



Dŵr Cymru  
Welsh Water

Enhanced Investment  
Case:  
WSH74-PE03 –  
Reducing Risks of  
Serious Pollution  
Incidents



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## Executive Summary

Welsh Water is advocating that £54M be invested in the AMP8 period to begin addressing those assets that present the highest environmental risk. There will be subsequent investments in similar assets in PR29 and beyond as is outlined in our WSH01 Long Term Delivery Strategy.

We have structured this document using the enhancement assessment criteria set out in Ofwat's PR24 Final Methodology, Appendix 9 (Setting Expenditure Allowances), Section A1. The enhancement assessment criteria are divided into four criteria groupings:

- need for enhancement investment (7 sections);
- best option for customers (eight sections);
- cost efficiency (3 sections); and
- customer protection (3 sections).

**Need:** Welsh Water manages and maintains 1,300km of pumped rising mains across its operating area. The mains are the biggest cause of higher category pollutions in our network, due in a large part to the difficulty in managing flows during and whilst repairing bursts.

We also have many mains which run underneath, or cross, rivers and streams. Failure of assets located within the river, although less frequent, will by their nature lead to increased risk of a higher category pollution. These assets are particularly prone to external factors such as riverine erosion and impacts from waterborne debris. As well as multiple sewers laid in rivers, Welsh Water have 3,375 sewers that cross a primary river, of which over 1,000 are 300mm diameter or larger. Only 433 are either routed over a pipe bridge or through a tunnel.

**Options:** Unless abandonment can be achieved, options for rising mains and riverine sewers are limited with replacement being the most likely requirement when management control is no longer enough to prevent serious pollutions. We have considered different levels of activity and identified a balance between reducing risk whilst maintaining affordability and a deliverable program.

**What we will deliver:** We are targeting replacement of 10 of the highest pollution risk rising mains and 5 highest risk riverine sewers as well as 1 sewer that runs through a SSSI.

**Efficient Costing:** Whilst the locations being addressed in this program present some challenges the work type of mains replacement is well understood, and we have been able to use historic projects costs to build up our price estimate. We will invest £54M (CapEx, post efficiency, 22/23 price base) to replace sewers and rising mains.

**Customer Protection:** Customers are protected through the serious pollutions performance commitment which will be tracked annually by Ofwat and NRW/EA regulatory framework which will report performances and enforce response to failure.

**Benefits:** The investment will begin to replace assets with known failure histories that have caused previous pollution incidents and continue to pose risks of further significant pollution incidents. The assets included within this investment category, whilst known to have very high environmental risks, are those that also have very high replacement costs in relation to many of our other rising mains and sewers. This high cost has historically meant they have not been included in previous price reviews on an overall cost benefit basis. With the increased environmental focus from Welsh Government, our Regulators, wider stakeholders, and society in general, it is not tenable that these environmental risks continue to go unaddressed, with this investment being the first phase of a multi-AMP investment requirement.

Our approach to benefits has been independently assessed by Jacobs (Engineering and Costs) and Economic Insight (CBA).

## 1. Introduction

The Welsh PR24 forum provides a collaborative approach between Government, regulators, water companies and wider stakeholders in Wales to focus on the priorities and themes as outlined in the Welsh Government's Strategic Priorities Statement to Ofwat.

A joint vision for the water sector in Wales was discussed and endorsed by the forum that contained a requirement to support a thriving environment in our rivers and seas by effectively managing and treating wastewater.

Welsh Government and the Forum members raised concerns over perceived “declining [pollution] performance” and insufficient Welsh Water ambition to reduce pollution incidents over PR24. The Welsh PR24 forum also issued a Company specific steer to Welsh Water that they expect the company to prioritise environmental interventions that provide the maximum environmental benefit, to target a 4\* EPA assessment and to deliver zero category 1 and 2 pollutions, whilst reducing category 3 pollutions.

This clear direction from Welsh Government and the Welsh PR24 forum is also underpinned by an ever-increasing focus on our (and indeed the rest of the industry's), environmental performance by our customers, regulators, wider stakeholders, and the media.

This investment will begin to address the risk of serious pollutions occurring. This is the start of a multi-AMP investment requirement to address one of Welsh Government's strategic priorities of providing 21<sup>st</sup> century drainage and sewerage systems. Welsh Government have identified that deteriorating sewerage assets pose a significant risk to water quality and have requested to see a structured approach to the planning and maintenance of the sewerage and drainage network, whilst accepting the difficulty of balancing this requirement against the affordability challenge that this will create.

Welsh Water manages and maintains ~1,300km of pumped rising mains across its operating area. Rising mains are the biggest cause of higher category pollutions in our network, due in a large part to the difficulty in managing flows during and whilst repairing the bursts.

Whilst the risk of failure of these assets and the associated pollution risk has been increasing over time, the cost of replacing them has been too high when considered as a cost benefit assessment against other cheaper investments to avoid pollution. These assets are therefore proposed and considered for investment at each Periodic Review but have not historically been included in lieu of many other investments being completed for the same cost as one of these rising mains, which address several pollution risks as opposed to just one. As the value society places on reducing pollution increases and the number of higher spend/benefit ratio schemes decreases investment in higher cost interventions will increase.

## 1.1 Structure of this Document

We have structured this investment case using the enhancement assessment criteria set out in Ofwat's PR24 Final Methodology, Appendix 9 (Setting Expenditure Allowances), Section A1.1.

ID from Appendix 9	Abbreviated Assessment Criterion	Addressed in
<b>A1.1.1 Need for enhancement investment</b>	a Is there evidence that the proposed investment is required?	Section 2.1
	b Is the scale and timing of the investment fully justified?	Section 2.1
	c Does the proposed investment overlap with base activities?	Section 2.2
	d Does the need and/or proposed investment overlap/duplicate with previously funded activities or service levels?	Section 2.3
	e Does the need clearly align to a robust long term delivery strategy within a defined core adaptive pathway?	Section 2.4
	f Do customers support the need for investment?	Section 2.1
	g Have steps been taken to control costs, including potential cost savings?	Section 2.5
<b>A1.1.2 Best option for customers</b>	a Have a variety of options with a range of intervention types been explored?	Section 3.1
	b Has a robust cost-benefit appraisal been undertaken to select the proposed option?	Section 3.1
	c Has the carbon impact, natural capital and other benefits that the options can deliver been assessed?	Section 3.2
	d Has the impact of the proposed option on the identified need been quantified?	Section 3.2
	e Have the uncertainties relating to costs and benefit delivery been explored and mitigated?	Section 3.3
	f Where required, has any forecast third party funding been shown to be reliable and appropriate?	Not applicable for this case
	g Has Direct Procurement for Customers (DPC) delivery been considered?	Please refer to WSH50-IP00 Our Approach to Investment Planning (Section 3.4.1)
	h Have customer views informed the selection of the proposed solution?	Please refer to Stepping up to the Challenge: Business Plan 2025-30 (Section 2.2)
<b>A1.1.3 Cost efficiency</b>	a Is it clear how the company has arrived at its option costs?	Section 4.1
	b Is there evidence that the cost estimates are efficient?	Section 4.2
	c Does the company provide third party assurance for the robustness of the cost estimates?	Section 4.1
<b>A1.1.4 Customer protection</b>	a Are customers protected if the investment is cancelled, delayed or reduced in scope?	Section 5.1
	b Does the protection cover all the benefits proposed to be delivered and funded?	Section 5.1
	c Does the company provide an explanation for how third-party funding or delivery arrangements will work for relevant investments?	Not applicable for this case

## 2. Need for Enhancement Investment

### 2.1 Evidence that Enhancement is Needed

***Is there evidence that the proposed enhancement investment is required?***

***Is the scale and timing of the investment justified?***

***Where appropriate, is there evidence that customers support the need for investment?***

***Where appropriate, is there evidence that customers support the need for investment (including both the scale and timing)?***

*– Ofwat’s final methodology for PR24, Appendix 9, A1.1.1a, A1.1.1b and A1.1.1f*

Our approach to customer engagement is set out in Stepping up to the Challenge: Business Plan 2025-30 (Section 2.2).

With over a third of the UK’s bathing waters and 9 Special Areas of Conservation (SAC) rivers, the environment in which we operate is much more susceptible to serious pollution classification as any impact on such sensitive waters is deemed more serious. It is for these environmental sensitivities that we need extra / enhancement investment.

The Strategic Steers<sup>1</sup> from Welsh Government and the PR24 Forum direct Welsh Water to reduce the level of risk it is willing to accept in managing serious pollution risks. They also support the business’s ambition to have zero serious pollution incidents and a four-star EPA rating. Welsh Government and the PR24 Forum also expect Welsh Water to put forward the case for enhancing asset health and resilience and propose replacing those assets where there is a known condition issue or risk of serious pollution.

NRW and the EA have both indicated that they intend to focus more on compliance, have a lower tolerance of repeat asset failures and make more use of their enforcement powers to require companies to replace assets known to be vulnerable. Previously Welsh Water has been able to successfully manage serious pollution risks through mitigation measures and incident response planning, reducing the environmental impact of service failures. This has led to the position where the risk level Welsh Water operate at is managed through a combination of capital maintenance on smaller assets and operational risk management on larger assets.

NRW are also very clear, we must move quickly to a zero serious pollution incident position. This EPA metric is tightening; since 2016, 1 or no incidents would mean we could achieve a ‘green’ performance, but from 2025 anything more than 0 incidents will put the company at either AMBER, or RED if there is more than 1 incident. If performance on this metric is red, the company cannot achieve its 4\* ambition.

There has also been a significant shift in the regulatory environment in which Welsh Water operate compared to when the PR19 business plan was developed, which in turn will impact on the performance throughout AMP8 and beyond.

Public and stakeholder focus are driving a change in the risk appetite for regulators and a demand for greater penalties and prosecutions from serious pollution incidents. Regulators in both England and Wales report an increasing focus on regulation and enforcement and Welsh Water can expect greater sanctions to be applied particularly on sites with repeat incidents or known serious pollution risks.

This means that previously adopted measures to manage assets with a known risk of failure are no longer seen as a suitable mitigation measure by regulators. Welsh Water can expect to see an increase in the use of enforcement notices and more serious categorisation of incidents that will require Welsh Water to invest more in asset replacement than mitigation measures in future.

We have identified two areas that carry the biggest risk to serious pollution incidents, which this enhancement case is aiming to address:

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<sup>1</sup>PR24 Strategic Steers Final



- **Rising Mains** - several of these assets have previously failed and caused significant pollution incidents, with many of these assets now being the subject of warning notices from NRW.
- **Sewers in Rivers (Riverine)** - there are a significant number of large diameter wastewater sewers which are located within, or very near to, rivers. These are subject to the accelerated influence of river erosion and the physical and environmental impacts of riverine debris during severe weather events.

Many of these assets have been, and continue to be, considered for investment. However, when compared using cost benefit analysis against all the other pollution risks that exist across the Welsh Water asset base, the replacement of these particularly large assets has previously been seen as disproportionate to the potential environmental harm. The significant impact that such large-scale investments would have on the wider sewer maintenance programme has to date, prevented them from being progressed. Instead, Welsh Water has opted to manage these risks as opposed to replacing the assets.

The reasons outlined above imply that Welsh Water must reduce the level of risk it is willing to accept on assets with known risk problems beyond that allowed in Ofwat's standard cost modelling for its sewerage service. This means that there is an enhancement case for replacing such assets for inclusion in the business plan to address serious pollution risks.

### 2.1.1 Current Performance

Table 1 outlines our serious pollution performance from 2012-2022. We had five serious sewerage pollution incidents in 2022, following two (a further incident was from a water asset) in 2021. This has resulted in us dropping from amber to red for serious pollution incidents and a resultant downgrading in our EPA rating, due to this red metric.

Table 1: Welsh Water Serious Pollution Performance & EPA Rating

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
<b>Serious pollution incidents</b>											
<b>Total incidents (Categories 1 &amp; 2)</b>	3.3	1.1	2.2	1	0.6	0.3	0.8	0	0.3	3 <sup>2</sup>	5
<b>Company star rating</b>	3*	3*	3*	3*	3*	2*	3*	3*	4*	3*	2*

We recognise our performance is not good enough. The PR24 Forum, Welsh Government and NRW<sup>3</sup>, all expect us to push for an improvement in this metric as quickly as possible and expect us to achieve zero serious pollutions. With the outlined pressures on our compliance, this means that we require additional funding over and above base allowances to meet this target, particularly for riverine sewers and rising mains.

### 2.1.2 Scale and Timing of Investment

The PR24 Forum expects us to seek a more stretching target to reduce pollution targets over AMP8. The scale and timing of investment is acknowledged as being slower than would be desired to replace such high environmental risk assets, should affordability and the requirement for all other investment needs not be so great.

<sup>2</sup> Note that in 2021 EPA Serious Pollution incident classification changed to incident numbers from a standardised number per 10,000km sewer (as per previous EPA reporting). The metric from 2021 also includes water pollution incidents.

<sup>3</sup> Annual environmental performance report for DCWW 2022, NRW

A pragmatic view has therefore been taken by Welsh Water as to how many of these expensive but high environmental risk assets can realistically be afforded to be replaced in the AMP8 period.

Future AMPs will see a continuation of this investment requirement.

## 2.2 Overlap with Activities to be Delivered through Base

**Does the proposed enhancement investment overlap with activities to be delivered through base?**

– Ofwat’s final methodology for PR24, Appendix 9, A1.1.1c

Table 2 below sets out our assumptions for what is included and excluded from this enhancement case.

Table 2: Apportionment of activity in expenditure categories.

Base	Enhancement
Deliver improvement on current levels of pollution for total incidents (Category 1-3).	Significant increases in cost arising from a required step change for <b>serious pollution</b> incident reductions for our most impacting assets that are not sufficiently covered by the base allowances. <b>These are interventions for large, high impact rising main and riverine sewer assets.</b>

## 2.3 Overlap with Funding from Previous Price Reviews

**Does the need and/or proposed enhancement investment overlap with activities or service levels already funded at previous price reviews?**

– Ofwat’s final methodology for PR24, Appendix 9, A1.1.1d

Previous price reviews have made allowance for sewer and pump replacements, which will have had beneficial impacts on pollution risk, and which we have been able to deliver from our base allowances. However, because of a much greater focus on the environment and category 1 and 2 pollution risks in PR24, supported by Welsh Government and PR24 Forum direction, it is now the direction of our Board to begin a process of investing in these assets to reduce the risk of serious pollutions occurring. Therefore, this is new investment and does not overlap with any funding from previous price reviews.

## 2.4 Alignment with the Long Term Delivery Strategy

**Is the need clearly identified in the context of a robust long term delivery strategy within a defined core adaptive pathway?**

– Ofwat’s final methodology for PR24, Appendix 9, A1.1.1e

Welsh Water have a dedicated long-term output focused on reducing serious pollution events caused by either the water or wastewater asset base. The long-term target focuses on not causing any category 1 or 2 pollution events. This enhancement case directly aligns to Welsh Water’s core pathway and addressing serious pollution events as part of the strategic outputs from the DWMP and WINEP/NEP. Further details can be seen in Welsh Water’s WSH01 Long Term Delivery Strategy.



## 2.5 Management Control of Costs

***Is the investment driven by factors outside of management control? Is it clear that steps been taken to control costs and have potential cost savings been accounted for?***

*– Ofwat’s final methodology for PR24, Appendix 9, A1.1.1g*

As we have discussed previously, management of serious pollution risk has been delivered through mitigation measures and incident response planning, reducing the environmental impact of service failures. We have been successful in improving our responses to reduce the impacts of failure.

This has led to the position where the risk level Welsh Water operate at is managed through a combination of capital maintenance on smaller assets and risk management on larger assets.

The new policy and political stance within the PR24 Strategic Direction from Welsh Government, as endorsed by the PR24 Forum and wider stakeholders, has led the Welsh Water Board to determine that the current practice of trying to manage these risks is now exhausted, and that a failure to invest to resolve these significant risks, is now untenable. Welsh Water must reduce the level of risk it is willing to accept on assets with known pollution risk beyond that allowed in Ofwat’s standard cost modelling for its sewerage service.

### 3. Best Option for Customer

In this section we will describe how we have developed options for addressing the need identified above.

For this investment case we have identified investments that pose the greatest environmental consequence in conjunction with the probability of failure of these assets – the likelihood of the risk occurring. We have used our standard approach to CBA to help assess the impacts of proposed options.

The sub-sections below correspond to the eight criteria set out in Ofwat's PR24 Final Methodology, Appendix 9 (Setting Expenditure Allowances), Section A.1.1.2.

#### 3.1 Identification of Solution Options

***Has the company considered an appropriate number of options over a range of intervention types to meet the identified need?***

***Is there evidence that the proposed solution represents best value for customers, communities, and the environment over the long term?***

*– Ofwat's final methodology for PR24, Appendix 9, A1.1.2a and A1.1.2b*

As part of Welsh Water's strategy to reduce serious pollution, we are proposing a range of schemes including rising mains, sewers in riverbanks and sites that are polluting SSSIs; these will all contribute to a reduction in serious pollution incidents. We have considered various combinations and scales of investment and worked to strike the right balances of benefits, affordability and deliverability within the context of our wider investment plan.

##### SSSI Pollution

The Nook – Oxwich

The main at this location causes discharges to a SSSI site which is a major pollution risk and requires funding to be able to remove this risk. The root cause is primarily hydraulic incapacity.

The unit cost database has been used to cost solutions including abandoning a section of the existing sewer, construction of a new sewer and package pumping station and a new rising main to connect into the existing network.

##### Rising Mains

In developing rising main schemes, once optimisation of the pumping regime has been exhausted, consideration is given to either utilising the existing route of the rising main or establishing a new route. As well as the direct cost of the replacement pipe material, consideration is given to the impacts on different routes of items such as Land Access, Road and Rail crossing, potential for public disruption, environmentally sensitive areas such as SSSIs etc. In the event of a new route being the preferred solution from reusing the existing, consideration is then given to any change in main length – a change in length potentially requiring the existing pumping arrangements / duty to be changed, with the associated cost then determined.

The most cost beneficial route will then be determined.

Welsh Water is targeting ten of its top pollution risk rising mains to reduce the level of pollution risk and enhance the environment. This includes eight named sites and two unnamed sites. The eight sites that are named have been identified by Welsh Water as having a significant pollution risk. Two further sites will be identified in AMP8 once further investigations have taken place and identified the highest risk rising mains.

The rising mains have been costed using the unit cost database. The two unnamed sites have used the average cost of the seven sites (Kinmel Bay has been excluded as the cost is much higher, an outlier).

## Sewers in Riverbanks

Welsh Water is targeting the top five sewers in riverbanks that carry a large pollution risk. Two of these sites have been named and a further three are currently unnamed but will be identified following investigations in AMP8.

The costs have been built up using the unit cost database and show two 'typical' schemes. The average of these two costs have been used to price the five schemes.

In developing 'sewer in river' schemes once mitigation of the environmental risk has been exhausted, consideration is given to either reinforcing the existing route of the sewer or establishing a new route. As well as the direct cost of the replacement pipe material, consideration is given to the impacts on different routes of items such as Land Access, Road and Rail crossing, potential for public disruption, environmentally sensitive areas such as SSSIs etc. In the event of a new route being the preferred solution from reusing the existing, consideration is then given to the impact of any change in hydraulic gradient – a change potentially requiring a longer length of existing sewer to be re-laid, with the associated cost then determined.

The most cost beneficial solution will then be determined.

## Investigations

Welsh Water's asset base includes 1,323km of rising mains. We also have 3,375 sewers that cross a primary river, of which over 1,000 are 300mm diameter or larger. Only 433 of these are either routed over a pipe bridge or through a tunnel. In the Rhondda valley alone, there are upwards of 25km of sewers within 5 m of a main river.

Welsh Water is proposing to undertake £0.36M of rising main investigations. This will be to prioritise assets for future work and to identify the two additional highest priority rising mains and three additional highest priority sewers in riverbanks or riverbeds in this investment package.

### 3.1.1 Assessment and Selection of Solution Options

Our approach to cost benefit appraisal and its role in decision making is set out in WSH50-IP00 Our Approach to Investment Planning (Sections 4.10 and 4.3).

We have assessed the cost-benefit of investing in serious pollution and this is outlined in table 3.

Whilst the analysis shows that the scheme will not pay back within a 30-year horizon, there are over £45m of benefits assigned in the analysis.

This figure will be understated if we have underestimated the number of potential failures, it is also arguable that repeat failures or failures in an area of special beauty or scientific interest should be given higher benefit rating.

Table 3: Cost Benefit Analysis

Solution Option	Option Name	CapEx	Present Value Whole Life Costs (WLC)	Present Value Whole Life Benefits (WLB)	Benefit/Cost Ratio	Net Present Value (=WLB - WLC)
Conventional Solution	Do Nothing		£7.159M	£0.000M	0.000	-£7.787M
Option S1	Implement fully the range of solutions - primarily replacement of assets	£53.673M	£52.404M	£45.880m	0.875	-£7.098M

All monetary values are expressed in 2022/23 prices and are prior to portfolio adjustments for corporate overheads and efficiency challenge. Welsh Water ref: SMF version 5

Third-party technical assurance of cost–benefit appraisal has been completed by Economic Insight who have confirmed that our approach is robust and in line with Ofwat expectations. Full details are given in WSH50-IP00 Our Approach to Investment Planning (Section 6).

### 3.2 Quantification of Benefits

***Has the company fully considered the carbon impact, natural capital and other benefits that the options can deliver?***

***Has the impact (incremental improvement) of the proposed option on the identified need been quantified, including the impact on performance commitments where applicable?***

*– Ofwat’s final methodology for PR24, Appendix 9, A1.1.2c and A1.1.2d*

Within our cost benefit process the impacts of each option on the need have been quantified.

Our methodology is set out in WSH50-IP00 Our Approach to Investment Planning (Section 4.10).

Our Service Measure Framework (SMF) quantifies a wide range of aspects including Carbon and impacts on performance within the Cost benefit Assessment. The results are shown in Table 4 below.

Table 4: Benefits in AMP8

Benefits from AMP8 Spend relative to baseline									
Scenario	Legal Compliance	Environmental Impact	Customer Contacts	Avoidable Costs	Staff Productivity	Nuisance - Odour	Pollution Incidents	Greenhouse Gas Emissions	Total
Preferred –	2.1%	5.6%	0.3%	2.9%	4.3%	20.0%	56.5%	8.3%	100%

In this case a reduction in pollution incidents carries the most weight with 56% of the benefits in this category.

From our analysis, the proposed option will make the following impacts on performance commitments:

Table 5: Performance commitment impact in AMP8

Commitment Area	2025-26	2026-27	2027-28	2028-29	2029-30
Serious pollution incidents in year (Base Maintenances only)	0	0	0	2	3
Serious pollution incidents <b>avoided</b> in year through this Enhanced Investment case (PE03)	0	0	0	-2	-3
Serious pollution incidents in year (Base Maintenances and Enhancement investment)	0	0	0	0	0

Whilst serious pollution events are low in volume the activity set out in this Enhanced Investment case will make a measurable impact on our performance. We will avoid one serious pollution in year 4 (-1) and two serious pollution incidents in year 5 (-2).

### 3.3 Uncertainties relating to cost and benefit delivery.

***Have the uncertainties relating to costs and benefit delivery been explored and mitigated? Have flexible, lower risk and modular solutions been assessed – including where forecast option utilisation will be low?***

*– Ofwat’s final methodology for PR24, Appendix 9, A1.1.2e*

Our methodology is set out in WSH50-IP00 Our Approach to Investment Planning (Sections 5.4 and 4.3). This includes commentary on our approach to optioneering, costing and cost benefit analysis.

We have highlighted areas in which the calculation of costs or benefits are unusual or uncertain and how we have mitigated for this in our evaluation. Innovation and new approaches such as nature-based work is inherently more uncertain than tried and tested engineering approaches.

#### Managing cost uncertainty

The costs of schemes to replace rising mains are well understood by the company and therefore uncertainty over cost is limited: cost will vary by size of main, ground type, surface type and depth and the company’s unit cost models reflect these cost drivers adequately. Given the scale of proposed replacement, while the costs will vary at the individual level, at the programme level there is much greater certainty.

The cost of schemes to replace riverine sewers are well understood however there is a greater level of uncertainty over cost as this work is often difficult to plan, with significant weather constraints in rivers with very ‘flashy’ flow characteristics, complex flood risk assessments required before work commences, and flow management of large diameter sewers incurring a significant proportion of the scheme costs.

#### Managing benefit uncertainty

As we mention above, the need to move to an improved risk position is paramount: the company selects schemes which have the highest confidence of achieving the desired outcomes throughout the optioneering process.

The options chosen have clearly understood benefits, in terms of reducing the likelihood of failure and subsequent pollution.

## 4. Costing Efficiency

In this section we give details on our approach to costing and benchmarking. Our overarching approach to developing efficient costs is set out in WSH50-IP00 Our Approach to Investment Planning (Section 4.10).

The sub-sections below correspond to the three criteria set out in Ofwat's PR24 Final Methodology, Appendix 9 (Setting Expenditure Allowances), Section A.1.1.3.

### 4.1 Developing a cost for Reducing Pollution

***Is it clear how the company has arrived at its option costs? Is there supporting evidence on the calculations and key assumptions used and why these are appropriate?***

***Is there evidence that the cost estimates are efficient (for example using similar scheme outturn data, industry and/or external cost benchmarking)?***

***Does the company provide third party assurance for the robustness of the cost estimates?***

– Ofwat's final methodology for PR24, Appendix 9, A1.1.3a and A1.1.3c

The costing approach for this project was using the like-for-like (top down) cost modelling through our Unit Cost Database (UCD) Cost & Carbon Estimating Tool (C&CET) as described in WSH50-IP00 Our Approach to Investment Planning (Section 4.10). This approach covers 83% of this enhancement case.

The costing was carried out by Welsh Water costing team. The governance procedures, as outlined in Section 5 costing methodology were adhered to with the appropriate use of cost models being confirmed and all manual allowance verified prior to providing sign offs throughout the different iterations of the costings.

The costs for the additional rising main & riverine schemes have been generated from an average of the named rising main & riverine schemes given in the table. This approach equates to 17% of the enhancement case and uses costs which originate from our UCD cost models.

We have identified the costs for the following Rising Mains & Riverine sewer schemes as summarised in Table 6 below. All monetary values in 2022/23 price base, post efficiency:

*Table 6: Rising Main Replacement Schemes for Addressing Serious Pollution Risks*

Site	Asset Type	Length to be replaced (m)	Cost
The Nook CO 72835 (unconsented discharge), Oxwich	Rising Main	295	£1.422M
Supporting Piers - 375mm CI sewer, Llewellyn Street, Pontygwaith	Riverine	N/A	£0.938M
Bynea SPS Rising Main	Rising Main	1,495	£4.038M
Asset 655 - Penrhyndeudraeth Rising Main	Rising Main	1,340	£3.058M



Site	Asset Type	Length to be replaced (m)	Cost
Kinmel Bay FE pipe	Rising Main	3,839	£15.420M
Britannia Bridge Asset 3264 Menai Llyn y Felin SPS	Rising Main	2,350	£4.303M
375mm CI Sewer, Rhydney River	Riverine	500	£0.938M
Rising Main SE Asset 31206 Duffryn Foul SPS	Rising Main	1,400	£2.829M
Tenby Headworks Salterns SPS Rising Main	Rising Main	2,000	£3.717M
Rising Main SE Asset 31781 Miskin SPS	Rising Main	1,100	£2.103M
Llandudno GRP Rising Main	Rising Main	2,433	£4.671M
Additional 2No Rising Main Schemes (subject to outcomes of investigations)*	Rising Main	TBC	£7.063M
Additional 3No Sewers in Riverbank Schemes (subject to outcome of investigations)*	Riverine	TBC	£2.813M
Rising Main & Riverine Sewer Investigations	Rising Main/Riverine	N/A	£0.361M
<b>Total</b>		<b>16,752**</b>	<b>£53.673M</b>
<p>* The costs for the additional rising main &amp; riverine schemes have been generated from an average of the named rising main &amp; riverine schemes given in the table with Kinmel Bay excluded as it is an outlier compared to the rest **from identified named schemes</p>			

The above represent the initial candidates to be progressed as part of this enhancement case. £9.867M of this enhancement funding will be directed towards rising main & riverine sewer assets, that, subject to a targeted condition-based assessment, are identified to pose the greatest risk to environmental pollution, in addition to the named schemes above.

We have not commissioned benchmarking of this activity.

Along with our overall costing strategy being reviewed and assured by Jacobs, we have also employed third party consultants to review single enhancement cases to provide confidence that the estimates within them are robust, efficient, and deliverable.

Please refer to WSH50-IP00 Our Approach to Investment Planning (Section 6) for more information regarding the review and assurance undertaken.

## 5. Providing Customer Protection

The sub-sections below correspond to the three criteria set out in Ofwat's PR24 Final Methodology, Appendix 9 (Setting Expenditure Allowances), Section A.1.1.4. There is no third-party funding.

Delivery of this activity will be required to ensure compliance with the common performance commitment for serious pollution incidents.

### 5.1 Proposed Protection

***Are customers protected (via a price control deliverable or performance commitment) if the investment is cancelled, delayed or reduced in scope?***

***Does the protection cover all the benefits proposed to be delivered and funded (e.g., primary and wider benefits)?***

*– Ofwat's final methodology for PR24, Appendix 9, A1.1.4a, b*

We are not proposing a PCD for this enhancement case as there is strong control through the serious pollution performance commitment and environmental regulation from NRW/EA, with the threat of enforcement if we do not mitigate against the risk of serious pollution in the future and a continued downgrading of our EPA performance.

## 6. Appendix A

The table below shows the total CapEx enhancement costs in Amp 8 for this enhancement case. The Ofwat driver this enhancement case maps to is:

- CWW3b.187 - Additional line 4; Enhancement programme to address increased risks of serious pollution incidents - enhancement wastewater capex

No other enhancement cases contribute to this driver.

### Total CapEx in AMP8 Plan in 2022/23 prices

Driver Ref	Year in AMP8					Grand Total
	1	2	3	4	5	
CWW3b.187	£4.042M	£13.381M	£14.764M	£10.697M	£10.789M	£53.673M

**What we will deliver:** We are targeting replacement of 10 highest pollution risk rising mains and 5 highest risk riverine sewers as well as 1 sewer that runs through a SSSI.