Large Gated Schemes: Inland Bathing Waters

Submission One

Severn Trent Water
01 October 2026

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Executive summary

In this Submission 1, we set out the progress we have made in developing our Inland Bathing Waters programme for Shrewsbury and Ironbridge. Since PR24, we have materially strengthened the evidence base through water quality monitoring, hydraulic and water quality modelling, ground and sewer investigations, environmental and heritage assessments, customer research, stakeholder engagement and early supply chain input. This work has reduced uncertainty and enabled us to move from prudent, tunnel-led strategic assumptions towards more targeted solutions that better reflect local catchment conditions, delivery constraints and customer value.

For Ironbridge, our preferred direction is a package of smaller, network-based interventions, including targeted storm storage, sewer capacity improvements, flow transfer and treatment works upgrades. This approach avoids the significant geological, mining, heritage, access and carbon impacts associated with a strategic tunnel or new treatment works. For Shrewsbury, we prefer targeted local interventions and supporting network improvements, including sewer upsizing, surface water separation, strategic and shaft storage, flow diversion, infiltration reduction, pumping infrastructure and increased treatment capacity. These solutions offer a more proportionate balance of regulatory compliance, technical feasibility, deliverability, environmental impact and cost.

Our current appraisal indicates a positive economic case for both schemes, although the results remain sensitive to assumptions about spill reduction benefits. Shrewsbury remains above a benefit-cost ratio of one across the reported scenarios; Ironbridge is positive in the central and high cases and marginally below one in the low case. The analysis also shows that a counterfactual based on fewer than ten spills per overflow per year could deliver materially greater value for money. We will therefore continue to engage with Ofwat on proportionality, affordability and the incremental benefits of the bathing water standard as we refine the case for Submission 2.

We have also demonstrated efficient stewardship of development funding. **[REDACTED – commercially sensitive financial information]**. This reflects targeted investigation and option development rather than reduced scope or ambition. Independent technical and commercial assurance, supported by our internal review and governance, provides further confidence in the robustness of this submission and the work completed to date.

Our priority before Submission 2 is to complete the remaining monitoring, source apportionment, modelling and design development; refine risk-adjusted costs, benefits and delivery plans; resolve interfaces with existing AMP8 obligations; and develop clear, location-specific customer protection. Subject to completing this work and maintaining appropriate governance and assurance, we recommend that both schemes progress to Submission 2 so that the preferred solutions, funding requirements and delivery commitments can be considered by Ofwat.

1. Background and objectives

The Inland Bathing Waters programme was included in Severn Trent Water's PR24 final business plan to address wastewater-related pressures affecting the newly designated inland bathing waters at Shrewsbury and Ironbridge. The programme supports statutory environmental obligations delivered through the Water Industry National Environment Programme ('WINEP), aligns with the objectives of Severn Trent's Drainage and Wastewater Management Plan, and contributes to wider river water quality improvements for communities that use and value the River Severn.

PR24 context and investment need

At PR24, the inland bathing water designations had only recently been confirmed, and the evidence base was not sufficiently mature to define the full scale, scope, timing and cost of the required interventions with confidence. Detailed bathing water monitoring data, microbial source tracking, calibrated water quality models and completed sewer investigations were not yet available. The original solutions therefore represented prudent strategic assumptions developed under significant uncertainty.

For this reason, both schemes were progressed through Ofwat's Large Gated Scheme process. The gated process provides a structured route to reduce uncertainty, build an evidence-led case for investment, test alternative options and demonstrate that any future delivery funding request is efficient, deliverable and proportionate.

Objectives

The objectives of the programme are to establish a robust evidence base on bathing water performance and pollution sources, understand the contribution of Severn Trent wastewater assets, identify efficient and deliverable intervention options, improve confidence in costs, benefits, risks and delivery plans, and provide the evidence required to support Submission 2 and subsequent regulatory approvals. These objectives recognise that bathing water quality is influenced by multiple factors, including wastewater discharges, surface water runoff, agricultural activity, highways drainage, private drainage and wider catchment conditions.

Changes since PR24

Since PR24, the programme has materially improved its evidence base through monitoring, modelling, surveys, ground investigations, ecological and environmental assessments, land and planning reviews, stakeholder engagement and early supply chain input. This work has enabled the programme to move from strategic tunnel-led concepts towards more targeted, evidence-led intervention packages that better reflect local catchment conditions, constraints and customer value.

At both locations we are considering other obligations in the area especially those that are included within the AMP8 storm overflows programme. Hydraulic and water quality modelling is identifying potential changes to the original plans are these sites which we are incorporating into this large-gated process. We are also considering non-infrastructure assets that may require upgrades or capacity increases due to their hydraulic link to the bathing rivers overflows.

In Shrewsbury, this has resulted in assessment of a broader range of local and hybrid interventions, including sewer upsizing, strategic storage, shaft storage, flow diversion, surface water separation, infiltration reduction, localised network improvements, pumping station and rising main infrastructure and treatment works capacity increases. In Ironbridge, feasibility work has confirmed the importance of geological, mining, heritage, flooding and access constraints within the Gorge, supporting a move away from the original large tunnel concept towards feasible network-based interventions that balance environmental performance, constructability and protection of the World Heritage Site setting.

The remainder of this report explains how the programme has developed since PR24 and sets out the evidence supporting progression to Submission 2. Section 2 describes the optioneering, cost-estimation, cost-benefit analysis and solution-design approach. Sections 3 and 4 present the Ironbridge and Shrewsbury schemes respectively, including their preferred solutions, costs and benefits. Section 5 sets out the programme, delivery plan and risks. Section 6 explains the proposed approach to customer protection. Section 7 summarises stakeholder and customer engagement. Section 8 describes the assurance undertaken for this submission. Section 9 assesses the efficiency of expenditure to date. Section 10 concludes with the recommendations for both schemes.

2. Our approach to optioneering, cost estimates, cost benefit analysis and solution design

Optioneering methodology

The Green Book's Option Framework Filter (OFF) was used to develop and assess a comprehensive range of options for both Ironbridge and Shrewsbury. The approach was applied proportionately and is consistent with Green Book guidance to ensure a robust and transparent appraisal process.

The approach adopted for optioneering is outlined below. A more detailed description is provided in *Annex 1: Optioneering and Cost Benefit Analysis*.

Step 1 - Identifying Critical Success Factors

Critical Success Factors (CSFs) are the essential requirements that options must meet to be considered viable and taken forward for further assessment. The Critical Success Factors (CSFs) were chosen to ensure options align with customer priorities, address environmental impacts, and could be feasibly delivered. All options choices were evaluated against the CSFs to ensure the preferred solution delivered the best value for money for customers. The CSFs are listed below:

- *Regulatory compliance,* assessing the intervention's ability to achieve the bathing water spill standard of fewer than one spill per storm overflow per bathing water season.
- *Technical feasibility*, assessing whether the choice is technically and hydraulically viable.
- *Deliverability,* assessing whether the intervention can be delivered within the required timeframe, taking account of resource, regulatory and implementation constraints.
- *Environmental and heritage impact*, assessing potential impacts on the natural environment, landscape character and heritage assets.
- *Carbon impact*, assessing the intervention's carbon footprint, focusing on embodied carbon and, where relevant, operational carbon emissions.

Step 2 - Identifying categories and evaluating option choices

Categories represent the high-level approaches considered to achieve the scheme objectives. For both Ironbridge and Shrewsbury, three categories were identified. Within each category, a range of option choices was developed and assessed as potential means of delivering the scheme objectives. Each option was evaluated against the CSFs and assigned a Red, Amber or Green (RAG) rating. Only option choices receiving an Amber or Green rating were shortlisted for further development and progressed to the full option appraisal stage. A summary of the assessment results is presented in the relevant section for Ironbridge and Shrewsbury, with further detail provided in Annex 1: Optioneering and Cost Benefit Analysis.

Step 3 - Development of options from viable option choices

Following assessment against the CSFs, the viable option choices were combined to form a single credible option for further appraisal for each location, one for Ironbridge and one for Shrewsbury. These options bring together complementary interventions that collectively meet the scheme objectives while remaining feasible, deliverable, compliant with regulatory requirements and representative of value for money. These solutions

consider both the improvements at specific overflows as well as the required improvements to assets downstream that are hydraulically linked including sewerage and treatment works upsizing. These options were taken forward for cost benefit analysis as described below.

Solution design

Our PR24 Bathing Rivers programme was developed within a compressed regulatory timetable that required the identification and funding of potential wastewater interventions before the designated bathing waters had been fully investigated or modelled. The original PR24 solutions therefore represented prudent strategic assumptions intended to identify the likely scale of intervention that might be required to support bathing water objectives.

Since PR24, the programme has undertaken extensive monitoring, modelling, feasibility assessments and stakeholder engagement activities to improve understanding of the sources of bathing water pollution and the contribution of wastewater assets within both catchments.
This evidence base has improved understanding of catchment behaviour, pollution pathways, hydraulic performance, constructability constraints and environmental risks. The main challenge has been progressing from strategic concepts developed under significant uncertainty to evidence-based solutions capable of addressing multiple pollution sources within complex river catchments. Contributing factors include;
only data collected during the 2025 and 2026 bathing seasons has been available to inform solution development.

As bathing water quality can be influenced by multiple sources, including wastewater assets, agriculture, highway runoff and private drainage systems, determining the relative contribution of each source requires ongoing monitoring, microbial source tracking, hydraulic modelling and water quality analysis.
Specialist design requirements, complex planning and environmental interfaces, and the need to coordinate solutions with other regulatory drivers.
These investigations continue to inform the development and refinement of potential intervention options.

Ultimately our viable solutions have progressed through initial design by our in-house design teams to produce a first view of likely type and size of interventions required. These initial designs have been used to inform the bottom-up cost assessment.

Costing methodology

Cost estimates have been developed using a bottom-up, asset-based approach at AACE Class 4 feasibility level, consistent with the current stage of scheme development. Individual interventions identified through hydraulic modelling, engineering assessment and optioneering have been defined at asset level and costed separately before being aggregated into whole scheme estimates.
Asset-level estimates have been developed for storage infrastructure, pumping station upgrades, conveyance improvements, flow control structures and associated MEICA works. Initial estimates were developed using the Severn Trent Unit Cost Application (STUCA), which collates unit costs from previously completed projects at asset level and provides benchmark unit rates to support option screening.
At this stage, construction costs, allowances for design development, project management, contractor preliminaries, commissioning, risk and contingency remain at an early level of maturity and will be further developed as the scheme progresses. These elements will be refined through further design development, hydraulic modelling, site investigation, specialist estimating input, risk assessment and cost assurance.

The principal cost components comprise:

- Civil works, including storage tanks, shafts, sewer upsizing, rising mains, conveyance infrastructure and flow control structures.

- MEICA works, including pumps, pipework, valves, power supplies, telemetry, instrumentation and control systems.
- Design and project management allowances.
- Contractor preliminaries and commissioning allowances.
- Risk and contingency allowances, to be further developed as scheme definition improves.

The largest cost drivers are expected to be storage infrastructure, pumping station and treatment works upgrades and conveyance improvements required to achieve the target performance outcomes.

Evidence and Output of External Benchmarking
Severn Trent commissioned Gardiner & Theobald (G&T) to provide independent assurance on the robustness and efficiency of the cost estimates and costing methodology. In addition to the cost estimates process described above, specialist contractor and supply chain input was used where appropriate to test construction methodologies and validate key assumptions. G&T reviewed the cost build-up, unit rates, estimating assumptions and proposed delivery approach, providing independent challenge on the robustness and efficiency of the estimates.

[REDACTED – commercially sensitive financial information]. For Ironbridge, the cost estimates detailed within this report are the initial consultant estimates due to the large variance identified by the G&T independent assurance which requires further assessment to ensure the benchmarked estimates correctly reflect the scope of works. For Shrewsbury, the benchmarked value has been utilised as the basis for the cost estimates detailed within this report due to an acceptable variance.

Solution Cost Estimates and Accuracy of Estimates
At this stage, the estimate is based on benchmarked and asset-level costs rather than contractor tender prices. Contingency allowances have been included to reflect the current level of estimate maturity and identified project risks. We discuss key risks and uncertainties in detail in the following sections.

As the scheme remains at feasibility stage, further cost development will be undertaken ahead of Submission 2. This will include further design development, risk assessment, cost assurance, competitive procurement, market testing and supply chain engagement. These activities will improve cost certainty and provide a more robust, market-tested estimate for Submission 2.

Cost benefit analysis methodology
Following completion of the long list optioneering process, a preferred option was identified for both Ironbridge and Shrewsbury and taken forward for detailed appraisal. A Cost Benefit Analysis (CBA) was undertaken to assess the economic case for investment by comparing the costs and benefits of the proposed interventions over the appraisal period. The appraisal was developed in accordance with relevant guidance and established good practice.

Further detail on the CBA methodology is provided in *Annex 1: Optioneering and Cost Benefit Analysis*.

Cost assessment
Whole-life costs were developed in line with the approach outline in section ‘Costing methodology’ and assessed over a period comprising construction and 60 years of operation, reflecting the longest asset life within the preferred option. The assessment includes capital expenditure associated with delivering the interventions, future renewal and replacement costs, operating expenditure, and carbon costs. Carbon costs comprise embodied emissions associated with construction activities and operational emissions arising from the ongoing operation of the assets.

Benefits assessment

A detailed assessment was undertaken of the benefits expected from the proposed investment, including benefits to Severn Trent through avoided costs, customers, wider society and the environment. Benefits are assumed to commence once the preferred solution has been delivered and is fully operational.

The benefits included within the CBA were:

- reductions in storm overflow spill frequency and associated customer service benefits
- local economy and amenity benefits associated with improvements in bathing water quality
- local economy and health and wellbeing benefits associated with increased recreational use of the river

The assessment focused on benefits that were material and could be quantified with a reasonable degree of confidence. Benefits were assessed relative to no intervention, with bathing water quality remaining at Poor status and storm overflow performance continuing at current levels. For spill frequency, the baseline was based on the average number of spills recorded for each overflow over the previous six years.

A number of benefits were identified but could not be robustly quantified for inclusion in the CBA. These include potential reductions in reputational, regulatory and environmental penalty risks. While the proposed intervention is expected to contribute positively to these outcomes, the scale of the impacts remains uncertain due to a lack of robust and representative historical data. Consequently, these benefits have not been monetised and are excluded from the CBA.

Additionally, no material benefits have been attributed to reductions in pollution incidents. Historical evidence indicates that pollution incidents at the relevant locations, including serious incidents, are already infrequent. Although some benefit may arise from further reductions, the impact is expected to be immaterial and unlikely to influence the relative performance of options. These benefits have therefore been excluded from the CBA. Avoided costs, such as company clean-up costs, were considered as part of the appraisal but have been excluded from the CBA due to the absence of robust and reliable evidence to support their quantification. These benefits are expected to be common across all feasible options and, therefore, are unlikely to materially influence the relative assessment or ranking of options.

Storm overflow spill reduction benefits

Storm overflow spill reduction benefits were assessed using historical spill performance data for each overflow requiring intervention. The assessment considered compliance with the relevant regulatory standards, namely the requirement for no spills during the bathing water season for designated bathing waters.

These improvements were monetised using applicable Outcome Delivery Incentive (ODI) rates, providing a consistent and industry-recognised basis for valuing environmental performance improvements.

Storm overflow spill reduction benefits represent the largest component of the overall benefits package and are therefore a key driver of the CBA results. Sensitivity analysis was undertaken to test the robustness of the bathing water benefits estimates. Compliance with the bathing water standard was maintained across all sensitivity cases by assuming zero spills during the bathing water season. Spill frequencies occurring outside the bathing water season were varied to reflect uncertainty in future operational performance where:

- The low case assumes the minimum observed spill frequency outside the bathing water season;
- The central case assumes the average observed spill frequency; and
- The high case assumes the maximum observed spill frequency.

This approach ensures that all scenarios maintain bathing water compliance while appropriately testing the sensitivity of the CBA results to assumptions regarding residual spill performance outside the bathing water season.

Bathing water quality improvement benefits
Benefits associated with bathing water quality improvements were estimated by assuming one designated bathing water site at each location and quantifying the resulting local economic and amenity benefits using values from the Common Value Framework (CVF).

Increased recreational use benefits
Recreational benefits were estimated using a triangulation of available evidence sources. This included Environment Agency[1] information on the number and type of water-based recreational locations, together with membership data from official sources such as Paddle UK. Activities considered within the assessment included rowing, paddling and swimming, reflecting the principal forms of water-contact recreation expected to benefit from improvements in water quality.

For the purposes of the assessment, it was assumed that Shrewsbury contains two rowing locations, one paddling location and one swimming location, whilst Ironbridge contains one rowing location, one paddling location and one swimming location. These assumptions were informed by available evidence and local knowledge and were considered proportionate to the level of appraisal undertaken.

Membership data provides an indication of national participation in each activity but does not contain location-specific usage information. To estimate total annual recreational sessions at the identified recreational sites, participation frequency was apportioned evenly across all rowing, paddling and swimming locations nationally and then multiplied by the number of benefiting locations in each study area. This simplifying assumption was adopted in the absence of robust evidence on the distribution of users between sites and was considered proportionate to the level of appraisal undertaken.

Total annual recreational sessions were therefore estimated using the following approach:
*Total annual recreational sessions = Annual sessions per location*number of benefiting locations*

Given the uncertainty associated with estimating recreational participation, a range of low, central and high scenarios was developed to test the sensitivity of the results. This approach avoids undue reliance on a single estimate and provides a proportionate assessment of the potential variation in recreational use. The resulting variation in benefits was not material to the overall appraisal outcomes, with BCRs varying by between 0.3% and 2.2% across the sensitivity scenarios. As the sensitivity testing had an immaterial impact on the appraisal conclusions, detailed results have not been presented.

Once total annual recreational sessions estimates had been derived, benefits were monetised using values from the CVF, which is based on willingness-to-pay evidence. The framework was used to estimate the health and wellbeing and local economy benefits associated with enhanced recreational experiences resulting from improved water quality.

3. Ironbridge

As described within the original business case there are 12 storm overflows and one wastewater treatment works (Buildwas – Park View) which discharge within 5 km upstream and 1 km downstream of the designated

[1] Exploring recreational water use in England

bathing area at Ironbridge in Shropshire. Ironbridge town discharges down to Coalport treatment works which serves a larger area, within which there are 17 storm overflows within the AMP8 WINEP plan.

The original submission proposed the implementation of a major tunnel solution. This covered 11 storm overflows that had significant hydraulic linkages, with a further 6 overflows that would need investment within the large-gated scheme, but were on separate drainage 'legs' to the treatment works meaning a more standard local solution could be implemented in AMP8.

As part of our feasibility and optioneering works we have identified a total of 24 sites that are being assessed:

- 12 storm overflows within the bathing water area
- Two storm overflows in the area that are included in AMP8 WINEP and funded through PCDWW5 but may require additional storage to satisfy the 1 spills per bathing season criteria;
- Four storm overflows in the area not included in either the AMP8 WINEP or the Bathing Rivers 5km rule but are hydraulically linked to the solutions; and
- Coalport treatment works is also being reviewed. This is both to address its own WINEP Storm overflow driver and any additional treatment needs driven by the rest of the scheme. UV treatment will also be required at Rushmoor and Buildwas treatment works.

At this stage we continue to cover solutions which address all requirements in the most holistic and integrated way through the large-gated scheme process. We recognise this may require modifications to PCDWW5 once decisions have been made around the final scheme scope.

The original PR24 solution for Ironbridge centred on major conveyance infrastructure intended to achieve substantial reductions in spill activity affecting the designated bathing water.

Whilst feasible at a strategic level, the solution was developed before detailed understanding of the area's geological conditions, historic mining legacy, heritage constraints, flood risks and constructability challenges had been established. Since then, a comprehensive programme of feasibility studies and investigations has been completed, including:

- Hydraulic modelling of Ironbridge wastewater network.
- Collection of 457 water quality samples from 12 sampling points.
- Deployment of four river water quality monitoring sondes.
- Completion of 64 Geotechnical investigations (boreholes and window samples)
- Completion of 20 Geophysical Surveys
- Sewer inspections and condition assessments.
- Archaeological and heritage assessments.
- Planning and land assessments.
- Stakeholder engagement with Telford & Wrekin Council, Historic England and local stakeholders.
- Review of historic mining and geological information.

This work has materially improved understanding of delivery risks associated with the Ironbridge Gorge World Heritage Site and has enabled refinement of potential intervention strategies.

The feasibility work has confirmed that geotechnical uncertainty, mining legacy constraints, flood risk and heritage sensitivities represent major project considerations. However, it has also demonstrated that more targeted and potentially lower-risk solutions may be available than those originally assumed within PR24 which has been through our optioneering assessment.

The Ironbridge optioneering process identified three categories for assessment: a new treatment works, a strategic tunnel solution, and a package of smaller interventions:

Category 1 – New treatment works: Construction of a new treatment works west of Ironbridge to divert and treat flows from the Ironbridge catchment before they reach Coalport STW.
Category 2 – Tunnel solution: Construction of a strategic tunnel to intercept CSO flows and convey them to Coalport STW for treatment.
Category 3 – Package of smaller interventions: A combination of targeted interventions designed to achieve the scheme objectives without major new infrastructure. This includes reducing spills at CSOs, providing additional storage at Ladywood Car Park and Dale End Car Park, and conveying flows to Coalport STW.

Within each category, a range of option choices (for example, a long tunnel compared with a short tunnel) was identified and assessed as potential approaches for achieving the scheme objectives. Each option choice was evaluated against the CSFs and assigned a Red, Amber or Green (RAG) rating. In total, 24 option choices were assessed.

Following this assessment, the viable option choices were combined into a single preferred option for detailed appraisal. The preferred solution comprises a package of targeted interventions, including CSO spill reduction measures, additional storage at Ladywood and Dale End Car Parks, and conveyance upgrades to transfer flows to Coalport STW. The strategic tunnel and new treatment works options were discounted as, despite delivering compliance benefits, they were associated with significant deliverability, environmental and cost challenges, resulting in poorer overall value for money than the preferred package of interventions.

A high-level summary of the optioneering assessment is presented below, further detail is presented in Annex 1: Optioneering and Cost Benefit Analysis.

Critical Success Factors	New treatment works	Tunnel solution	Package of smaller interventions
Regulatory Compliance	**Green** Achieves bathing water compliance through upstream treatment.	**Green** Achieves bathing water compliance through large-scale flow transfer.	**Green** Achieves bathing water compliance.
Technical Feasibility (hydraulically viable)	**Amber** Only partially resolves catchment issues and requires Coalport STW upgrades.	**Green** Provides a hydraulically robust network solution.	**Green** Hydraulically robust and supported by modelling.
Deliverability	**Red** Significant access and construction constraints.	**Red** Deep tunnelling and shaft construction create major delivery challenges.	**Amber** Deliverable but constrained by site and access limitations which will require some adjustments.
Environmental and Heritage Impact	**Red** Unacceptable impacts on the World Heritage Site setting.	**Red** Significant impacts on the World Heritage Site and surrounding environment.	**Amber** Impacts are manageable with appropriate mitigation.
Carbon Impact	**Red** High operational and embodied carbon requirements.	**Red** Very high embodied carbon from extensive tunnelling works.	**Amber** Moderate carbon impact from storage and network upgrades.
Decision	**Do not proceed**	**Do not proceed**	**Proceed**

The current preferred solution is a 'package or smaller interventions' focussing on feasible network-based interventions which balance environmental performance, operational resilience, constructability and heritage protection. These include:

- Strategic conveyance infrastructure utilising existing network corridors (avoiding large diameter tunnelling)
- Targeted storm storage solutions.
- Sewer capacity improvements.
- Flow transfer infrastructure.
- Infiltration and ingress reduction measures.
- Treatment works capacity increase.

A Cost Benefit Analysis (CBA) was undertaken to assess the economic case for investment by comparing the costs and benefits of the preferred intervention over the appraisal period.

Costs

We have considered the costs of all elements required to meet the statutory obligations including additional storm overflows interventions, improvements at non-infrastructure assets and expansions to existing AMP8 funded obligations. We have not factored in the cost of already funded obligations through PCDWW5. As noted in section **'Cost benefit analysis methodology'**, whole life cost analysis, including future operating and maintenance costs, over a 60-year period has been undertaken.

The table below shows direct construction costs of the solutions, not the whole-life cost.

Solutions	Coverage	Estimates
Bathing water driver sites	12 storm overflows with BR drivers in WINEP	**[REDACTED – commercially sensitive financial information]**
Linked sites PCDWW5	2 storm overflows included in PCDWW5	**[REDACTED – commercially sensitive financial information]**
Linked sites – additional investment required in infrastructure assets	4 storm overflows not included in PCDWW5 or requiring additional storage to meet BR standard	**[REDACTED – commercially sensitive financial information]**
Linked sites – treatment work upgrades	Coalport WwTW – New Works Monkmoor WwTW UV Rushmoor WwTW UV	**[REDACTED – commercially sensitive financial information]**
Total		**[REDACTED – commercially sensitive financial information]**

Benefits

Based on the benefits framework described in the section 'Benefits assessment', we have assessed the following quantified benefits over the 60 year period.

Benefits	Number	Present Value £m	%
Spills reduction per overflow	**[REDACTED – commercially sensitive financial information]**	**[REDACTED – commercially sensitive financial information]**	**[REDACTED – commercially sensitive financial information]**
Bathing water - local economy and amenity	**[REDACTED – commercially sensitive financial information]**	**[REDACTED – commercially sensitive financial information]**	**[REDACTED – commercially sensitive financial information]**
Recreational - local economy and health	**[REDACTED – commercially sensitive financial information]**	**[REDACTED – commercially sensitive financial information]**	**[REDACTED – commercially sensitive financial information]**

The results demonstrate that the preferred option generates a positive net benefit and represents value for money for customers, with a Benefit-Cost Ratio (BCR) greater than 1. Sensitivity testing was undertaken to assess the impact of varying spill frequency, the primary driver of benefits. The resulting BCRs varied across scenarios, the option continued to deliver a positive economic case except for the low spills scenario, indicating that the overall conclusions are **not** robust regarding spill frequency and the associated benefits. The analysis also indicates that our counterfactual solution which achieves WINEP compliance of fewer than 10 spills per CSO per year delivers significantly greater value for money, with a BCR significantly more than that of the preferred option. No sensitivity analysis was applied to the WINEP scenario, as achieving fewer than 10 spills per year is a regulatory requirement and therefore constitutes a fixed target.

Option	Central	High	Low
Ironbridge bathing water compliance	1.89	2.84	0.97
Ironbridge – counterfactual	3.39	n/a	n/a

The increasing maturity of the preferred solutions has enabled targeted engagement with specialist delivery and engineering partners. To date, supply chain engagement has included:

- Constructability reviews with specialist contractors.
- Workshops with tunnelling advisors and temporary works specialists.
- Cost validation exercises.
- Programme and sequencing reviews.
- Buildability assessments.
- The principal focus of engagement has been to:
- Validate proposed construction methodologies.
- Review geotechnical risk management approaches.
- Identify programme constraints.
- Assess logistics and access requirements.
- Improve confidence in efficient delivery costs.

The outcome of these activities has been increased confidence in the feasibility and deliverability of the emerging preferred solution and has provided valuable insight into efficient delivery approaches appropriate to the unique constraints of the Ironbridge Gorge.

[REDACTED – commercially sensitive information]

4. Shrewsbury

As described within the original business case there are 14 storm overflows which discharge within 5 km upstream and 1 km downstream of the designated bathing area at Shrewsbury. Shrewsbury town discharges down to Monkmoor treatment works which serves a larger area, within which there are 33 storm overflows within the AMP8 WINEP plan.

The original submission proposed the implementation of a major tunnel solution. This covered 27 storm overflows that had significant hydraulic linkages, with a further 6 overflows that would need investment within the large-gated scheme, but were on separate drainage 'legs' to the treatment works meaning a more standard local solution could be implemented at the same time.

As part of our feasibility and optioneering works we have identified a total of 52 sites that are being assessed. 15 of these are within the bathing water area. We have a further 37 overflows that are being assessed for investment. These are all included within the hydraulic and water quality modelling and subsequent design activities. As part of these activities we are assessing the potential for up to 4 sites to impact on the bathing water areas, and would have the relevant spill driver added accordingly (2 currently have 10 spill drivers and 2 are not currently in WINEP).

Some overflows are currently within PCDWW5, with a different level of storage applied for each (between storage required for 0 spills and storage required for 40 spills). This storage was included to enable early works to be completed. Feasibility and optioneering will cover all 52 sites, with a view to optimising solutions to provide the best value outcomes for customers.

Monkmoor treatment works is also being reviewed as part of the large-gated scheme. This is both to address its own WINEP Storm overflow driver and any additional treatment needs driven by the rest of the scheme. We propose that we continue to cover all overflows within the large-gated scheme and address any modifications required to PCDWW5, once decisions have been made around the final scheme scope.

Feasibility studies and design development

At PR24, the preferred concept for Shrewsbury was a strategic tunnel solution designed to provide significant reductions in storm overflow activity across the wider catchment. This concept was developed before detailed modelling, monitoring and site investigations had been completed and therefore reflected the limited evidence available at that time.

Since entering the gated process, a substantial programme of feasibility and option development activities has been undertaken, including:

- Hydraulic modelling of Shrewsbury wastewater network.
- Collection of 384 water quality samples across 11 sampling points.
- Installation and commissioning of five river monitoring sondes for water quality measurement.
- Completion of 21 sewer surveys and CCTV inspections.
- Completion of 86 topographical, GPR & Bathymetric surveys.
- Completion of 27 boreholes.
- Ecological and environmental assessments at 20 locations.

Landowner and stakeholder engagement activities covering potential intervention sites and access routes. This includes liaising with Network Rail regarding under track crossings, and high-level discussion of proposals with at least 10 different landowners regarding easements or land purchase requirements.

These investigations have improved understanding of the factors affecting bathing water performance and identified significant interactions between river flooding, groundwater conditions, sewer network performance and land availability that were not fully understood during the preparation of the PR24 submission.

The feasibility stage has enabled the identification of solutions for all overflows within the bathing water area. However, recent findings at some locations have resulted in the need to redefine aspects of some solutions, and further development is ongoing. Where solutions have reached a sufficient level of maturity, interventions are progressing through outline design. Some solution components remain subject to further development as additional information becomes available, including interpretive reports arising from supplementary borehole investigations and soil sampling.

The feasibility carried out to date has enabled the programme to identify additional solutions beyond the original tunnel-led concept, and assess a wider range of potentially more efficient interventions.
The current preferred solution comprises a combination of local interventions:

- Targeted sewer upsizing.
- Strategic storm storage.
- Shaft storage solutions.
- Flow diversion infrastructure.
- Surface water separation.
- Infiltration reduction measures.
- Localised network improvements.
- New pumping station and rising mains.
- Treatment works capacity increase.

The Shrewsbury optioneering process identified three categories for assessment: a tunnel solution, local interventions, and a hybrid intervention:
Category 1 – Tunnel solution: Interception and conveyance of flows to Monkmoor STW for treatment.
Category 2 – Local interventions: Targeted measures to reduce, store and pump flows within the catchment.
Category 3 – Hybrid intervention: A combination of tunnelling where it provides the greatest benefit and local interventions elsewhere in the network.

In addition to the core infrastructure categories, a range of supporting measures was assessed against the CSFs. These measures cannot achieve regulatory compliance in isolation but support the performance and effectiveness of the core infrastructure interventions and form part of the solution for each category. Supporting measures considered included river ingress protection, sewer rehabilitation, active system control, sediment management and an upgrade to Monkmoor STW.

Within each category, a range of option choices was identified and assessed as potential approaches for meeting the scheme objectives (for example a bored tunnel versus a pipe jack tunnel). The option choices were assessed against the CSFs and assigned a Red, Amber or Green (RAG) rating. In total, 16 option choices were assessed. Following this assessment, the viable option choices were combined into a single preferred option for detailed appraisal. The preferred option comprises targeted local interventions and supporting network improvements, including upgrades to Monkmoor STW. Together, these measures reduce CSO spills, increase storage, improve network performance and achieve regulatory compliance in a feasible, deliverable and cost-effective manner.

The tunnel option was discounted as, despite being hydraulically effective, it was associated with significant environmental and heritage impacts and high embodied carbon. The hybrid tunnel option was also discounted as it retained many of the delivery, environmental and carbon challenges of a full tunnel solution while

delivering fewer benefits. As a result, neither option offered a clear advantage over the preferred local interventions approach.

A high-level summary of the optioneering assessment is presented below, with further detail presented in *Annex 1: Optioneering and Cost Benefit Analysis:*

Critical Success Factors	Tunnel solution	Local interventions	Hybrid interventions
Regulatory Compliance	**Green** Capable of achieving Bathing Water compliance through strategic flow interception and transfer.	**Green** Collectively reduce spill frequency and improve network performance to support compliance.	**Green** Capable of achieving Bathing Water compliance through strategic flow interception and conveyance.
Technical Feasibility (hydraulically viable)	**Amber** Hydraulically feasible in principle but requires further design and operational assessment.	**Green** Proven and well-understood interventions with established engineering solutions.	**Amber** Hydraulically feasible but requires further assessment of tunnel and system performance.
Deliverability	**Red** Significant construction complexity, delivery risk and programme challenges.	**Amber** Deliverable using conventional techniques, although some interventions require land access, excavation and network-wide works.	**Amber** Technically deliverable but involves complex tunnelling and network integration works.
Environmental and Heritage Impact	**Red** Significant impacts on sensitive environmental and heritage receptors.	**Amber** Primarily localised construction impacts, offset by longer-term environmental benefits.	**Red** Significant risks to environmentally sensitive areas and heritage assets.
Carbon Impact	**Red** High embodied carbon associated with major tunnelling works.	**Amber** Moderate embodied and operational carbon associated with storage, pumping and network improvements.	**Red** High embodied carbon associated with extensive tunnelling and civil engineering works.
Decision	**Do not proceed**	**Proceed**	**Do not proceed**

Cost benefit analysis

A Cost Benefit Analysis (CBA) was undertaken to assess the economic case for investment by comparing the costs and benefits of the preferred intervention over the appraisal period.

Costs

We have considered the costs of all elements required to meet the statutory obligations including additional storm overflows interventions, improvements at non-infrastructure assets and expansions to existing AMP8 funded obligations. We have not factored in the cost of already funded obligations through PCDWW5. As noted in the section '**Cost benefit analysis methodology'**, whole life cost analysis, including future operating and maintenance costs, over a 60 year period has been undertaken.

The table below shows direct construction costs of the solutions, not the whole-life cost:

Solutions	Coverage	Estimates
Bathing water driver sites	15 storm overflows with BR drivers in WINEP	**[REDACTED – commercially sensitive financial information]**
Linked sites PCDWW5	7 storm overflows included in PCDWW5	**[REDACTED – commercially sensitive financial information]**
Linked sites – additional investment required in infrastructure assets	14 storm overflows not included in PCDWW5 or requiring additional storage to meet BR standard	**[REDACTED – commercially sensitive financial information]**
Linked sites – treatment work upgrades	Monkmoor WwTW FFT increase and storage	**[REDACTED – commercially sensitive financial information]**
Total		**[REDACTED – commercially sensitive financial information]**

Based on the benefits framework described in the section 'Benefits assessment', we have assessed the following quantified benefits over the 60-year period.

Benefits	Number	Present Value £m	%
Spills reduction per overflow	**[REDACTED – commercially sensitive financial information]**	**[REDACTED – commercially sensitive financial information]**	**[REDACTED – commercially sensitive financial information]**
Bathing water - local economy and amenity	**[REDACTED – commercially sensitive financial information]**	**[REDACTED – commercially sensitive financial information]**	**[REDACTED – commercially sensitive financial information]**
Recreational - local economy and health	**[REDACTED – commercially sensitive financial information]**	**[REDACTED – commercially sensitive financial information]**	**[REDACTED – commercially sensitive financial information]**

The analysis also indicates that an intervention capable of achieving WINEP compliance of fewer than 10 spills per CSO per year delivers significantly greater value for money, with a BCR four times than that of the preferred option. No sensitivity analysis was applied to the WINEP scenario, as achieving fewer than 10 spills per year is a regulatory requirement and therefore constitutes a fixed target.

Option	Central	High	Low
Shrewsbury bathing water compliance	2.86	5.49	1.06
Shrewsbury - counterfactual	12.44	n/a	n/a

Successful learning from other major AMP8 projects, such as our programme of work at Wanlip, have demonstrated the benefits of printing and Integrated Project Team into the early stages of design and delivery planning. This drives meaningful engagement with our supply chain partners and leads to a robust delivery plan for all parties.

To date, the programme has been developing:

- Constructability reviews.
- Design workshops.

- Commercial and cost challenge sessions.
- Engagement with framework contractors and specialist suppliers.

This engagement has provided valuable input regarding:

- Construction methodologies.
- Temporary works requirements.
- Site access arrangements.
- Programme sequencing.
- Buildability constraints.
- Commercial risk allocation.
- Cost estimate validation.

The output from these activities has informed ongoing design optimisation and increased confidence in both feasibility and efficient delivery costs ahead of Submission 2.

A key constraint in the Shrewsbury catchment relates to the successive interventions through AMP8 WINEP, bathing rivers and future AMP9 WINEP that are all hydraulically linked. Solving these issues in a piecemeal way adds complexity, disruption to customers and the local environment, and cost. We discuss our proposal further in section 10, recommendations.

5. Programme and planning

The Bathing Rivers programme is being managed through Ofwat's Large Gated Scheme delivery framework, with progress tracked through a structured programme governance and stage-gate process. The gated approach provides a structured mechanism for reducing uncertainty, improving design maturity and demonstrating efficient expenditure before progressing to subsequent decision points (*as summarised below*):

Delivery plan requirement	Current position
Scheme name	Shrewsbury Bathing Rivers; Ironbridge Bathing Rivers
Enhancement area	Inland Bathing Waters Large Gated Scheme
Current interim milestone	IM1 (Promotion)
Next milestone	IM2 (Single Solution / Submission 2)
Forecast IM2 date	May 2027
Regulatory completion date	30 April 2028 (subject to ongoing review with the EA for BW_IMP1 date)
Spend to date	**[REDACTED – commercially sensitive financial information]**
Forecast expenditure to Submission 2	**[REDACTED – commercially sensitive financial information]**
Reporting mechanism	Quarterly Engagement Sessions and programme governance reviews
Delivery focus to Submission 2	Preferred solution selection, design maturity, cost refinement, risk reduction and assurance

Consistent with Ofwat's requirements, the delivery plan records scheme identifiers, regulatory milestones, interim milestone status, expenditure to date, forecast expenditure to complete investigations and baseline and forecast delivery profiles. Both schemes are currently being managed as wastewater enhanced engagement schemes and remain subject to ongoing governance, assurance and delivery reviews. Progress is reported through regular programme governance arrangements and Quarterly Engagement Sessions, providing visibility of programme delivery, cost performance, risks and emerging issues.

5.1 Programme and delivery plan

The programme remains broadly on track against key regulatory milestones. To support these milestones, activities are being progressed in parallel where appropriate, recognising the challenging programme timetable and the need to mature evidence ahead of Submission 2.

Optioneering, hydraulic and water quality modelling, ground investigations, outline design development, environmental studies and stakeholder engagement are progressing concurrently across both catchments. This integrated approach is intended to reduce programme risk, accelerate evidence development and improve confidence in both solution selection and efficient cost estimates.

While the programme remains aligned with the gated process timetable, ongoing assessments continue to identify potential alternative solutions that may offer enhanced value for customers and the environment. In some cases, these options require additional modelling, survey information or feasibility testing before their performance and efficiency can be fully understood. Consequently, there remains a possibility that some potentially beneficial solutions may not reach sufficient maturity within the timescales available for Submission 2 *(see Figure 5.A of Appendix).*

IM Milestones

Both Schemes are recorded in the DPWW4-style scheme-level extract as wastewater high-profile/enhanced engagement schemes, each with a current regulatory date.
Both Schemes are currently recorded at Interim Milestone 1 (IM1), with progression to Interim Milestone 2 (IM2) forecast by May 2027 (*as shown below*):

	Regulatory Date	IM1	IM2	IM3	IM4	IM5	IM6
Ironbridge	30/04/2028	28/02/2025	30/03/2027	21/12/2027			30/04/2028
Shrewsbury	30/04/2028	28/02/2025	30/03/2027	21/12/2027			30/04/2028
Including construction							
Ironbridge and Ludlow	30/04/2028	28/02/2025	30/03/2027	30/12/2027	10/01/2028	30/03/2030	30/03/2030
Shrewsbury	30/04/2028	28/02/2025	30/03/2027	30/12/2027	10/01/2028	30/03/2030	30/03/2033

IM1: Promotion – both projects officially promoted.
IM2: Single Solution – submission 2 to Ofwat.
IM3: Contract Execution – conclusion of Ofwat decision following submission 2. Contracting work to be arranged in time for final conclusion.
IM4 & IM5: No construction currently in place.
IM6: Project Closure – regulatory date for the completion of dedicated WINEP lines associated with the Gated Scheme.

5.2 Programme governance and control

Governance arrangements include regular reviews of design development, costs, programme, risk and assurance prior to advancement through each stage of the gated process.

The governance framework is designed to ensure that decisions are supported by an appropriate level of technical evidence and challenge, whilst maintaining alignment between design maturity, risk understanding and cost confidence. Before Submission 2, governance activities will focus on confirming the preferred solution for each scheme, reviewing delivery plans, validating programme forecasts and assessing the adequacy of supporting assurance evidence.

Ironbridge

The original programme assumed a strategic infrastructure-based solution prior to detailed understanding of the geological, mining, flooding and heritage constraints associated with Ironbridge Gorge. Further investigations have significantly improved understanding of the delivery environment and associated risks. The programme has completed detailed feasibility assessments and is now progressing through outline design development. Current activities are informed by hydraulic modelling, water quality monitoring, site investigations, geological assessments and stakeholder engagement.
Special consideration continues to be given to the World Heritage Site designation, heritage sensitivities, planning constraints and constructability challenges associated with access and delivery within Ironbridge Gorge.

Shrewsbury

At PR24, the delivery programme was based on a single strategic solution pathway with significant uncertainty regarding scope, constructability, planning requirements and delivery duration. Since that time, the programme has progressed substantially through hydraulic modelling, water quality investigations, land and planning assessments, ecological surveys and intrusive ground investigations.
The current phase of work is focused on option refinement and outline design development. Multiple intervention combinations are being assessed, including sewer upsizing, surface water separation, strategic storage, flow diversion, infiltration reduction measures and hybrid solutions. This continuing optioneering process reflects the complexity of the catchment and the requirement to demonstrate that the preferred solution represents best value for customers and the environment.

The programme continues to face a range of delivery risks typical of major infrastructure schemes at this stage of development. Key risks include constructability constraints, modelling uncertainty, geotechnical conditions, environmental and ecological constraints, planning and land access requirements, heritage considerations, stakeholder expectations and programme interdependencies.

Challenges include complex urban interfaces and flooding risks in Shrewsbury and Ironbridge, together with geotechnical, mining, heritage and access constraints within Ironbridge.
In Shrewsbury, recent site investigations have identified conditions that require changes to previously developed solutions. These include:

- Bagley Brook: The final section of Bagley Brook is culverted. The proposed solution includes a crossing beneath the railway line at the location where the brook has now been identified, contrary to the location the records were showing, requiring a review of the design.
- Buried structures: Buried structures were discovered within a car park where a shaft tank had been planned. As a result, the shaft tank has been relocated to an adjacent car park.
- National Grid works (Earls View): National Grid is installing new high-voltage (HV) cables at Earls View. This has created a conflict with the proposed scheme layout and has necessitated the relocation of a shaft tank.

These risks are being actively managed through targeted investigations, early stakeholder engagement, phased surveys, ongoing design development and structured programme governance.
The programme also remains exposed to uncertainty regarding future regulatory requirements, third-party consents, solution optimisation and emerging information from technical investigations. Mitigation measures include integrated project team working, scenario testing, collaborative design reviews, phased decision-making and continuous refinement of programme assumptions *(see Figure 5.B of Appendix).*

6. Customer protection

6.1 Holding ourselves accountable for delivery

We recognise that customers should receive the benefits promised through the investment they fund. As such, we are committed to developing Price Control Deliverables (PCD) that provide appropriate customer protection and create clear accountability for delivery.

However, the focus of this submission 1 paper is on demonstrating progress made in understanding the investment need, technical challenges, customer and stakeholder perspectives, programme deliverability and potential intervention options. At this stage, activity is centred on investment case development which will inform the scope of the final delivery solution.

As the scheme progresses through the large gated scheme process, the final PCDs will be developed alongside the preferred delivery solution and funding package. While it is therefore premature to define the final PCDs at this stage, we believe it is helpful to set out our initial thinking on how the customer protection mechanism could operate, together with the key principles that should underpin its design to ensure it is both effective and proportionate.

6.2 Applying PCDs for Large Gated Schemes

Reflecting the approved delivery solution
The final PCD will be developed through the Submission 2 paper once the preferred delivery solution has been agreed. Consistent with the PCDs applied in the PR24 Final Determinations, it should be focused on the delivery of the approved interventions rather than the broader investment need identified at PR24.

Maintaining a clear link between investment and delivery
Given the differing obligations, intervention requirements and delivery challenges across our two locations, we consider that separate PCDs should be established for each bathing water scheme. A location-specific approach would strengthen accountability by providing a clear and transparent link between the funding provided, the interventions delivered and the benefits achieved for customers and the environment.

Focusing accountability on activities within company control
The PCD should be linked to the delivery of the agreed intervention package rather than the achievement of a specific spill performance standard or environmental outcome. While operational and environmental performance remains an important consideration, these measures can be influenced by factors outside the company's direct control. By contrast, and consistent with PCDs set at PR24, delivery of the agreed interventions provides a clear, measurable and directly accountable basis for customer protection.

Setting accountability for funding
The final PCD should primarily relate to the delivery funding sought through this process rather than the development funding already approved at PR24 Final Determination (6%). This approach is consistent with the

treatment of development expenditure and its interaction with the non-delivery and clawback mechanisms established at PR24. We will also consider the appropriate treatment of any efficiency against the development allowance to ensure a coherent accountability framework across both funding stages.

Supporting innovative delivery through appropriate flexibility
Recognising that further investigations and detailed design may identify new information during scheme development, the PCD should incorporate an appropriate degree of flexibility. This would allow alternative interventions to be considered where justified by the identification of more suitable solutions or by materially different ground conditions, contamination, flood risk, access constraints or other delivery considerations. Consistent with the flexibility provided within certain PR24 PCDs, such as Storm Overflows, alternative interventions could be accommodated where the appropriate governance and approvals have been obtained, and where the revised intervention remains consistent with the approved need and delivers an equivalent level of customer and environmental benefit.

Encouraging timely delivery where customer benefits justify it
We will consider whether there is a case for incorporating time incentives within the final PCD where earlier delivery would provide material additional benefits for customers or the environment.

Accommodating delivery across regulatory periods
Where delivery spans an AMP boundary, the PCD mechanism will need to be structured appropriately to reflect the timing of approvals, detailed design and construction activities. Given the nature of the large gated scheme process, the final PCD framework should ensure accountability and customer protection are maintained throughout the delivery lifecycle.

7. Stakeholder and customer engagement

(see Figures 7.A-7.K of Appendix)
Stakeholder and customer engagement is central to the development of the Inland Bathing Waters programme. The schemes affect communities with strong connections to the River Severn and require careful consideration of local expectations, environmental outcomes, affordability, deliverability and wider catchment responsibilities.
Engagement to date has focused on explaining the designation context, building understanding of the evidence-led gated process, and ensuring stakeholder and customer insight informs option development ahead of Submission 2. This reflects Ofwat's expectation that large gated schemes demonstrate clear progress, robust evidence, stakeholder awareness and transparency on risks and dependencies before future funding decisions are made.
Since December 2023, Severn Trent has undertaken structured engagement across the Shrewsbury and Ironbridge bathing water locations through the Get River Positive programme and wider local stakeholder channels. Engagement has covered the designation context, river health, storm overflow performance, the need for further evidence, and the constraints that will influence future solution development.
Early engagement focused on senior local stakeholders, including MPs, local authorities and community representatives. Following designation in May 2024, engagement broadened to reflect local issues in Shrewsbury, Ironbridge, Coalbrookdale and Coalport, including heritage, tourism, flood risk, land constraints, storm overflow concerns and community expectations.
The engagement programme has helped explain that improving bathing water performance requires action from multiple parties. Severn Trent is responsible for the assets it owns and operates, while wider river health is also influenced by land use, agriculture, highways, drainage, weather and community activity. This distinction is important for managing expectations and aligning stakeholders around proportionate, evidence-based interventions.

Where appropriate, engagement has been framed around wastewater upgrades and river health rather than committing to specific bathing water interventions before Ofwat gate decisions. This protects the integrity of the gated investment process while enabling early, constructive engagement with stakeholders who may influence consenting, access, deliverability and public understanding.
Engagement outputs are being used to inform communications, stakeholder mapping, delivery planning and risk management ahead of Submission 2.
A chronological record of engagement activity is provided in the appendix.

Insights into customer views on river health and engagement
Customer evidence for Submission 1 is supported by independent research undertaken by Blue Marble between November 2025 and February 2026. The research examined customer views on river pollution, recreational river use, inland bathing water investment at Shrewsbury and Ironbridge, affordability and willingness to pay. It provides the primary customer evidence base for the scheme at this stage of the gated process.

Research methodology
The research engaged 2,415 customers, including household and non-household customers, recreational river users, non-river users, financially vulnerable customers and future customers. It comprised deliberative qualitative research with 103 participants and a representative quantitative survey of 2,312 customers, including boosted samples in and around Shrewsbury and Ironbridge. Customers were asked to consider costed investment options and, through a Gabor-Granger approach, their willingness to pay additional bill impacts for potential investment.

Key findings of the customer research
The research shows strong support for improving river health, but more conditional support for additional investment specifically to target bathing water quality at Shrewsbury and Ironbridge. Customers recognise the importance of cleaner rivers for wildlife, communities and recreation, but affordability, fairness and uncertainty of outcome are significant considerations. Nearly half of household customers were unwilling to pay anything extra for the proposed investment, with lower willingness to pay among financially vulnerable customers and those living further from the sites. Support was stronger among river users, local customers and non-household customers.

Main findings of the customer research
Key findings indicate that customers want cleaner rivers and expect water companies to reduce storm overflow impacts. However, many customers have limited understanding of storm overflows, the role of wider pollution sources, and the difference between river health and bathing water classification. This reinforces the need for clear, balanced communication about what Severn Trent can directly control and where wider catchment collaboration is required.

Customers placed a high priority on river health, particularly ecological outcomes, but support for bathing water investment was more nuanced. Many customers supported the principle of designated bathing waters once explained, while also questioning the fairness of all bill payers funding large investments at two specific locations where outcomes cannot be guaranteed due to pollution sources outside Severn Trent's direct control.
Willingness to pay evidence indicates that affordability and perceived fairness are material customer considerations. Among household customers willing to pay, most supported a lower additional bill impact than would be required to fund the full scale of potential works. Non-household customers showed higher willingness to contribute, although views remained dependent on proximity, perceived benefit and confidence that investment would deliver meaningful outcomes.

What we have learned so far (and how it is shaping the scheme)
Engagement to date has highlighted the importance of clear, jargon-free communication, transparent explanation of roles and responsibilities, and early discussion of local constraints, disruption and dependencies. These insights are being used to shape the programme's communications approach, stakeholder engagement plan and risk management ahead of Submission 2.

Forward engagement plan (to Submission 2 – delivery-focused and evidence-led)
Engagement before Submission 2 will become more delivery-focused and evidence-led. The programme will continue structured engagement with regulators, local authorities, landowners, river groups and community stakeholders to support option development, consenting, access planning, disruption management and monitoring design.

8. Assurance

For this submission Ofwat have set requirements for independent commercial and technical assurance. The technical assurance has been completed to cover the engineering element of the submission whereas the commercial assurance has covered the cost estimation.

We have subjected this submission to rigorous internal review and challenge as well as engaging our independent, third-party assurance providers – Jacobs. Our internal review has included first and second line assurance ahead of the third line review provided by Jacobs.

Jacobs completed a package of assurance work aligned with the Ofwat guidance and have provided an assurance letter on completion. Jacobs also have an actionable duty of care to Ofwat in relation to this submission – as part of the common assurance requirements for enhancement schemes published in the Ofwat guidance.

9. Efficiency of expenditure to date

The PR24 Final Determination included a development allowance of **£75.93 million (2022/23 prices)** to support progression of the Inland Bathing Waters programme through Ofwat's Large Gated Scheme process. This allowance was derived using high-level assumptions based on approximately 6% of the indicative engineering costs associated with the strategic tunnel-based solutions considered at PR24.

Since entering the gated process, expenditure has been targeted towards reducing uncertainty and improving evidence maturity through a structured programme of investigations, modelling, monitoring, stakeholder engagement and option development activities. The focus of expenditure has been to generate the information required to support robust decision-making and identify efficient solutions capable of delivering the required environmental outcomes.

The work completed to date has enabled the programme to progress significantly beyond the strategic concepts presented at PR24. Through the gated process, both schemes have developed a substantially improved understanding of hydraulic performance, water quality drivers, geological conditions, planning constraints, environmental risks, constructability considerations and customer expectations. This evidence base has informed the development of a broader range of potential interventions and reduced reliance on the strategic tunnel-based concepts that informed the original cost assumptions.

[REDACTED – commercially sensitive financial information].

9.1 Expenditure to date

Expenditure incurred to date has focused on progressing both Shrewsbury and Ironbridge through the investigation, modelling and option development phases required under the gated process.

Ironbridge

Expenditure has focused on hydraulic and water quality modelling, geological investigations, mining risk assessments, sewer surveys, flow monitoring, ground investigations, planning and heritage studies, stakeholder engagement and the development of feasible intervention options. These activities have materially improved understanding of site constraints, constructability risks and heritage considerations, enabling refinement of the strategic solutions considered during PR24.

Shrewsbury

Expenditure has been directed towards river water quality monitoring, hydraulic and sewer network modelling, ground investigations, geotechnical assessments, environmental and ecological surveys, land and planning studies, stakeholder and customer engagement and the development of outline designs and feasible intervention options. This work has enabled the programme to move beyond the original PR24 concept and assess a wider range of technically feasible and potentially more efficient solutions.

9.2 Comparison against development allowance

At PR24 Final Determination, Ofwat included a development allowance of **£75.93 million (2022/23 prices)** to support gated process activities, reflecting the level of uncertainty associated with the strategic solutions identified at that time.

[REDACTED – commercially sensitive financial information].

Metric	£m (2022/23 prices)
PR24 development allowance	**[REDACTED – commercially sensitive financial information]**
Forecast cumulative development expenditure to 2026/27	**[REDACTED – commercially sensitive financial information]**
Variance	**[REDACTED – commercially sensitive financial information]**

[REDACTED – commercially sensitive financial information].

The gated process has enabled expenditure to be targeted towards reducing the most significant sources of uncertainty before committing to detailed solution development. As evidence has improved, the programme has been able to focus resources on the most promising intervention pathways while continuing to assess a broad range of feasible options. The forecast funding remains sufficient to complete Submission 2 development activities and support future gate decisions.

9.3 Evidence of efficient delivery

The programme considers that expenditure incurred to date represents an efficient use of development funding, as it has delivered substantial improvements in evidence maturity while remaining significantly below the level of funding assumed at Final Determination.

Ironbridge

Expenditure has supported:

- Establishment of 4 river monitoring sondes.

- Collection of approximately 460 water quality samples.
- Development of hydraulic and water quality models.
- Completion of geological and mining risk assessments.
- Ground investigations and feasibility studies.
- Refinement and optimisation of feasible intervention options.

Shrewsbury
Expenditure has supported:

- Establishment of five river monitoring sondes.
- Collection of more than 380 water quality samples.
- Development of hydraulic and water quality models.
- Completion of ground investigations, ecology assessments and sewer surveys.
- Development and assessment of multiple intervention pathways, including alternative and hybrid solutions.

Collectively, these activities have materially reduced technical, environmental and delivery uncertainty across both schemes. They have also enabled the programme to progress from the high-level strategic concepts presented at PR24 towards evidence-based option selection, supported by improved understanding of engineering feasibility, environmental performance, customer acceptability and delivery risk.

The programme therefore considers that expenditure incurred up to Submission 1 demonstrates efficient stewardship of development funding and illustrates the value delivered through the Large Gated Scheme process. Significant progress has been achieved in advancing solution maturity whilst maintaining expenditure at a level substantially below the original development allowance, creating a strong foundation for Submission 2 and future investment decisions.

10. Conclusions and recommendations

This Submission 1 demonstrates that the Inland Bathing Waters programme has made substantial and efficient progress since PR24. The evidence base for Shrewsbury and Ironbridge has materially improved through water quality monitoring, hydraulic and water quality modelling, ground and sewer investigations, environmental and heritage assessment, customer research, stakeholder engagement and early supply chain input. This work has confirmed that the original tunnel-led concepts were reasonable strategic assumptions under uncertainty but are not presently the best-value or most deliverable solutions. More targeted packages of network, storage, conveyance, pumping and treatment interventions now provide a stronger basis for development.

[REDACTED – sensitive information].

[REDACTED – sensitive information].

[REDACTED – sensitive information].

The current cost-benefit analysis supports a positive economic case for both schemes, although results are sensitive to assumptions about spill reduction benefits. Shrewsbury remains above a benefit-cost ratio of one across the reported scenarios; Ironbridge is positive in the central and high cases and marginally below one in the low case. The analysis also identifies that the alternative WINEP standard of fewer than ten spills per overflow per year could provide materially greater value for money. This reinforces the need to retain regulatory dialogue on proportionality, customer affordability and the incremental benefits of the bathing water standard.

[REDACTED – commercially sensitive financial information].

Next steps to Submission 2

The immediate priority is to complete the remaining monitoring, source apportionment, model calibration and scenario testing, and use these outputs to confirm the wastewater contribution and required intervention performance at each location. Outline designs should then be matured, incorporating ground conditions, flooding, access, heritage, ecology, land, planning, power and operational requirements. Constructability reviews and supply chain engagement should be expanded to validate sequencing, logistics, delivery durations and commercial assumptions.

Cost estimates and the economic appraisal should be refreshed as design maturity improves, including risk-adjusted whole-life costs, carbon, market-tested rates and sensitivity analysis. The programme should explicitly compare the bathing water standard with the WINEP counterfactual and explain the incremental benefits, affordability implications and reasons for the recommended solution. Remaining interfaces with PCDWW5 and linked treatment works must also be resolved so that scope and funding are coherent and no expenditure is duplicated.

Stakeholder engagement should become increasingly delivery-focused, securing clarity on land, consents, disruption and local constraints while communicating transparently about multiple pollution sources and the limits of company control. Separate, location-specific Price Control Deliverables should be developed around delivery of the approved intervention packages, with proportionate flexibility for justified design changes and clear customer protection.

Subject to completion of this work and continued governance and assurance, we recommend that both schemes progress to Submission 2, with the preferred solutions, delivery plans, costs, benefits, risks and customer protections presented for Ofwat's decision.