

Asset Health Cost Change 2026

**Asset Health Business Case
Enhancing Water Network
Storage Assets**

UUW26-13

April 2026

Executive Summary

United Utilities Water (UUW) welcomes Ofwat’s consideration of evidence-based proposals for additional asset health investment, focused on priority assets identified in the *Roadmap for Enhancing Asset Health Understanding in the Water Sector*.

Description

This case, which is a standard – single main submission, sets out our plans for additional investment at 24 treated water storage tanks across 17 sites for a total totex claim of £78.2m (net of repair savings).

The evidence and analysis presented in this case demonstrates that a step change in investment is needed now to deliver the most cost effective, whole life cost long term plan to safeguard asset health and prevent unsustainable deterioration that will impact service and cost over the long term. This is driven by the proactive identification and escalation of risks via our established asset and operational risk management processes.

Our proposal is consistent with our asset class strategy and complementary but distinct from our PR24 submission. It comprises a defined and deliverable programme of refurbishment and renewal where base expenditure is no longer sufficient to meet long-term water quality, resilience and safety requirements cost effectively.

Asset Class Strategy Vision

- **We will deliver a reliable and resilient supply of potable drinking water** meeting all statutory water quality commitments whilst ensuring customer acceptability focussed on water taste, smell and appearance.
- **We will deliver a step change in the overall asset health of treated water storage** building on previous investment to mitigate water quality risks and optimising asset investment for long-term resilient solutions.
- **We will use an asset data driven approach to risk management.** We continue to evolve our management approach moving from reactive interventions to proactive inspections and remediation. Our strategy goes a step further by utilising an asset data driven approach, ensuring investments balance both short-term requirements with long-term asset health risks (e.g. structural condition and health and safety), all focused on putting **Water Quality First**.

Need

UUW operates 634 tanks across 360 sites that fall under Ofwat’s “Treated Water Storage” priority asset class. These include:

- 50 contact tanks which store treated water for a sufficient duration for effective disinfection; and,
- 39 clear water tanks, 541 service reservoir compartments, and 4 water towers which store water on the outlet of WTW or in the network to balance fluctuations in demand and provide resilience.

It is critical that these assets maintain the integrity of water quality between treatment and the customer’s tap.

During the last two investment periods, AMP6 and AMP7, UUW invested heavily in treated water storage assets to deliver a transformation in water quality compliance and risk. This focus upon water quality led to improved performance. We also gained a much richer understanding of the structural state of the asset base and the associated investment needs. This knowledge, and continued development in our asset management maturity, underpins our Treated Water Storage strategy and this business case.

The case is built around two primary drivers:

- Directly improving the asset health of 13 tanks. Tank refurbishment, replacement roofs and membranes all support stabilising the health of the asset base; and,
- Improving the operability and maintenance of 11 tanks. Addressing historic design constraints that inhibit the operation assets to facilitate future maintenance activities and therefore maximise their service lives and

reduce future risk for customers. This includes dividing single compartments and refurbishing currently long-term out of service tanks on the same site as single compartments.

What base buys

Our AMP8 base programme is actively prioritised and focused on the full drain down, inspection and maintenance of over 100 tanks per year. The risk-based inspection programme is designed to address risks that have been highlighted either on previous inspections, site visual inspection or have been identified as part of the Drinking Water Safety Plan assessment (DWSP) process. The range of work undertaken is broad, from minor repairs to extensive large scale refurbishments. It also includes the refurbishment and replacement of sample taps, pipework and site drainage that are not included in the scope of this case.

Our analysis demonstrates that water quality risks are managed in the near-term. A key principle is that a tank will not be returned to service with an unacceptable water quality risk. The base programme therefore prioritises investment that directly addresses immediate risks, or in extreme cases an asset may be left offline if remediation cannot be accommodated. However, the programme's ability to restore long-term asset health and prudently intervene ahead of deterioration is constrained. Our current forecast is that 70% of treated water storage assets are at the end of life by 2040. This proposal defers that asset class aggregate position to 2050 by delivering longer-life benefits to high-priority assets.

Benefits

Customer research shows that customers expect high quality drinking water, at any time, every day, without fail. Treated water storage is a key element in ensuring the overall security of supply and resilience to customers.

The primary benefit of the proposed investment is to progress towards sustainable health of this critical asset class which will continue to safeguard the quality and resilience of supply to customers. Compared to our current forecast, it reduces the increase in risk due to deterioration by 10% over a modelling horizon to 2055. The direct impact is on risks to customer service including water quality, security of supply and network operability.

It is also important to recognise the non-linear, wider system benefits for customers and the North West economy. Firstly, the complexity, risk and cost of performing maintenance becomes exponentially harder as a growing proportion of assets reach the end of their life. Investing now smooths requirements between current and future customers. Secondly, extending asset lives creates space for innovation to improve asset maintenance. Thirdly, a healthy asset base derisks the delivery of other important upgrades for customers in the North West (e.g. outages to deliver the Haweswater Aqueduct Resilience Project will be dependent on high asset availability).

Cost efficiency and best option for customers

Efficiency has been embedded through disciplined scope control, external benchmarking of our estimates against third party comparable costs and use of established AMP8 delivery models consistent with our PR24 approach and asset strategy. Customer protection is provided through output-based Price Control Deliverables (PCDs), ensuring that customers only fund efficiently delivered outcomes and an expenditure-based PCD covering our existing AMP8 programme.

This business case is a proportionate, evidence-led, and low-regret response to material and accelerating asset health risks, consistent with Ofwat's expectations and with customer preferences for proactive maintenance that protects the environment, service reliability, and long-term value for money.

This case fully aligns with Ofwat's outcome focussed approach, and our own strategic objectives of ensuring reliable and resilient wastewater service that protects the environment whilst supporting customers, communities, and the wider North West for the long-term.

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1. Description

This section explains why treated water storage is essential to delivering reliable and wholesome water for customers. It then provides an overview of our investment proposals and explains the need for a step change in investment. It outlines how we have defined a prioritised and evidence based scope of investment in 24 treated water storage tanks across 17 sites.

1.1 What the investment will involve

1.1.1 This business case has been developed to address risks in key structural aspects of our network storage assets. It is in addition to, and complementary to, our base programme for AMP8, this business case covers investment at 24 treated water storage tanks.

1.1.2 The treated water storage asset class breaks down into four subcategories. Contact tanks have a specialist function in water treatments works which use chemical disinfection; they delay water for a specified time to allow disinfectants to be effective before water enters distribution. The function of the other three subcategories is to balance fluctuations in demand and to create resilience if the upstream supply is interrupted, in particular:

- Clean water tanks are located at a water treatment works facility;
- Service reservoirs occur in the distribution network; and,
- Water towers are a special case within the network where a tank is elevated to provide sufficient water pressure.

1.1.3 Irrespective of subcategories, the requirements of the asset are consistent:

- They must be structurally sound to store water securely without leakage or a risk of flooding;
- The integrity of the treated water must be protected to ensure a wholesome supply to customers. Construction materials must be safe to be in contact with drinking water and there must be no ingress into the tank from the environment. The majority of tanks are constructed from concrete but there are also a small number of steel and glass-reinforced plastic tanks; and,
- They must be sized to provide a reliable and resilient supply without impacting water quality by holding the same body of water for a prolonged period. A remote, rural tank can be less than 100m³ whereas a strategic reservoir may contain over 100 000m³.

1.1.4 The planned work covers the following five broad intervention types:

Tank replacement due to asset health deterioration.

- Steel tanks have a shorter asset life, benefit less from refurbishment, and cost less to replace. This is also a preferred option for other assets with severe structural deterioration which refurbishment has not successfully addressed in the long-term.

Roof replacement due to asset health deterioration.

- Where deterioration is too severe for refurbishment to be effective, but the extent is limited to an individual component.

Refurbishment due to asset health deterioration.

- Where deterioration has not impacted the structural integrity of the asset but there is a long-term risk without intervention.

Tank recommissioning to enable effective maintenance.

- Where bringing back into service former tanks, that were taken offline due to asset health, will reduce the service risk of isolating critical tanks that remain in service for maintenance.

Tank division to enable effective maintenance.

- Where the design of a treated water structure does not allow the independent operation of compartments (e.g. due to half-height walls) and therefore maintenance carries a high level of risk.

1.1.5 We are seeking additional investment for our treated water storage assets at service reservoirs and contact tanks to improve their long-term asset health. This is complementary to our PR24 submission and long-term strategy which is outlined in Section 3.5 below. We have a strong track record in maintaining treated water storage assets through our base expenditure allowances but our analysis identifies a requirement to go further now to maintain an acceptable cost and risk profile over the long term.

1.1.6 This is a planned programme of interventions focused on investment to sustain the health of assets at the end of their service life, either in entirety or on specific components. It is necessary to carry out works to maintain the structural integrity of network storage assets and extend their serviceable lives. In a small number of cases, we plan to reinstate some former reservoir compartments where there is a single compartment in service, reducing service risk during essential maintenance. Reinstating that component is the most efficient solution has a higher upfront cost but is a better whole life option as it avoids recurrent operational costs and reduces service risk during essential maintenance. We also have small number of assets at the end stage of their lifecycle such as steel tanks that need to be replaced.

1.1.7 This investment supports reduced risk and improved efficiency of maintenance.

1.2 Where we are planning to invest

Site selection process

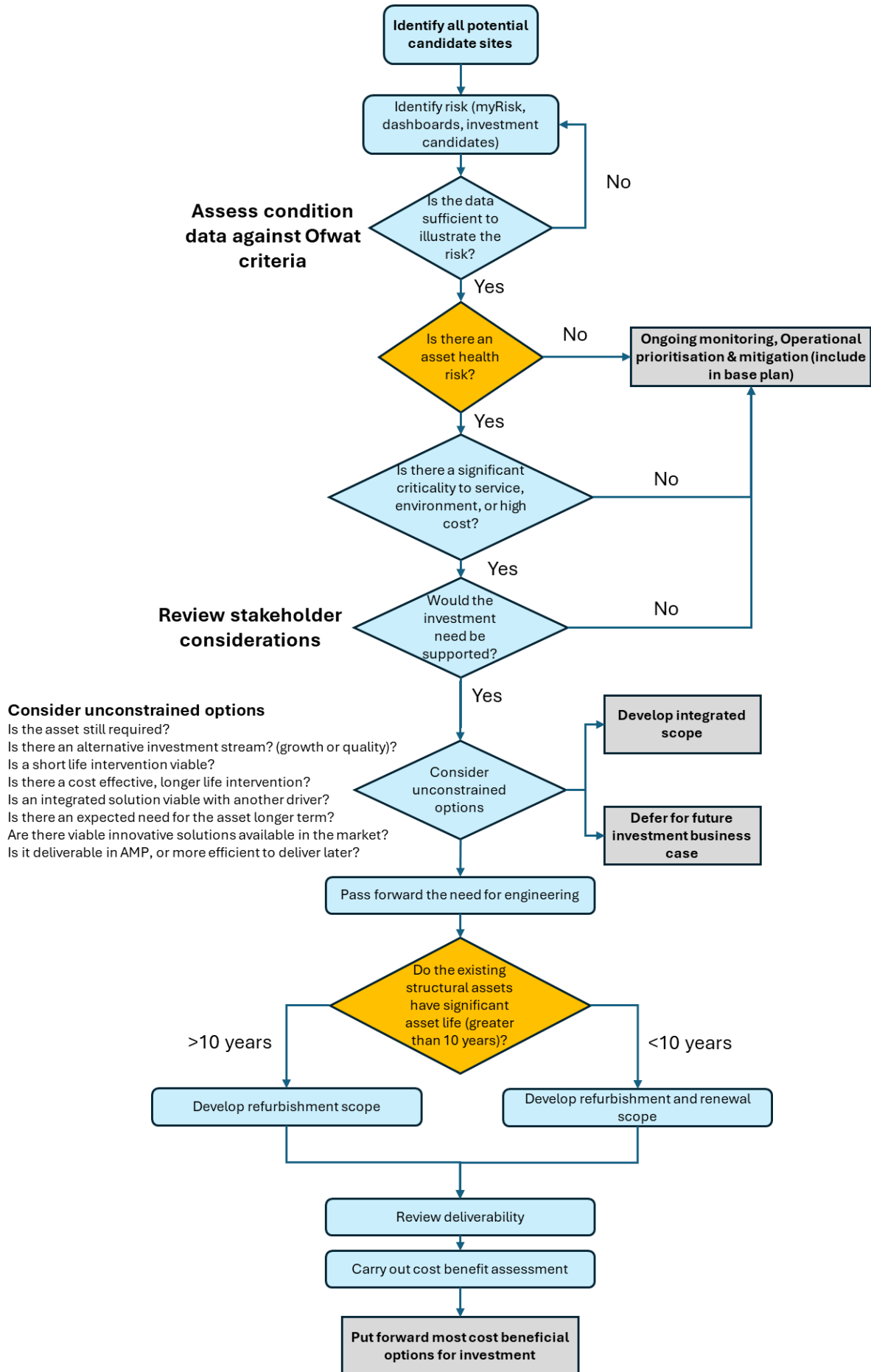
1.2.1 Assets included within this business case were identified through a structured, risk-based screening and prioritisation process designed to focus investment on the highest risk assets while ensuring deliverability within AMP8.

1.2.2 We began with the full asset list and used corporate asset systems and operational knowledge to apply initial exclusion criteria and narrow the population to those sites most likely to exhibit material asset health risk. We used asset condition ratings from internal inspections together with asset criticality, and the availability and suitability of alternative intervention options, alongside deliverability considerations. This process generated a final, prioritised list of candidate sites where deterioration is evidenced, risks are material, and targeted intervention represents the most proportionate and efficient response.

1.2.3 Further details of the site selection and selection of interventions is outlined in Section 5. Section 8 provides evidence that the proposed investment is deliverable within the constraints and fully integrated into our wider AMP8 programme. It also identifies how deliverability is enhanced by increasing investment in AMP8 because the Haweswater Aqueduct Resilience Project (HARP) – a major Direct Procurement for Customers project on our largest aqueduct – will require critical asset outages in AMP9.

1.2.4 A summary of the selection process is provided in Figure 1.

Figure 1: Asset health optioneering process



Source: UUW analysis

Candidate sites

1.2.5 We plan additional investment at 17 sites covering 24 network storage tanks spread across the North West of England as shown in Figure 2. The case focuses on structural investment needs to support resilience, to improve safety and to reduce ongoing costs and complexity associated with routine inspection and maintenance. Appendix A contains the asset-specific detail on how we have built this programme, including the drivers for investment, the options to address the need, selecting cost-beneficial options and considering deliverability.

Figure 2: Map of planned treated water storage programme



Source: UUW analysis

2. Guide to evidence

Table 1 below highlights where the key evidential components of our case are located within the document. It is designed to help readers easily navigate to the supporting information that underpins our assessment and justification. It also provides clarity on which key evidential requirements our document is focused on.

2.1 Asset health evidential requirements signposting

Table 1: Signposting to key sections of document

Assessment area	Key requirements	Section reference
Need for step change in investment	Historical investment and asset management approach	3.5 and 3.6
	'What base buys' assessment	4
	Asset health risk to service environment	3.1
	Future asset health and risk	3.2 and Appendix B
	Aligned long-term strategies	3.5
Best option for customers	Stakeholder engagement	5.5
	Unconstrained credible options	5.2
	Our proposed solutions	5.3 and 10
	Benefits versus the current position	5.4
Robust and efficient costs	Customer engagement on options	5.5
	Costing methodology for option and solution costs	6.1
	Efficient option and solution costs and good industry practice	6.2
	Cost benchmarking	6.2
Customer protection	Solution costs	6.1
	PR24 base expenditure plan	3.5 and 7.1
	Investment proposed in this cost-change	7.1
Investment delivery plans	Design and delivery risks log	8.2
	Aligned long-term asset strategies	3.5
	Stakeholder and supply chain engagement in delivery plan	8.5
	AMP8 investment delivery is on track	8.4
	Outline delivery schedule	8.3

Source: UUW's internal assessment

3. Need for investment

This section explains why additional, targeted investment is needed in AMP8. While we have a track record of prudent investment in treated water storage assets delivering wholesome and reliable water supply, the evidence provided in this section shows that asset risks are growing and inspections show a deteriorating trend across the asset base. Our plans support this accelerated maintenance need.

3.1 Risks mitigated by the investment

3.1.1 The primary risks associated with network storage are outlined below.

Deteriorating trend in overall asset health

3.1.2 We have a strong track record for inspection and maintenance that has informed a comprehensive understanding of asset condition. The deterioration of asset condition through time needs to be addressed through a step change in investment focused on structural integrity and long-term resilience.

Operational resilience

3.1.3 There is increasing evidence showing an increase in the need for multiple interventions to address a decline in asset condition. In turn this presents a risk to service continuity for customers where we must remove specific assets from service to undertake these works.

Reduced operability of the fleet of network storage assets

3.1.4 We have a number of single cell storage assets which present operability challenges (difficult to plan and facilitate drain down and maintenance) when interventions are required to address the structural integrity.

Loss of service

3.1.5 We have several storage assets that are single cell structures with an associated risk of service interruptions and/or customer complaints about service interruption when failures occur due to lack of an immediate alternative supply. The resulting loss or change of supply blend can also impact on customer contacts for taste, smell and appearance.

Health and Safety risk

3.1.6 Many of our network storage assets are underground chambers and classified as confined spaces. These present additional health and safety risks to operational staff and add additional complexity to arranging and managing work. With a step change in investment, we will be able to carry out repairs and refurbishments to address multiple defects, reducing the need for repeated drain downs and confined space working with associated health and safety risks.

3.2 How the risks are changing

3.2.1 The risks associated with treated water storage are not static and are influenced by the changing climate and environment, the regulatory landscape and a changing economic environment with an emphasis on growth in the region. Alongside this, we are better informed about the asset condition and how we need to prepare for these risks through addressing the asset health baseline.

Climate change

3.2.2 The impacts of climate change will place increased operational stress on our assets particularly with regards to power and telecommunications resilience. The impact of climate change and the decarbonisation of the UK energy supply are increasing power resilience risks (as outlined in supplementary document UUWR 39 of our PR24 submission). Interdependency between infrastructure sectors is a growing concern, as evidenced by changes to the National Risk Register in 2023¹. The option of previously taking a treated water storage asset out of supply and feeding customers directly by pumps as

¹ [National Risk Register 2023 - GOV.UK](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/114444/national-risk-register-2023.pdf)

opposed to replacing/refurbishing a tank is an increasingly unfavourable option due to the direct reliance on reliable power supply.

Growth and development

- 3.2.3 The pace of development and increasing demand for water places increasing importance on having a resilient asset base to provide security of supply and support growth in the North West. This significant development of household properties including new towns, and non-household demand for water such as the development of emerging technology and data centres further underpin the need for resilient storage systems. The pattern of water usage also changes dependent on the type of housing and location. Reductions in the availability and condition of local storage due to deteriorating asset health would impact our ability to support future regional growth.
- 3.2.4 **Changing demand patterns.** In some areas de-industrialisation created headroom which made tanks surplus to requirement. Historically, this allowed poor condition assets to be mothballed. However, with the emerging growth that we are seeing, we need to reverse this strategy in some areas as it is no longer appropriate from a resilience perspective.

Asset base understanding

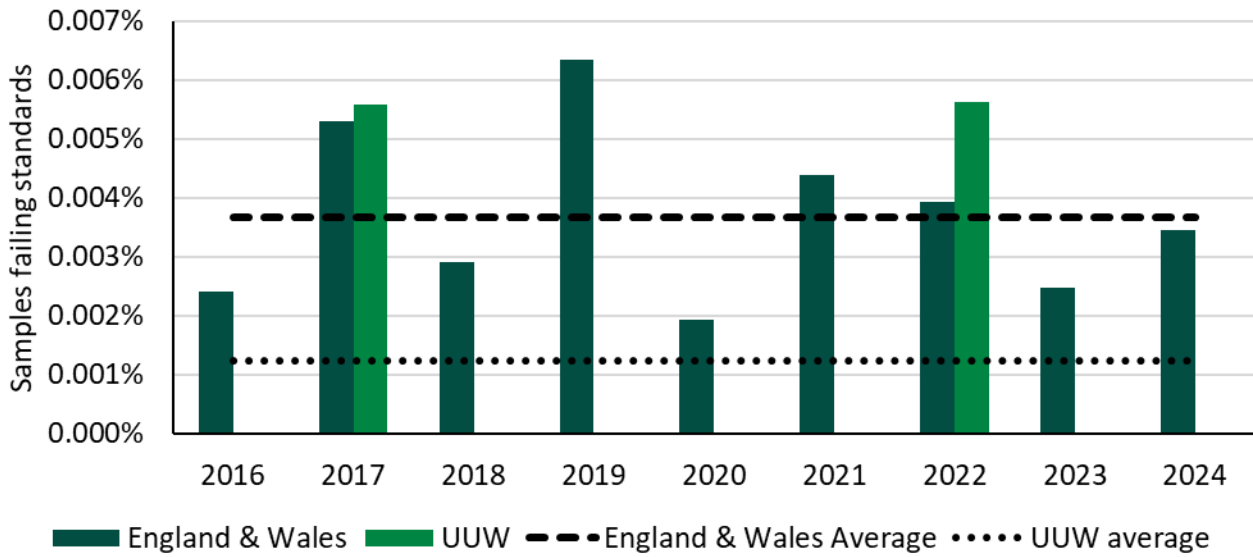
- 3.2.5 Our understanding of asset condition has been enhanced through an intensive period of asset inspections. During AMP6 and AMP7, UUW had a legal notice from DWI to inspect and clean all treated water storage tanks. The legal notice 'Treated Water Storage tanks UUT3563' focused on flood testing to identify and mitigate the risk of infiltration at all treated water assets. This included interventions to ensure that all tanks could be bypassed to be taken out of service for inspection. This influenced investment to focus on mitigating infiltration. This notice was formally closed in July 2024 although was substantially complete by 2022-23.
- 3.2.6 These inspections have informed our condition assessment and allowed us to better assess the risk position. This identified assets that, whilst not at immediate risk of infiltration, are in a sub-optimal condition structurally. The following section outlines why there is a compelling requirement to invest now, with further analysis of asset data in Section 3.4 evidencing the growing investment requirement.

3.3 Why now is the right time to invest

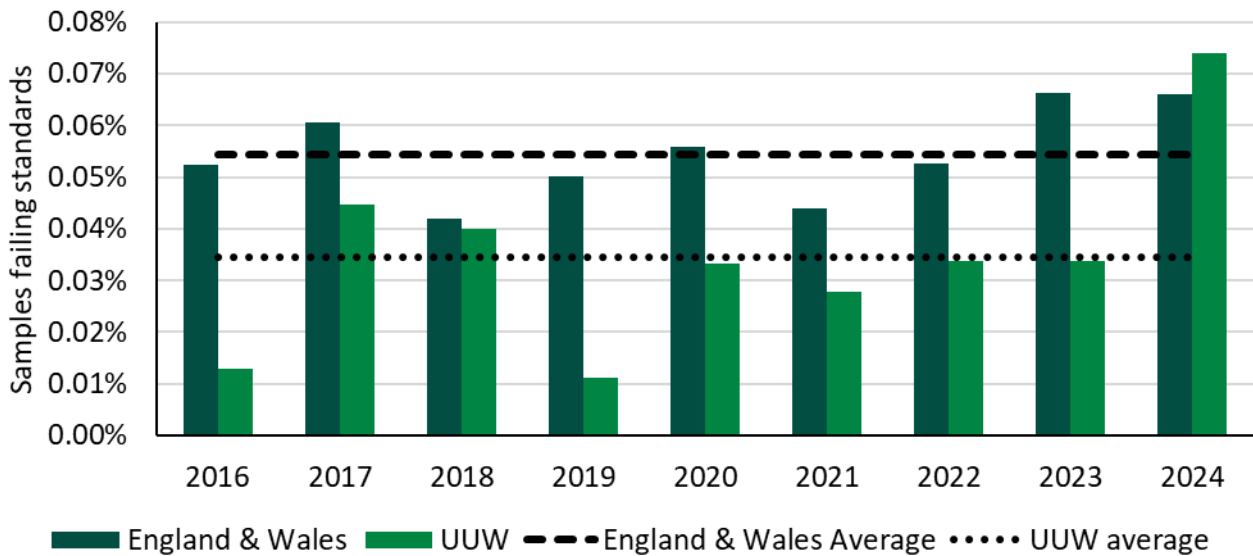
- 3.3.1 This case is driven by the long-term risk to customer service from a deteriorating asset base, and the opportunity to intervene now to mitigate this risk. This section outlines why acting now to protect standards of service at an efficient cost is the best option for customers.
- 3.3.2 UUW has managed this risk carefully and prudently; Figure 3 shows that bacteriological performance at service reservoirs has routinely outperformed the industry average. The 2022 DWI Chief Inspector's Report commends us for completing work to inspect and clean every one of our service reservoirs². This substantial programme, funded from our base maintenance allowance, gives us a strong baseline position in terms of organisational capability and awareness of current asset condition.

² Drinking Water Inspectorate. 2023. *Drinking Water 2022*. [Drinking Water 2022 - Drinking Water Inspectorate](#)

Figure 3 UUW and industry service reservoir bacteriological performance: E. coli – top graph & Total coliforms – bottom graph



Source: DWI Chief Inspector’s Reports



Source: DWI Chief Inspector’s Reports

- 3.3.3 Building on this strong inspection record, we will focus on longer-term permanent asset upgrades to facilitate management of risks through improvements to structural integrity. This will provide a step change to address asset health with asset integrity and resilience as primary drivers.
- 3.3.4 The interventions deployed to meet short to medium term water quality imperatives are not necessarily the same as those required to secure long term asset health. A programme optimised to address water quality drivers within a given budget will prioritise the actions that cost effectively manage the salient risk. If the risk is potential ingress through a joint, crack or hatch then a water quality perspective would lead you to block the ingress pathway at that specific point as shown in **Error! Reference source not found..** By contrast, a programme optimised on asset health would look at the asset and intervention in the round. Rather than addressing a specific need for a relatively lower cost, would an intervention that costs more in the near-term reduce both water quality and other risks more effectively over the asset’s full lifecycle (for example, a membrane might be applied over the full structure rather than just a joint, or structural repairs might be preferred to overbanding).

[✂]

- 1. [✂]
- 2. [✂]
- 3. [✂]

[✂]

1



2



3



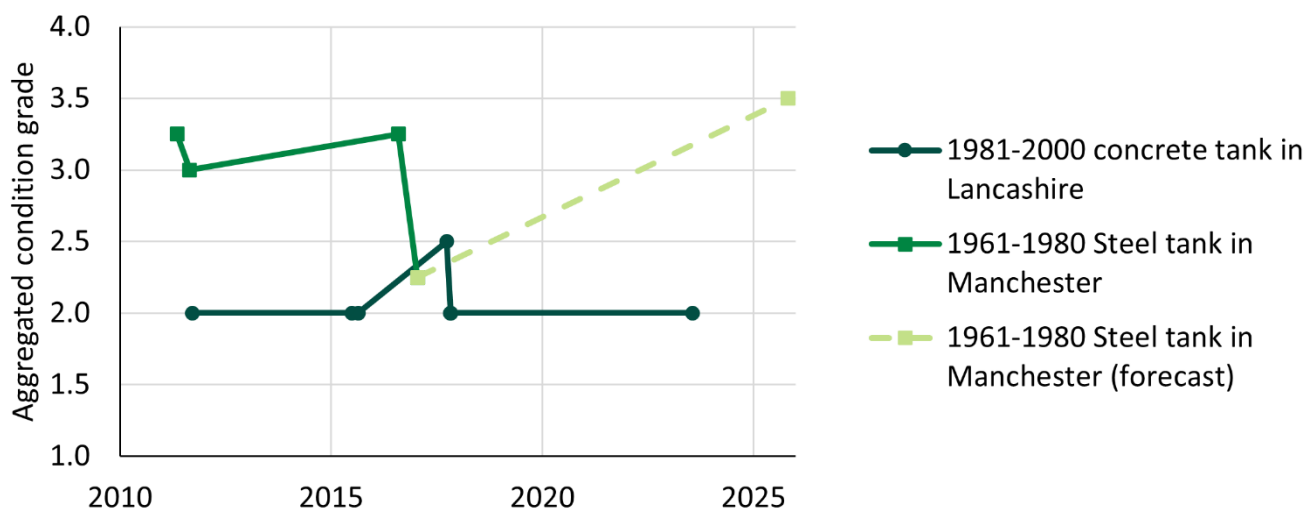
Source: UUW Inspection Archive.

3.3.5 Figure 4 below shows two examples of how the long-term picture of asset health changed at treated water storage assets. One shows a very stable asset condition and indicates an asset with ample remaining asset life. The other shows an asset approaching the end of its life with a worse baseline condition and frequent maintenance required to offset deterioration.

3.3.6 The concrete tank shows a generally stable profile with a temporary deterioration caused by a failed wall joint. By contrast the condition of the steel tank follows a saw tooth pattern. An initial inspection identifies issues which are remedied, and the condition grade improves before the tank is returned to service. The tank then deteriorates again over until the next inspection. The forecast condition is based upon a recent inspection of an identical tank on the same site.

Figure 4: Aggregated condition grades at two tanks over multiple decades.

Grading aligns with Table 2.1 in Ofwat’s Asset Health Condition Data Collection methodology³ with a higher number indicating worse condition. There is further discussion of condition data below.



Source: UUW analysis

3.3.7 **Our long-term strategy for treated water storage is to work towards a long-term, asset health-driven approach supported by better data and an improved understanding of our network.** This aligns directly with the following key strategic themes from our Strategic Asset Management Plan⁴:

- Better exploitation of our data to optimise the management of our assets at all stages of their lifecycle.
- A permanent transition in the deployment of our maintenance activities from reactive recovery to proactive maintenance, meaning that maintenance is safer, quicker less disruptive and more cost efficient.
- Using data to support our decisions and activities with greater levels of insight.

3.3.8 A step change in investment is needed to move beyond addressing immediate ingress risks. [✂] need to be maintained in a stable condition for future generations as outlined in our Asset Class Strategy for Treated Water Storage.

3.3.9 [✂]. We manage asset outages across our system to maintain the resilience and redundancy that reduces the risk of disruptive events (such as poor weather, power outage, equipment failure etc.) impacting customers. This is relevant to treated water storage in two ways:

³ Binnies (2025). *Asset Health Condition Data Collection. Methodology – Treated water storage.*

⁴ United Utilities (2025). *Strategic Asset Management Plan.*

1. Preventing contamination to treated water means that projects at storage facilities typically require the asset to be taken offline. This must be carefully planned and the dependencies with other programmes mapped out to maintain sufficient headroom in the system. With large infrastructure upgrades – such as the Haweswater Aqueduct Resilience Programme – planned over the next decade it is more important than ever to be proactive with properly planned and sequenced work on existing assets.
2. A deteriorating asset base requires an exponentially higher level of outage to recover back to a healthy state because a higher number of assets require more extensive work. Prudent proactive maintenance is a better option for customers in terms of both cost and service risk.

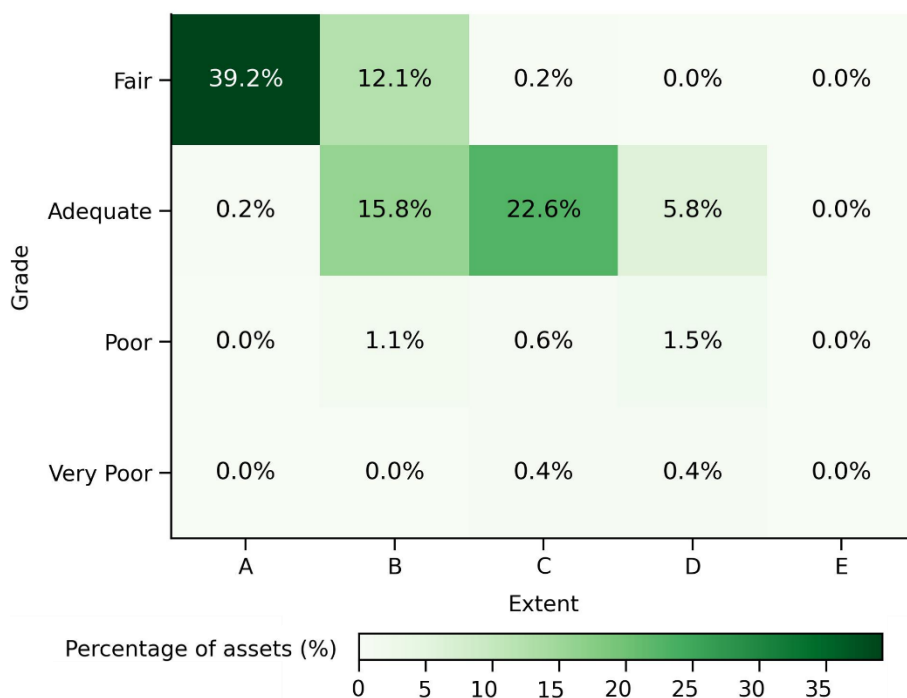
3.3.10 Figure 5 summarises the condition of UUW treated water storage asset base. The distribution shows that a small number of assets are in poor or very poor condition. This reflects the very low risk tolerance for these assets that was outlined in the introduction but we cannot tolerate an unacceptable risk to water quality and continue to address the most pressing concerns through our existing allowances. It is also important to note that the survey is completed when the tank is first isolated so records the condition prior to any remediation before the asset is returned to service.

3.3.11 This notwithstanding, **there is a cohort of assets in unfavourable condition. This cohort is the focus of this submission where we have looked closely at the best value approach to managing these assets over their whole life.**

3.3.12 The aggregate condition has been calculated in line with the 2025 methodology prepared for Ofwat by Binnies⁵. We have a pre-existing survey for each treated water storage asset from our rolling programme of inspection and maintenance. In many cases we have multiple surveys built up over multiple AMP periods (as shown in the previous Figure 4). To assess the current condition grade, we use the most recent survey.

Figure 5: Condition grade of UUW treated water storage asset base

This data is taken from UUW’s rolling programme of treated water storage inspections. In line with the Asset Condition Methodology⁵, the condition grade reflects the overall health of the asset (aggregated using a weighted average approach) while the extent describes the spatial extent of the defects.



Source: UUW analysis

⁵ [Binnies \(2025\). Asset Health Condition Data Collection. Methodology – Treated water storage.](#)

3.3.13 It is important to note that the condition is assessed when the tank is first isolated and inspected so is prior to any remediation before it is returned to service. The results are more granular than the component level, so we have used a weighted average approach to produce a single score for the civil component. These are shown in Table 2 below. We then used the weightings from the guidance to combine the civil component with the membrane where one was present.

Table 2: Weightings applied to aggregate civil sub-components.

Sub-component	Weighting excluding membrane	Weighting including membrane
Roof	25.00%	18.75%
Walls	50.00%	37.50%
Floor	25.00%	18.75%
Membrane		25.00%

Source: UUW analysis

Base Asset Health Dashboard

3.3.14 Figure 6 on the following page shows outputs from our base asset health dashboard for different scenarios:

- Each chart shows how assets in the treated water storage class are spread across their asset lives. A new asset is counted at the bottom; it is 0% of the way through its life. A life expired asset is shown at the top; it is 100% of the way through its life. Above 85%, an asset is flagged as 'end of life'.
- The first chart of each series – the furthest to the left – shows the current asset health profile (so is the same in each scenario). Most assets are within the central portion of the chart (25-75% of asset life) with a moderate skew towards an older asset base. It is important to note the high value of assets in the 70% range; it is critical to start addressing this need over multiple investment periods to avoid a spike of assets at the end of asset life with the consequential increase in risks to customer service and maintenance costs.
- Moving across to the right, subsequent charts show forecasts at five-year intervals out to 2055.

3.3.15 Further details explaining how the dashboard works are included in Appendix B.

3.3.16 Scenario A shows that with no investment the whole asset base continues to age unchecked. By 2040 nearly a quarter of assets are at the end of life and very few are within the first half of their life. This continues until at the end of the scenario where the asset health profile is extremely skewed with over £2 billion of assets at the end of life.

3.3.17 Scenario B shows how our current AMP8 plan is managing this risk. The 2045 position in this scenario is broadly equivalent to the 2040 position in Scenario A; the risk has been pushed back five years later. The benefit of our current plan continues across the full modelling period; in 2055 there are 7% fewer assets at the end of life compared to Scenario 1. However, the asset health profile is still strongly skewed with four out of five assets at the end of life and replacement cost remains close to £2 billion.

3.3.18 Scenario C shows how this case begins to address the issue of an ageing asset base. The 2045 position from Scenario B is deferred by a further 7-10 years, reaching an equivalent asset health profile between 2050 and 2055. The asset health profile remains skewed at the end of the period with 75% of assets at the end of life in 2055 so there is evidently more to do over the next 30 years. However, this modelling clearly demonstrates the benefits of this case as it moves towards more sustainable asset health. It creates headroom to innovate, embed efficiency and phase infrastructure investment requirements.

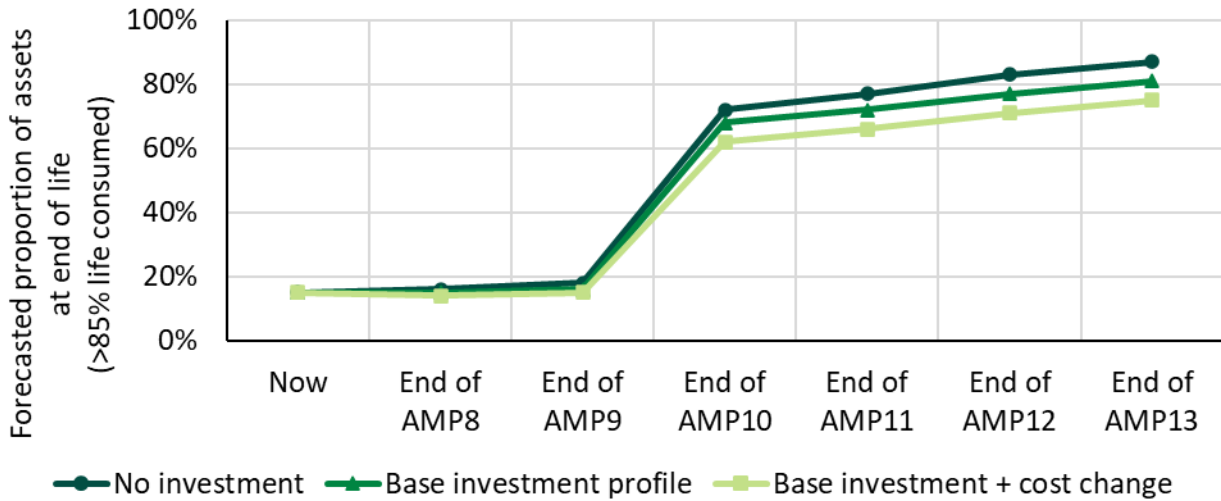
Figure 6: Scenario A – Asset health profile with no investment in treated water storage assets.; Scenario B – Forecasted asset health profile with AMP8 investment and Scenario C – Forecasted asset health profile with AMP8 investment and this business case.



Source: Uuw analysis (Base Asset Health profile dashboards)

3.3.19 Figure 7 summarises the modelling outputs into a single chart showing the proportion of assets at the end of life over time. Our current plan reduces the number of assets at the end of life compared to the baseline, but this case drives a substantial reduction beyond that. The step between AMP9 and AMP10 is driven by the large group of similarly aged assets crossing the 85% threshold.

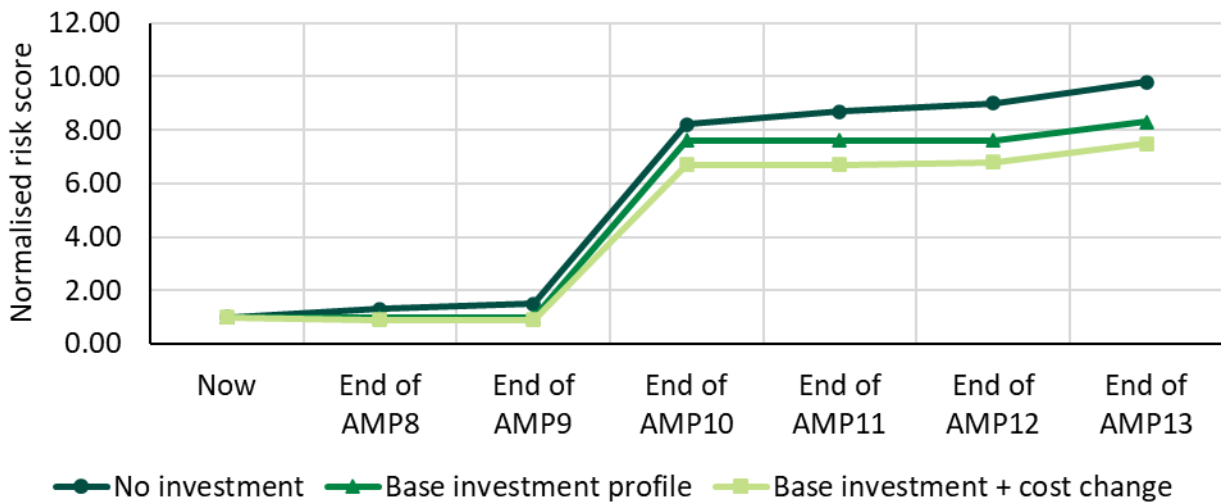
Figure 7: Forecasted proportion of assets at end of life (>85% life consumed)



Source: UUW analysis

3.3.20 This is also reflected in the services delivered by the assets for customers, and the risks posed by asset failure (Figure 8). With no investment the risk associated with these assets increases by 30% up to the end of AMP9, by contrast the existing AMP8 investment maintains stable performance and this case creates a minor improvement.

Figure 8: Forecasted risk linked to treated water storage assets



Source: UUW analysis

3.3.21 The large group of assets of similar age then drives a large increase in risk. Here, and thereafter, the benefit this case is apparent. Our AMP8 investment reduces the step change by 9% compared to no investment; **this case drives the risk down further to a 20% smaller increase.**

3.3.22 There are also system benefits that are not accounted for by modelling on an individual asset basis. The impact on system capability, operational resources and maintenance capabilities grows exponentially as

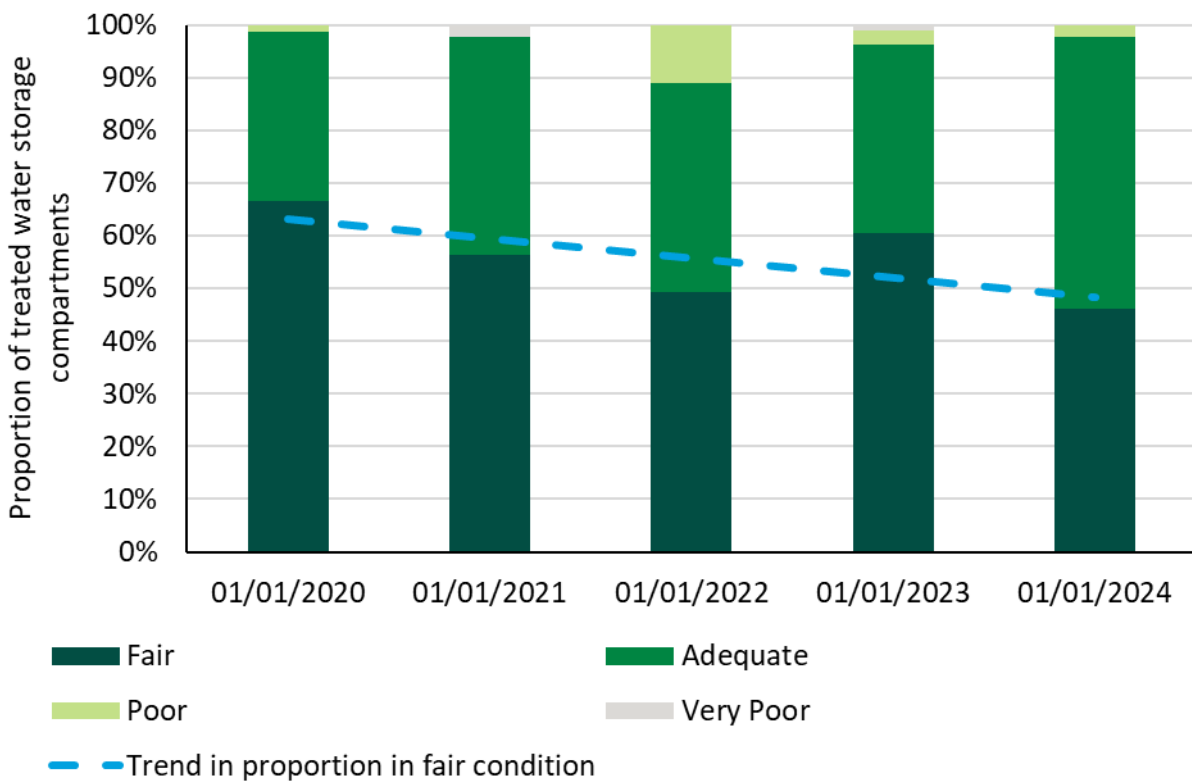
the proportion of assets at the end of life increases. This means that the investment proposed in this case has compound benefits enabling more effective and efficient maintenance in the long-term.

3.4 Evidence of deterioration

- 3.4.1 Our approach to asset management, in particular the rolling programme of inspections and growing database of asset information, allows us to build up a rich picture of asset health. This is on both a site-by-site (as seen in the previous Figure 4) and across the asset class.
- 3.4.2 When we look across the asset base, we see an underlying pattern of deterioration, with a declining proportion in fair condition over time (as shown in Figure 9). This is despite the maturity of our asset management approach and the track record of efficient expenditure outlined later in this section. Treated water storage assets are requiring more to remain healthy; hence why a step change in approach is needed.

Figure 9: Condition grades of tanks inspected 2020-2024

N.B. Grading reflects the condition of the tank upon initial inspection. It does not reflect the condition when it is returned to service post any interventions or investment.

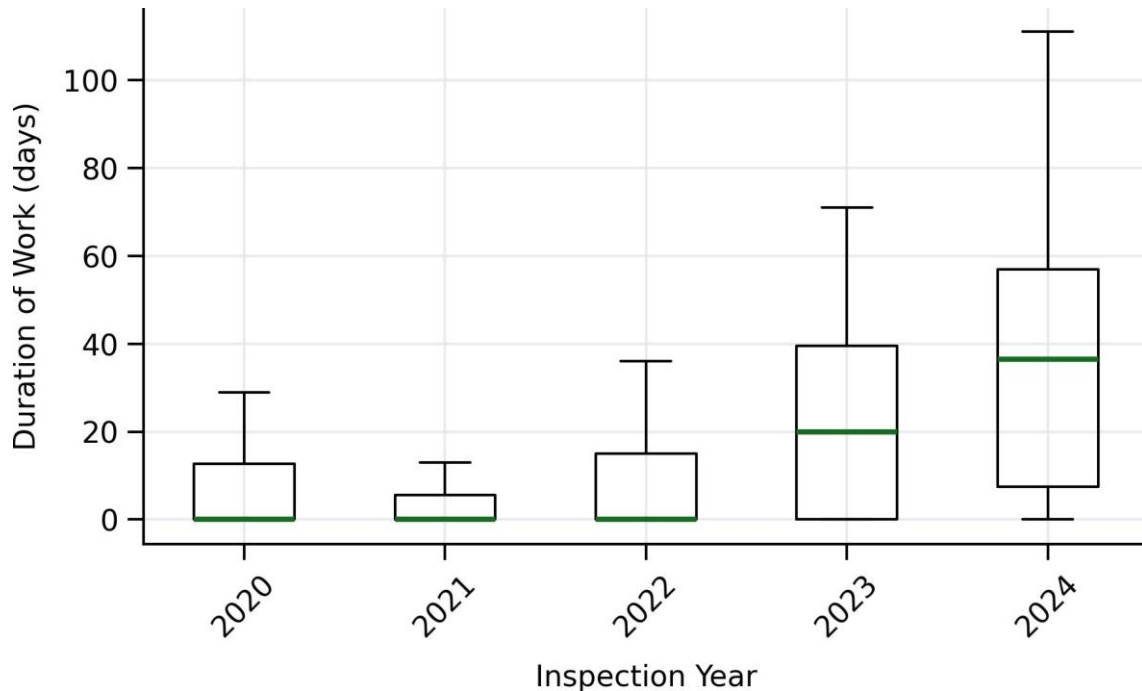


Source: UUW analysis

- 3.4.3 This is reinforced by the increasing duration of works completed on assets before they are returned to service (see Figure 10). This is a useful proxy for the complexity and extent of works required; localised non-structural issues (e.g. a poor condition hatch or joint) can be resolved quickly but a structural or extensive risks takes longer to resolve. The increasing trend indicates a shift towards these more fundamental issues and therefore an important change in asset health across the asset class.

Figure 10: Boxplot showing the duration of works on treated water storage assets 2020-2024.

The median duration outage is shown the by green line, the interquartile range by the box and the maximum and minimum (excluding outliers) is shown by the whiskers.



Source: UUW analysis

3.4.4 Identifying these trends in asset health early is critical to intervene to address a deteriorating trend. If the risk is not addressed, it has the potential to impact water supply and quality in the long-term and the increasing duration of works to resolve issues at multiple sites will impact the performance and resilience of the wider water system. This is reflected in UUWs’ strategy and investment approach outlined below.

3.5 Our existing strategy and base programme

3.5.1 Historically we have maintained water network storage assets using base maintenance funds. In AMP6 and AMP7 the driver for maintenance was the reservoir inspection programme mandated by the DWI for water quality performance. Building on this strong inspection record, our AMP8 approach focuses on longer-term permanent asset upgrades to facilitate management of risks through improvements to structural integrity.

3.5.2 This is aligned with our asset class strategy, which aims to:

- Stabilise the health of the treated water storage asset base using whole life cost assessment to determine best value options;
- Improve operational resilience of the supply system balancing treated water storage investment and reducing reliance on direct pumped options;
- Invest to maintain water quality integrity of the asset base;
- Focus on structural investment needs to support resilience, to improve safety and to reduce ongoing costs and complexity associated with routine inspection and maintenance; and,
- Facilitate safe operation and proactive maintenance of the asset base.

3.5.3 Our intention is to invest in treated water storage maintenance (structural repairs/membranes) in line with the outage programme which offers us the opportunity to address asset health previously driven to maintain water quality performance. We now need to invest in the overall asset health to maintain the

integrity of the assets necessitating a step change in investment to manage long-term asset integrity and resilience as primary drivers.

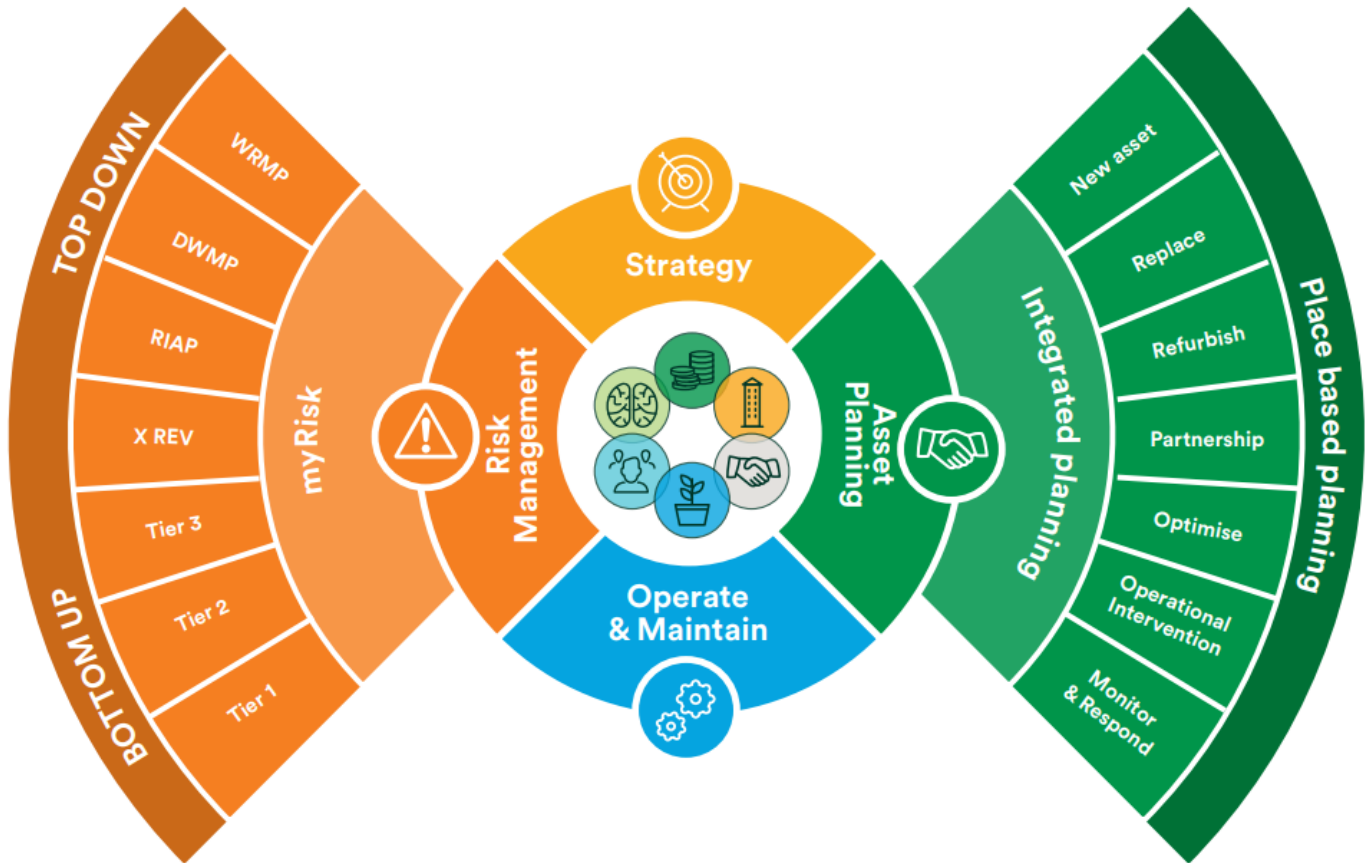
- 3.5.4 In our AMP8 programme we have allocated base funding to cover drain down, cleaning and inspection and remediation at a specified number of small, medium and large sites. Further details of our analysis of what base buys is contained within Section 4.
- 3.5.5 Full drain down, inspection and refurbishment work is completed in line with our proactive risk-based inspection programme. A full structural inspection is completed at this time to document and maintain the asset health record through time for asset.
- 3.5.6 All tanks are inspected within a 10-year period. We have a risk-based programme moving towards a maximum inspection period of 7 years. This rolling programme is business as usual and does not overlap with additional investment set out in this case. There are no current enhancement schemes related to this asset class.
- 3.5.7 The current base programme includes the refurbishment and replacement of sample taps, pipework and site drainage that are not included in the cost adjustment. This programme is carefully aligned with production planning needs to ensure that the outage of each tank can be completed without impacting overall system supply and resilience.
- 3.5.8 The base programme is designed to address known risks that have been highlighted either on previous inspections, site visual inspection or have been identified as part of the Drinking Water Safety Plan assessment (DWSP) process. The highest risks on the DWSP have already been addressed in the base programme or are scheduled to be completed in AMP8.
- 3.5.9 This submission opportunity has enabled us to consider additional sites that have additional drivers such as resilience and securing future asset reliability and maintenance. These have lower (water quality driven) DWSP scores so would not have been scheduled in the initial base programme.

Risk Management

Risk identification, assessment and escalation

- 3.5.10 We manage operational and asset health risks through an enterprise-wide risk management framework that provides a clear golden thread from asset-level risk identification to Board-level oversight. This is delivered through our Risk and Asset Planning (RAP) process, as set out in our Strategic Asset Management Plan (SAMP), and was assessed by Ofwat through the PR24 Final Determination and AMMA processes.
- 3.5.11 Operational risks are identified at asset and site level through routine condition assessments, performance monitoring and operational experience. These risks are recorded in myRisk, United Utilities' corporate risk management system, which assesses likelihood and consequence across safety, environmental, service and financial dimensions. Risks are scored against defined criteria and supported by documented controls and mitigation actions. Where risks exceed tolerance thresholds, they are escalated through formal governance routes for prioritisation and intervention.
- 3.5.12 An illustration of this approach is in Figure 11 below.

Figure 11: Risk and Asset Planning bowtie diagram



Source: UUW analysis

Integration with corporate risk governance

3.5.13 The myRisk system operates as the bottom-up risk capture mechanism and is fully integrated with our wider corporate risk framework. Operational risks recorded in myRisk are aggregated and reviewed through regular six-monthly risk review cycles, informing the strategic risks managed through our corporate risk system. This ensures alignment between operational reality and corporate risk appetite, enabling informed decision-making on investment prioritisation and risk trade-offs at both executive and Board level.

3.5.14 This integrated approach ensures that asset health risks are not considered in isolation, but alongside other material business risks, including regulatory compliance, environmental performance, health and safety, and resilience to climate change. The framework enables the company to identify where reliance on reactive or temporary controls is increasing, signalling the point at which proactive capital intervention represents the most efficient and lowest-regret response.

Alignment with asset management standards and PR24 commitments

3.5.15 Our risk management approach is embedded within our ISO 55001:2024 certified Asset Management System and is set out in our SAMP. The SAMP defines how risks are identified, evaluated, escalated and mitigated across the asset lifecycle, linking long-term strategic objectives to short-term operational decision-making. This framework underpins the company’s AMP8 asset health and resilience strategy and provides assurance that investment decisions are evidence-led, proportionate and targeted at the highest-risk assets.

3.5.16 As described in Chapter 7 of our PR24 submission⁶, we use asset risk modelling, operational risk management processes and structured assurance to manage current and emerging asset health risks. However, where deterioration becomes non-linear and constrains safe operation or maintainability, the effectiveness of operational controls reduces and reliance on reactive intervention increases. In these circumstances, proactive capital investment is required to restore risk to tolerable levels and maintain alignment with the company’s stated risk appetite.

Proactive risk management

3.5.17 We work to avoid disruption that negatively impacts customers or the environment now and in the future. We do this by proactively managing risk associated with our assets, systems and processes, with control and mitigation focusing on preventing or limiting problems, while maintaining the capacity to respond effectively.

3.5.18 Many of our proactive risk management capabilities cut across multiple operational risks. More detail of our approach to risk management can be found in chapter 7 of our main PR24 submission, including details on asset risk modelling, managing operational risks, and our approach to asset health.

3.6 Our historical investment

Innovation integral to the programme

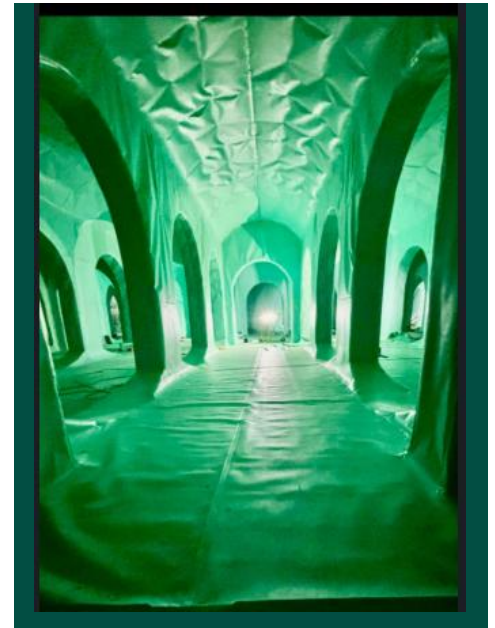
UUW’s approach to treated water storage inspection and maintenance has been recognised as industry leading⁴

This has been powered by close relationships with supply chain partners, enabling UUW to be early adopters of new technologies like tank liners, and driving efficiency and innovation through the full process from initial inspection to solution implementation.

Example of lining applied to full tank

⁶ UUW PR24 Submission, Chapter 7, Section 7.6: UUW07 Chapter 7 Resilience and asset health

3.6.1 Historical investment in AMP6 and AMP7 focused on water quality performance by reducing the risk of infiltration, following the DWI’s Enforcement Notice and spending in the most efficient way in line with the DWI’s reservoir inspection programme. In 2022 the DWI’s Chief Inspector’s report commended us for completing work to inspect and clean every one of our service reservoirs.



‘The company is also able to isolate any of its reservoirs from supply for inspection and cleaning. This is a significant achievement, and the company is to be commended for it.’⁷

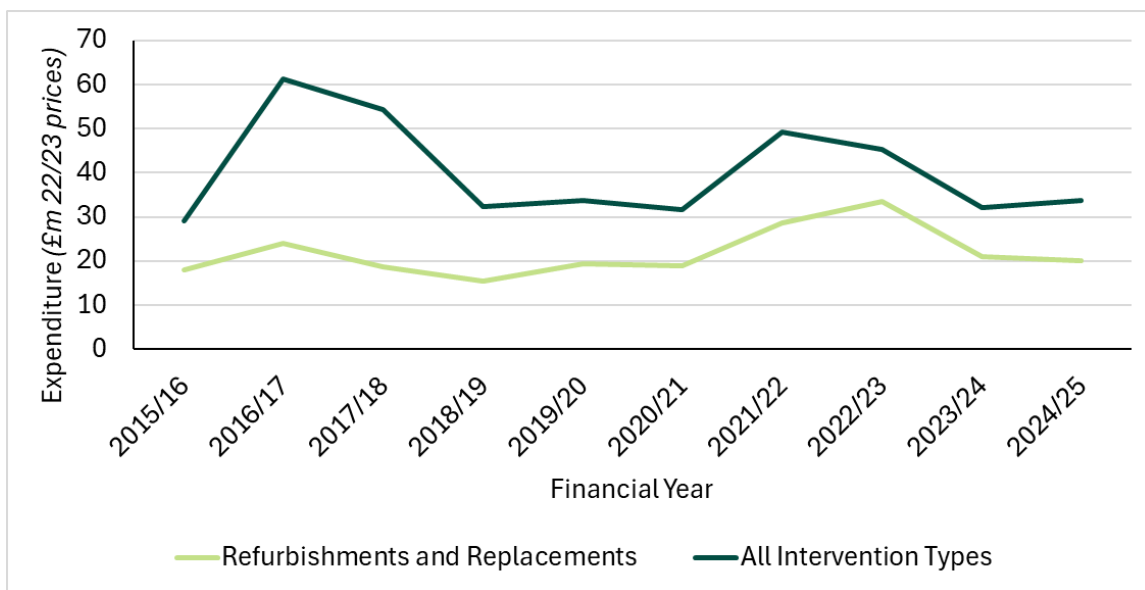
3.6.2 This substantial programme, which was funded from our base maintenance allowance, provided additional base asset health data which we have used to identify investment that is required to maintain the long-term asset health of the assets.

3.6.3 This has enabled us to manage compliance risk more effectively and put us in an informed strong position to meet future challenges. This is illustrated by the increase in refurbishment/ replace expenditure with the peak of this in 2020/21-2022/23 as illustrated in Figure 12.

3.6.4 We need to increase spend to address the overall reliability and longevity of the asset base focused on the most effective whole life cost. This will build on previous investment to mitigate water quality risks and optimise asset investment for long-term resilient solutions.

3.6.5 Water Quality has been a predominant driver in historic investment. This base investment has been driven by the inspections and maintenance programme with the aim to not return any tank to service with known ingress. This has led to improvements in regulatory coliform compliance. The tank is flood tested and structurally inspected at the time of drain down and as such the level of investment at a tank is only fully known and quantified at the time of inspection.

Figure 12: UUW’s legacy expenditure on treated water storage⁸



Source: UUW analysis of Ofwat (2026) Sector workload and expenditure dataset v2 – for circulation.

⁷ [Drinking Water 2022: The Chief Inspector’s report for drinking water in England](#) page 26

⁸ Ofwat (2026), Sector workload and expenditure dataset v2 – for circulation.

- 3.6.6 At this point, the required investment is assessed and the most appropriate solution completed before the tank is returned to service. As our approach and experience of this programme matured, it became easier to predict the type and level of investment required in order to appropriately plan for it. This was illustrated earlier in Figure 10 showing how the time a tank is out of service for investment has increased through time.
- 3.6.7 Historic base investment includes a wide range of interventions such as:
- Sealing around hatches/ covers to prevent ingress;
 - Installation of a membrane across the roof of the tank;
 - Improving pipework and valve condition and configuration to facilitate the operation of the asset;
 - Installation/ repair and replacement of baffle curtains to improve circulation;
 - Replacement of sample taps to ensure a representative water quality sample can always be taken; and,
 - Improvements to site access and security.
- 3.6.8 In some instances, we have abandoned a tank and supplied customers via direct pumping. Many of these tanks were taken out of service due to poor asset condition and being surplus to requirements at that point in time, with customers switched to direct pumping. This is especially true in towns around the M62 corridor which saw falling industrial demands over the second half of the 20th century. Although this was justified action at the time, and supported the removal of water quality risks, this approach increased reliance on pump and power resilience. As growth has accelerated in the region, this approach no longer offers the long-term resilience of supply and this claim includes the re-evaluation of the optimum option for some of these assets.

4. Determining What base buys (WBB)

This section explains how much investment is already assumed to be funded through base allowances, and how the additional investment proposed ensures that customers are not paying twice.

4.1 Purpose of WBB

- 4.1.1 WBB represents the level of investment in asset maintenance and renewal that Ofwat assumes to be implicitly funded through PR24 base expenditure allowances. We calculate WBB in order to ensure that our investment proposals are not duplicative of those allowances and therefore represent genuine additional investment that has not been previously funded.
- 4.1.2 In developing asset health investment proposals, any additional asset health investment proposed through the cost change process should reflect the true incremental investment above and beyond WBB. This is informed by an assessment of the capital maintenance activity planned for each relevant asset class in AMP8, and an evaluation of the extent to which this activity can reasonably be delivered within existing base allowances.
- 4.1.3 The value of the cost change claim therefore comprises of the incremental investment requested net of our implicit allowance (WBB). This supports transparency and ensures that customers are not paying twice for the same investment.

4.2 Limitations of WBB

- 4.2.1 It is important to note that at PR24 Ofwat set allowances across the entire asset base. Under the current totex-based regime, companies are given discretion to allocate base allowances across their asset base in line with efficient operational priorities, rather than to deliver predefined levels of investment in each specific asset classes.
- 4.2.2 As a consequence, there is no established approach to estimating WBB for specific asset classes. It is therefore important to recognise the limits of any mechanistic approach used to assess WBB for individual asset classes. Importantly, Ofwat has acknowledged that “there is no perfect way to determine what base buys”⁹.
- 4.2.3 Assessing WBB ex-post after the Final Determination for specific asset classes requires making several key methodological assumptions and apply some judgement. It is difficult to robustly estimate WBB because:
- Base expenditure allowances are set in aggregate across the asset base;
 - There is a lack of consistent cost definitions across the industry;
 - There is a lack of comparative data that can be used to perform robust benchmarking;
 - The funding needs for a specific asset class vary over time reflecting companies’ specific asset cycles; and,
 - The funding needs will depend on the asset strategy adopted by companies for each asset class.
- 4.2.4 In light of this, in assessing different approaches, we have set out the key risks and limitations associated with the data available for calculation of WBB in the supplementary document *UUW26-18 Asset Health – What base buys methodology*.
- 4.2.5 In applying any methodology, Ofwat should give significant consideration to the risk of an overstatement of WBB and the potential impacts this could have on restricting companies’ base

⁹ Ofwat (2025). Asset Health Investment Assessment Guidance. Available at: <https://www.ofwat.gov.uk/wp-content/uploads/2025/12/Asset-Health-Assessment-Guidance.pdf>, pg. 21.

expenditure decisions in a way that would be inconsistent with the PR24 approach to base expenditure allowances.

- 4.2.6 Our view is that the methodology presented in this document very much represents the upper end of the range that should be considered for WBB and that, in view of the risks associated with over-estimation, Ofwat should consider whether lower limits should be binding on companies. This may be particularly appropriate in the event that Ofwat applies the same methodology broadly across all companies.
- 4.2.7 Examples of potential mitigations that Ofwat could consider are set out in the supplementary document *UUW26-18 Asset Health – What base buys methodology*.

4.3 Calculating WBB

- 4.3.1 Despite these limitations, we have calculated our WBB in line with the principles set out by Ofwat and ensured that industry benchmarking is used alongside externally verifiable data. This is set out Table 3 below and explained in further detail in our full methodology which is set out in the supplementary document *UUW26-18 Asset Health – What base buys methodology*.
- 4.3.2 We present three potential approaches to calculating WBB in Table 4. Our assessment of each approach is also set out in the supplementary document *UUW26-18 Asset Health – What base buys methodology*. Following this assessment, we concluded that the bottom-up approach is most aligned to these principles. Therefore, all WBB numbers presented are calculated following this methodology.
- 4.3.3 Based on our approach to calculating the requirement set out by Ofwat on WBB the implicit funding allowance for network storage assets is £55.7m over AMP8. As discussed in Section 4.2, this represents the upper end of a plausible range.

Table 3: Alignment with WBB principles¹⁰

Principles of WBB	Approach's alignment with principle
Avoid the risk of customers paying twice for investment, once through existing base allowances and once through any additional adjustments	✓
Have a clear rationale, and where possible, is consistent with the way allowances are set during the price review	✓
Acknowledges that companies receive long-term base allowances, and that spend on an asset class across periods is likely to vary over time	✓
Is informed by good quality information, and where there are limits to this, is aware of data limitations	✓
Uses externally verifiable data	✓
Relies on an industry benchmark rather than a company specific view	✓

Source: *UUW assessment of the WBB principles*

¹⁰ Ofwat (2025). Asset Health Investment Assessment Guidance. Available at: <https://www.ofwat.gov.uk/wp-content/uploads/2025/12/Asset-Health-Assessment-Guidance.pdf>.

Table 4: Summary of different approaches assessed¹¹

Approach	Description
Bottom-up approach	Adjusting sector average/median outturn AMP6 and AMP7 capital maintenance expenditure related to the priority asset class to the increase in base expenditure allowances provided at PR24.
Econometric based approach	Remove historic capital maintenance expenditure related to priority assets from PR24 base expenditure econometric benchmarking models to estimate implicit level of funding in modelled allowances associated with priority asset classes.
Historic company-specific expenditure approach	Scale company-specific historic capital maintenance expenditure on priority asset classes to PR24 base expenditure allowances and use each company's historic expenditure shares rather than industry-wide averages to estimate the implicit level of base funding associated with those assets.

Source: Ofwat (2025). *Asset Health Investment Assessment Guidance*.

4.3.4 The bottom-up approach estimates the network storage specific WBB by identifying the industry average share of modelled base historical expenditure allocated to network storage refurbishment and replacement. This share is applied to UUW' AMP8 wholesale water base allowance to derive an implicit network storage allowance. The mean and median estimates are triangulated to reduce sensitivity to outliers and provide a robust implicit allowance.

4.3.5 The approach involves the following steps:

- Step one: Sum historical asset expenditure
 - Sum all refurbishment and replacement expenditure for network storage across the full dataset period (2015/16–2024/25).
 - Source: *Workload and Expenditure Dataset (06/02/2026)*.
- Step two: Sum modelled historical base expenditure
 - Sum a company's modelled base expenditure over the same period for:
 - Wholesale Water
 - Source: Ofwat PR24 Base Costs Water Model 3 – 'Costs' sheet¹²
- Step Three: Calculate historical spend shares
 - Divide the summed network storage historical expenditure (Step 1) by the summed modelled historical expenditure (Step Two).
 - This allows us to obtain a percentage share of modelled base historical expenditure on network storage for each company.
- Step Four: Calculate the industry mean of this percentage share
- Step Five: Apply the mean share to AMP8 allowances
 - Multiply each company's AMP8 base allowance by the mean percentage derived in Step 4.

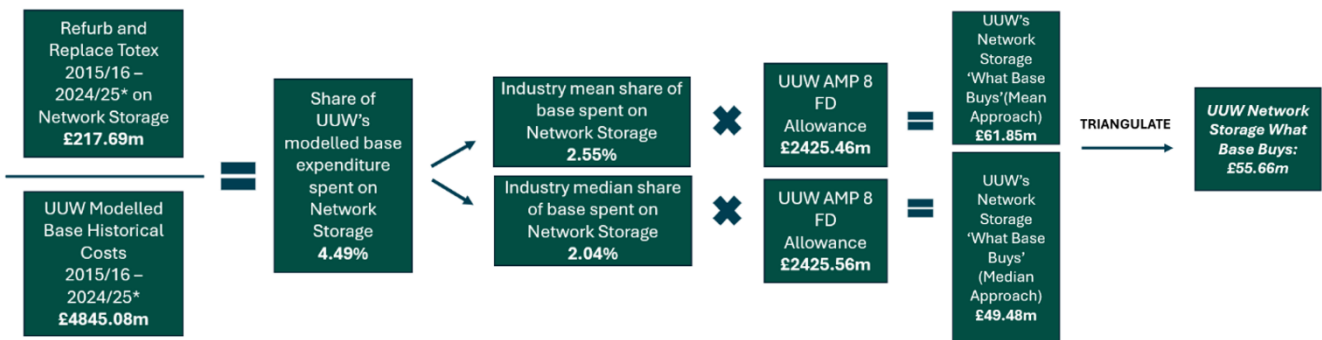
¹¹ Ofwat (2025). *Asset Health Investment Assessment Guidance*. Available at: <https://www.ofwat.gov.uk/wp-content/uploads/2025/12/Asset-Health-Assessment-Guidance.pdf>.

¹² Ofwat (2024). *Cost assessment models: Base costs – water model 3, 'Costs'*. Available at: <https://www.ofwat.gov.uk/wp-content/uploads/2024/12/PR24-FD-CA05-Base-costs-water-model-3.xlsx>.

- AMP8 allowances are taken from *Base Costs Water Model 3 – ‘final allowance’*¹³, adjusted using the cumulative net price change for each year (from the *Base Costs Aggregator Model*¹⁴) to reflect post-frontier-shift and RPE-adjusted allowances.
- Step Six: Repeat step 4 for the industry median
- Step Seven: Apply the median share to AMP8 allowances
 - Multiply each company’s AMP8 base allowance by the median percentage.
 - This follows the same process as Step Five.
- Step Eight: Triangulate results
 - Average the mean-based and median-based estimates to form the final AMP8 implicit allowance for network storage.

Figure 13 outlines the calculation process for the network storage implicit allowance.

Figure 13 Calculation of the network storage AMP8 implicit allowance



Source: UUW analysis of Ofwat (2026) Sector workload and expenditure dataset v2

4.4 Summary of Proposal

- 4.4.1 To demonstrate that our cost-change claim is incremental, we propose an expenditure-based Price Control Deliverable in Section 7 that would protect customers from non-delivery and claw back unspent allowances for WBB across the asset classes.
- 4.4.2 Given the limitations highlighted in Section 4.2 and the supplementary document *UUW26-18 Asset Health – What base buys methodology*, we consider that our assessment of WBB represents the upper end of a plausible range. In light of the risks associated with over-estimation, it is therefore important that Ofwat considers the potential implications for constraining companies’ base expenditure decisions.
- 4.4.3 We also plan to report expenditure for each relevant asset class in our Annual Performance Report as per Ofwat’s latest proposals on companies’ reporting requirements ¹⁵.
- 4.4.4 In Section 7 we propose that the base expenditure PCD covers all relevant asset classes of the investment proposal so that if the expenditure in one asset class is less than its implicit funding allowance, but it is offset by a higher expenditure in one of the other asset classes, there would be no net PCD clawback. This would provide sufficient flexibility to ensure that companies remain incentivised to target their maintenance interventions efficiently whilst providing appropriate customer protection.

¹³ Ofwat (2024). Cost assessment models: Base costs – water model 3, ‘Final Allowances’. Available at: <https://www.ofwat.gov.uk/wp-content/uploads/2024/12/PR24-FD-CA05-Base-costs-water-model-3.xlsx>.

¹⁴ Ofwat (2024). Base Costs aggregator model. Available at: <https://www.ofwat.gov.uk/wp-content/uploads/2024/12/PR24-FD-CA02-Base-costs-aggregator-model.xlsx>

¹⁵ Ofwat, Consultation on regulatory reporting for the 2025-26 reporting year, December 2026 can be found [here](#).

- 4.4.5 Further examples of potential mitigations that Ofwat could consider, reflecting the risk of over-estimation and the upper-bound nature of these WBB estimates, are set out in the supplementary document *UUW26-18 Asset Health – What base buys methodology*. We would be happy to discuss the merits of any such approaches with Ofwat.
- 4.4.6 The cost-change claim is for activities above this already-funded level of expenditure, and for this we propose an output-based PCD as set out in Section 7. Overall, this approach provides transparency and accountability and ensures that customers are appropriately protected.
- 4.4.7 Table 5 sets out our total allocated spend in AMP8, comprising WBB and the cost change claim.

Table 5: WBB and Cost Change Claim: Network storage (£m, 2022-23 CPIH prices)

	WBB	Cost Change Claim*	Total Allocated Spend AMP8
Network storage	55.7	78.2	133.8

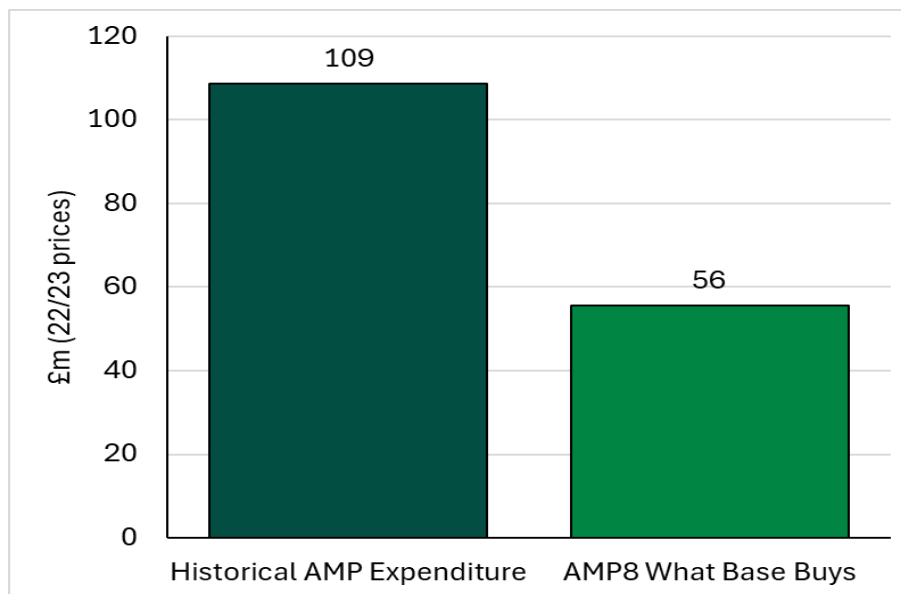
Source: *UUW analysis of What Base Buys using Ofwat (2026) Sector workload and expenditure dataset v2 – for circulation*

*net of repair savings

4.5 Comparison with historical expenditure

- 4.5.1 UUW has historically spent a large proportion of its base expenditure on network storage compared to the industry benchmark. As shown in Figure 14, our historical base expenditure exceeds our calculated AMP8 WBB allowance which represents the high end of a plausible range. This illustrates a strong track record of investing our base allowances, providing confidence that customers are not paying twice.

Figure 14: Comparison of average historical capital maintenance expenditure per AMP with AMP8 WBB, Network storage¹⁶¹⁷



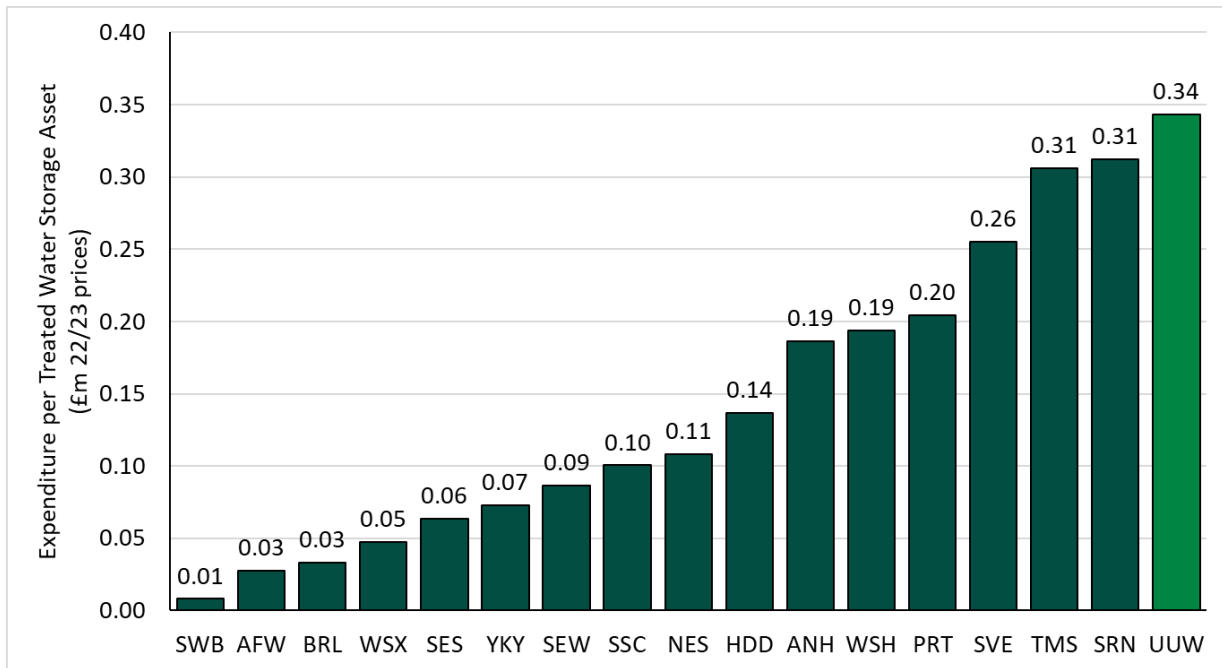
Source: *UUW analysis of Ofwat (2026) Sector workload and expenditure dataset v2 – for circulation*.

- 4.5.2 UUW has spent more historically per treated water storage asset on capital maintenance in comparison to the rest of the industry, which provides further confidence that we are committed to spending our allowances in AMP8. This is illustrated in Figure 15.

¹⁶ Ofwat (2026). Sector workload and expenditure dataset v2 – for circulation.

¹⁷ Historical AMP expenditure represents the average five-year expenditure on refurbishment and replacement in treated water storage across 2015/16-2024/25.

Figure 15: Capital maintenance expenditure per treated water storage asset (2015/16-2024/25)¹⁸



Source: UUW analysis of Ofwat (2026) Sector workload and expenditure dataset v2 – for circulation.

4.5.3 Further evidence of our actual AMP8 planned expenditure is provided in Section 3.5.

¹⁸ Ofwat (2026). Sector workload and expenditure dataset v2 – for circulation. Ofwat (2026) Sector number of assets dataset – for circulation v1.

5. Best option for customers

This section demonstrates how we have developed the preferred programme via a robust optioneering process, tested our programme for value, assessed its benefits and how it is been informed by customer research and stakeholder engagement.

5.1 Our proposals are based on robust optioneering

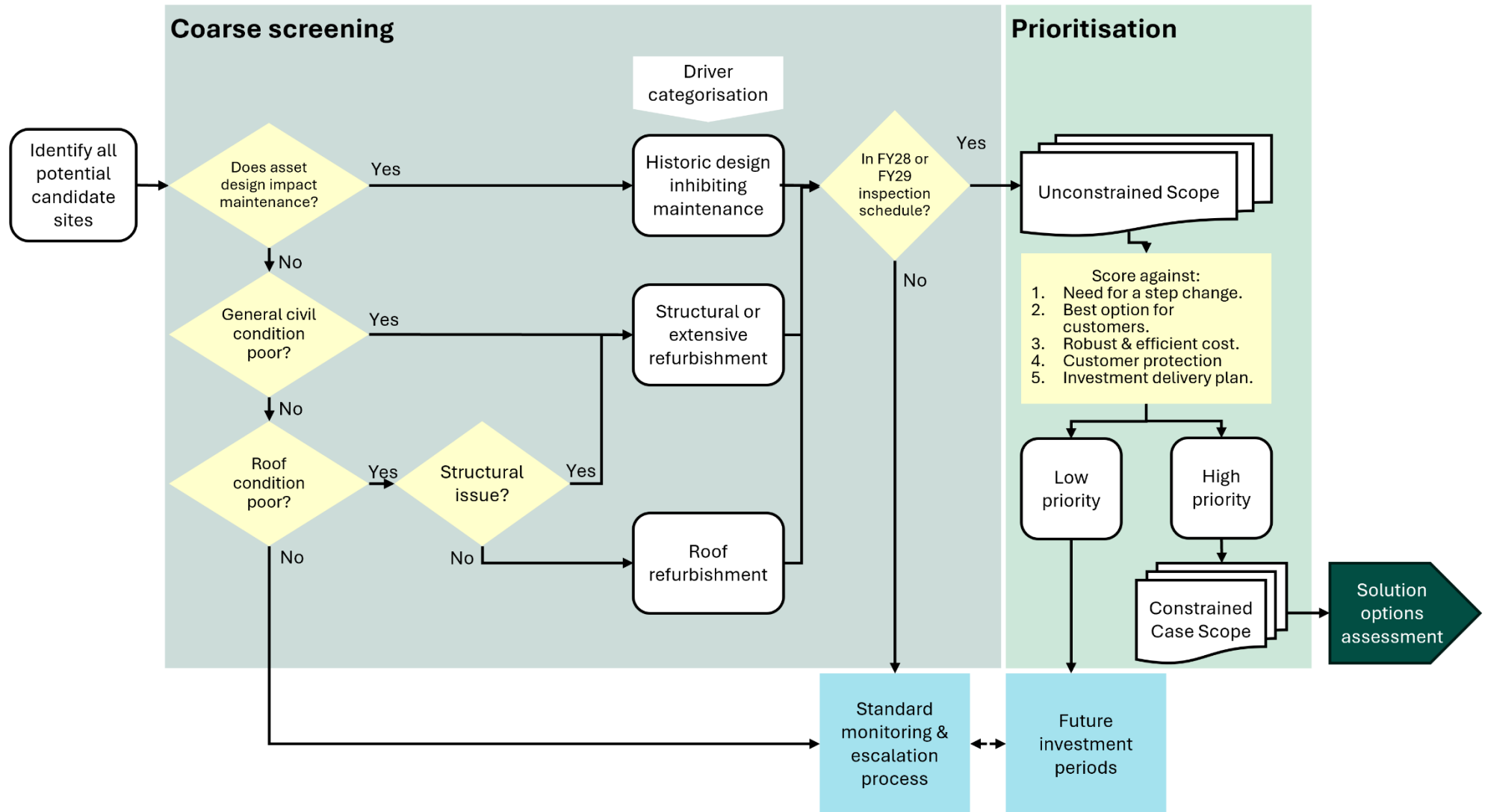
- 5.1.1 UUW has undertaken structured optioneering across our asset health submissions (see Figure 1 on page 8) to ensure they deliver best value for current and future customers. The purpose of this process was to ensure that the proposed AMP8 cost change programme represents a proportionate, deliverable and efficient response to the need.
- 5.1.2 The proposed programme has been shaped by three primary considerations:
- Current levels of asset health risk: based on core data sets such as the latest internal inspection data and aligned to Drinking Water Safety plans.
 - Deliverability within AMP8: only interventions that can be designed and constructed within the AMP8 period have been included.
 - Alignment with asset strategy: consideration of the long-term need for the assets and alternative growth
- 5.1.3 The optioneering process was undertaken in two stages:
- (a) Unconstrained optioneering was used to confirm the site-specific need and alignment to the requirements for inclusion within the asset health cost change process. This stage is described in Section 5.2.
 - (b) Constrained optioneering was then applied to develop solution options that represent a credible, proportionate and deliverable solution within AMP8. This is described in Section 5.3.

5.2 Unconstrained optioneering – assets considered

- 5.2.1 Customer and stakeholder views (as outlined in Section 5.5) and Ofwat’s Asset health investment assessment guidance¹⁹ shaped how we assessed which assets were correct to include in this submission. As shown in Figure 16 this assessment had two parts; coarse screening and prioritisation.
- 5.2.2 Coarse screening excluded the majority of assets from the proposed programme because:
- Our condition records do not indicate an asset health risk. Any unexpected issues are risks that should be managed through normal business processes in existing allowance;
 - The asset is scheduled for inspection before 2027. The requirements of these tanks will be covered by our existing allowances.
 - The asset is not scheduled for inspection in AMP8. Isolating a tank for inspection or maintenance requires substantial resources and must be scheduled avoiding dependencies on other assets. Therefore, assets that are already programmed for inspection are preferred to ensure a deliverable and efficient programme.

¹⁹ Ofwat 2025 PR24 Cost change process: Asset health investment assessment guidance.

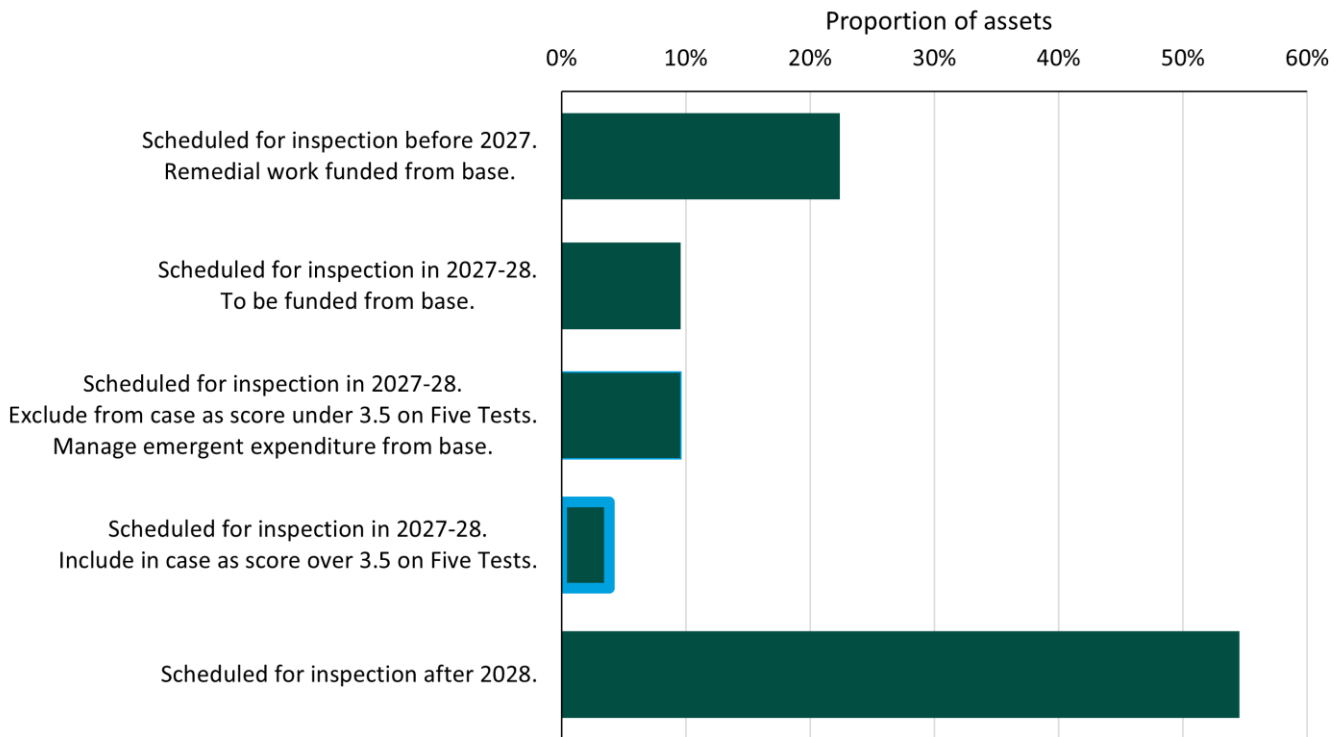
Figure 16: Process flow for intervention options



Source: UUW internal diagram

- 5.2.3 Coarse screening also categorised investment needs into three groups to assist option identification (i.e. roof, structural/extensive, and historic design inhibiting maintenance) which is covered in the following section.
- 5.2.4 Having established an asset health requirement, prioritisation assessed if there is a clear and compelling case to address the need in AMP8. Assets that met this threshold were passed forward to solutions options assessment.
- 5.2.5 Assets which did not pass coarse screening and prioritisation are those where “Do Nothing” is the best option. This protects long term value for customers by selecting low-regret options. If risks materialise within the AMP8 period they will be managed through normal business processes. Long-term risks will be candidates for future investment periods.
- 5.2.6 Figure 17 below illustrates the outcomes of coarse screening and prioritisation across UUW’s treated water storage assets. Most assets are excluded at this stage; only a small proportion are passed forward to constrained option assessment.

Figure 17: Proposed allocation of UUW treated water storage assets to investment pathways



Source: UUW analysis

5.3 Constrained optioneering – interventions considered

- 5.3.1 Assets which passed the coarse screening and had a compelling investment requirement in AMP8 were fed through an options selection process. A list of feasible options for each of three driver categories was compiled by engaging subject matter experts and considering industry best practice. This was accompanied by a high-level cost and assessment of the life extension secured by the intervention.
- 5.3.2 The following tables show the outputs of the options assessment with the calculated life extension for each feasible option divided by its cost. This approach has been used to demonstrate that the preferred option (in bold in the following tables) provides the most cost effective intervention from the feasible approaches to resolving each need. Detailed site-specific information is provided in Section 10.

Table 6: Solution options assessment - Roof refurbishment (£m, 2022-23 CPIH prices)

Cost adjusted life extension	Over-banding	Roof membrane	Replace roof	Replace tank
Denton No. 1	0.3	2.9	0.4	0.4
Gorse Hill No.3	0.9	17.4	2.6	2.5
Haslingden High Level	117.5	400.0	139.0	135.1
Oakshaw Hill	7.2	57.2	69.8	67.5
Woodgate Hill No. 2	0.1	28.6	0.2	0.2

Source: UUW analysis

Table 7: Solution options assessment - Structural or extensive refurbishment (£m, 2022-23 CPIH prices)

Cost adjusted life extension	Patch repairs	Refurbish tank	Replace roof	Replace tank
Castle Hill	5.5	7.6	2.3	8.0
Greavefold	4.8	125.0	8.3	8.1
Knutsford	0.0	0.0	0.9	2.9
Warbreck	0.6	8.7	0.8	0.8

Source: UUW analysis

Table 8: Solution options assessment - Historic design inhibiting maintenance (£m, 2022-23 CPIH prices)

Cost adjusted life extension	Recommission tank	Divide tank	Construct a new tank
Brown Edge	22.6	1.5	0.5
Gorse Hill No4&5	0.0	73.5	2.5
Heswall	0.0	9.4	4.9
High Warren	3.4	2.1	1.7
Pex Hill	7.2	3.1	1.0
Ridgaling	0.0	11.3	2.0
Willows Lane	0.0	16.0	6.7
Winwick	2.9	2.7	2.2

Source: UUW analysis

The above 3 tables demonstrate the viable technical options to resolve the specific investment needs for each short-listed site. The emboldened figure represents the preferred option that has been progressed. This option has been selected in each case as it provides the most cost effective way to resolve the investment need over the asset life.

5.4 Best value assessment

5.4.1 For this submission, we have used a valuation tool that evaluates the most cost-beneficial approach out of a 'refurbishment', a 'replacement' or a 'do nothing' approach. This analysis draws on our work to develop a broader "six capitals" based valuation approach to reflect changes in regulatory and government approaches to valuations of service, the environment and amenity values.

- 5.4.2 Proactive rehabilitation of ageing network storage assets delivers whole-life cost benefits by reducing reliance on reactive outages and avoiding an increase in the population of customers served from direct pumped supplies. Coordinated structural interventions undertaken during planned outages are more cost-effective than unplanned responses to asset failure with associated service failures.
- 5.4.3 By addressing structural deterioration before it becomes acute, with longer life interventions where appropriate, the programme moderates the scale of future investment required, reducing the likelihood of large, disruptive, and higher-cost interventions in PR29 and beyond. This represents a lower-regret, more efficient use of customer funds than deferring action and managing increasing risk through reactive spend.
- 5.4.4 The benefits associated with the planned treated water storage investment programme include the following:
- 5.4.5 **Increased resilience of our fleet of network storage.** With the step change in investment, we will be able to address multiple defects identified through the reservoir inspection programme. We will carry out substantial structural repairs in one period of outage rather than piecemeal repairs across multiple outages. We have assessed the value of reducing the future risk of significant structural failures of the tanks within the programme, based upon their sizes, assessed properties served and typical incident resolution durations for major events such as the unexpected loss or failure of a network storage tank. As the tanks selected for the programme are likely to require investment during or before their next scheduled outage this assessment is a major contribution to the assessed value of the programme. The quantified assessment of value for this programme is focused on the future risk of either customer service interruptions or greatest benefit to water quality compliance associated with improved asset health.
- 5.4.6 **Increased security of supply for customers.** We propose to reinstate several abandoned service reservoirs and/or split single cell assets into multiple cells. This offers increased security of supply for customers because there will be a reduction in risk of supply interruptions when a single celled asset is taken out of service and the network re-zoned because supply will continue from the cells remaining in service.
- 5.4.7 **Better operability of our network storage assets.** We will be able to operate the network storage assets more efficiently because of:
- A reduction in single cell assets which currently risk service interruptions to customers when inspection and maintenance is required.
 - Carrying out multiple repairs during one outage period to enhance the long-term asset health reducing the need for future remedial work.
 - Creation of a fleet of network storage assets which have a sustainable and long-term high standard of asset health.
- 5.4.8 **Reduction in customer contacts for service interruption and/or water quality.** With increased resilience and enhanced operability of our network storage assets, we anticipate a reduction in unwanted customer contacts regarding service interruptions related to treated water storage outages and water quality. We have assessed the value of reducing this risk through analysis of contacts relating to a typical example of an outage at a difficult site for operational resilience. By analysis of contact rates prior, during and after a difficult compartment outage we have modelled approximately 20 additional contacts, which has been valued at an average rate of 4 per year.

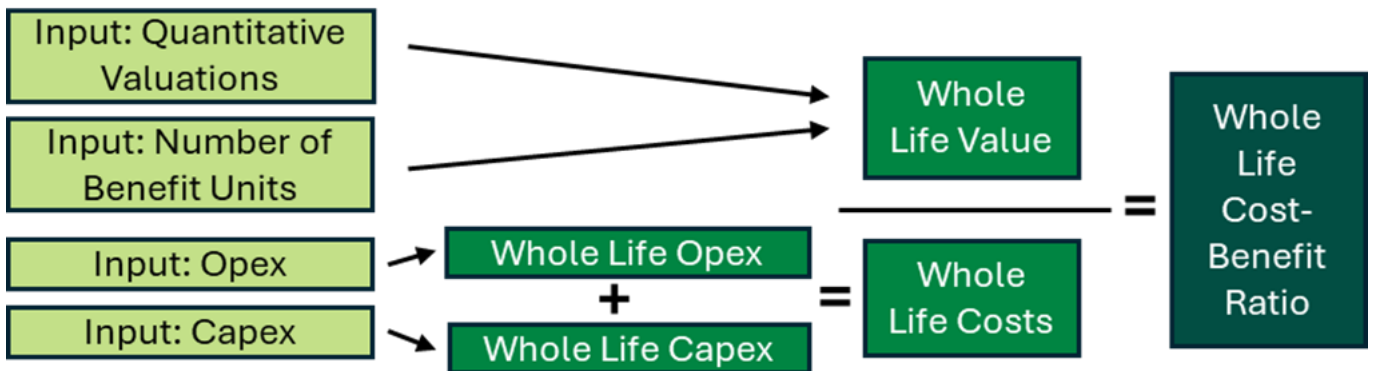
Our approach to cost benefit assessment

- 5.4.9 Our approach comprises three key steps as summarised below.
- Calculating the whole life value;
 - Calculating the whole life cost; and,

- Comparing the whole life cost-benefit ratio across different solutions.

5.4.10 These steps are described in further detail below, with the calculation of the whole life cost-benefit ratio depicted in Figure 18.

Figure 18 : Cost benefit analysis flow diagram



Source: UUW analysis

Whole life value

5.4.11 We calculate whole life value of an investment solution as the present value of the total benefits accrued over a 30-year assessment period. This is derived by:

- Multiplying the number of projected benefit units from the investment solution by the annual quantitative valuation; and,
- Calculating the compounded value over the investment horizon and discounting it using the Social Time Preference Rate, in line with the HM Treasury Green Book.

Whole life cost

5.4.12 We calculate the whole life cost of an investment solution by adding the whole life capital expenditure and the whole life ongoing operating costs. Capital expenditure includes capital overheads but excludes the effect of taxation. Whole life cost has been calculated on a consistent basis to the approach taken for PR24 investment appraisal. The present value of capital expenditure has been converted to a stream of annual costs over a 30-year appraisal period. To calculate the present value of these costs, and associated operating costs, the Social Time Preference Rate was used for discounting, consistent with the HM Treasury Green Book. Costs are in 2022/23 price base, using the CPIH financial year average.

Cost benefit ratios

5.4.13 The cost benefit ratio is calculated by dividing whole life value by whole life cost. For network storage assets the following cost benefit ratios have been assessed for the preferred options. All solutions rank consistently above 1 and are the most cost beneficial interventions assessed.



Site	Whole life costs	Whole life benefits	Cost Benefit Ratio
[redacted]	1.4	188.2	132.37
[redacted]	7.9	9.5	1.20
[redacted]	13.0	273.4	20.96
[redacted]	2.6	75.8	29.04
[redacted]	0.3	75.9	220.81
[redacted]	0.3	23.5	92.51
[redacted]	0.2	0.7	4.07

Site	Whole life costs	Whole life benefits	Cost Benefit Ratio
[X]	0.9	6.9	7.38
[X]	2.7	19.6	7.25
[X]	8.9	56.1	6.31
[X]	7.7	9.0	1.16
[X]	0.6	1.4	2.35
[X]	4.5	94.4	21.11
[X]	2.2	47.4	21.06
[X]	4.3	119.0	27.37
[X]	1.6	28.5	18.12
[X]	10.3	42.2	4.11
[X]	1.3	575.7	441.33

Source: UUW analysis

5.5 Customer and Stakeholder views

- 5.5.1 It is vital we engage with customers and stakeholders across the entire region about their water and wastewater services. We have undertaken an iterative research approach to understanding customers' views on Asset Health. For this submission, we therefore reviewed recent and relevant research from our established body of customer research, including key projects which informed the PR24 business plan. Building on this existing knowledge base, we then undertook targeted bespoke research using both qualitative and quantitative methods. We have taken steps to ensure our customer research approach is proportionate and comprehensive, with the quantitative survey elements using a robust sample allowing for sub group analysis, and qualitative research using members of our existing research community.
- 5.5.2 Further information on the methodology, Independent Challenge Group engagement and the application of our insights can be found in the appendix *UUW26-26 Customer Research Approach – Regional Growth and Asset Health*.
- 5.5.3 The research programme shows strong customer support for intergenerational equity and a clear expectation that UUW invests proactively to address major long-term challenges. Customers consistently prioritise safety, service reliability and regulatory compliance as core outcomes. In particular, the findings indicate that:
- Customers expect investment decisions to be fair, future-focused and environmentally responsible.
 - There is strong support for approaches that avoid transferring costs and risks to future generations. Customers want UUW to take early, responsible action on long-term risks, ensuring that expenditure is targeted at what matters most and delivers value for money. The Asset Health proposals have been developed in direct response to these expectations.
 - Customers support increased investment to protect drinking water quality. They want UUW to stay ahead of high-impact, long-term risks, while retaining the flexibility to respond quickly to emerging issues and emergencies. The proposed investment reflects this balance and acknowledges customer sensitivity to bill impacts.
- 5.5.4 We have proactively sought the views of key statutory and customer stakeholders, in line with our programme wide engagement plan. This has ensured that our proposals are grounded in customer expectations and aligned with regulatory priorities. Engagement to date includes:
- 5.5.5 **YourVoice** – the Independent Challenge Group for the North West. We presented our findings from the recent customer research and welcomed input. The panel was broadly supportive of our plans.

- 5.5.6 **The Drinking Water Inspectorate (DWI)** – we have held an initial discussion with the DWI to explain our intent to submit cases for additional asset health investment for the three water asset classes and agreed an approach to providing further information for these. On 31 March we submitted three approach documents setting out our proposals to improve asset health in boreholes, rapid gravity filters and treated water storage facilities. We received a Final Decision Letter – Commend for support on 30 April 2026 a copy of which can be found in *UUW26-25 Letters of support*.
- 5.5.7 **The Environment Agency** – we held a meeting with the Environment Agency on 17 March to explain our intentions to submit asset health investment cases across a range of water and wastewater assets. We followed this up with a letter setting out our proposals and high-level indications around cost. We received a response on 25 March explaining that the Environment Agency will be working jointly with Ofwat to assess the proposals where those proposals are relevant to the Environment Agency. Due to the collaborative model of business case assessment, the Environment Agency will not provide additional supporting comments ahead of the submission deadline.

6. Robust and efficient costs

This section explains how we have developed our costs and the build-up of our estimates. It also provides evidence that our proposals are efficient, and summarises the results of the benchmarking against third party comparable costs.

6.1 How we developed our costs

6.1.1 This section explains how we developed our cost estimates for treated water storage interventions. We give a general overview of our methodology then we show a breakdown of costs at a project and programmatic level.

An overview of our methodology

6.1.2 This section sets out our methodology for calculating direct and indirect costs.

6.1.3 Direct costs are those that can be clearly and directly attributed to a specific asset, activity, or scheme. They arise solely because of the works being undertaken and would not be incurred otherwise. Direct costs are typically site-specific and measurable, and include construction labour, plant and equipment, materials, and disposal cost directly associated with delivering the works on site.

6.1.4 We assess direct costs using a bottom-up approach. This involves developing an engineering scope for each element of the work. We then develop a granular view of cost of each element of scope. To do this, we considered what we would need to do to deliver each element of scope. For example, if the engineering scope indicated we need to demolish existing infrastructure, we would need to use a bulldozer, remove the demolished material etc. In some cases, we had to make assumptions on what would be involved in each element of scope. We have detailed these in paragraph 6.4.5.

6.1.5 Each of these elements was then priced using a database containing costs from a range of different companies. This ensures that our estimates are in line with industry standards. Finally, we added an element of optimism bias to reflect best estimating practice, which varied depending upon whether we had a robust understanding of the asset. This produced our estimate of direct costs. We provide an example of this process in Section 6.4.

6.1.6 Indirect costs are those that enable, support, and govern the delivery of direct activities, but which cannot be practically or proportionately allocated to a single asset or activity. These costs are required to ensure that works are properly planned, managed, assured, and delivered safely and compliantly, and are typically incurred across multiple activities, projects, or sites rather than at an individual asset level.

6.1.7 Indirect costs include, for example:

- project and programme management;
- design management and technical assurance;
- health, safety and environmental management;
- planning, supervision and coordination activities;
- temporary works design and oversight; and,
- the corporate and operational support functions required to enable delivery.

6.1.8 Indirect costs are therefore not discretionary overheads, but a necessary and integral part of delivering capital works in a regulated, safety-critical environment. Excluding these costs would understate the efficient cost of delivery and would not reflect how capital programmes are practically delivered in the water sector.

6.1.9 Our calculation of indirect costs are aligned with best estimating practice. We include a risk allocation, which is informed by the extent to which historic schemes have been impacted by cost changes. We also

include for our cost to serve, which reflects the costs UUW incurs managing and integrating the project. Finally, we include our corporate overhead, which enables us to recover our functional support costs.

6.1.10 We then subjected our cost estimates to third party benchmarking, which is set out in Section 6.2.

Programme-level cost build

6.1.11 This section provides more detail on the breakdown of direct and indirect costs. We have allocated optimism bias to direct costs. This is because we would expect optimism bias to reduce and direct costs to increase as schemes mature and move into delivery. Where applicable, we allocate contractor indirect costs to indirect costs.

6.1.12 Table 9 shows the split between direct and indirect costs by project. This shows that our indirect cost allocation is low compared to what could typically be expected - that the ratio of direct to indirect costs to be roughly equal. This is because we have challenged ourselves with a lean indirect cost allocation for this programme of work. This reflects the fact we will aim to absorb a high proportion of the programme into our existing cost base.

Table 9: Split of direct and indirect capital expenditure by project (£, 2022-23 CPIH prices)

Project	Direct	Indirect	Total
[REDACTED]	7,121,091	5,372,590	12,493,681
[REDACTED]	484,121	320,908	805,029
[REDACTED]	821,732	544,699	1,366,431
[REDACTED]	1,170,226	775,704	1,945,930
[REDACTED]	456,575	302,648	759,224
[REDACTED]	1,406,730	932,474	2,339,205
[REDACTED]	177,177	117,444	294,621
[REDACTED]	2,937,752	1,947,338	4,885,090
[REDACTED]	167,213	110,840	278,054
[REDACTED]	933,976	619,102	1,553,078
[REDACTED]	5,847,017	4,411,350	10,258,367
[REDACTED]	6,171,691	4,656,304	10,827,994
[REDACTED]	8,122,694	6,128,261	14,250,955
[REDACTED]	1,624,539	1,225,653	2,850,192
[REDACTED]	108,302	81,710	190,012
[REDACTED]	812,269	612,826	1,425,095
[REDACTED]	2,707,565	2,042,753	4,750,318
[REDACTED]	4,028,857	3,039,618	7,068,475
Total	45,099,528	33,242,221	78,341,749

Source: UUW analysis

6.1.13 Table 10 shows the programme-level breakdown of costs across the different indirect cost categories as described in paragraph 6.1.9.

Table 10: Programme-level cost build (£, 2022-23 CPIH prices)

[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]



Source: UUW analysis

6.2 Our costs are efficient

6.2.1 This section presents evidence of cost efficiency. First, we demonstrate that our costs are in line with those expected by independent third parties.

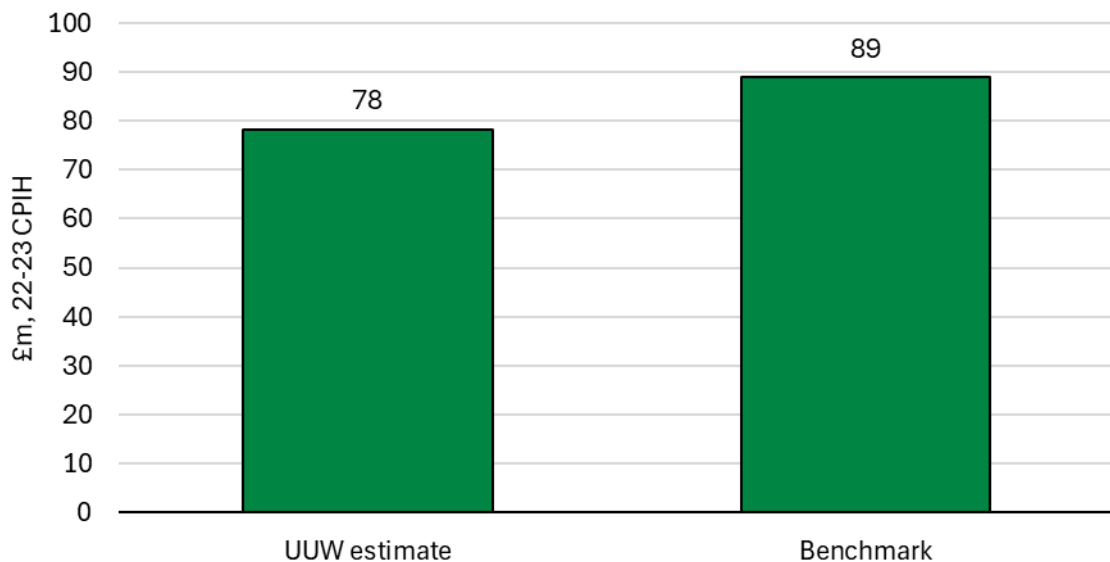
Our costs are considered efficient by Mott MacDonald

6.2.2 We engaged Mott MacDonald to provide third party benchmarking. This involved comparing our cost estimates against the costs similar organisations incur when carrying out the activity. We provide an excerpt from Mott MacDonald’s report below, which sets out the methodology used as part of the benchmarking analysis.

“The objective was to develop a robust benchmark using a hybrid estimation approach. For most scope items a benchmarking approach was implemented based on top-down industry models. In instances where a top-down approach could not be applied, such as complex elements and custom/bespoke assets, a bottom-up cost estimating approach was implemented where possible. In instances where neither a top-down nor bottom-up approach were appropriate, costs were substituted from the UU scope using a ‘like-for-like’ approach to develop a full direct works estimate. Each benchmark incorporates Direct Works Costs, Contractor and Client Indirect Costs, as well as a provision for Biodiversity Net Gain, Risk and Estimating Uncertainty and Corporate Overheads. A benchmark of each was incorporated to allow comparison between the UU scope costs and industry averages across different cost attributes.²⁰”

6.2.3 Figure 19 shows the results of the benchmarking exercise for our treated water storage programme. This demonstrates that our cost estimates are efficient and below those expected by third parties.

Figure 19: Mott MacDonald found that our treated water storage costs are efficient



Source: UUW estimates and Mott MacDonald

6.2.4 We provide a full overview of our benchmarking approach and associated reports in *UUW26-28 Benchmarking reports*.

²⁰ Mott MacDonald. *Service reservoirs benchmark report*.

6.3 We do not consider Ofwat’s workload and expenditure data to be a robust source for cost benchmarking

- 6.3.1 We have concerns over the consistency and comparability of the “Workload and expenditure dataset” collected by Ofwat as part of the Asset Health Roadmap, at least in so far as it might be applied to cost assessment in this case. Ofwat should exercise caution if attempting to assess efficiency using this dataset.
- 6.3.2 We have set out below the reasons why we believe the data is not sufficiently granular to provide a meaningful indication of relative efficiency. This is because it reflects an average cost of multiple different intervention types carried out across the sector. A company that carries out a greater proportion of cheaper intervention types will appear artificially efficient – whereas – in reality - the lower observed unit cost is merely reflecting a simpler programme of work, often with shorter life interventions.
- 6.3.3 We believe it is important to demonstrate why this dataset cannot support robust cross-company comparisons for setting cost efficiency targets. If applied inappropriately, its use could distort incentives and discourage companies from selecting lowest whole-life-cost solutions aligned with good Asset Management practice.
- 6.3.4 We have set out the key issues in relation to the dataset and its unsuitability for robust cost efficiency assessments under the following headings:
- Lack of granularity;
 - Inconsistent categorisation;
 - Inherent variability in the data; and,
 - Distortion of incentives.

Lack of granularity

- 6.3.5 The data is split into four categories, ‘repair’, ‘refurbishment’, ‘replacement’ and ‘other’ types of intervention. There is significant variation captured within each expenditure category, as refurbishment or replacement activities can differ materially in scope and complexity. As a result, higher unit costs may simply indicate that a company is undertaking more intrusive or costly interventions that can result in a longer asset life rather than implying a lower level of efficiency.

For example, UUW’s historical treated water storage refurbishments can be disaggregated into seven distinct categories. Of these, the most expensive activity type, operational resilience, is, on average, £1.2m more expensive than a hatches refurbishment. Variation in company unit costs will therefore be driven by both efficiency and each company’s mix of intervention type. For example, 15.1% of UUW interventions are in operational resilience, the most expensive intervention, as opposed to just 0.8% in hatches, the cheapest intervention. This skews any refurbishment-level unit cost upwards.

Table 11: Number of interventions and average unit costs of refurbishment sub-types (2015/16-2024/25)²¹

Refurbishment Type	Number of Interventions	Average Unit Cost (£m, 22/23 prices)
Operational Resilience	39	1.286
Roof/Membrane	10	1.084
Infiltration Remedials	190	0.524
Baffle Curtain	3	0.439
Wall Rebuild	5	0.126
Pipework/Drainage	10	0.085

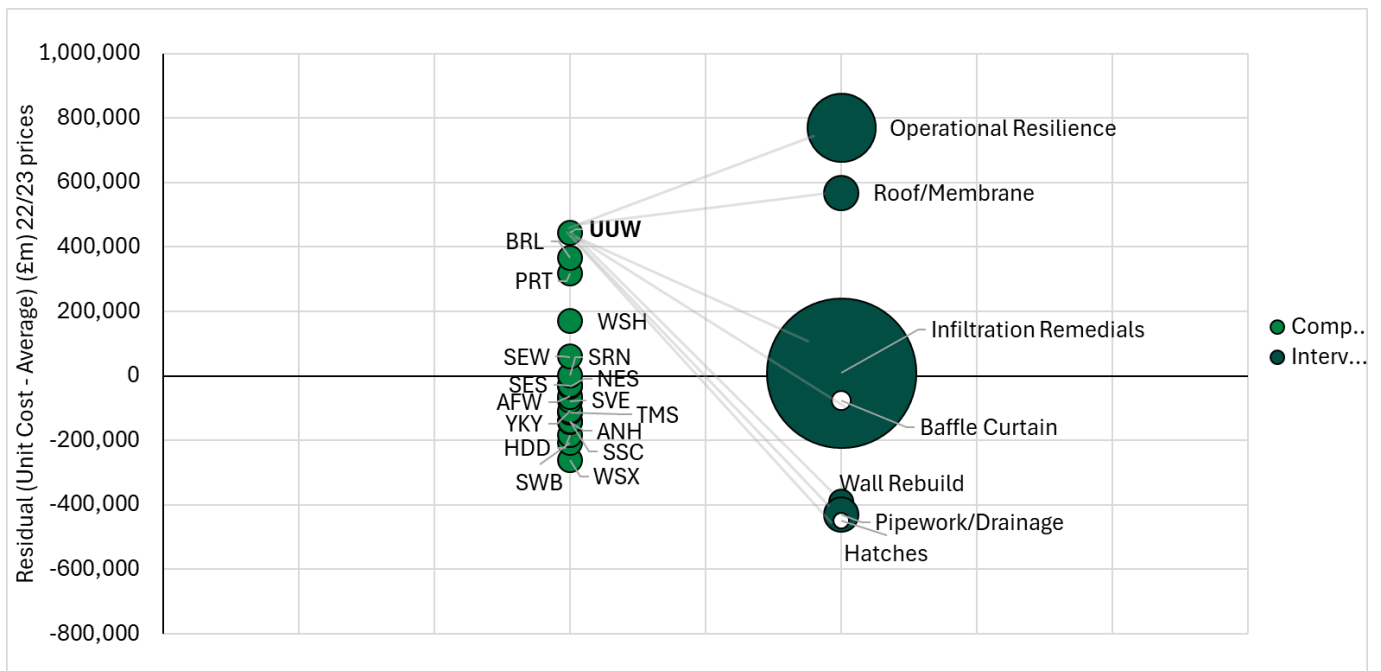
²¹ Based on internal UUW analysis of our submitted workload expenditure data

Refurbishment Type	Number of Interventions	Average Unit Cost (£m, 22/23 prices)
Hatches	2	0.066

Source: UUW analysis

- 6.3.6 If unit costs are used at the refurbishment level, as captured by Ofwat, genuine differences in company intervention mix will be embedded as differences in efficiency. Ofwat has acknowledged the importance of arriving at “an efficient unit cost that reflects a mixed programme of work”²² in its approach for gravity sewers. There is also a significant diversity of works within treated water storage, as seen in Table 11.
- 6.3.7 An efficiency assessment based solely on historical unit costs from the workload and expenditure dataset²³ would reward companies undertaking a higher share of low-cost refurbishment interventions. In contrast, companies will be disincentivised to invest in a high proportion of more expensive refurbishment interventions as the assessed efficient unit cost will be unachievable for these solutions. Furthermore, this incentive structure would contradict a key aim of the Asset Health Roadmap, that companies should use allowances to “maintain the long-term capability of assets”²⁴ This would require proactive and long-lasting interventions.
- 6.3.8 This is illustrated in Figure 20, which shows the residual spread from the mean for both the company refurbishment unit costs (as captured by Ofwat) and for UUW’s granular refurbishment categories. On the right-hand side of the chart, the bubbles are scaled by the number of interventions. This highlights that UUW overall unit cost is comparatively higher due to a larger number of expensive and more intrusive interventions, and we believe that other companies are skewed downwards by adopting cheaper and less intrusive interventions.

Figure 20: Residual Spread (Companies vs. Intervention Unit Costs): Treated Water Storage Refurbishments²⁵



Source: UUW analysis

²² Ofwat (2026). Gravity sewer rehabilitation data request (26th March).

²³ Ofwat (2026). Sector workload and expenditure dataset – for circulation v2.

²⁴ Ofwat (2024). Roadmap for enhancing asset health understanding in the water sector. Available at: [PR24-final-determinations-Roadmap-for-enhancing-asset-health-understanding-in-the-water-sector.pdf](#), pg. 8.

²⁵ Based on internal UUW analysis of our submitted workload and expenditure data

6.3.9 For example, as seen in **Error! Reference source not found.**, [] appears to carry out a relatively high volume of small-scale refurbishments, which would reduce its unit costs for reasons not solely linked to differences in efficiency. Notably, the reported number of interventions suggests that [] has, on average, refurbished each treated water storage asset more than twice within the 10-year cycle.

[]²⁶

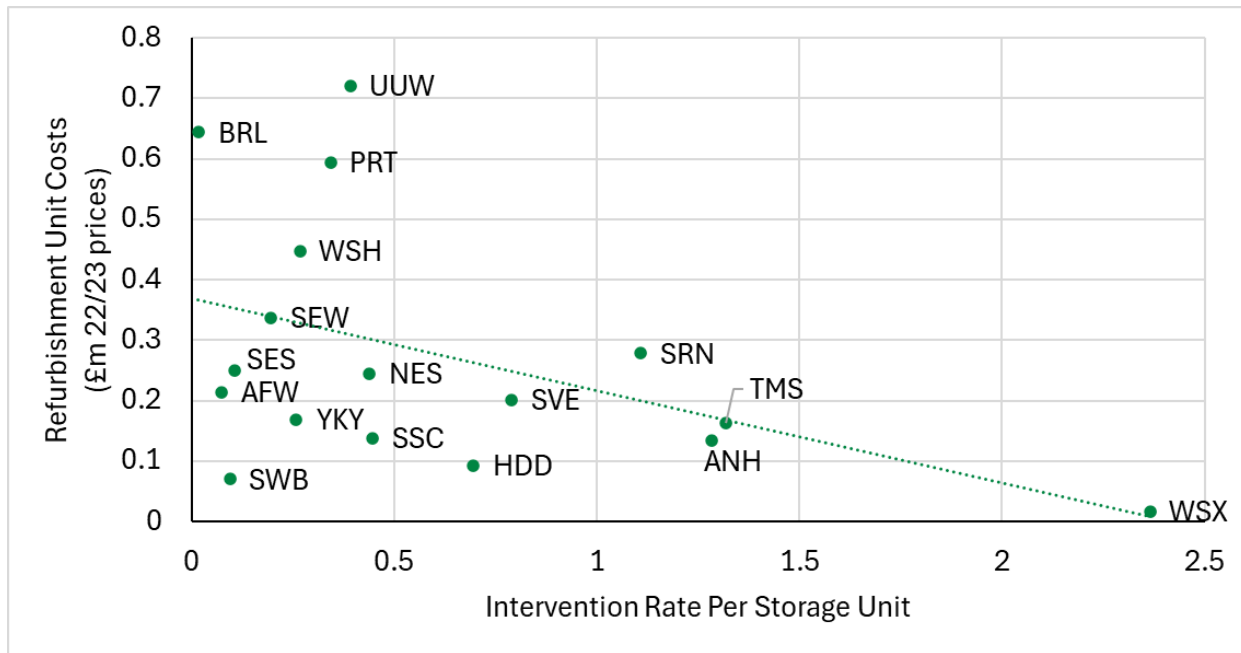
Company	Expenditure (£m) (2015/16 – 2024/25)	Number of Interventions (2015/16 – 2024/25)	Average Unit Cost (Expenditure / Interventions)	Number of Treated Water Storage Units	Intervention Rate per Storage Unit
WSX	19.98	1265	0.02	535	2.36
SVE	139.40	692	0.20	877	0.79
ANH	82.23	613	0.13	478	1.28
TMS	78.26	479	0.16	363	1.32
SRN	113.42	408	0.28	368	1.11
UUW	179.36	249	0.72	634	0.39
YKY	29.46	175	0.17	676	0.26
NES	38.00	155	0.25	354	0.44
WSH	55.41	124	0.45	464	0.27
HDD	7.62	82	0.09	118	0.69
SEW	24.25	72	0.34	366	0.20
SSC	7.00	51	0.14	114	0.45
SWB	3.36	48	0.07	508	0.09
AFW	3.84	18	0.21	245	0.07
PRT	6.54	11	0.59	32	0.34
SES	1.50	6	0.25	57	0.11
BRL	1.93	3	0.64	186	0.02

Source: UUW analysis of Ofwat (2026) Sector workload and expenditure dataset v2 – for circulation.

6.3.10 This is further supported by the negative correlation between refurbishment unit cost and the intervention rate per storage unit, which indicates that there is a contrast between companies that engage in a large number of small-scale interventions and those that prioritise fewer, more costly, interventions. This is illustrated in Figure 21.

²⁶ []

Figure 21: Diagram showing the negative correlation between number of refurbishments per storage unit and the overall refurbishment unit cost²⁷



Source: UUW analysis of Ofwat (2026) Sector workload and expenditure dataset v2 – for circulation.

- 6.3.11 Even if unit costs were further disaggregated into these seven categories, they would still fail to capture other key cost drivers. For example, baffle curtain refurbishment unit costs can vary dramatically based on the size of the storage tank and the material required. [✂] is a 0.8 MI tank and cost £117k for a baffle-curtain refurbishment. However, [✂] is not only a larger tank at 25 MI, but also required a full steel curtain to withstand higher flow forces. As a result, its sanctioned cost is £1.6m. This clearly demonstrates that these two storage tanks should not be compared against a single efficient unit cost.
- 6.3.12 Ofwat has not captured information linking asset size, or other cost drivers, to intervention in its treated water storage data collection to date. It does acknowledge the importance of size, location and potential company-specific factors in its data collection to establish a sewer unit cost²⁸.

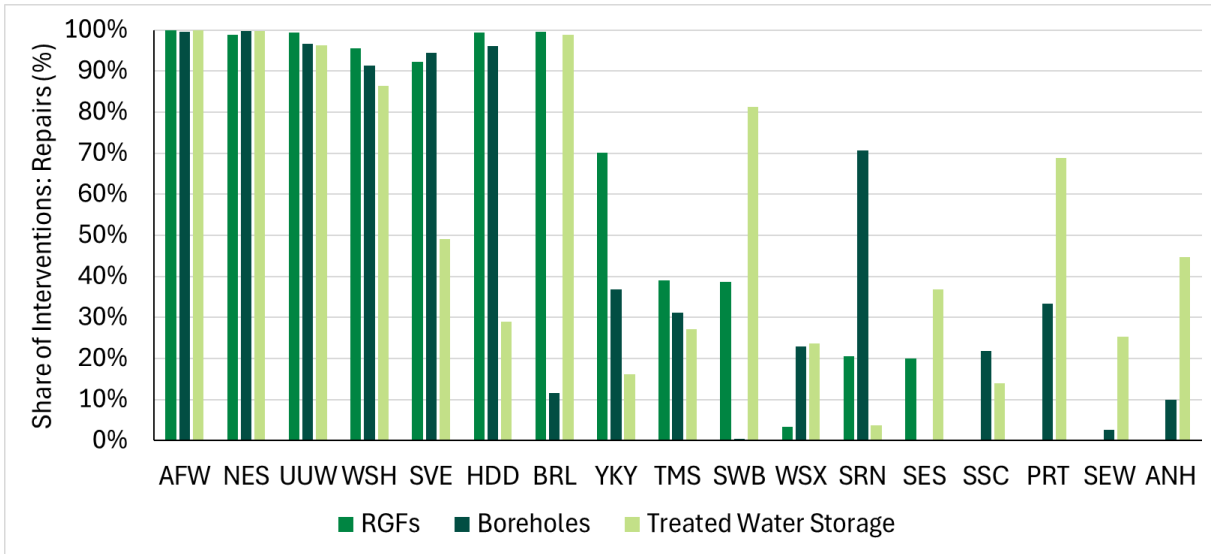
Inconsistent Categorisation

- 6.3.13 There is not necessarily a clear distinction between repairs and refurbishments, which may lead to some companies having the same cheaper intervention categorised as a ‘repair’ where others categorise it as a ‘refurbishment’. This will distort any unit costs comparisons.
- 6.3.14 Figure 22 and Figure 23 show that companies with a higher proportion of repairs typically have a low proportion of refurbishments. Without a more granular breakdown of the data, it is not possible to ascertain whether this stems from a preference for proactive over reactive maintenance, or simply inconsistency in classification of repairs and refurbishments.

²⁷ Ofwat (2026). Sector workload and expenditure dataset – for circulation v2.

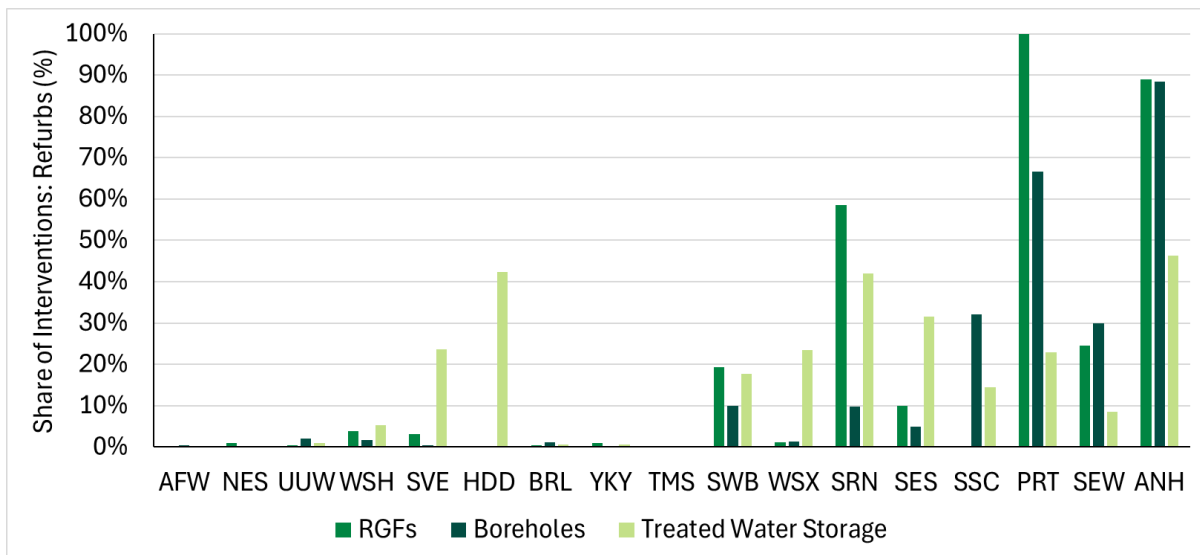
²⁸ Ofwat (2026). Gravity sewer rehabilitation data request (26th March).

Figure 22: Proportion of water asset class interventions categorised as 'Repair'²⁹



Source: UUW analysis of Ofwat (2026) Sector workload and expenditure dataset v2 – for circulation.

Figure 23: Proportion water asset class interventions categorised as 'Refurbishment'³⁰



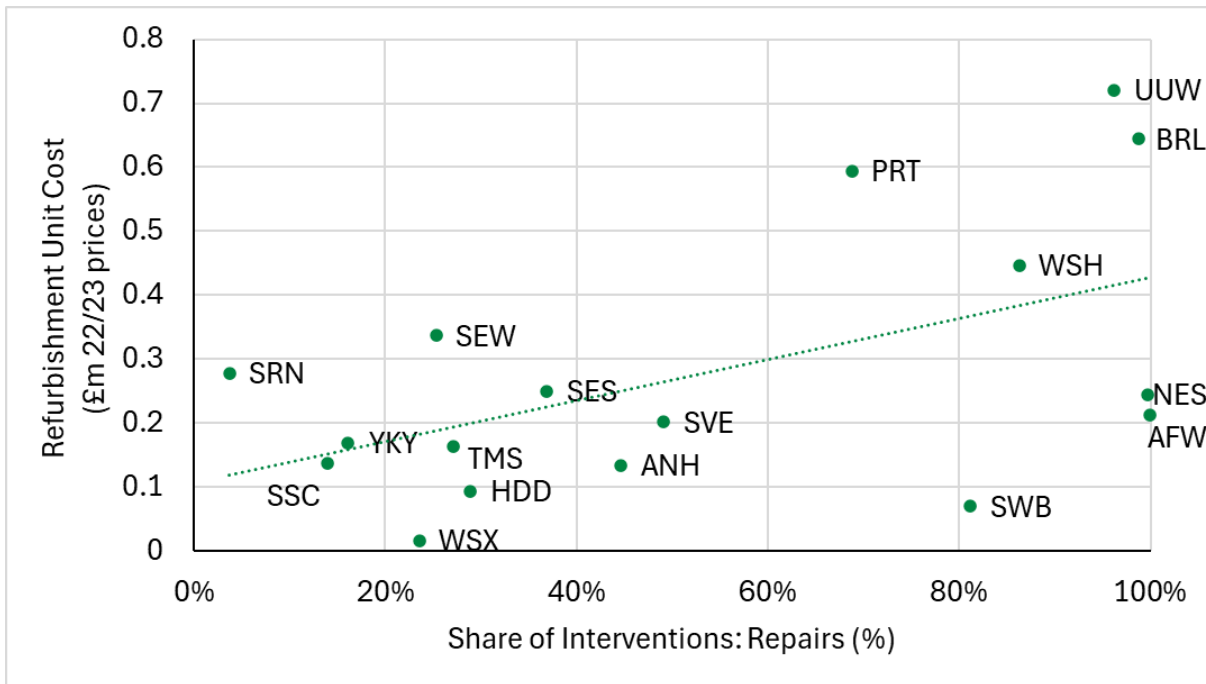
Source: UUW analysis of Ofwat (2026) Sector workload and expenditure dataset v2 – for circulation.

6.3.15 Potential misclassification is also evidenced by the fact that companies with a low proportion of repairs are more likely to have a low refurbishment unit cost, which suggests that certain repairs could be miscategorised as refurbishments.. Figure 24 illustrates this graphically.

²⁹ Ofwat (2026). Sector workload and expenditure dataset – for circulation v2.

³⁰ Ofwat (2026). Sector workload and expenditure dataset – for circulation v2.

Figure 24: Diagram showing the positive correlation between proportion of repair of interventions and refurbishment unit cost³¹



Source: UUW analysis of Ofwat (2026) Sector workload and expenditure dataset v2 – for circulation.

- 6.3.16 The relationship between the proportion of repair interventions and refurbishment unit costs presented in Figure 24 above may help to explain the negative correlation observed in Figure 21, between the refurbishment unit cost and the volume of refurbishment interventions. Specifically, where a relatively high proportion of lower-cost repair activities are delivered alongside, or instead of, more expensive refurbishments, this can influence the reported average refurbishment unit cost across the industry.
- 6.3.17 If there was no allocation bias between repairs and refurbishments, and assuming a consistent industry case-mix of refurbishment activities, we would expect unit cost to remain stable and a broadly flat line of best fit. We would expect expenditure to increase linearly with the number of interventions, and unit cost would remain stable over time.

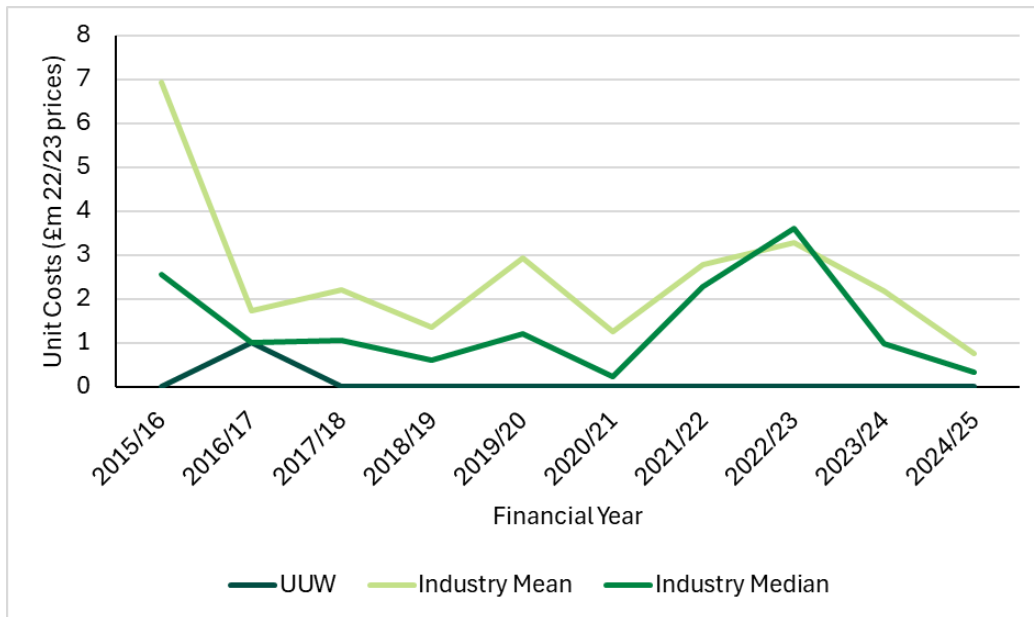
Inherent variability in the data

- 6.3.18 Figure 25 illustrates the replacement unit costs³² over time for Treated Water Storage for UUW and across the industry. It highlights the variability inherent in the recorded data and the challenges this presents for interpreting unit cost differences. The volatility in unit cost over time is so large that it is unlikely to be solely as a result of (in)efficiency differences. For example, the mean and median show significant volatility throughout the period, which is not directly attributable to expected year-on-year variation.
- 6.3.19 If the scope of activities undertaken were comparable between companies and over time, we would expect the unit cost to remain stable throughout the period. Instead, it indicates that there are material differences in the scope of activities undertaken inherent in the historic data, not reflected by a simple unit cost assessment. This presents challenges for interpreting a forward-looking unit cost allowance opposite company plans. This further supports our position that there are a number of different types of replacement activity that cannot be assessed under a single broad category.

³¹ Ofwat (2026). Sector workload and expenditure dataset – for circulation v2.

³² Calculated as the totex expenditure on replacements divided by the quantity of replacements.

Figure 25: Replacement unit costs over time: treated water storage³³



Source: UUW analysis of Ofwat (2026) Sector workload and expenditure dataset v2 – for circulation.

A simple unit cost approach would create distortive incentives

- 6.3.20 A simple unit-cost approach to assessing cost efficiency could materially distort incentives for a company asset strategy. If companies are judged against a single refurbishment, or replacement-level unit cost, the regulatory framework would implicitly reward those who choose the lowest short-term capital expenditure option—regardless of whether it delivers the best whole-life outcome. Under such an approach, companies are likely to prioritise low-cost interventions to remain “efficient” in comparative assessments, even where a more substantial, longer-lasting intervention would provide better value for customers over the asset’s life and deliver improved environmental and operational resilience.
- 6.3.21 This incentive structure would contradict a key aim of the Asset Health Roadmap, that companies should use allowances to “maintain the long-term capability of assets”³⁴ This would require proactive and long-lasting interventions.

6.4 An example cost breakdown

6.4.1 We now provide a full worked example for the Winwick project. This gives a practical example to demonstrate the methodology we set out in Section 6.1.

About Winwick treated water storage tank

- 6.4.2 The principal objective of this scheme is to reinstate Winwick Service Reservoir 1 (SR1) in order to enhance operational flexibility within the network. SR1, referred to as the 'old reservoir' in the 1899 works extension drawings, was constructed prior to 1899. The most recent internal inspection, undertaken in 2008, concluded that the reservoir's condition was so severely deteriorated that it no longer possessed any usable life.
- 6.4.3 Given its age, there are no available engineering drawings for SR1, which presents a challenge in accurately defining its original specifications. Consequently, the scope of this scheme has been defined as the demolition of the existing structure and construction of a new tank of equivalent capacity.

³³ Ofwat (2026). Sector workload and expenditure dataset – for circulation v2.

³⁴ Ofwat (2024). Roadmap for enhancing asset health understanding in the water sector. Available at: [PR24-final-determinations-Roadmap-for-enhancing-asset-health-understanding-in-the-water-sector.pdf](#), pg. 8.

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Source: UUW analysis

6.5 How we have accounted for repair costs associated with the proposal

- 6.5.1 Typically, civils assets have relatively infrequent, but more substantial investment than mechanical, electrical and instrumentation assets. Water network storage assets are often repaired or refurbished as part of their routine cyclic inspection with a frequency of between 5 to 10 years. This is reflected in the historic cost splits for repairs, as whilst civils account for approximately half of repair expenditure, this is infrequent.
- 6.5.2 We therefore expect to realise only modest savings in repair costs across the Water Network Storage asset class during AMP8 because of the asset health cost change expenditure. This is because:
- Our investment proposal covers only a small proportion of the installed asset base within the Water Network Storage asset class i.e. around 4% of our stock (24 of 634 compartments); and
 - The delivery investment is profiled in the last few years of the AMP.
- 6.5.3 Whilst the proposed investment on Water Network Storage will help to extend the life of these assets and reduce the risk of incidents and failures it will have a negligible impact upon in-AMP repair costs across the class.

Historical repair expenditure and implicit allowance

- 6.5.4 It is important to note that Ofwat has not set asset class specific allowances but rather an overall base expenditure allowance across the entirety of the asset base. Therefore, assessing ex-post WBB for a subset of asset classes requires applying key methodological assumptions and extensive judgement. While we have complied with Ofwat's guidance for the Cost Change process, we believe that adopting a mechanistic approach to estimating WBB has its limitations and that such an approach should not set a precedent for wider application at PR29.
- 6.5.5 We have used a similar WBB approach to assess an implied level of allowance for repairs for four of the five asset classes in our cost change submission (excluding gravity sewers). This assessment indicates that we have historically invested in a higher level of repair than is implicitly funded.

Table 15: Historical repair expenditure compared with implied WBB allowance for water network storage (£m, 2022-23 CPIH prices)

	Water Network Storage (£m/AMP) 2022/23
WBB assessment - repair	15.8
UUW's average AMP repair expenditure over AMP6-7	33.7

Source: UUW analysis

- 6.5.6 We have quantified an estimated range of implied savings associated with the proposed investment as **£89k to £165k** for AMP8. These potential savings would only be relevant to AMP8 as they would be associated with avoiding repair work on the assets in scope as they would instead be receiving capital investment during the AMP.
- 6.5.7 Our approach involved the following steps:

- **Step 1a** - Calculate a WBB allowance for repair by extending our existing WBB calculation to include repair expenditure alongside replacement and refurbishment costs (for detail please see *UUW26 – 18 Asset Health – What base buys methodology*);
- **Step 1b** - Subtract from the total WBB that include repair costs (as calculated in step 1) the WBB covering only refurbishment and replacement costs;
- **Step 2** - Scale the repair only WBB allowance calculated in Step 1b based on the subset of assets in scope for the cost change investment;
- **Step 3** - Adjust the potential savings based on the delivery profile of our investment (this assumes that each year's delivery programme on average delivers mid-year, so the year 3 programme has potential for savings across the last 2.5 years of the AMP); and,
- **Step 4** - Assess the low end of the range by adjusting the potential savings by the proportion of civils only.

Table 16: Calculation of indicative repair cost savings associated with the AMP8 water network storage investment

Step	Description	Calculation
1	Calculate WBB repair	
	WBB implied repair allowance per AMP	£15.830m
2	Scale WBB for assets in scope	
	Proportion of asset base included in cost change	4%
	WBB repair for assets in scope	£0.633m
3	Calculate potential WBB savings based on investment profile (20%,40%,40%)	
	20% x 2.5 years + 40% x 1.5 years + 40% x 0.5 years	26%
	Whole AMP implied saving (£572k x 26%)	£0.165m
4	Calculate the proportion of potential civils repair savings	
	Historic civils proportion of repair	54%
	Whole AMP implied civil saving (£149k x 10%)	£0.089m

Source: UUW analysis

- 6.5.8 We have therefore included £165k as potential opex savings associated with avoided repairs in AMP8. This represents the high end of the plausible range.

7. Customer Protection

This section sets out strong safeguards to ensure customers only fund efficiently delivered work. We propose output-based PCDs for our incremental investment and an expenditure-based PCD for our existing AMP8 programme. Our proposals ensure that customers are protected from double-funding through transparent separation of base and incremental investment.

7.1 Price Control Deliverables (PCDs)

Water network storage cost change PCD

- 7.1.1 We are proposing PCDs based upon efficient delivery of intervention types for this investment proposal programme. For the cost change claim on the network storage priority class this would involve an output-based PCD with 18 sets of rates, one for each deliverable, specific to the type of structure at each site. Any non-delivery of outputs would be subject to the PCD clawback mechanism as set out below in Table 17.
- 7.1.2 Table 17 presents the breakdown of intervention types used to set the output-based PCD deliverables and associated non-delivery rates. The rates reconcile directly to the total net cost proposed as part of this investment proposal, reflecting the value of each intervention at an individual level.

Table 17: Cost change PCD deliverables and non-delivery rates

Site	Deliverable (activity)	Non-delivery PCD unit rate (£m)	Intervention type
[REDACTED]	Additional resilience by returning [REDACTED] 1 back into service	1.553	Recommission tank
[REDACTED]	End of life - Tank replacement	10.258	Replace tank
[REDACTED]	Additional roof access and new membrane	14.251	New membrane
[REDACTED]	New membrane on SR3	2.850	New membrane
[REDACTED]	Divide SR2x2 to provide additional resilience and maintainability,	0.295	Divide tank
[REDACTED]	End of life - Tank refurbishment	0.278	Tank refurbish
[REDACTED]	New roof membrane	0.190	New membrane
[REDACTED]	Divide tank to provide additional resilience and maintainability (half height walls)	0.805	Divide tank
[REDACTED]	Divide tank to provide additional resilience and maintainability	2.339	Divide tank
[REDACTED]	Additional resilience by returning High Warren 2 back into service	10.828	Recommission tank
[REDACTED]	End of life - Tank replacement	7.068	Replace tank
[REDACTED]	New roof end of asset life	0.759	New roof

Site	Deliverable (activity)	Non-delivery PCD unit rate (£m)	Intervention type
[X]	Additional resilience by returning Pexhill 2 into service	4.885	Recommission tank
[X]	Divide tank to provide additional resilience and maintainability	1.946	Divide tank
[X]	Internal refurbishment including fully lining.	4.750	Tank refurbish
[X]	Divide tank to provide additional resilience and maintainability (half height walls)	1.366	Divide tank
[X]	Additional resilience by returning Winwick 2 into service	12.494	Recommission tank
[X]	Perimeter membrane to prevent water penetrating under existing roof membrane.	1.425	New membrane
		78.342	

Source: UUW internal data

PCD reporting, assurance and other conditions

- 7.1.3 This section provides further details underpinning our approach to this proposed PCD. This includes parameters such as the measurement, reporting and assurance of the PCD, any timing incentives proposed and any additional conditions of the PCD mechanism on the proposed allowance.
- 7.1.4 This is an output-based PCD mechanism that applies to the relevant expenditure, this would be above and beyond our base programme expenditure.
- 7.1.5 The base programme would be assured as part of the APR process to confirm base capex each year against each priority class.
- 7.1.6 The APR assurance for Asset Health would confirm there has been no overlap between the base programme and the additional Asset Health expenditure.
- 7.1.7 Any changes to the list of sites / interventions arising from new information as set out in the agreed Asset Health cost change would be presented alongside the APR PCD data. Commentary would provide a clear explanation for the change(s) and demonstrate how it would not increase risk to customers.
- 7.1.8 The overall programme value would not exceed the cost adjustment allowance although the mix of interventions could be varied.
- 7.1.9 PCD outputs, progress and expenditure would be reported each year as part of our standard Delivery Plan reporting arrangements applied to all existing PCDs. Overall delivery against this PCD will be assessed at the end of year five AMP8 (i.e. 2029/30). If we have spent at least 60% of the allowed expenditure for this PCD due in AMP8, then there would be no claw back provided that the remaining delivery takes place by the end of AMP9 (i.e. 2034/35). This is in line with Ofwat's current PCD guidance (February 2026).
- 7.1.10 The delivery of the interventions is not anticipated to have any impact on existing PR24 FD PCDs. We therefore do not propose any adjustment to the existing FD PCDs.
- 7.1.11 Timing incentives: Ofwat's PR24 Final Determination sets out where timing incentives apply. These are restricted to water supply, supply and resilience interconnectors, metering, phosphorus removal, storm

overflows and mains renewals. These incentives are designed to promote timely delivery of benefits. With the exception of mains renewals, these areas use scheme level PCDs that allow greater flexibility in deliverables, therefore reducing the financial risk created by the application of timing incentives. In contrast, the PCDs proposed in this submission case have tightly defined, granular outputs, limiting the ability to substitute deliverables. For this reason, we do not propose applying timing incentives, except for investment delivery post-AMP8.

Examples

- 7.1.12 We provide worked clawback examples in each case submission document. However, the PCD proposed for treated water storage assets is comparatively straightforward and does not therefore require a worked example. For each line item which is not delivered by the end of AMP8 (2029/30) we propose that the specific unit rate for that item shown in Table 17 would be clawed back.

Base expenditure PCD

- 7.1.13 In addition to the output based PCD for this cost change submission, we also propose an expenditure-based PCD to protect customers from non-delivery and claw back unspent allowances for WBB across four asset classes (see Table 18). We propose a single expenditure-based PCD that would operate across four of our asset classes. If the expenditure in one asset class is less than our implicit funding allowance, but it is offset by a higher expenditure in one of the other asset classes, there would be no PCD clawback. This would provide sufficient flexibility to ensure that companies remain incentivised to target their maintenance interventions efficiently whilst providing appropriate customer protection.
- 7.1.14 This type of expenditure-based PCD is similar to the PCDs included in PR24 FD. These include Network Reinforcement and Climate Change Uplift PCDs, both of which have separate expenditure-based outputs for the Water and Wastewater services respectively. This additional granularity of reporting at Water and Wastewater price control levels provides additional customer protection.

Limitations of WBB

- 7.1.15 In our calculation of WBB, we have highlighted the limitations of any mechanistic approach used to assess WBB for individual asset classes and the data issues associated with the assessment. In applying any methodology, we believe that Ofwat should give significant consideration to the risk of an overstatement and the potential impacts this could have on restricting companies' base expenditure decisions in a way that would be inconsistent with the PR24 approach to base expenditure allowances.
- 7.1.16 We therefore believe that our WBB estimates very much represents the upper end of the range that should be considered for WBB and that, in view of the risks associated with over-estimation, Ofwat should consider whether lower limits should be binding on companies. We have therefore proposed potential mitigations that Ofwat could consider in the *UUW26-18 Asset Health – What Base Buys* document.

Detail of PCD breakdown

- 7.1.17 In our AMP8 programme across the priority asset classes, we have allocated base funding to cover drain down, cleaning and inspection and remediation at a specified number of small, medium and large sites. The planned expenditure on proactive interventions will be ringfenced through a base expenditure PCD in line with the aggregate WBB figure of £77m across the asset classes. This ensures that the cost-change claim is incremental to our existing AMP8 capital maintenance plan. Our expenditure on refurbishments and replacements was £95m in AMP6 and £122m in AMP7, therefore we are confident that we will spend our implicit allowance for water network storage.
- 7.1.18 Table 18 below summarises the breakdown of WBB across the relevant asset classes in our submission (excluding Gravity Sewers, because it is not an expenditure based PCD). We propose that our base expenditure PCD should be ringfenced at the aggregate level. This approach ensures delivery of the full £77m of base investment, whilst allowing us to optimise prioritisation of intervention across assets in response to emerging risks.

Table 18: Breakdown of WBB PCD (£m, 2022-23 CPIH prices)

Asset class	WBB
Boreholes	6.4
Rapid Gravity Filters	8.5
Water Network storage assets	55.7
Trickling filters	6.5
Total	77.1

Source: UUW analysis

7.2 Impact on Performance Commitments

- 7.2.1 The delivery of the interventions is not anticipated to provide measurable in-period performance improvement, as the programme is targeting risk reduction, not short-term performance uplift. While the investment will strengthen resilience and reduce the likelihood and severity of future supply-interrupting events, these benefits primarily manifest as avoided failures rather than improvements visible in AMP8 performance commitments, such as the Water Supply Interruptions and Customer Contacts about Water Quality PCs.
- 7.2.2 The benefits are preventative in nature reducing structural, operational and configuration risks that would otherwise lead to future interruptions. However, avoiding sporadic low-frequency failures does not produce a consistent or detectable change in annual performance as measured by the PR24 performance commitments. The investment is not targeted at failing assets, but the future risk of failing assets in the long term, so would not be expected to have an impact on performance under the Unplanned Outage performance commitment.
- 7.2.3 Many of the improvements (e.g., replacing roofs, dividing tanks) aim to reduce risk during future outage cycles rather than altering day-to-day operation in AMP8. The supply interruptions and customer contacts performance commitments measure day-to-day operational performance and the customer experience of the water service, rather than the underlying resilience improvements that accrue over multiple AMPs.

8. Investment Delivery Plan

We are actively managing all key delivery risks, including outage availability, access constraints and interfaces with live assets, through early operational engagement and flexible outage planning. Delivery planning shows investment is fully deliverable within AMP8, with supply-chain capacity confirmed across build-only and design and build runways. Outages have been aligned with the existing inspected-tank schedule to maintain resilience, supported by the deferment of major HARP-related outages to early AMP9.

8.1 Supply chain readiness

- 8.1.1 Our strategy is to deliver the projects within this case via the most appropriate delivery "runway" in our AMP8 runway-based delivery model, which is described in more detail in Section 7.1 of *UUW26-02 Growth Unlocked: Water for the New Economy*
- 8.1.2 Assessment of supply chain capacity and deliverability risk should not be considered in the context of any one case in isolation. Instead, we have considered the impact of all cases with our Growth and Asset Health submissions in aggregate on the baseline AMP8 programme. We have undertaken a thorough programmatic assessment of capacity in our new AMP8 supply chain, to assure ourselves that the overall investment proposal is deliverable, and that there is sufficient headroom in capacity and availability of resource within our design consultants and construction supply chain, in addition to our internal programme management capacity, to accommodate the additional investment.
- 8.1.3 Please refer to Section 7 of *UUW26-02 Growth Unlocked: Water for the New Economy* for the programmatic assessment which considers all projects proposed for investment across all cases within our Growth and Asset Health submissions, with the supporting evidence that all such investments are deliverable.

8.2 Delivery risks: design & delivery risks tracked with mitigations

- 8.2.1 Our plan to deliver the accelerated investment is to carefully plan any necessary outages through production planning, aligned to the reservoir inspection programme. Outages required as part of the Haweswater Aqueduct Resilience Project (HARP) are scheduled for early AMP9. This means there is an opportunity to carry out works now to reduce risk across treated water storage assets – and therefore the wider water system – ahead of this critical period.
- 8.2.2 A programme risk register has been developed for Asset Health, please refer to *UUW26-27 Deliverability risk register*. Some of the key risks associated with treated water storage assets are shown in Table 19 below.

Table 19: Key delivery risks

Risk Description	Risk Type	Mitigation Details and Progress	Risk Impact Score Maximum 25
Production capacity impact – there is a risk that demand may restrict the ability to carry out the required refurbishments	Threat	The programme has been reviewed against outage requirements. The programme will be planned and scheduled inline with operations to avoid peak periods	15
WATER Programme – There is a risk that dry weather impacts may reduce the window for outages or flow reductions	Threat	The programme has been developed to limit this impact.	15

Risk Description	Risk Type	Mitigation Details and Progress	Risk Impact Score Maximum 25
Availability of supply chain (Build) to deliver the additional scope in AMP8 - risk that there is insufficient capacity to deliver the additional scope causing delays to delivery and/or increased costs for accelerated delivery	Threat	Early visibility of the Growth & Asset Health programmes will be provided to our delivery partners - this work will help to bridge the ramp up to AMP9 Transitional Investment and AMP9 and avoid critical resources being redeployed to other water programmes or other growth industries. Where there is overlap between Growth and Asset Health with the AMP8 programme the works will be amalgamated to reduce rework	6

Source: UUW26-27 Deliverability risk register

8.3 Outline delivery schedule

- 8.3.1 A robust and deliverable programme has been established through detailed site assessments, ensuring that the proposed refurbishment works can be undertaken without compromising production capacity or service continuity.
- 8.3.2 The interventions required at each site differ and this has been taken into account for deliverability. Each site has been evaluated to confirm that operational resilience can be maintained throughout the works and that sufficient supply chain capability exists to support timely delivery. The programme sequencing and delivery strategy have been developed directly from the outcomes of this assessment, providing a plan for completion.
- 8.3.3 To strengthen confidence in deliverability, the sites have been assessed against defined constructability and delivery criteria. These criteria set out the required delivery runway, identify any enabling works, and clarify the expectations placed on contractors. This structured approach ensures that each site enters delivery with a clear understanding of constraints, risks, and resource requirements.
- 8.3.4 A review has also been undertaken to identify interfaces with AMP8 investment programmes. This has ensured alignment with wider capital delivery commitments and avoided potential conflicts in access, resourcing, or outage planning. As a result, the proposed programme integrates well with the broader AMP8 portfolio, reducing the risk of delay.
- 8.3.5 To carry out the refurbishment or replacement some assets must be taken offline during the construction period and therefore an operational impact assessment is to be completed for each site.
- 8.3.6 Through this structured assessment process, clear delivery criteria, and alignment with AMP8 programmes, the proposed works are demonstrated to be both deliverable and operationally resilient. The programme provides strong assurance that the required asset health improvements can be achieved.

8.4 AMP8 delivery evidence

- 8.4.1 UUW remains on track to deliver strong performance against its PR24 Final Determination (FD) Performance Commitment Deliverables (PCDs). As explained in the *UUW26-02 Growth Unlocked: Water for the new Economy* we are delivering against the requirements of the FD PCDs whilst spending in line with UUW’s AMP8 enhancement allowances in the final determination
- 8.4.2 The mains renewals base PCD in the PR24 Final Determination is of most relevance to this submission case as it helps monitor improvements in the asset health during AMP8. Our performance illustrates

how we are successfully delivering against our current FD PCD commitments. In the FD, Ofwat expects the sector to move towards a sustainable mains replacement rate to maintain and improve asset health during the period. It therefore set a PCD on all companies to deliver the specified output of the PCD (a company specific length of mains). In the May 2026 Delivery Plan progress update we are reporting delivery against this PCD as Green, showing that we are on track with delivering the requirements of this base investment to Ofwat’s FD requirements.

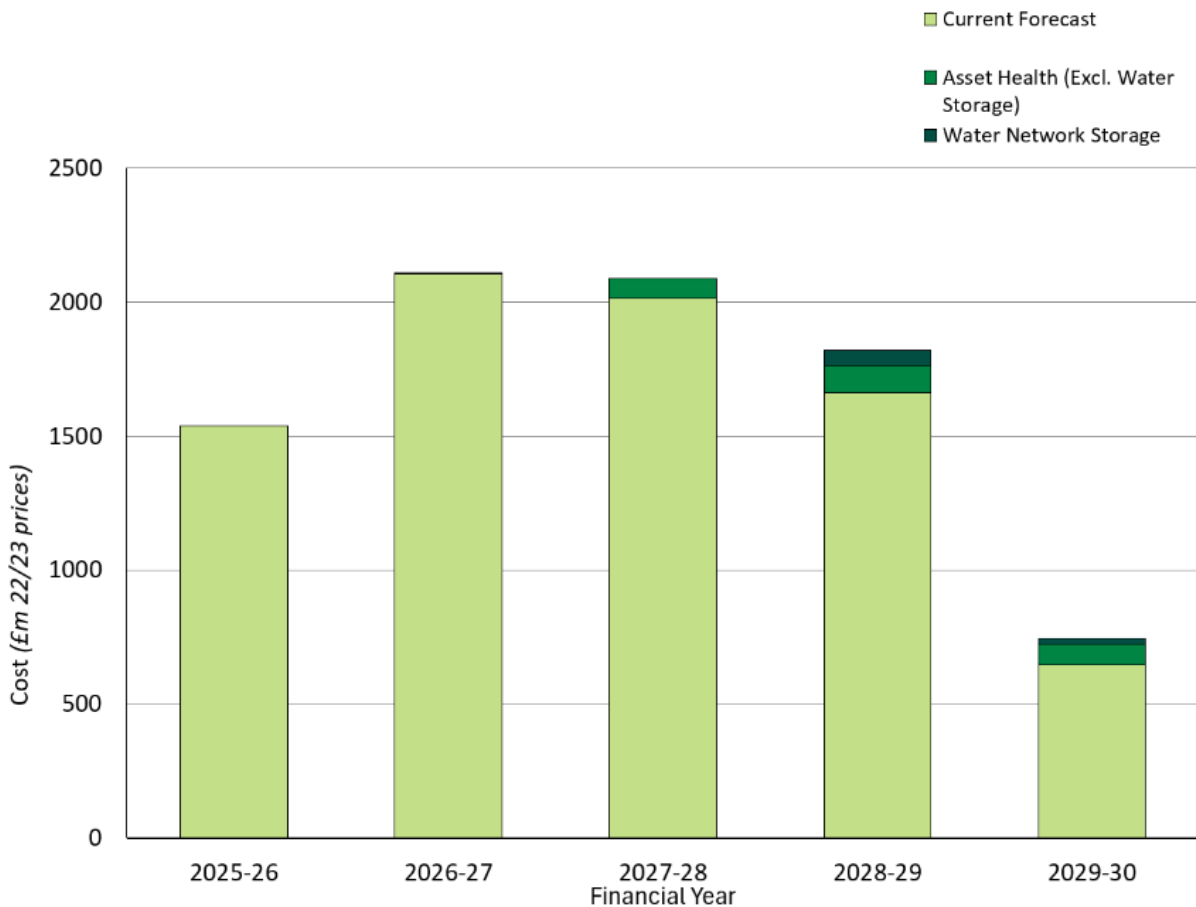
8.4.3 Table 20 and the following graph (Figure 26) illustrates the investment for asset health in the context of the Asset Health submission and the existing AMP8 programme. We are confident that the full programme is deliverable. Letters of support from key organisations within our supply chain can be found in *UUW26-25 Letters of support*.

Table 20: Water Network Storage Expenditure Profile (£m, 2022-23 CPIH prices)

Totex	2025-26	2026-27	2027-28	2028-29	2029-30	Total AMP8
Asset Health (Excl. Water Storage Assets)	-	1.28	75.86	101.33	78.17	256.64
Water Network Storage	-	-	-	57.02	21.33	78.34

Source: UUW analysis

Figure 26: Investment profile for Water Network Storage against AMP8



Source: UUW analysis

8.5 Stakeholder engagement and permissions

- 8.5.1 Each year, UUW delivers a wide-ranging programme of infrastructure investment, spending around £800 million annually across its asset base, based on average capital expenditure over the past three financial years. Most of this work, including the water network storage asset activities set out in this proposal, takes place within our site boundaries and has minimal impact on customers or local stakeholders. Where communities may be affected, for example by increased traffic movements associated with deliveries, we proactively manage impacts by streamlining traffic routes, using screening to reduce visual and noise disruption, and offering community drop-in sessions for nearby residents. These measures ensure stakeholders are well informed, supported, and able to raise concerns at an early stage.

9. Assurance

The submission meets Ofwat’s requirements for third-party assurance, with independent review of technical scope, cost robustness and customer protection mechanisms. This provides strong confidence that the programme is justified, efficient, deliverable, and aligned with PR24 asset health expectations.

- 9.1.1 This section summarises U UW’s approach to assuring this submission and the outcomes of the third-party assurance. It is supported by *U UW26-19 Asset Health assurance report*.
- 9.1.2 Ofwat requires cost changes submissions to include a third-party assurance report in line with the requirements set out in “PR24 final determinations: Expenditure allowances - assurance requirements for delivery of enhancement schemes appendix”³⁵. This includes technical and commercial assurance across the content of the submission.
- 9.1.3 The Technical Assurance confirms that the proposed investment meets the requirements set out in Ofwat’s guidance for the following areas:
- Need for a step change in investment;
 - Best option for customers; and,
 - Investment delivery plan.
- 9.1.4 The Commercial Assurance provides a view on the robustness of the costs proposed by the company and whether they are efficient and represent industry best practice, this includes an assessment of cost estimation approach.
- 9.1.5 The Commercial assurance also confirms that the proposed investment meets the requirements set out in this document for the following areas:
- Robust and efficient costs; and,
 - Customer protection.

³⁵ [PR24-final-determinations-Expenditure-allowances-Assurance-requirements-for-delivery-of-enhancement-schemes-appendix.pdf](#)

10. Site Specific Case Studies – Section removed

Appendix A Site selection methodology

Table 21: Site list by exclusion criteria

Option	Is there an asset health risk	Is the asset critical?	Is the asset still required?	Is there an alternative investment stream (growth or quality)?	Is a short life intervention viable?	Is there a cost effective, longer life intervention?	Is an integrated solution viable with another driver?	Is the need for the asset expected to outlast the proposed asset life?	Do the existing structural assets have significant asset life
Brown Edge (St Helens)	Yes	Yes	Yes	No	Y	Yes	No	Yes	Yes
Denton	Yes	Yes	Yes	No	N	Yes	No	Yes	Yes
Gorse Hill (Southport)	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Pex Hill	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Ridgaling (Fulshaw Farm)	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Willows Lane	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Winwick	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No
Woodgate Hill	Yes	Yes	Yes	No	N	Yes	No	Yes	Yes
Greavefold	Yes	Yes	Yes	No	N	Yes	No	Yes	Yes
Haslingden High Level	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes
High Warren	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No
Knutsford	Yes	Yes	Yes	No	N	Yes	No	Yes	Yes
Oakshaw Hill	Yes	Yes	Yes	No	N	Yes	No	Yes	Yes
Warbreck	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Castle Hill (Pennington)	Yes	Yes	Yes	No	N	Yes	No	Yes	No
Herd House	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Heswall	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes

Appendix B Base Asset Health Dashboard Risk Forecasting

B.1 Base Asset Health Dashboard

- B.1.1 The Base Asset Health dashboard is a tool developed by UUW to support asset investment decision making. It provides a picture of the current and future asset health, and risk position of our asset base resulting from a defined investment programme.
- B.1.2 The dashboard presents a view across our whole above ground asset inventory. Each asset has:
- a modelled replacement cost, based upon historic UUW's project costs.
 - a nominal expected asset life based upon historic UUW norms for asset replacement ages.
 - an effective age based on physical age but influenced by the most recent condition assessment.
 - a criticality band, based upon the potential service impact associated with asset failure.
- B.1.3 The model includes forecasts of asset health and risk for various investment scenarios for each five-year investment period for the next thirty years to 2055.
- B.1.4 The dashboard displays three scenarios with the profile of asset value by life for the selected assets in that investment period. Assets move upwards as they age. Assets which have exceeded 85% of their life are identified as 'end of life'.
- B.1.5 The three scenarios are:
- No investment. In this scenario the assets age and are not replaced or renewed.
 - Planned investment. In this scenario the current planned level of capital maintenance for AMP8 is continued each AMP for the next 30 years, ring fenced to the relevant part of the asset base, such as "all water treatment works".
 - Planned investment with cost change. In this scenario the current planned level of capital maintenance for AMP8 is supplemented, just for AMP8 with the refurbishment of the targeted assets included within the AMP8 cost change business cases. Subsequently investment returns to PR24 levels for the next 30 years, ring fenced as before.
- B.1.6 For all three scenarios for each forecast period, the effective age of the asset base is increased by five years, i.e. accounting for the initial condition state. Assets that are predicted to be fully life expired are then selected for renewal based upon a risk measure; the most critical life expired assets are selected first, until the available capital maintenance programme budget is exhausted. Upon renewal assets are assumed to have an effective age of zero as they enter the next timestep.
- B.1.7 In the third scenario "Planned investment with cost change" additional specific assets included within the investment cases are refurbished i.e. a tank, including media, instruments, scrapers, distributors, valving and pipework, plus any local control.
- Risk forecasts**
- B.1.8 Assets typically carry significantly more risk of failure as they enter the last 15% of their lives. The forecast change in risk position is driven by the number, value, and criticality of assets that are predicted to be life expired. This assessment enables us to track whether a well targeted investment programme is sufficient to stabilise or improve the overall risk position of the asset base, or if is predicted to lead to an overall degradation in asset health related risk.
- B.1.9 The following worked example indicates the risk forecast assessment methodology on four assets over two investment periods, showing scenarios with and without investment.

Table 22: Risk forecast assessment methodology on four assets over two investment periods (without investment)

Without investment

End of AMP	Asset	Effective age	Asset Life	Criticality	Replacement cost	BAH	Last 15% End of life	Criticality weight	End of life risk score
7	1	10	12	A	£1,000	83%	0	5	0
	2	60	60	B	£10,000	100%	1	4	40000
	3	30	35	C	£20,000	86%	1	3	60000
	4	25	23	D	£5,000	100%	1	2	10000
End of AMP7 risk score									110000
End of AMP7 normalised risk score									1.00
End of AMP	Asset	Effective age	Asset Life	Criticality	Replacement cost	BAH	Last 15% End of life	Criticality weight	End of life risk score
8	1	15	12	A	£1,000	100%	1	5	5000
	2	65	60	B	£10,000	100%	1	4	40000
	3	35	35	C	£20,000	100%	1	3	60000
	4	30	23	D	£5,000	100%	1	2	10000
End of AMP8 risk score									115000
End of AMP8 normalised risk score									1.05
End of AMP	Asset	Effective age	Asset Life	Criticality	Replacement cost	BAH	Last 15% End of life	Criticality weight	End of life risk score
9	1	20	12	A	£1,000	100%	1	5	5000
	2	70	60	B	£10,000	100%	1	4	40000
	3	40	35	C	£20,000	100%	1	3	60000
	4	35	23	D	£5,000	100%	1	2	10000
End of AMP9 risk score									115000
End of AMP9 normalised risk score									1.05

Source: UUW analysis

Table 23: Risk forecast assessment methodology on four assets over two investment periods (with investment)

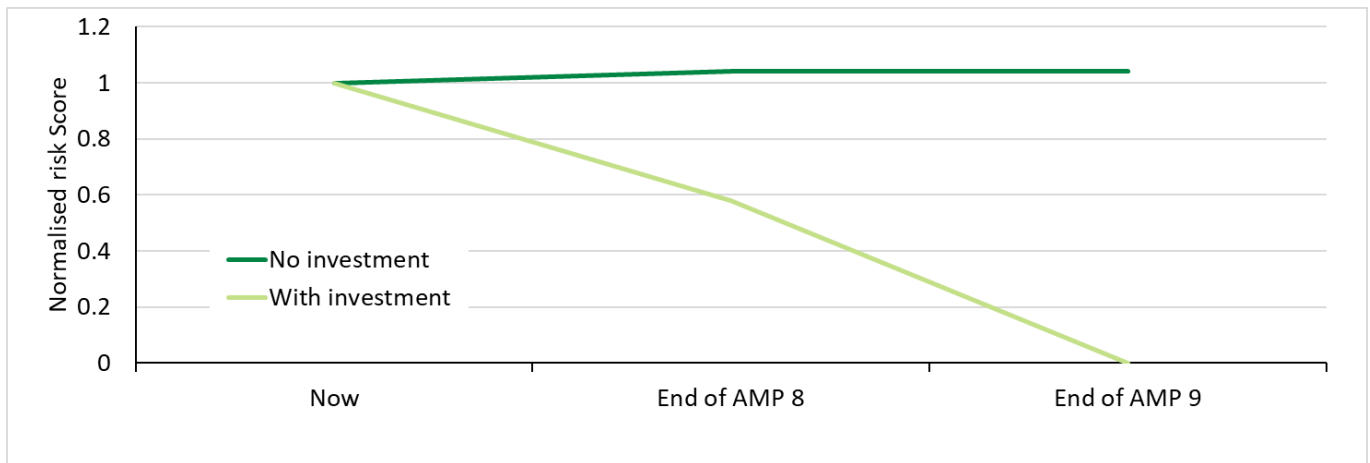
With investment (grey highlighting indicates investment)

End of AMP	Asset	Effective age	Asset Life	Criticality	Replacement cost	BAH	Last 15% End of life	Criticality weight	End of life risk score
8	1	15	12	A	£1,000	100%	1	5	5000
	2	0	60	B	£10,000	0%	0	4	0
	3	35	35	C	£20,000	100%	1	3	60000
	4	0	23	D	£5,000	0%	0	2	0
End of AMP8 risk score									65000
End of AMP8 normalised risk score									0.59
End of AMP	Asset	Effective age	Asset Life	Criticality	Replacement cost	BAH	Last 15% End of life	Criticality weight	End of life risk score
9	1	0	12	A	£1,000	0%	0	5	0
	2	5	60	B	£10,000	8%	0	4	0
	3	0	35	C	£20,000	0%	0	3	0
	4	5	23	D	£5,000	22%	0	2	0
End of AMP9 risk score									0
End of AMP9 normalised risk score									0.00

Source: UUW analysis

The above example (no investment) as described in Table 22, and the related example (with investment) as described in Table 23 would result in the following changes over time in underlying asset health risk across the portfolio of assets, as shown in the Figure 27.

Figure 27: Risk change over time



Source: UUW analysis

United Utilities Water Limited
Haweswater House
Lingley Mere Business Park
Lingley Green Avenue
Great Sankey
Warrington
WA5 3LP
unitedutilities.com



Water for the North West