than one type of flooding event, which increases the likelihood of the same site experiencing a flood that may affect water supplies. Table 7 illustrates the number of sites and the type flooding that they are at risk of.

Table 7 - Number of Sites at Risk of Flood

	Groundwater	Fluvial	Pluvial
Number Sites Prone to Flood Risks	15	33	94

Forecasts by the UK Met Office suggest that climate change will increase the risk of flooding by up to 20%[6]. The Technical Report for the third Climate Change Risk Assessment (CCRA3) identifies a wide range of potential costly impacts of climate change. It identifies under the 2°C by 2100 warming scenario that annual damages from flooding for non-residential properties across the UK is expected to increase by 27% by 2050 and 40% by 2080[7].

To meet our planned business outcomes, it is necessary that we invest in flood resilience to mitigate the risks of climate change and to safeguard our customers water supplies from the short-, medium- and long-term impacts of flooding.

4.1.3 Best option for customers

Improving resilience was one of the customers highest priorities for us to invest in over AMP 8[8]. Increasing the amount of flooding alleviation that we complete within the AMP will maximise benefits to customers over many generations and will reduce the impact of flooding to our customers supply over the next 5 years.

All our options have been developed in line with our business case development criteria for PR24 , as stated within our business plan appendix AFW08 – Our investment decision process[9], which includes cost benefit analysis to ensure that the best option for customers is selected for investment.

4.1.4 Cost efficiency

The cost numbers used to formulate the proposal have been taken from the historical information held by Affinity Water from actual quotations from suppliers. The costing has factored an inflation rate into consideration at the time of writing this representation. As the inflation rate keeps on rising, there is a risk of increased costs. Therefore, the confidence rating in the costs is mid to high.

The cost estimates for previous flood civil, mechanical, and electrical works were determined using actual outturn costs from suppliers who were appointed following a full OJEU tender and procurement processes. The actual solutions are known to be efficient as the works packages underwent detailed design, solution optioneering and value engineering prior to construction.

6 https://www.metoffice.gov.uk/weather/climate-change/climate-change-in-the-ukk
7 The Third UK Climate Change Risk Assessment Technical Report, 2021, Betts, R.A., Haward, A.B. and Pearson, K.V. (eds.). Prepared for the Climate Change Committee, London
8 AFW04 – What our customers and stakeholders want: https://www.affinitywater.co.uk/docs/PR24/Appendices/AFW04.pdf
9 AFW08 – Our investment decision process: https://www.affinitywater.co.uk/docs/PR24/Appendices/AFW08.pdf