



CPRE and GARD evidence for the House of Lords Environment and Climate Change Select Committee – Drought Inquiry

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Executive Summary

This submission presents evidence to the House of Lords Environment and Climate Change Select Committee regarding the proposed South East Strategic Reservoir Option (SESRO), focusing on its justification, assessment, and regulatory process. The evidence identifies significant concerns across four key areas: consultation, cost, demand transparency, and the credibility of deployable output (DO) and drought resilience.

First, the consultation process is found to be fundamentally deficient. It failed to meet established public-law and regulatory standards, including the Gunning Principles and Ofwat's Public Value framework. Stakeholders—including elected representatives and local authorities—were not meaningfully engaged, key evidence was withheld or under-reported, and overwhelmingly negative feedback was not properly reflected in decision-making. As a result, the process has undermined public confidence and failed in its core purpose of informing and shaping the scheme.

Second, the economic case for SESRO has materially weakened. The estimated capital cost has increased from approximately £2.2 billion to £6.6 billion, calling into question whether the scheme remains the best-value option, its size and, indeed, whether it is needed at all. The huge cost escalation affects the benefit–cost assessments of the large, planned abstraction reductions for '*Environmental Destination*', which comprise about half of the estimated water supply deficits to be met by the Reservoir. Similarly, it affects the value-for-money justification for the T2ST, for which about 30% of the deployable output (DO) of SESRO is allocated. The cost of SESRO is now so high that the proportionality of costs should be properly and transparently considered for abstraction reductions that have been proposed for compliance with the Water Framework and Habitats Directives. The cost escalation exceeds previously tested cost thresholds and has not been accompanied by a transparent reassessment of alternatives, such as the Severn–Thames Transfer or demand-side measures like further leakage reduction by replacement of ancient water mains. The lack of updated comparative analysis raises serious concerns about affordability, proportionality, and the continued justification for the scheme.

Third, the need for SESRO is based on demand forecasts that lack transparency and robustness. The evidence indicates a consistent reliance on upper-bound or worst-case assumptions for abstraction reductions, population growth, and climate change. This approach inflates projected deficits and biases decision-making toward large-scale infrastructure, without sufficient consideration of more adaptive or lower-cost solutions. Consequently, the fundamental need for SESRO has not been demonstrated to the standard required.

Finally, and most critically, the deployable output and drought resilience claims for SESRO lack credibility. The widely cited DO figure of 271 Ml/d has not been reassessed at Ofwat/RAPID's Gate 3 checkpoint, is based on outdated modelling, and fails to reflect current operational assumptions. The analysis identifies multiple errors and methodological flaws—including incorrect climate scenarios,

modelling inaccuracies, and inadequate representation of long-duration droughts—which together suggest that the true DO may be substantially lower, potentially by as much as 50%. Moreover, the modelling does not robustly test the scheme against plausible multi-year drought sequences, raising serious doubts about its resilience under the conditions it is intended to address.

Across all four themes, a consistent pattern emerges: insufficient transparency, inadequate analysis, and a failure to apply robust, evidence-based decision-making. Taken together, these deficiencies indicate that the case for SESRO remains unproven.

The submission therefore recommends that progression of the scheme be paused pending a comprehensive and transparent reassessment. This should include: a lawful and inclusive consultation process; a full re-evaluation of costs and alternatives; a robust and evidence-based review of demand projections; and a complete, independently verifiable reassessment of deployable output and drought resilience. Without these steps, advancing SESRO would be premature and risks imposing unnecessary financial, environmental, and social costs.

Introduction

CPRE Campaign to Protect Rural England is a charity established 100 years ago to protect, promote, and enhance the English countryside. We have been approached by Baroness Sheehan to submit evidence to the House of Lords Environment and Climate Change Committee inquiry on drought focusing specifically on a case study of the South East Strategic Reservoir Option (SESRO) in South Oxfordshire. This evidence has been compiled working with GARD ‘Group Against Reservoir Development’ a community-based organisation representing local residents and businesses, mainly in the South Oxfordshire villages and in the town of Abingdon, who would be affected by Thames Water’s plans to build a major new reservoir near Abingdon.

Both CPRE and GARD campaign against this inappropriate reservoir solution and in favour of sustainable water resource options such as effluent reuse and raw water transfer from the River Severn to the River Thames. We also strongly support demand-side measures to reduce leakage of water and to promote efficient-use strategies, including metering.

Context

Thames Water is proposing to build the SESRO, recent name change to **White Horse Reservoir**, near Abingdon in South Oxfordshire. It will be the largest artificial embanked reservoir of its type ever constructed in the UK. The reservoir would be constructed on prime agricultural farmland and a flood plain with cumulative effects on neighbouring communities, transport links and biodiversity.

The scheme would involve large earth embankments (bunds) up to **25 metres high**, around the height of an eight-storey building, and would cover **around 4 square miles**, roughly the size of Gatwick Airport. It would hold **150 billion litres of water**, making it the **largest reservoir of its kind in Europe**.

The proposal involves pumping untreated water from the **River Thames** (from the Sutton Courtenay / Culham area) into the reservoir. A major pipeline costing around **£1 billion** would then transfer water out of the Thames Valley to supply **Southern Water (30%)**, in Hampshire. Otherwise, the water is intended for downstream areas in the Thames Valley (principally London), with about 15% transferred down the Thames to **Affinity Water** in Hertfordshire.

The scheme has been controversial due to concerns about its scale, environmental impact, cost, and the lack of full public scrutiny. Campaign groups argue that changes to water demand projections and cost estimates call into question whether such a large reservoir is necessary.

Timeline

1990s

- Thames Water begins pursuing plans for a large reservoir in the area.

2010

- A public inquiry considers proposals for a reservoir on the site.
- The Thames Water proposal for 1 **100 billion litre reservoir is rejected**. A maximum capacity of **50 billion litres** is considered suitable at that time.

2018

- After ignoring the Public Inquiry findings, and omitting to go ahead with a smaller reservoir, Thames Water return in their **draft Water Resources Management Plan (dWRMP) 2019 – 2024**, to a proposal for a large (150 billion litre) reservoir. The Regulators make no decision for going forward.

2023-24

- Thames Water includes the reservoir in its **dWRMP** for 2025–2029. The Reservoir (size 100 billion litres is planned to be constructed from 2029 – 2038 and filled from 2039-2040.
- The reservoir is selected in the only scenario considered by **Water Resources South East (WRSE)** up to 2040.
- After the public consultation on the dWRMP24, Thames Water, despite concerns, unilaterally increases the size of the reservoir (post-consultation) to 150 billion litres.
- **April 2024:** The Environment Agency raises **14 concerns** about the proposal in a letter to Thames Water.
- **July 2024 :** Thames Water revises the scheme in response.
- **August 2024:** The newly appointed Steve Reed Secretary of State of DEFRA allows the project to progress to the next stage (Development Consent Order process).

- **October 2024:** The Environment Agency's concerns and Thames Water's responses are finally published, after the decision had already been made.
- The revisions also indicate **reduced projected water deficits after 2050**, raising further questions about the need for a reservoir of this scale.

2025

- Campaign group **GARD**, through its sister company **SAFERWaterS**, together with **CPRE**, launches a **legal challenge** against the Secretary of State's decision and calls for a public inquiry.
- A **petition with over 6,600 signatures** is delivered requesting a public inquiry.
- **25–26 June:** Judicial Review hearing takes place in the High Court.
- The claim is **rejected and a public inquiry is not granted**.
- **Seven weeks later:** Thames Water announces costs have risen from **£2.2 billion to £6.6 billion**.
- **Once the increased costs have been announced**, Thames Water and partners submit the latest version of the project to the Ofwat/RAPID Gate 3 assessment process.
- **Pre-DCO consultation** by Thames Water begins in October. The project submitted to the public is very different from that submitted to RAPID. Within two months the land-take has tripled from 12 sq km to 38 sq km, and there have been more than a dozen design changes.

2026

- **Application for a Development Consent Order (DCO)** expected to be submitted in **autumn 2026**.

Future timeline

- Construction expected to take **at least 10 years**.
- The reservoir would take **around 2 years to fill**.
- **Operational date currently planned for 2040**.

Evidence

For many years, a committed group of experts in their respective fields has worked on issues relating to the reservoir, providing specialist knowledge and insight. The evidence presented in this report has been compiled with input from these experts. Biographical details of contributors can be found in Appendix B. The remainder of this document presents evidence to the Inquiry structured around four key themes:

- 1) The consultation process and its deficiencies
- 2) Comparative cost analysis of alternative options
- 3) Transparency and robustness of data relating to the demand for, and need for, SESRO
- 4) The credibility of deployable output assumptions and associated drought resilience claims

1. The consultation process and its deficiencies

Thames Water's engagement has been characterised by a repeated pattern in which substantive concerns raised by consultees are dismissed with inadequate evidence or deferred with assurances that further information will be provided at a later stage, followed by much of that information remaining undisclosed.

Multiple stakeholders repeatedly requested information fundamental to assessing feasibility and risk, including fluvial and groundwater flood-risk modelling, dam-breach analysis, emergency drawdown scenarios, deployable-output reliability, cost escalation and environmental impacts.

Even at the pre-DCO consultation, the last remaining opportunity for public engagement, most of the information was still missing. Consultation has therefore taken place without sufficient evidence for experts, local authorities and the public to understand the scheme's risks and consequences.

Moreover, consultation materials and engagement activities have placed disproportionate emphasis on speculative amenities and 'legacy benefits', while substantive issues repeatedly raised by stakeholders – reservoir safety, flood risk, cost escalation, feasibility and alternatives – were largely absent from questionnaires and public-facing materials.

Thames Water has stated that key matters – including the scheme scale and strategic alternatives – are not now open for discussion, because SESRO has already been identified as the preferred option. This position has been maintained notwithstanding unresolved feasibility, safety and flood risks, and an unproven best value case, as evidenced by Ofwat's requirement that the WRMP be reopened and best value reassessed.

The consultation has required detailed interpretation of technical documentation to understand local impacts, but insufficient time has been provided for this to be

undertaken effectively and shared with those affected, limiting meaningful engagement.

The cumulative effect of these failures is that consultation has not performed its essential function of de-risking the scheme at an early stage. The engagement and consultation process has not enabled stakeholders to influence the scheme on matters of substance, undermining trust and confidence in both the consultation and the decisions that follow.

Given SESRO’s unprecedented scale, design and cost, and its impacts across multiple authorities, customer regions and downstream communities, the project requires a transparent, evidence-led and fully accessible consultation process. We assessed Thames Water’s Gate 3 engagement against the guidance from RAPID and PINS, the Gunning Principles¹ and Ofwat’s Public Value Principles², focusing on whether stakeholders have been provided with the information and opportunities necessary for informed participation. The findings presented here identify the key areas where Thames Water’s Gate 3 submission falls short of these standards and where further action is required to ensure regulatory compliance and public accountability.

1.1 Systemic, procedural and legal non-compliance

Thames Water’s engagement record reveals a **systemic pattern of non-compliance** with regulatory, procedural, and ethical duties, as detailed in the table below.

<p>Failure to meet RAPID requirements</p>	<ul style="list-style-type: none"> ● Critical evidence on safety and feasibility (dam breach, flood-risk modelling, carbon, and cost escalation) was deferred until after consultation deadlines, preventing informed participation. ● The submission lacks transparent mapping of stakeholder issues raised and how they have been addressed – contrary to RAPID Appx 2. <p>RAPID requires completion of non-statutory consultation and commencement of statutory pre-planning consultation before Gate 3.³ Thames Water’s statutory consultation began only in late 2025, after submission, and thus breaching the required timing sequence.</p>
<p>Breach of Planning Inspectorate Advice Note 11</p>	<ul style="list-style-type: none"> ● Advice Note 11 (Annex B) demands front-loaded, accessible, and iterative consultation SESRO engagement was neither front-loaded nor iterative: information was withheld, feedback loops were absent, and consultation materials were promotional rather than evidential.
<p>UK government’s 2024</p>	<ul style="list-style-type: none"> ● The consultation sets out a clear and immediate policy direction. “Infrastructure promoters must provide high-quality early, meaningful and constructive engagement and

¹ R v Brent LBC ex p Gunning [1985] and reaffirmed in R (Moseley) v Haringey LBC [2014] UKSC 56.

² Ofwat (2022), “Ofwat’s Final Public Value Principles”.

³ Ofwat (2024), “RAPID Final Gate 3 Guidance”, January, p. 37.

<p>consultation on NSIPs⁴</p>	<p>consultation with those affected... thereby enabling positive changes to be made to them without causing undue delays.” The expectation is for front-loaded, proportionate, and timely consultation with open and transparent communication, acknowledging that local people often hold critical insights that can help de-risk proposals.</p> <ul style="list-style-type: none"> ● For a project of SESRO’s scale and potential impact, failure to align with these priorities is not only out of step with best practice; it risks undermining the legitimacy of the consultation process.
<p>Violation of the Gunning Principles</p>	<ol style="list-style-type: none"> 1. Consultation occurs when proposals are still at a formative stage. 2. Sufficient information is provided to enable intelligent consideration and response. 3. Adequate time is given for participants to respond. 4. Consultation responses are conscientiously considered. <p>Thames Water’s approach breaches all four principles.</p>
<p>Conflict with Ofwat Public Value Principles</p>	<p>Ofwat’s framework requires transparency, inclusivity, and demonstrable influence of feedback.⁵ Thames Water’s process, by contrast, is opaque, exclusive, and unresponsive.</p>

These combined breaches render the SESRO engagement process non-compliant with public-law standards for consultation. Under RAPID’s Gate 3 assurance framework, this should constitute a show-stopper condition, preventing progression until compliance can be demonstrated.

1.2 Lack of cost transparency, failure of best-value demonstration and impact on consumers

As noted in the table below, Thames Water has consistently violated the expectations of stakeholder engagement in relation to the costs and value of the project.

<p>Failure to re-assess best value</p>	<p>Following the major cost escalation of August 2025 (£2.2Bn to £6.6Bn), Thames Water failed to engage stakeholders in reassessing the “Best Value” proposition required under RAPID’s guidance.⁶ No transparent comparison has been</p>
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⁴ Department for Levelling Up, Housing and Communities (2023), “[Consultation on Streamlining Infrastructure Planning](#)”.

⁵ Ofwat (2024), “[Strategic regional water resource solutions guidance for gate three](#)”, version 3, January, section 9.

⁶ Ibid., section 8.

	undertaken of SESRO against alternative SROs (e.g. the STT).
Evasion of customer impact disclosure	Despite the tripling of costs, calls for transparency on impact on customer bills have been ignored, ⁷ Thames Water has not transparently disclosed any quantified impact, other than be non-specific admissions in an email ⁸ . In our view, this omission breaches RAPID’s transparency expectations and Ofwat’s customer-engagement principles.
Regulatory and ethical implications	Failure to disclose cost escalation and consumer impact breaches RAPID Guidance § 3.2 (“transparency and completeness of financial data”), Ofwat Public Value Principle 2 (“customers must be informed about value trade-offs”) and the Gunning Principle 4 and thus invalidate the adequacy of consultation at Gate 3.

1.3 Evasion of life-critical safety and feasibility

Thames Water’s stakeholder engagement demonstrates a systematic pattern of **avoidance of safety-critical dialogue**. Evidence central to life safety, flood risk, and feasibility has been withheld or deferred—contrary to RAPID para. 3.4.2 and PINS Annex F requirements for early safety engagement.

1.3.1 Dam breach risk

Despite repeated requests from GARD, local authorities and independent experts, Thames Water has not published dam-breach modelling, downstream hazard mapping or emergency-drawdown feasibility analysis at formative consultation stages. The Gate 3 submission contains only high-level references to these matters and provides no substantive evidence. As a result, communities, including those who would be subject to emergency drawdown flows or future evacuation protocols, have not been provided with the information necessary to understand or comment on the implications of SESRO.

This approach does not meet the expectations for high-hazard infrastructure set out in PINS Advice Note 11 (Annex D), which requires early, transparent engagement on site-specific risks affecting life and property. On the contrary, Thames Water has actually sought to scope out a Dam Breach Analysis (DBA) from its EIA. This attempt, in the scoping submission of its EIA to the Planning Inspectorate, was contested by the EA, supported by Oxfordshire County Council (OCC) and the Vale of White Horse District Council VoWHDC, amongst others. Consequently, in its scoping opinion to the Secretary of State, the Inspectorate ruled that Thames Water had to produce a DBA⁹.

⁷ Thames Water (2025), “[Supporting Document G - Stakeholder and Customer Engagement Strategy: SESRO Gate 3 Stakeholder and Customer Engagement Report](#)”, Appendix 2, p. 47.

⁸ Thames Water email to GARD, 6th October 2025.

⁹ The Planning Inspectorate (2024), “[Scoping Opinion: Proposed South East Strategic Reservoir Option \(SESRO\)](#)”, Case Reference WA010005, 8th October.

It also diverges from modern reservoir-safety practice, including risk-tolerability and As Low As Reasonably Practical (ALARP) principles. (Whilst not yet statutory, these are widely recognised as the established professional standard for a reservoir of SESRO’s scale, and were emphasised in the report following the Toddbrook Reservoir emergency in 2019¹⁰.)

For a project with significant potential consequences and where lower-risk alternatives exist, early application of risk-tolerability and ALARP frameworks is essential for responsible option appraisal. In the absence of a DBA, GARD’s use of Defra’s methods indicates that increasing the volume from 100 Billion litres to 150 Billion litres could result in a **tenfold rise in the estimated fatality rate** for East Hanney, with over 60% of residents falling within the critical depth-velocity zone¹¹. Given the availability of alternative water supply options that pose no comparable risk to life or infrastructure, the lack of engagement on this material change is indefensible. Public-facing materials from Thames Water consistently minimise the risk, citing statistical improbability and legal compliance with largely irrelevant legislation, ignoring the government (Defra) guidance,¹² not to mention the ethical imperative to assess low-probability, high-consequence events. The literature misleadingly emphasises the “safer” nature of a bunded reservoir, while disregarding siting risks that contravene Institution of Civil Engineers **benchmark standards**: “*No dam above a village or town should be designed knowingly with a finite chance of a disastrous breach.*”¹³

There is no discussion of evacuation planning, no admission of breach scenarios, and no transparency around how these risks are being assessed or mitigated. A clear purpose of the DBA is to provide the flood risk map for a reservoir¹⁴, without which the Emergency Planning responsible organisations cannot plan their responses (hence the pushback from the county and district councils). The Defra guidance emphasises that such information should be available for making siting decisions,¹⁵ so, in SESRO’s case, should have been performed years ago. Communities have been denied the opportunity to understand, question, or influence decisions that could affect their safety. Without published dam-breach modelling, stakeholders and Regulators cannot test whether the scheme’s risk profile is acceptable or mitigation is feasible. This omission undermines the de-risking expectations for Gate 3 and leaves SESRO’s risk–benefit balance unproven at a time when its best-value justification is increasingly uncertain. Until full dam-breach modelling is made available for independent and transparent scrutiny, the project cannot be said to meet the requirements of lawful, informed and meaningful consultation.

¹⁰ Balmforth D. (2021), “[Independent Reservoir Safety Review Report](#)”, March.

¹¹ Appendix D of the GARD Gate 3 report [GARD response to SESRO-Gate-3](#)

¹² Appendix D of the GARD Gate 3 report [GARD response to SESRO-Gate-3](#), communicated by GARD to Thames Water on numerous occasions.

¹³ Institution of Civil Engineers (1996), “Floods and Reservoir Safety”, 3rd edn, London: Thomas Telford, ISBN 0727725033.

¹⁴ <https://check-long-term-flood-risk.service.gov.uk/map>

¹⁵ Defra and the Environment Agency (2014), “[Small Reservoirs Simplified Risk Assessment Methodology](#)”, Guidance Report, January, prepared by HR Wallingford.

1.3.2 Emergency drawdown and downstream risk

Emergency drawdown poses direct and foreseeable risks to downstream communities, yet Thames Water has undertaken no public consultation on this life-critical issue. No modelling of drawdown flows, evacuation feasibility or downstream hydraulic impacts has been shared, and there has been no engagement with residents, parish councils or local authorities within the emergency-drawdown zone. The proposed volumetric expansion further increases potential drawdown volumes, but this heightened risk has not been addressed.

Non-statutory consultation instead has focused on peripheral matters (e.g. pipeline vs infeasible canal transfer), while omitting downstream feasibility and safety impacts once water enters the River Thames. The Gate 3 Stakeholder Engagement Report contains no reference to drawdown consequences. This approach falls short of RAPID's requirement to engage "*all stakeholders affected by solution development*"¹⁶ and PINS Advice Note 11 (Annex D), which requires early engagement with anyone facing physical risk. Without drawdown modelling and open consultation, downstream communities cannot understand or comment on risks, and SESRO cannot be regarded as de-risked at Gate 3.

1.3.3 Flood risk and feasibility failures

Flooding is one of the most persistent public concerns, in an area characterised by high fluvial and groundwater risk. Despite more than a decade of warnings from communities, councils, experts and statutory bodies, no fluvial or groundwater flood-risk modelling has been published. This omission is critical given that, since 2017, Thames Water's own feasibility work has identified a red-rated floodplain encroachment risk¹⁷—reflecting the site's inherent fluvial and related hydrological constraints—with the rating repeated in subsequent internal addenda.¹⁸

Throughout this period, stakeholders repeatedly raised concerns that SESRO would also exacerbate groundwater levels. Nevertheless, Thames Water continued to downplay the flood risk, stating as late as Gate 2 in 2022¹⁹ – that groundwater flooding was "*a potential risk*". This was based, in part, on an estimate of the groundwater level as 2.5m below the surface. This completely ignorant assumption, which could have been easily shown to be incorrect by true community liaison, is now known to be completely false, as the autumn/winter groundwater levels are much less than 1.0m below the surface – something which Thames Water found to its cost when its CCT trials were delayed for over five months by flooding. Its Gate 3 submission now acknowledges both groundwater and fluvial risks, but confirms that the relevant modelling and assessments will not be completed until the 2026 DCO application. As a result, a core feasibility risk remains unassessed at the point when stakeholders are required to provide meaningful input.

¹⁶ Ofwat (2024), "RAPID Final Gate 3 Guidance", January, p. 37.

¹⁷ Thames Water (2017), "WRMP19 Resource Options - Reservoir Feasibility Report", Rev 01A, July. Internal report referenced in Thames Water (2023), "[Reservoir Feasibility Report Addendum](#)", August.

¹⁸ Thames Water (2022), "[Draft WRMP24 - Resource Options: Reservoirs Feasibility Report Addendum](#)", November.

¹⁹ Thames Water (2022), "[Standard gate two submission for South East Strategic Reservoir Option \(SESRO\)](#)", 14th November, para. 4.27 et seq.

Thames Water also continues to assure both the public and the Regulators overseeing SESRO's progression that the scheme will satisfy the NPPF Flood Exception Test and cause “*no increased flood risk*”. These assurances rely on outdated internal assessments completed before groundwater considerations were incorporated and cannot therefore be substantiated.

Stakeholder engagement has been further undermined by:

- **Unfulfilled commitments**—Thames Water did not provide its promised summary of flood-risk modelling during the 2024 non-statutory consultation.
- **Reliance on generic factsheets**—consultation materials offered only high-level reassurance without modelling, uncertainty analysis, or opportunities for technical questioning.
- **Deferral of all critical evidence**—both groundwater and fluvial assessments have been deferred to the DCO, contrary to RAPID's requirement for early de-risking.
- **Omission of stakeholder feedback**—concerns raised by GARD, parish councils, MPs, local authorities and the EA were materially absent from the Gate 3 stakeholder-engagement report.

Regulatory implications: these actions breach RAPID's requirement for early de-risking and transparent evidence at Gate 3 and conflict with PINS Advice Note 11, which requires early engagement on site-specific risks affecting life and property. By deferring the publication of flood-risk modelling until the DCO stage, Thames Water has:

- Prevented stakeholders from understanding or testing SESRO's feasibility.
- Withheld evidence necessary for informed participation.
- Left unresolved a red-rated risk identified since 2017.
- Made it impossible to verify claims of NPPF Exception Test compliance.
- Eroded public trust in the engagement process.

Flood risk is not a peripheral concern – it is a **core feasibility determinant** for a reservoir proposed on a floodplain. The continued absence of modelling, despite a decade of requests, represents a significant procedural deficiency and undermines the legitimacy of SESRO's progression at Gate 3.

1.4 Technical transparency and inappropriate timing of disclosure

A core requirement of RAPID's Gate 3 process is that solution owners provide timely, accessible,²⁰ and complete information to stakeholders so that consultation can meaningfully influence design. Thames Water has done the opposite. Evidence critical to feasibility, safety, cost, water quality, and design viability has been strategically deferred, or released after key consultation windows had closed.

²⁰ Ofwat (2024), “RAPID Final Gate 3 Guidance”, January, p. 37.

1.4.1 Strategic deferral of evidence

As evidenced in this section above, across multiple domains (including carbon, flood risk, safety and cost) Thames Water has consistently relied on the phrase “*work in progress*” to justify non-disclosure. This pattern has systematically deprived stakeholders of the opportunity to test or challenge assumptions at the formative stage, contrary to RAPID Gate 3 (requirement for iterative, transparent engagement),²¹ PINS Advice Note 11 (Annex B, “*front-loading*”) and Gunning Principle 2. Stakeholders have been routinely assured that data would be shared “*later,*” “*near DCO,*” or “*at detailed design stage.*” This frustration has been echoed by parish councils, MPs and OCC, all of whom repeatedly requested modelling and evidence that never materialised.

The Clay Compaction Trial (CCT) is a salient example **of withheld transparency, misleading public framing, and procedural evasion** – contrary to the “*transparent engagement*” requirement. It highlights a pattern of procedural opacity designed to avoid scrutiny at the critical moment when public participation could shape design decisions.

Case study: The Clay Compaction Trial

Lack of early engagement

Although GARD and Professor Chris Binnie had been calling for meaningful trials since 2007, Thames Water failed to involve stakeholders in scoping or planning the trial. The trial ultimately undertaken was smaller than originally recommended by early consultants²². It was presented to the public as an “early” trial, despite occurring more than a decade after initial feasibility concerns were raised.

Restricted access and withheld data²³

During the 2024 site visit:

GARD’s technical advisers were denied close inspection of the embankments and borrow pit.

Requests for core geotechnical data, revised embankment cross-sections, and settlement information were refused.

Thames Water used semantic deflection (“zones existed previously”) to deny that the embankment design had been changed as a result of the CCT, even though drawings and descriptions clearly indicated a redesign.

Timing and withheld results

- Trial delays (caused by waterlogged conditions) were not disclosed to the public or stakeholder groups.
1. A planning application to extend trial operating hours revealed delays only indirectly.²⁴

²¹ Ibid., p. 15.

²² Binnie, C.J.A. (2024), “[Report on Aspects of SESRO Dam Design](#)”, GARD, 12th January.

²³ GARD (2025), “[Notes of Visit to SESRO Clay Compaction Trial Site](#)”, 20 May 2025”, 11th June.

2. Key findings have been **withheld from the Gate 3 submission**, even though trumpeted as key in the journal *Ground Engineering*²⁵, meaning that feasibility, deliverability, and cost implications arising from the CCT remain unknown to stakeholders and Regulators.
 - Concerningly, Supporting Document D (Project Management Plan) shows that weather-related delays, geological conditions and embankment design—initially rated as red key risks in the RAG-rated register—were downgraded on the basis of historic investigations, lessons from other projects, and the expectation of future trials. These are not evidence-based mitigations. Timely disclosure of SESRO’s own trial results would, if anything, demonstrate that uncertainty is considerably higher than assumed. Instead, the trial has been publicly described as a success while material operational difficulties—including leaks, saturation and delays—were not disclosed to stakeholders or RAPID, resulting in unjustified risk downgrading and a lack of transparency at a critical regulatory stage.

1.4.2 Deployable output suppression

Significant questions remain over the Deployable Output of SESRO. This issue goes to the core of SESRO’s justification within the WRMP, yet it was not made transparent to stakeholders and is not addressed in Thames Water’s Gate 3 submission.

1.5 Exclusion of elected and expert stakeholders

As set out in the guidance from Ofwat and the Planning Inspectorate, a lawful consultation must be inclusive, accessible, and responsive to all affected parties. Thames Water’s engagement with elected representatives, parish councils, statutory bodies and technical experts has been limited in scope, inconsistently documented, and not enabled meaningful participation.

1.5.1 Exclusion of MPs and local authorities

Three MPs, every affected district and parish council, and OCC have expressed clear and consistent opposition to SESRO, citing concerns over flood risk, cost escalation, safety and dam-breach implications, environmental impacts, the omission of viable alternatives, and procedural and transparency shortcomings. Yet Thames Water’s Gate 3 submission:

- Mentions MPs only briefly and does not reflect the extent of their formal objections.

²⁴ Savills (2024), “[Section 73 Application to Vary Condition 11 of Planning Permission P23/V2559/FUL - Clay Compaction Trial, Cow Common](#)”, submitted on behalf of Thames Water.

²⁵ Ground Engineering (2025), “[Reservoir renaissance: Clay trials advance Thames Water project in Oxfordshire](#)”, 12th August.

- Does not acknowledge motions passed by district and parish councils opposing SESRO²⁶.
- Provides no record of correspondence, meeting outcomes, or evidence of how feedback from elected representatives has informed design choices (except for one table in Appendix G which predominantly records deferral, promotional framing and non-committal responses).
- Does not reference the united cross-party call from local MPs and councils for a Public Inquiry—an indicator of the seriousness of the concerns and the level of trust breakdown.
- Does not summarise or engage substantively with the issues raised in correspondence, including the request by Layla Moran MP²⁷ for a transparent account of how Thames Water has considered consultation responses and how these have influenced decision-making.

Activities described by Thames Water to demonstrate engagement – email updates, newsletters, topic briefings, and invitations to public events – expose one-way communication, designed to inform not involve. This does not constitute meaningful engagement and is inconsistent with PINS Advice Note 11 (Annex A),²⁸ which identifies elected representatives as key statutory consultees, and with Ofwat’s Public Value principles requiring inclusive and balanced participation.

1.5.2 Motion filed by Vale of White Horse District Council (VoWHDC) on the 11th February 2026²⁹

The VoWHDC have drawn similar concerns about the inadequacies of the consultation and stakeholder engagement about SESRO and on the 11th February 2026 a motion was proposed by Councillor Cooke, seconded by Councillor Clegg on the “Inadequate Statutory Public Consultation for SESRO. The Council further notes that:

- Despite the scale of WHR’s cost escalation, there has been no clearly published, transparent re-ranking of the scheme against lower-cost and lower-risk alternatives, such as strategic water transfers, leakage reduction, and demand management.
- WHR has been passed into Gate 4 of the OFWAT Rapid scheme despite not meeting the regulators own framework targets and £100m of customer money allowed to be spent on the next Gate (£74m granted upto Gate 3)
- Progressing a scheme with materially deteriorated affordability, without transparent reassessment, risks undermining public confidence in the RAPID process and regulatory decision-making.

The outcome is the Council resolves to request:

- The leader to write to OFWAT to pause further RAPID development funding allowance, and hold WHR at Gate 3 until a transparent, updated comparative assessment has been published, re-ranking the scheme against reasonable alternatives using current cost data.

²⁶ See <https://groupagainstresevoirdevelopment.org/#latest-news>.

²⁷ Moran, L. (2024), [Letter to Thames Water regarding SESRO consultation](#), 28th August.

²⁸ See footnote **Error! Bookmark not defined.**.

²⁹ VoWHDC Motion [Link to agenda](#)

- The leader to write to OFWAT and request publication of an updated affordability and customer bill-impact assessment for SESRO, reflecting the full scale of cost escalation.
- The leader to write to the Secretary of State for Environment, Food and Rural Affairs requesting ministerial assurance that OFWAT’s handling of WHR complies with its statutory duties under the Water Industry Act 1991.
- The leader to write to the Secretary of State for DEFRA and ask for the Thames Water, WRMP24 to be resubmitted, not just a costing adjustment due to the fundamental material change to the original signed off

1.5.3 Exclusion of technical experts

A further concern is the limited engagement with independent technical experts, including Professor Chris Binnie, one of the UK’s most experienced reservoir construction and safety engineers. Despite repeated requests for technical dialogue: meetings were held only after consultation windows had closed³⁰; Professor Binnie’s expert safety report was not referenced or addressed in the Gate 3 submission; Dr Julian Parfitt’s biodiversity analysis³¹, which raises substantive questions about deliverability of BNG, largely proven correct by the new large-scale land requirement in the DCO statutory consultation³², was not acknowledged or discussed.

GARD has participated constructively for over two decades, supported by advisors with expertise in dam engineering, hydrology, biodiversity, water-resource planning and finance³³. Treating GARD solely as a “*campaign group*,” without substantive technical engagement, mischaracterises its role and seeks to limit the value of its contributions. Such an approach falls short of expectations for early engagement with expert stakeholders. It is also inconsistent with government NSIP engagement principles, which emphasise the importance of incorporating “*critical local and technical insight*” during early design stages.

1.5.4 Exclusion of downstream communities

Downstream residents—those most directly affected by emergency drawdown—were not consulted on structural safety, drawdown flows, evacuation feasibility, or local vulnerabilities. This absence of engagement does not meet Gunning Principle 3, particularly where issues may impact danger to life.

A downstream councillor recently contacted GARD for information after hearing concerns from residents in Hanney. The fact that affected residents are seeking information from third parties rather than the promoter highlights gaps in communication and a lack of trust in the consultation process.

³⁰ GARD (2024), “[Response to First Pre-DCO SESRO Consultation](#)”, 26th August.

³¹ <https://groupagainstredevelopment.org/wp-content/uploads/2025/06/BNG-Review-GARD-April-2025.pdf>

³² DCO map book.

³³ GARD (2025), [About GARD](#) web page.

1.6 Community feedback failure and quality of materials

Community engagement has been characterised by promotional content, selective presentation of information, and limited opportunities for stakeholders to provide meaningful input. Thames Water's Gate 3 Stakeholder Engagement Report³⁴ contains minimal reference to the substance of the community feedback and states that *"although the voices we hear the loudest oppose the scheme, they do not represent the overall community"*, contrary to the evidence in their consultations and presented here.

Hundreds of community members have repeatedly responded to Thames Water's consultations over multiple years. The Wantage and Grove Campaign Group publicly noted a *"complete discounting of local residents' and organisations' views"* in the 2023 draft WRMP24 consultation³⁵. Many residents who submitted detailed written responses to the 2024 non-statutory consultation found that their comments were not reflected in the Gate 3 reporting, despite overwhelmingly negative feedback recorded by Ipsos during the analysis period.

Cllr Povolotsky (VoWHDC, Steventon and the Hanneys) summarised widespread local sentiment: *"We have thousands of residents who have responded to consultations with genuine, evidence-led concerns, and yet their voices – a flood of voices – have been ignored. Local groups like CPRE Oxfordshire and SaferWaters are not saying 'not here'; they are saying 'do better'."*³⁶

1.6.1 Barriers to meaningful input

At Gate 2, RAPID explicitly requested *"much more detailed community engagement"*. In response, Thames Water produced a suite of promotional materials and held seven community events, however none of this provided structured or recordable mechanisms through which participants' views and community feedback could be meaningfully captured or used to influence design decisions. The *"legacy benefits"* perception-testing exercise was presented as though it constituted consultation evidence, despite not addressing issues of feasibility, safety or environmental impact.

The consultation questionnaires were tightly curated, focusing on illustrative design themes, access routes and speculative amenity concepts. They did not provide sections for stakeholders to comment on the issues of greatest concern to them. Ipsos's analysis of the non-statutory consultation³⁷ also shows that some participants relied on campaign templates because the consultation materials were highly technical and narrowly framed. This reliance reflects barriers to understanding, not organised bias. However, these responses were excluded from the quantitative analysis, leading to an under-representation (by c. 10%) of negative feedback in precisely those areas where stakeholders were attempting to comment on the issues most important to them.

³⁴ Thames Water (2025), "[Supporting Document G: Stakeholder and Customer Engagement Report](#)", 21st July.

³⁵ Wantage and Grove Campaign Group (2024), "[Response to the SESRO consultation - "complete discounting of local residents and organisations' views in the 2023 dWRMP24 consultation"](#)".

³⁶ Povolotsky, S. (2025), "[Statement on SESRO Judicial Review Outcome](#)", 24th July.

³⁷ Ipsos (2024), "[South East Strategic Reservoir Option Consultation: Feedback Report](#)", produced for Thames Water Utilities Ltd.

Question 9 asks directly about: “*The process undertaken to identify infrastructure associated with the reservoir*”. Of the 379 consultees who responded, only 26 (c. 7%) were positive or supportive, while 351 (c. 93%) raised concerns, in particular about how the process was planned and thought through (109); lack of consideration for local people and local communities (85); that local people/communities had not been properly consulted (70); and that public opinion had not been fully taken into account (57).” This is clear evidence that the consultation process was lacking.

Thames Water’s Statement of Response to the 2024 non-statutory consultation admits that there were over 500 complaints about the consultation itself – including the process and framing of questions; the lack of meaningful information; the misleading nature of images and visuals. The report states: “*However, not all the comments received relating to the consultation were negative. There were 20 positive and supportive comments...*”³⁸ That is barely 1.25% of responses.

Residents frequently report that they rely on GARD and other community groups for technical advice because they lack confidence in Thames Water’s consultation materials, reflecting a persistent deficit of trust.

1.7 Promotional bias, imbalanced information

1.7.1 Substituting amenity marketing for transparent consultation on safety and feasibility

Thames Water has placed significant emphasis on speculative “*legacy benefits*” and amenities in both its Gate 3 submission and public-facing materials. These claims—covering paddleboarding, walking routes and leisure access—have been presented as alignment with Ofwat’s Public Value Principles despite being uncoded and technically uncertain. This promotional focus displaced engagement on core issues repeatedly raised by stakeholders: safety, flood risk, biodiversity loss, cost justification, feasibility and alternatives.

This pattern reflects the shortcomings highlighted in Ofwat’s 2022 Public Value Principles report³⁹, which noted wide variation in companies’ maturity in delivering genuine public value. Thames Water’s focus on early-stage leisure concepts, while substantive issues remain unresolved, exemplifies this gap. The 2023 Yonder Survey⁴⁰ provides a further example. Respondents were presented with a stimulus document stating that the Reservoir “*would play a crucial role*” in drought resilience and “*could*” provide leisure and wildlife benefits. No equivalent information was provided about safety, flooding, water-quality risk, cost, clay compaction or environmental impacts. Nevertheless, in its Gate 3 Supporting Document, Thames Water claims that: “*the majority of people within 5 km... support the reservoir.*”⁴¹ This is not a reliable reflection of informed public opinion. It is

³⁸ Thames Water, “[Non-Statutory Public Consultation: Our Statement of Response](#)”, section 6.1.2, p. 36.

³⁹ Ofwat (2022), “[Ofwat’s Final Public Value Principles](#)”, March.

⁴⁰ Yonder (2023), “Community Research for Thames Water’s WRMP Consultation”, commissioned by Thames Water.

⁴¹ Canvassing by volunteers for GARD in summer 2025 in Letcombe Gardens, less than half a kilometre from the proposed location of rail sidings, found that, of the c. 100 households visited, around one in ten knew absolutely nothing about the Reservoir when asked. They had not even heard about it.

a measure of how effectively promotional messages landed, not an assessment of support for SESRO itself.

Promotional presentation of the Reservoir as a future public park is inconsistent with the infrastructure's scale and risk profile, and with disclosures elsewhere in the Gate 3 submission. Thames Water acknowledges serious water-quality issues⁴² requiring aeration by two 200kW compressors – proposed mitigation likely to be insufficient for a reservoir of this scale (see section **Error! Reference source not found.** and **Error! Reference source not found.**) – yet stakeholders were not consulted on the implications for water quality, amenity feasibility, public health or access restrictions. This disconnect between promotional messaging and operational reality undermines the credibility of the engagement strategy and falls short of Ofwat principles requiring openness about both positive and negative aspects, collaboration with communities, transparency about performance, and attention to risks as well as benefits.

By substituting amenity marketing for transparent engagement on safety, feasibility, flooding, environmental risk and cost, Thames Water has not provided stakeholders with the information required for informed participation. Thames Water chooses to emphasise uncoded and premature leisure concepts rather than engage with the fundamental issues repeatedly identified by communities as critical to their assessment of SESRO. Thus, across all consultation windows, the concerns most frequently raised by communities⁴³ have been largely absent from consultation questionnaires and public-facing materials. These concerns must come before speculative surveys on leisure activities.

The consultation did not fulfil its core purpose under public-law standards: to enable informed participation and for feedback to influence emerging design. This approach does not meet the expectations in PINS Advice Note 11 (Annex B) for clear, balanced and accessible information.

1.7.2 Omission of feedback and evidence distortion

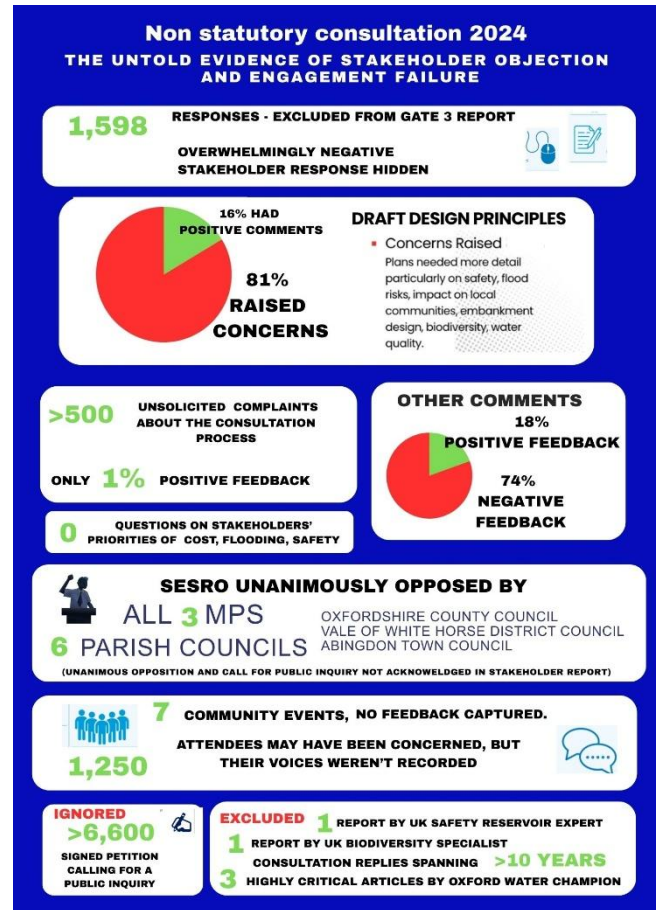
A central procedural failing is the exclusion of the results of the 2024 non-statutory consultation from the Gate 3 submission. The above-mentioned Ipsos analysis contains clear and significant levels of negative feedback. Thames Water did not publish analysis of these results nor disclose them to RAPID by Gate 3, despite being essential to understanding stakeholder views. As a result, it failed to meet RAPID's deadline and to demonstrate how this information influenced the project.

⁴² DWQRA report.

⁴³ Relating to reservoir safety and dam-breach scenarios; flooding and groundwater risk; environmental harm and biodiversity loss; cost escalation, bill impacts and best value; consideration of alternatives; and long-term construction disruption.

Crucially, the only places where stakeholders could comment on the substantive issues were the sections on design principles, the interim masterplan, and general comments, because the structured questions focused almost entirely on peripheral or promotional matters. It is therefore these sections that best reflect what stakeholders actually wished to raise. Across these key question areas, Ipsos reported overwhelming negative sentiment: **80% negative** on design principles; **65% negative** on the interim masterplan and **73% negative** in general comments. Negative feedback unrepresented by a factor of c. 10%, as any duplication of guideline text provided by GARD, where stakeholders had required guidance due to the opaque and technical nature of questions, was discounted.

Thames Water’s *Statement of Response*⁴⁴—which was *not* included at Gate 3—places greater emphasis on amenity and peripheral design issues and does not reflect the scale of substantive concerns recorded by Ipsos. Although Ipsos is more representative, the tightly framed consultation questions still limited direct expression of core issues. Together, these factors resulted in significant under-representation of stakeholder concerns in the material submitted for Gate 3, contrary RAPID’s requirement for transparent reporting of stakeholder concerns and Gunning Principle 4.



1.8 Regulatory compliance summary

Regulatory requirement	Standard	SESRO Performance (Gate 3)
RAPID – timing of Consultation	Non-statutory complete; statutory under way	Non-compliant (statutory began post-submission)
RAPID – de-risking before Gate 3	Safety, flood, cost data disclosed	Non-compliant (data withheld)
PINS Advice Note 11	Front-loaded, transparent, accessible	Non-compliant (promotional, opaque)
Gunning Principles	Information, fairness, conscientious consideration	Breached
Ofwat Public	Transparency, inclusivity,	Breached

⁴⁴ Thames Water (2024), “[Non-statutory Public Consultation 2024: Our Statement of Response](#)”.

Value Principles	customer impact	
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The compliance matrix shows systemic failure across ***every major regulatory standard***.

1.9 Conclusion

In conclusion, Thames Water’s approach to stakeholder engagement for SESRO has been fundamentally deficient in both process and substance. Rather than enabling informed, transparent and iterative dialogue, the consultation has been characterised by withheld evidence, deferred disclosures, and a persistent failure to engage meaningfully with the issues of greatest concern namely safety, flood risk, feasibility, cost escalation and alternatives.

This has resulted in a process that does not satisfy established regulatory and public-law standards, including RAPID requirements, Planning Inspectorate guidance, the Gunning Principles and Ofwat’s Public Value framework. Stakeholders have not been provided with the information, time or opportunity necessary to influence the scheme at a formative stage, and key risks, particularly those relating to life safety and flood impact, remain unresolved and untested through consultation.

The cumulative effect is a consultation that has not fulfilled its core purpose of de-risking the project or building public trust. Instead, it has limited scrutiny, constrained participation, and undermined confidence in both the scheme and the decision-making process.

Given the scale, cost and potential impacts of SESRO, progression beyond Gate 3 without full transparency, robust evidence, and demonstrable compliance with consultation standards would be premature and unjustified. A pause is therefore necessary to ensure that all material information is disclosed, stakeholder concerns are properly addressed, and a genuinely evidence-led, lawful and accountable process is undertaken before any further advancement of the scheme.

2. Comparative cost analysis of alternative options

The RAPID Gate 3 report has revealed a trebling of the capital cost of SESRO from £2.2 billion (Bn) to £6.6Bn since the Gate 2 report in November 2022 and since the issue of Thames Water’s WRMP24 in October 2024. This has profound implications for whether SESRO is the best-value scheme for the future needs of the South East, and for whether a scheme of this size is needed at all.

CPRE and GARD called for the Regulators to review the best value and affordability of SESRO in the light of the large increase in costs. Eventually the Regulators have instructed Thames Water, Affinity Water and Southern Water to review the best value and affordability of SESRO in the light of the large increase in SESRO’s cost, and to report on this by 22nd May 2026.

In contrary the Severn Trent Transfer (STT) costs have not been re-evaluated since the RAPID Gate 2 exercise and there has been no call from the regulators to review these alongside with the increase of costs of SESRO.

However, RAPID’s draft Gate 3 decision report makes only brief reference to actions needed to support the reassessment of best value and affordability of SESRO⁴⁵:

Priority Actions – to be addressed by the dates stated in each priority action				
Number	Area	Detail	Reason	Complete by:
4	Evaluation of costs and benefits	Provide a substantive update on preparations for the WRMP annual review in the 9 February 2026 checkpoint meeting. This should explain how the companies involved will use the statutory planning process (WRMP and related annual review) to conclude the best value decision making process.	The submission does not present any evidence of best value modelling with the updated solution costs.	9 February 2026

In view of the enormous increase in cost, GARD considers that the Gate 3 decision report should prescribe more specific actions to ensure that the water companies’ review of best value and affordability of SESRO covers an appropriate range and depth of analysis.

In addition RAPID has issued under the query process a request⁴⁶ asking for the following:

“RAPID gate three guidance Section 8.1 provides that evidence to demonstrate that a solution remains best value for customers and the environment is required. RAPID typically relies on the best value assessments undertaken as part of the regional plans and company water resource management plans (WRMPs) to ascertain this. The financial cost estimates for SESRO have changed from the estimates that were used for best value assessment in the WRSE regional plan and Thames Water’s WRMP24.

⁴⁵ Draft decision report, Appendix A, p. 28.

⁴⁶ RAPID (2025), [“Gate three query process: Query number SER011”](#), 23rd September.

We further note that within your submission, you have stated the following: ‘Our initial analysis indicates that SESRO continues to be one of the preferred options in WRMP24. However further work is required to validate this, and we aim to complete this work and publish our findings in Autumn 2025.’

Therefore, please provide a clear update on this work. This should include:

- *A specific date that this work will be shared with us*
- *When and how you expect to make this information publicly available*
- *What analysis the work will be based on and the arrangements in place for assurance of its inputs and outputs What data will be shared as part of this work.[...]*
- *What form the work will take, for example [...]*
- *Who is leading which elements of the work [...]*”

This request mainly relates to the need to reassess SESRO against the main alternative STT option. We note that, despite the RAPID request, no formal response has been given as to when the submission confirming whether the 150Mm³ SESRO option remains the ‘least cost’ plan for the WRSE region will be available (as at the time of writing). If, following the WRSE reassessment, the STT is found to be the least-cost option, are mitigation plans in place to ‘fast track’ implementation of this scheme?

In addition to the above, with the significant increase in the SESRO cost estimate, it may alter the Thames Water WRMP24, as the now-abandoned low Gate 2 cost estimate has been used to justify deferring 40MI/day of leakage reduction as representing poor value. With the significant increase in the cost of SESRO, this should by changing the economics of leakage reduction drive more mains replacement, further reducing leakage and thereby also reducing the SESRO needs case. The RAPID Gate 2 stage is summarised by the Regulators themselves as: “Gate two – detailed feasibility, design and multi-solution decision making.”

GARD believes that the reasonable expectation from this is that, in establishing the detailed feasibility and before moving on to Gate 3, a realistic project cost and programme target is established. This is especially relevant where the cost estimate at Gate 2 has been used in strategic planning as part of the WRSE Region option selection process and in selecting SESRO 150Mm³ over other options and then for inclusion within Thames Water WRMP 24.

GARD’s view is that, with the subsequent significant increase in the estimated cost between Gates 2 and 3, the detailed feasibility stage of the project in setting a realistic cost estimate target was not satisfactorily reached for Gate 2. The issue of the RAPID query SESRO 11, and the lack of satisfactory response from Thames Water or the WRSE region model taking account of the increase in the SESRO estimated cost, reinforces our view in this respect.

The question of the accuracy and validity of the Gate 2 cost estimate is reviewed in the sections below.

2.1 Implications of the trebling of SESRO cost on the WRSE programme

We have seen RAPID's request for evidence that SESRO is still the best-value solution⁴⁷:

"RAPID gate three guidance Section 8.1 provides that evidence to demonstrate that a solution remains best value for customers and the environment is required.

RAPID typically relies on the best value assessments undertaken as part of the regional plans and company water resource management plans (WRMPs) to ascertain this. The financial cost estimates for SESRO have changed from the estimates that were used for best value assessment in the WRSE regional plan and Thames Water's WRMP24.

We further note that within your submission, you have stated the following: "Our initial analysis indicates that SESRO continues to be one of the preferred options in WRMP24. However further work is required to validate this, and we aim to complete this work and publish our findings in Autumn 2025." Therefore, please provide a clear update on this work."

The water companies' response includes the following statement⁴⁸:

"The updated cost estimate was larger than the Gate 2 estimate, and the cost estimate increase from Gate 2 to Gate 3 exceeded the cost sensitivity ranges explored in the Thames Water WRMP24. In the Thames Water WRMP24, the conclusions drawn in relation to cost sensitivity testing were:

- If the construction Capex cost of SESRO were to escalate by more than c.£700-800m, SESRO may not be selected in a "least cost" plan for the WRSE Region. The Gate 3 construction Capex estimate is >c.£3Bn larger than the Gate 2 Capex estimate, and so breaches this indicative threshold.*
- However, any increase in the SESRO cost estimate would need to be considered alongside an up to date view of the cost of the main alternative to SESRO, the Severn Thames Transfer (STT).*
- While cost is an important factor to consider in making the decision between SESRO and the STT, it is not the only factor. The greater flexibility and simplicity of SESRO, for example, led us to further prefer SESRO over the STT."*

The water companies' response suggests that initial analysis indicates that SESRO is still preferred to the STT as the next major new source in the Thames Valley. However, they admit that complex further analysis is needed, including substantial contributions from United Utilities and Severn Trent Water, which are not expected before March 2026, and with no firm date set. This will then be followed by further analysis by WRSE before a proper comparison with the STT option can be made. There will also need to be updating of other resource option costs, including recycling, desalination and mains replacement, before the best-value sequence of resource development in the South East can be confirmed. This work all needs to be done before the target date of 30th June 2026, set in the

⁴⁷ RAPID (2025), "[Gate three query process: SER011](#)", 23rd September, p. 1.

⁴⁸ Ibid., p. 2.

Regulators' instruction to the water companies to reassess the best value and affordability of SESRO⁴⁹.

As well as affecting the best-value sequence for resource development in the South East, the huge cost increase affects the *need* for SESRO in several other ways:

- It affects the benefit–cost assessments of the large, planned abstraction reductions for ‘*Environmental Destination*’, which comprise about half of the estimated water supply deficits to be met by the Reservoir.
- Similarly, it affects the value-for-money justification for the T2ST, for which about 30% of the deployable output (DO) of SESRO is allocated.
- The amount of abstraction reduction under “*Environmental Destination*” and the justification of the T2ST also need to take account of the proportionality of the costs in relation to the benefits achieved. The cost of SESRO is now so high that the proportionality of costs should be properly and transparently considered for abstraction reductions that have been proposed for compliance with the Water Framework and Habitats Directives.
- It affects the economics of mains replacement as a leakage-reduction measure. Replacement of old mains pipes could now be more cost-beneficial than SESRO, especially when taking account of savings in future capital maintenance. This will reduce the deficit to be met by the Reservoir.

Therefore, GARD proposes that the Regulators should instruct the water companies to undertake a comprehensive and transparent review of the need for new sources in the WRSE area.

The review of need for new sources should take due account of the uncertainty in the deficit forecasts and the need for flexibility in the development programme to accommodate a range of deficit forecasts – both high and low forecasts. The review should recognise the danger of creating a white elephant by building a large inflexible source like the 150Mm³ Reservoir and should give due consideration to the flexibility that would be provided by a phased development of the STT and its various support sources.

The review should be completed before the Planning Inspectorate’s decision to accept the application for the DCO for SESRO. It should be linked to the programme for the draft WRMP29s. This should all be covered by specified actions in RAPID’s Gate 3 decision report.

In addition, it is proposed that RAPID’s draft decision on the SESRO Gate 3 report should require the development programme for SESRO to be adjusted so that the reassessment of the need for SESRO is completed before any decision on the DCO. There should also be urgent action to bring forward the completion of the STT Gate 3 report, which has been allowed to languish because of misplaced confidence that SESRO is the best-value option for immediate implementation.

⁴⁹ <https://www.ofwat.gov.uk/wp-content/uploads/2025/12/SESRO-gate-three-draft-decision-document.pdf> , Appendix A.

GARD proposes that there should be an immediate and public statement by the Regulators that the huge escalation of costs between the SESRO Gate 2 and Gate 3 reports has undermined the credibility of the resource development proposals in the water companies' WRMP24s and necessitated a comprehensive and transparent review of the need for more water resources in the South East and the selection of preferred strategic resource options (SROs).

2.2 Conclusion

In conclusion, the trebling of SESRO's estimated cost between Gate 2 and Gate 3 fundamentally alters the basis on which the scheme was selected and justified within regional and company water resource plans. A cost increase of this magnitude not only exceeds previously tested sensitivity thresholds but also undermines confidence in the robustness of earlier feasibility work and option appraisal. As a result, SESRO can no longer be assumed to represent best value without a comprehensive and transparent reassessment.

Crucially, this reassessment has not yet been undertaken to the standard or within the timeframe required, and it remains unclear whether SESRO continues to outperform alternative options such as the STT, or indeed whether a scheme of this scale is still necessary. The absence of updated comparative analysis, alongside the failure to re-evaluate wider programme impacts, including leakage reduction, demand management, and environmental obligations, means that key strategic decisions are currently being advanced on an outdated and potentially invalid evidence base.

The implications extend beyond cost alone. The increased financial burden raises serious concerns about affordability for customers, proportionality of environmental interventions, and the risk of committing to a large, inflexible asset that may not align with future demand scenarios. In contrast, alternative or phased options may offer greater adaptability, lower risk, and improved value for money.

Taken together, these issues point to a clear and urgent need for a full reappraisal of both the need for SESRO and its position within the wider water resource strategy for the South East. Progression of the scheme without such a reassessment would be premature and could result in significant long-term financial and strategic consequences. A transparent, evidence-led review completed before any further regulatory or planning decisions is therefore essential to ensure that investment decisions are justified, proportionate, and in the best interests of customers and the environment.

3.0 Transparency and robustness of data relating to the demand for, and need for, SESRO

The Thames Water Gate 3 submission⁵⁰, reproduced below in Table A1, provides a summary of the need for SESRO, referring to the four main drivers of the need for new sources identified in water company WRMPs, as below:

Table 2.1 Primary water resource drivers for increased demand for water

Driver	WRSE Implication
Future Population Growth	Results in the need to supply water to more customers. Forecast methodologies are contained in the UK Government's Water Resources Planning Guidance ³ . The impacted companies should plan for future population growth. WRSE uses the latest regional forecasts produced by the Office of National Statistics, local authority housing plans and estimates of the significant additional potential growth between Oxford and Cambridge.
Impacts of climate change	Forecast reductions in available flows in rivers or groundwater recharge, reducing the amount of water that can be supplied from existing water sources during droughts.
Impacts of existing abstractions	Taking water from rivers, streams and underground sources during periods of lower flow can cause damage to the environment. Water companies need to reduce how much they take from some of their most sensitive water sources to prevent damage in the coming years and help improve them. This reduces available supply. Under the Environment Agency's National Framework for Water Resources ⁴ , regional water resource groups are required to explore and implement the steps required to achieve a shared Environmental Destination to reduce the most environmentally unsustainable abstractions.
Improved drought resilience	The Environment Agency's National Framework for Water Resources ⁴ , requires companies to plan for a higher level of resilience to drought, so that restrictions such as rota cuts and standpipes will be needed no more than once every 500 years on average.

Table A1 - Gate 3 summary of drivers of need for SESRO

The drivers of need for the Reservoir, shown in this table, were critically reviewed in GARD's responses to Thames Water's, Affinity Water's and Southern Water's consultations on their draft WRMP24s.

A fundamental part of GARD's criticism of the case for the need for SESRO is failure to follow the WRMP24 Water Resource Planning Guidelines' (WRPG) recommendation for adaptive planning to deal with uncertainties, with preferred programmes based on the most likely future⁵¹:

“When you produce a preferred plan, there are uncertainties. We therefore recommend using adaptive planning. In this concept, when we refer to a preferred programme, this can also be referred to as representing the ‘most likely’ future (based on the uncertainties) and the pathway through it. That is, the route through the adaptive planning you will most likely follow.”

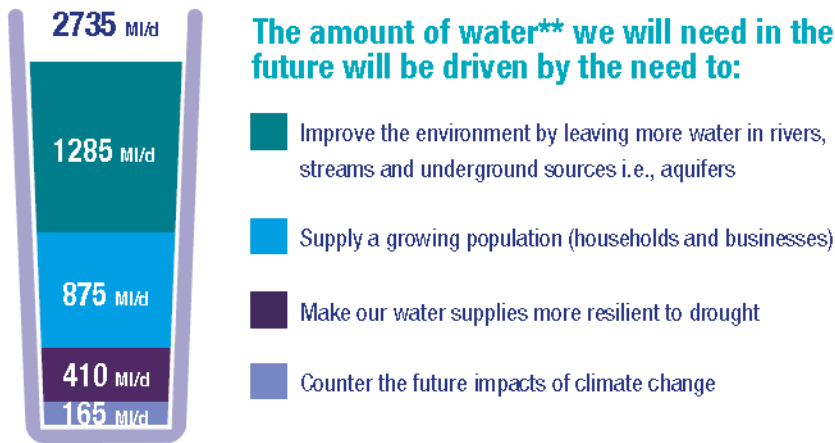
⁵⁰ Thames Water Gate 3 submission [Table 2.1 Thames Water Gate 3 Submission](#)

⁵¹ Gov.UK (2023), [“Water resources planning guideline”](#), p. 3.

In GARD’s opinion, rather than producing preferred plans based on the “most likely” future, the water companies’ preferred plans for WRMP24 were based on assumptions for environmental destination, population growth and climate change, which are close to worst-case scenarios, and which are highly unlikely to materialise. This will lead to gross over-provision of new supplies, with consequent high costs, unnecessarily high customer bills and irreversible environmental impacts from the new supplies. The failure to produce adaptive plans for the “most likely” future is a recurring theme in our comments on the various drivers of the need for SESRO.

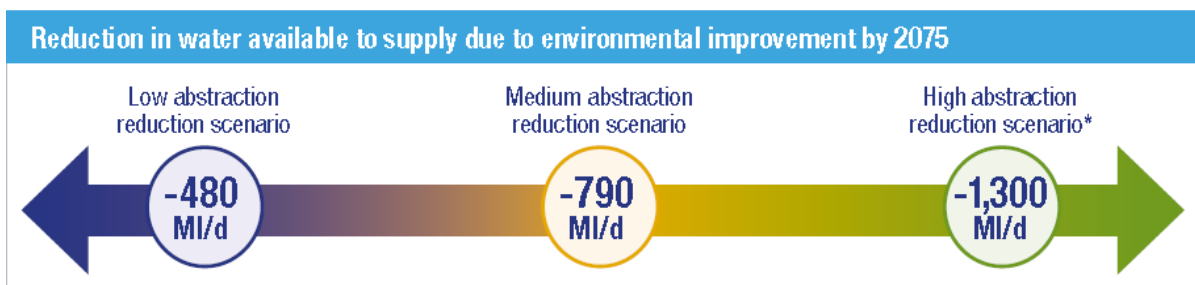
3.1 Abstraction reductions

To improve river flows and ecology abstraction reductions account for 1,285MI/d of the total 2,735MI/d of the WRSE’s forecast water supply deficits in the South East, as shown below:



* By 2075, we need to find alternative sources for 1.2Bn litres of this water to protect the environment and an additional 1.5Bn litres of new water to secure the region’s public water supplies.

** The figures used in this graphic represent the pathway of our adaptive plan that aligns with the requirements of the WRPG.



* The high abstraction reduction scenario reflects the EA’s BAU+ projection plus locally agreed reductions in certain zones.

Source: Upper graphic and notes: WRSE’s Non-Technical Summary to its Final Plan, June 2025, page 4; lower graphic and notes: <https://www.wrse.org.uk/media/opanojjv/wrse-final-regional-plan-non-technical-summary-june-2025.pdf>, page 5.

Figure A1 Drivers of demands for more resources in WRSE’s Final Regional Plan

The 1,285MI/d of abstraction reduction scenario assumed by WRSE and the water companies in their Final Plans is at the upper end of the range of reduction scenarios considered. Much of the reduction would be in areas which would be served by the Reservoir. The 1,285MI/d of lost supply is equivalent to nearly five SESROs, with a cost of about £33 billion, based on the Gate 3 SESRO cost of about £6.6 billion.

The high abstraction reduction scenario is based on the EA’s assessment of the **potential** need for abstraction reductions to achieve compliance with Environmental Flow Indicators (EFIs), whilst saying it is the water companies’ responsibility to decide what abstraction reductions to include in their plans, taking account of costs and benefits⁵². However, the water companies have included **all** the EA’s potential reductions, saying they have followed EA guidance that full EFI compliance is necessary for Water Framework Directive (WFD) compliance⁵³.

There was no benefit–cost assessment to justify the new resources needed to replace the 1,285MI/d of abstraction reductions in the water companies’ Final WRMP24s. Moreover, the EA states in its “[Environmental Destination technical report - June 2025](#)”, appended to the government’s National Water Framework:⁵⁴

“There has been no assessment of the actual ecological benefits that flow compliance [abstraction reductions] would deliver, or of their total cost, best value timing or affordability.”

The trebling of the costs of SESRO in the Gate 3 report has made the need for a proper benefit–cost assessment of the abstraction reductions even more urgent.

The need for consideration of lower abstraction reduction scenarios (Environmental Destination) is reflected in WRSE’s July 2025 letter to the EA on the recently published revised National Framework for Water Resources, which stated⁵⁵:

“We will be submitting separate feedback to your colleagues on the draft Environmental Destination guidance. Given the scale of investment that the Environmental Destination scenarios have and

⁵² Environment Group (2024), “EA response to GARD FoI request for details of abstraction reductions”, 3rd June, p. 4, email reference NR355420.

⁵³ Thames Water (2024), “[Water Resources Management Plan 2024, final report](#)”, section 5 – Environment Forecast, paragraph 5.19. (Henceforth ‘TW WRMP’.)

⁵⁴ Gov.UK (2025), “[National Framework for Water Resources 2025: water for growth, nature and a resilient future](#)”, Appendix C, p. 35.

⁵⁵ [WRSE letter to Environment Agency on the new National Framework for Water Resources](#), p. 2, 18th July 2025.

could continue to drive, we believe the guidance could be enhanced by allowing more flexibility in approach, and that by considering different scenarios will enable the identification of better long-term solutions for the environment.”

WRSE’s follow-up letter to the EA about its guidance on Environmental Destination includes these statements⁵⁶:

“we feel the guidance could be enhanced by setting out [...] which element of the bundled up Environmental Destination scenarios are subject to cost benefit analysis, and which are legally required”

“There should also be a clear and transparent process for incorporating the findings from these [individual reduction] investigations into the finalisation of the Environmental Destination programme, to ensure that investments are justified and provide tangible benefits.”

“We consider that it is important for the EA to share the underlying information and calculations [on amounts of ED] with all abstractors so the data is used is transparent and they can scrutinise it and check it against their own understanding.”

“It is essential to understand this breakdown [whether or not reductions are legal requirements] to provide companies and regional groups with the necessary information to allow them to undertake cost benefit analysis where necessary.

If this information is not available, then it will introduce a vulnerability into all the investment decisions that follow on from complying with these targets. We consider that this legal vulnerability could be reduced, if not eliminated, by clearly setting out a better breakdown of the ED numbers per category of driver stating which are a legal requirement and which are subject to a cost benefit analysis.”

“We are concerned that, under the current guidance, there is a risk that most abstraction reductions will default to the ‘fastest technically possible’ pathway. This could overlook important considerations such as cost, affordability, and uncertainties in existing information.”

GARD wholeheartedly supports the sentiments in WRSE’s letter. However, regarding whether or not abstraction reductions are legal requirements (e.g. compliance with the Water Framework or Habitats Directives), we believe that the matter of disproportionate costs will also need to be considered, even for the reductions deemed to be a legal requirement. The need to consider disproportionate costs has become much more relevant with the Gate 3 trebling of SESRO costs.

⁵⁶ [WRSE letter to Environment Agency on Environmental Destination Guidance](#), 18th July 2025.

3.2 GARD assessment of need for abstraction reductions

GARD totally supports the urgent need to re-naturalise flows in iconic chalk streams, especially those that have been severely impacted in the Chilterns, the Darent catchment and to the west of London. However, the High scenario abstraction reductions in WRMPs go far beyond these iconic rivers, often including canalised, lower reaches of rivers in urban environments, where the river ecology is not dependent on river flow. In total, GARD considers that it would be appropriate to allow for a total 255MI/d of net DO loss from the Thames Valley supplies of Thames, Affinity, South East and Sutton & East Surrey water companies. This compares with WRSE’s allowance of 758MI/d deployable output loss for these four companies from their Thames Valley supplies. Hence, the amount of required abstraction reduction in the SESRO supply areas has probably been over-estimated by about 500MI/d (excluding the areas supplied by the Thames to Southern transfer)⁵⁷.

GARD’s anticipates that the “*most likely*” abstraction reductions, after proper assessment of costs and benefits, would include **all** the proposed High scenario abstraction reductions for ecologically sensitive rivers in the SESRO supply areas, comprising the Colne and Lea tributary chalk streams, the upper and middle River Lea, the upper and middle River Darent, the Thames tributary chalk streams and Cotswold limestone rivers. However, the cost–benefit assessment is likely to exclude the large reductions planned for the lower reaches of the Rivers Colne, Lea and Darent, and in other locations where GARD thinks it unlikely that the reductions would be justified by a proper benefit–cost analysis, taking account of the environmental impact of replacement sources.

Even for the proposed reductions in potentially iconic chalk streams, there are likely to be constraints on how much abstraction can be reduced, because of the risk of groundwater flooding, particularly in catchments where there has been a lot of recent housing development in the bottom of valleys. This adds to the likelihood that abstraction reductions will turn out to be a lot less than indicated by strict compliance with EFIs.

A reassessment of planned abstraction reductions should also take account of the environmental impact of replacement sources. In our opinion, it defies common sense to suggest that the currently planned abstraction reductions, mostly affecting rivers that are not iconic chalk streams, bring more benefit than the environmental impact of five SESROs or other equivalent water sources.

GARD believes that a detailed and transparent review of the need for abstraction reductions should be a key part of the review of need for the Reservoir before any decision is made to proceed with the Reservoir. We propose that inclusion of this review into the SESRO development programme should be specified in RAPID/Ofwat’s decision on the draft Gate 3 report.

⁵⁷ GARD (2023), “[GARD response to WRSE’s consultation on their draft regional plan](#)”, pp. 30–31.

3.3 Population growth

In 2024, GARD commissioned a review of Thames Water’s and Affinity Water’s WRMP24 population forecasts from Mr Neil Tiley of Pegasus Group. A copy of Mr Tiley’s report is appended to this evidence request. available from GARD on request. Mr Tiley’s report showed that the population forecasts are flawed because:

- they are based on local authority plan housing growth forecasts which have been repeatedly shown to substantially exceed actual delivery of new housing.
- they don’t allow for reduced housing occupancy as more homes become available.
- they don’t take account of plans for “levelling up” that will focus housing and population growth away from the South East.
- Mr Tiley’s report proposed that population growth forecasts should be based on the ONS 2018 population forecast data, with consideration of a range of forecasts for adaptable planning, as for Thames Water’s total population below:

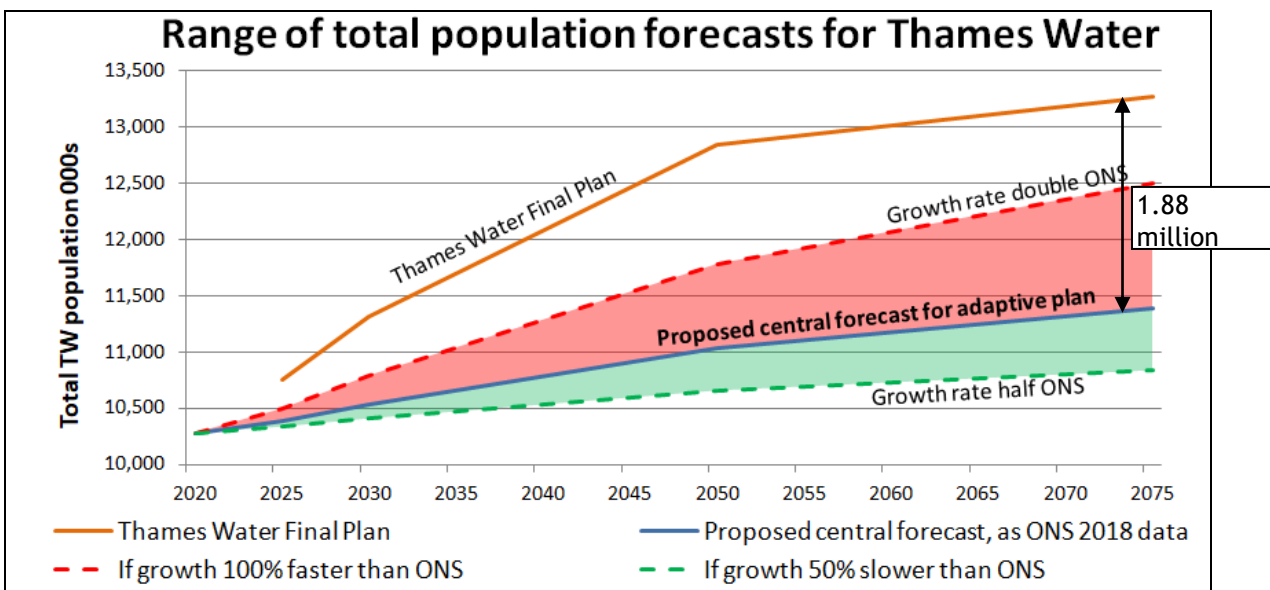


Figure A2 - Potential range of total population forecasts for Thames Water

Figure A2 shows the extent by which population forecasts based on local authority planned housing growth would exceed the official ONS forecasts. The 1.88 million population difference in 2075 is equivalent to 225MI/d of household supply. There is a similar pattern in all Thames Water’s and Affinity Water’s supply zones potentially served by SESRO:

Water resource zones	2075 population over forecast	Demand over-forecast (MI/d)

	(‘000s)	
Thames Water London WRZ	1,397	168
Thames Water SWOX WRZ	267	32
Thames Water Thames Valley WRZs	216	26
Total for all Thames Water zones	1,880	226
Affinity Water WRZs 1-6	748	90
Totals for zones supplied by SESRO	2,627	315

Figure A3 - Over-forecasting of population and household demand in zones served by SESRO

Assuming a per capita consumption of 120 litres per head per day, the total over-forecasting is equivalent to a household demand of 315MI/d – well in excess of Thames Water’s estimated 271MI/d DO of the proposed Reservoir.

Although there is considerable uncertainty in the population forecasts – upwards pressure from immigration and downwards pressure from declining birth rates – in GARD’s opinion, the forecasts used in Thames Water’s and Affinity Water’s Final Plans greatly exceed the “most likely” future, which the WRPG says should be the basis of preferred plans

3.4 Climate change

In its Final WRMP24, Thames Water considered a range of scenarios for climate change impacts on its existing supplies, as below⁵⁸:

Total 64MI/d difference between High and Medium impact scenarios

	London	SWOX	SWA	Kenne Valley	Total	ey
High Impact (MI/d)	-168	-13.2	-0.4	-4.7	-186.3	
Medium Impact (MI/d)	-110	-7.9	-0.2	-3.8	-121.9	
Low Impact (MI/d)	-39	-5.4	-0.1	-3.1	-47.6	

Note: Thames Water assumed zero climate change impact for Henley and Guildford zones, which are mainly supplied by groundwater.

⁵⁸ TW Final WRMP24, Table 4-19.

Figure A4 - Scenarios for 2070 climate change impacts on existing DO in the final Thames Water WRMP

In its Final WRMP24, Thames Water described its selection of climate change scenario for planning future supplies as follows⁵⁹:

“Thames Water, aligned with the WRSE Regional Group, has considered a ‘median’ climate change scenario as the central forecast”

Selection of the Medium impact scenario for climate change would have been consistent with the WRPG advice to plan for the most likely future. However, for the actual deficit forecasts in the WRMP Tables, Thames Water assumed the **High impact** climate change scenario from 2040 onwards⁶⁰, contrary to the WRPG advice. The assumption of the High climate change scenario after 2040 adds 64Ml/d to Thames Water’s 2070 deficit. The same use of incorrect climate change scenario was shown in its earlier draft WRMPs. In GARD’s opinion, this is a serious error in Thames Water’s plan that the Regulators should have picked up.

In GARD’s opinion, even the Medium Impact scenario shown in Figure A4 above is likely to be a substantial over-estimate of the climate change impact on Thames Water’s supplies. Although we believe unreservedly that major climate change has already occurred and will continue to be a worldwide threat, it does not necessarily mean that the impact on all water supplies is negative. In fact, evidence suggests that climate change to date has **increased** the availability of water supplies for London.

Thames Water’s modelling of existing London supplies shows that the three most severe droughts of the past 100 years, in terms of impact on London’s supplies, were in 1921, 1934 and 1944 – all at least 80 years ago⁶¹. Thames Water’s most severe drought of the past 80 years, in 1976, was appreciably less severe than the earlier droughts, in terms of its impact on London’s supplies. Droughts since 1976, including those of the past decade, have all had relatively little impact on Thames Water’s supplies. Droughts of the type that would affect London’s supplies – i.e. two summers and a winter – have become less frequent and less severe, because winters are becoming wetter, as is widely perceived from increased winter flooding and shown by rainfall data such as the example below⁶²:

⁵⁹ TW Final WRMP24, paragraph 4.191.

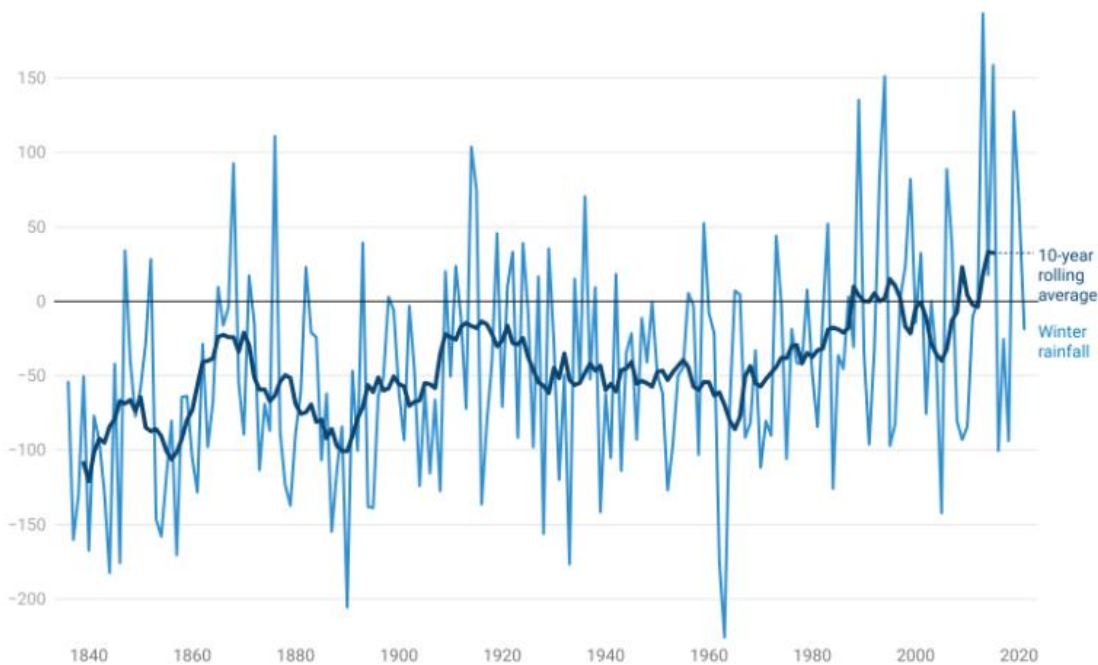
⁶⁰ TW Final WRMP24, WRMP Tables, rows 33 in zonal balance tabs.

⁶¹ GARD (2023), “[GARD response to TW’s draft WRMP24](#)”, 21st March, section 2.4.2 and Figure 10.

⁶² Carbon Brief (2024), “[Analysis: How UK winters are getting warmer and wetter](#)”, February.

UK winters are getting rainier

Total UK winter rainfall (mm) compared to a 1991-2020 baseline



Source: UK Met Office

CarbonBrief
CLEAR ON CLIMATE

Total winter (Dec-Feb) rainfall in mm over 1836-2021, based on the sum of December-February monthly rainfall totals, compared to a 1991-2020 baseline. 10-year rolling average shown in black. Credit: Chart by Carbon Brief, based on the [Met Office HadUK dataset](#).

Figure A5 - Winter UK rainfall trend since 1840

The Carbon Brief report referred to above also notes that 7 of the 10 wettest winters in the UK have occurred in the past 35 years and comments that this makes sense because, as the atmosphere heats up, it is able to hold more moisture, which can then fall as rain. The increasing trend in winter rainfall improves the resilience of London's supplies in the multi-season droughts which govern their deployable output. The winter rain is stored in the chalk aquifer and released slowly through the summer, raising drought flows and reducing the rate of depletion of the London reservoirs.

If the DO of London's existing supplies is determined only using the 80 years of river flow records since the 1940s, modelling shows that it **increases** by more than 200ML/d, compared with the DO assessed using historic records since 1920⁶³.

In GARD's opinion, the realistic range of climate change impact on the DO of Thames Water's supplies can lie between a **gain** of 200ML/d and the High impact scenario loss of 186ML/d. By

⁶³ GARD (2023), "[GARD response to TW's draft WRMP24](#)", 21st March, p. 39 and Figure 12.

adopting the High impact scenario loss in its preferred plan, Thames Water has assumed a highly improbable worst case.

The large conceivable range of climate change impacts on Thames Water's supplies is a strong argument for selecting a highly adoptable scheme like the STT as the next major source for the South East, rather than the totally inflexible 150Mm³ SESRO.

3.5 Conclusion

In conclusion, the evidence demonstrates that the case for the need for SESRO is founded on assumptions that lack transparency, robustness, and alignment with established planning guidance. Across all principal demand drivers abstraction reductions, population growth, and climate change the data and scenarios adopted by the water companies consistently reflect upper-bound or worst-case assumptions rather than the "most likely" futures required under the Water Resource Planning Guidelines.

This approach has materially inflated projected deficits and, in turn, the perceived need for large-scale new infrastructure. In particular, the absence of transparent, evidence-based justification for the scale of abstraction reductions, the reliance on overstated population forecasts, and the inconsistent application of climate change scenarios collectively undermine confidence in the demand forecasts underpinning SESRO. The lack of cost-benefit analysis, especially in relation to environmental measures, further weakens the credibility of the need case, particularly in light of the scheme's substantially increased cost.

Moreover, the failure to adopt adaptive planning principles has resulted in a rigid and potentially over-engineered solution to what is inherently an uncertain future. By prioritising high-end scenarios without adequate consideration of lower, more probable outcomes, the current approach risks significant over-investment, unnecessary environmental impact, and undue financial burden on customers.

Taken together, these deficiencies indicate that the need for SESRO has not been demonstrated to the standard required for a project of this scale and consequence. A transparent and comprehensive reassessment of demand drivers, grounded in realistic scenarios, robust data, and proper economic evaluation, is essential before any further decisions are made. Without this, the justification for SESRO remains unproven, and progression of the scheme would be premature and potentially disproportionate.

4.0 The credibility of deployable output assumptions and associated drought resilience claims

The Deployable Output (DO) of SESRO is not covered at all in the Gate 3 Basis of Design report and is referred to only briefly in the Gate 3 Main Report, which states (at paragraph 2.61) that the DO of the scheme has not been reassessed for Gate 3. The quoted DO of 271ML/d is the same value as assessed for Thames Water’s first draft WRMP24 in 2022⁶⁴. This was determined for a 1 in 500 year drought, taking account of the estimated impact of future climate change in the 2070s, using a scenario that was the median of the 28 different climate change scenarios from WRSE⁶⁵.

The Final Thames Water and Affinity Water WRMPs and the draft Final Southern Water WRMPs assume a split in the ownership of SESRO in the proportions 55% for Thames Water, 30% Southern Water and 15% for Affinity Water. The Gate 3 Main document shows the latest planned distribution of SESRO output between the water companies, as below:

Table 2.3 Summary of resource sharing for SESRO (Based on Thames Water Final WRMP24, Dry Year Annual Average resource share, reported pathway 4)

MI/d	Thames Water, London ***	Thames Water, Transfer to SWOX	Thames Water, SWA (Medmenham abstraction)	TW, Kennet Valley (via T2ST)	T2ST*	T2AT**
2040	50	24	0	5	14	0
2050	97	24	16	10	63	58
2060	119	24	15	10	67	73
2075	122	18.1	14	10	70	72

* excl. Thames Water export via spur to Kennet Valley and SEW supply (peak only)
 ** Affinity Water 15% share is based upon utilisation of initial (50 MI/d) phase of T2AT only. This is due to uncertainty with the scale of abstraction reductions expected by Affinity Water under their future Environmental Destination scenarios. However, the Final WRMP24 reported pathway 4 is based upon the more conservative scenario agreed with the EA, which requires a slightly higher utilisation of SESRO.
 *** the total resource share is more than 271 MI/d (DYAA DO), as the conjunctive use benefit of the T2AT in London WRZ is accounted for.

Table A2 - Gate 3 assumed utilisation share between water companies

The Gate 3 Main Report (paragraph 2.55) refers to modelling work for Gate 3 that explores how SESRO would actually be used to meet the various demands of about six supply zones for the four water companies mentioned in the table above:

⁶⁴ Thames Water (2022), “[Draft Water Resources Management Plan 2024](#)”, first draft, November, Table 7-6.

⁶⁵ Gate 3 Main Report, paras 2.61 and 2.62.

“The utilisation of the SESRO scheme has been tested and analysed within the WRSE PyWR modelling platform. This involves the integration of the demand profiles for SWS, AFW and TW and the simulation of reservoir operations under different design conditions to mimic the preferred WRMP24 configuration, as outlined previously.”

The Pywr modelling work referred to above used only 1,008 years out of the 19,200 years of available stochastic data⁶⁶, so it was not a DO reassessment of whether SESRO is able to meet all the various water company demands under 1 in 500 year drought conditions.

The DO of 271Ml/d quoted in the Gate 3 Main Report is out of date and does not take account of the SESRO utilisation now envisaged. GARD proposes that RAPID/Ofwat’s Gate 3 decision should call for a full and transparent reassessment of SESRO’s DO.

Although, the previously quoted DO of 271Ml/d is out of date, it was heavily criticised by GARD during the WRMP24 consultation process and all the criticisms should still be addressed in the reassessment of the SESRO DO that is now needed, supported by publicly available model output and analysis.

4.1 History of criticism of the 271Ml/d deployable output

In the Addendum to GARD’s response to Thames Water’s consultation on its draft WRM24, dated April 2023, GARD concluded that, using Thames Water’s stochastically generated river flows, the correct DO for the 150Mm³ Reservoir should be only 200Ml/d, as shown below⁶⁷:

	MI/d
DO with climate change as WRMP24 and Gate 3	271
Less:	-6
double-counting of droughts	
wrong value of Culham minimum flow	-2
wrong climate change scenario	-19
inadequate dead and emergency storage	-44

⁶⁶ Gate 3 Main Report, footnote to Table 2.4.

⁶⁷ GARD (2023), “[Volume 2 - Addendum to dWRMP24 consultation response: Review of WRMP aspects related to Pywr model output](#)”, submitted to Thames Water on 30th April, p. 7.

Corrected DO

3. 200

Table A3 - GARD identified errors in SESRO 271MI/d DO

In addition, GARD considered that the DO of SESRO will be a lot less than shown above, perhaps only half this value, when proper consideration has been given to the likelihood of a sequence of dry years which prevent the Reservoir from being full at the start of a major drought or delay its refilling after a drought. GARD criticised Thames Water's modelling of long-duration droughts, particularly the failure to include the historic data from the long droughts of 1921, 1934 and 1944 in the historic records used to generate the 19,200 years of stochastic daily data used in its modelling.

Some of GARD's criticisms of the assessed 271MI/d DO for SESRO were addressed in Thames Water's Statement of Response (SoR) to the WRMP consultation in August 2023⁶⁸. However, Thames Water rejected all GARD's criticisms and there was no change to the 271MI/d DO in the revised draft WRMP dated August 2023. Consequently, GARD asked its consultant, John Lawson, to prepare a detailed rebuttal of the DO aspects of Thames Water's SoR, which was sent to the Environment Agency (EA) and RAPID in October 2023⁶⁹.

This was followed by a meeting between GARD, the EA, Ofwat and RAPID on 13th October 2023, at which GARD's concerns were discussed. There is no formal record of this meeting, but some of GARD's concerns about SESRO's DO were reflected in Issue 6 in Defra's letter requesting further clarification of Thames Water's draft WRMP in February 2024, as copied below⁷⁰:

Issue 6: Provide further detail around the company's water resources modelling

Both the Group Against Reservoir Development (GARD) and ourselves raised concerns around the company's water resources modelling in response to the draft plan. The company has made some changes to its plan, but there are a number of topics where the company should provide further information including the:

- calibration of the rainfall run off model
- stochastic data set and its reflection of long duration droughts
- relationship between the deployable output benefit of a strategic resource option and the deployable output benefit it brings to the London supply system.

⁶⁸ Thames Water (2023), "[Thames Water Draft Water Resources Management Plan 2024: Statement of Response, Appendix G2](#)", August, pp. 103–118.

⁶⁹ GARD (2023), "[GARD rebuttal of Thames Water SoR on DO](#)", 6th October.

⁷⁰ Defra letter to Thames Water of 5th February 2024, requesting further information in support of SoR.

Defra request for Thames Water action on DO assessment

The requests for action listed above include some of the concerns that GARD raised at the meeting on 13th October 2023, relating to the stochastic data used in Thames Water’s DO modelling and the resilience of SESRO in long-duration droughts. However, the Defra request for more information did **not** address the other concerns raised at the meeting relating to errors in Thames Water’s modelling, incorrect climate change scenarios and insufficient emergency storage allowance for SESRO. These amount to an over-estimation of DO of 71ML/d, as shown in Table A3.

4.2 Error due to double-counting of droughts

Thames Water calculates deployable outputs for SESRO by using its Pywr model to simulate the frequency of London reservoir storage falling into the Level 4 emergency storage zone. The London demand that causes only 38 failure events in 19,200 years of simulation is then the 1:500 year DO ($19,200 \div 500 = 38.4$). The Pywr model is run repeatedly with small, stepped increases in demand to determine the frequency of failure at each demand level and hence DO.

However, on some occasions, drought events in which failure extends into two different years (with years defined as running from 1st April to 31st March) have been counted as two failure events instead of one. This error causes the DO of SESRO (without climate change) to be over-estimated by 6ML/d for the 150Mm³ Reservoir, as stated in GARD’s Addendum to its consultancy response to Thames Water’s draft WRMP⁷¹.

Thames Water’s SoR rejected GARD’s criticism, stating⁷²:

We do not agree that the approach taken in our Deployable Output calculation is incorrect. The Water Resources Planning Guideline states that we should plan so that our system is resilient to a 0.2% annual chance of failure caused by drought, where failure is defined as implementing an emergency drought order. We have, as GARD note, considered a year to be from April to March, and as such events which span across years represent additional failures.

We note two additional factors:

- *The impacts which GARD note are very minor.*
- *GARD have not been even-handed in their assessment, and have not considered whether the same issue should, in their consideration, impact the Deployable Output of the STT.*

GARD does not accept the excuse: “We have, as GARD note, considered a year to be from April to March, and as such events which span across years represent additional failures”. The

⁷¹ GARD Addendum to dWRMP24 consultation response, April 2023, p. 29.

⁷² Thames Water (2023), “[Thames Water Draft Water Resources Management Plan 2024: Statement of Response, Appendix G2](#)”, August, p. 112.

methodology which considers a year to run from April to March is clearly intended to avoid counting the use of a single emergency drought order that spans across a year end as two failures – as stated in by Thames Water in its EIR 22-23-390: “A year is defined from Apr to Mar, in order not to count L4 events which extend into January.”⁷³ The fact that Thames Water’s analysis failed to notice that some emergency drought orders spanned the re-defined March-April year end is clearly an error and should be corrected, as GARD has done in the analysis which showed that the DO of the 150Mm³ Reservoir is over-estimated by 6MI/d.

GARD does not agree with Thames Water’s comment that the impact of this error is “*very minor*”. Multiple small errors can add up to large errors, so all errors should be corrected.

The points we make above are all stated, with supporting evidence, in GARD’s detailed rebuttal of the DO aspects Thames Water’s SoR⁷⁴ and as discussed with the EA and RAPID on 13th October 2023. Therefore, it is disappointing that the matter has not been taken up in Defra’s request for more information from Thames Water in February 2024 and that there is no reference to it in Thames Water’s response to Defra in October 2024. We propose that RAPID’s Gate 3 decision should insist on correction of this error in the Gate 3 documentation.

4.3 Use of wrong value of Culham minimum residual flow

Thames Water’s modelling to derive SESRO’s 271MI/d DO erroneously assumed that, when refilling the Reservoir, the minimum required flow (MRF) in the River Thames at Culham is only 450MI/d, instead of the correct value of 1,450MI/d. Thames Water has recognised this error and provided a correction in an appendix to the modelling technical report, showing that it reduces DO by only 2MI/d. Our modelling shows a similar DO reduction due to this error, when simulating some stochastic variants of the 1975–76 drought.

As for the error due to double-counting of droughts, the Culham MRF error should not be ignored just because it has a relatively small impact – multiple small errors can add up to large errors. It should have been corrected in subsequent versions of Thames Water’s WRMP and in the Gate 3 report.

Although the Culham MRF error does not appear to have a big impact on SESRO DO, it can greatly affect the speed of Reservoir refilling after droughts. The main Gate 2 report for SESRO claimed that the Reservoir refills in five months after extreme droughts, showing an example of recovery after a stochastic version of the 1976 drought. However, the historic drought of 1976 was followed by a wet winter, so that also tends to be the case with stochastic versions of the 1976 drought.

⁷³ Thames Water (2023), EIR-22-23-390, 26th January, p. 5.

⁷⁴ GARD rebuttal of Thames Water SoR on DO, pp. 27–29.

For some of the relatively few droughts in the stochastic record which are not modified versions of the 1976 drought, GARD's modelling shows that the Reservoir is less than half full at the start of the next summer and vulnerable to failure if another dry summer follows. Therefore, we suspect that, when applied to the modelling of 19,200 years of stochastic data, the assumption of a Culham MRF of only 450ML/d instead 1,450ML/d, could lead to a substantial over-estimate of DO, particularly the output that can be sustained in long-duration droughts.

The points we make above are all stated, with supporting evidence, in GARD's detailed rebuttal of the DO aspects of Thames Water's SoR⁷⁵ and as discussed with the EA and RAPID on 13th October 2023. As for the error due to double-counting of droughts, the matter was not taken up in Defra's request for more information from Thames Water in February 2024 and there is no reference to it in Thames Water's response to Defra in October 2024. We propose that RAPID's Gate 3 decision should insist on correction of this error in the Gate 3 documentation and in the reassessment of SESRO DO.

4.4 Use of wrong climate change scenario

Thames Water's modelling determined SESRO's 271ML/d DO assuming the '*median*' climate change scenario. However, the water supply deficits in Thames Water's preferred plan (pathway 4) in the Final WRMP24 are based on the '*high*' climate change scenario⁷⁶, so the assessed DO for SESRO should also be for this '*high*' scenario.

Using Thames Water's figures, the DO of the 150Mm³ Reservoir with '*high*' climate change allowance is 252ML/d, rather than the claimed 271ML/d⁷⁷. In GARD's opinion, this is another serious error in Thames Water's DO assessment for SESRO.

In its SoR to the draft WRMP24 consultation, Thames Water's response to the criticism over the use of the wrong climate change scenario in assessing DO is shown below⁷⁸:

⁷⁵ GARD rebuttal of Thames Water SoR on DO, pp. 29–32.

⁷⁶ Thames Water Final WRMP24, paras 11.10 and 11.11

⁷⁷ GARD rebuttal of Thames Water SoR on DO, p. 34.

⁷⁸ Thames Water (2023), "[Thames Water Draft Water Resources Management Plan 2024: Statement of Response, Appendix G2](#)", August, pp. 112–113.

We have considered a median climate change impact for both the SESRO and STT options, and our consideration is that applying a median climate change reduction is appropriate and even-handed. We do not agree that we should adopt the "High" climate change scenario in the assessment of option Deployable Output calculation, as the Deployable Output figures are used in all branches of our adaptive plan. Applying a climate change impact reduction to option Deployable Output values is a step taken to ensure that we have considered climate impacts in our option assessment, and our primary concern in this respect is ensuring that we are comparing alternatives against one another in an appropriate way.

We note that GARD have again not taken an even-handed approach in their consideration of which factors to consider in the calculation of different options' Deployable Outputs.

We have not made changes to our dWRMP following this response, for the reasons set out in our consideration.

In GARD's opinion, Thames Water's arguments are irrational and unacceptable. As Thames Water's forecast deficits are for the 'high' climate change scenario, the DOs of all potential new sources should also be assessed for the 'high' scenario.

The use of the of median climate change scenario in assessing DO for SESRO is an error which should be corrected, reducing the DO of SESRO by 19MI/d. This is another matter that was brought to the attention of RAPID and Ofwat during, and discussed at, the meeting on 13th October 2023. We now propose that RAPID's Gate 3 decision should insist on correction of this error in the Gate 3 documentation and future modelling work.

If Thames Water is comparing options for different climate change scenarios, the DOs of options need to be adjusted for each climate change scenario. Otherwise, options that are climate change-resilient, such as leakage reduction, metering, recycling and desalination, will be unfairly assessed in comparison with options whose DOs reduce with climate change, like SESRO.

In the case of STT options, GARD agrees that the option DOs should be adjusted for each climate change scenario, but notes that several of the STT support options (e.g. the Netheridge and Minworth recycling options) are resilient to climate change. Therefore, in assuming a 'median' climate change scenario for all DO assessments, Thames Water has biased the selection of SESRO ahead of the STT.

We also note that, if Thames Water's supply deficits are based on the 'median' climate change scenario, the forecast future deficits in the London and SWOX zones would reduce by 63MI/d⁷⁹,

⁷⁹ Thames Water Final WRMP 24, Table 4-19.

further undermining the case for SESRO that has already been greatly weakened by the trebling of its cost.

4.5 Resilience in long-duration droughts

GARD's Addendum to its response to Thames Water's draft WRMP 24 concluded that the Pywr modelling of the London supply system is not fit for purpose and that, if proper consideration is given to the occurrence of long-duration droughts, the DO of SESRO would be in the region of 50% less than claimed by Thames Water. The Addendum included extensive evidence of this, identifying two main problems in the 19,200 years of stochastically generated flow data used in the Pywr modelling⁸⁰:

- The stochastically generated Teddington natural flows are a poor fit to gauged natural flows and flows generated from historic weather data.
- The use of the period 1950–97 to “train” the stochastic modelling has replicated the pattern of droughts in that period and excluded the long droughts that occurred in 1921, 1933–34 and 1943–44.

It was concluded that, if proper consideration is given to the occurrence of long-duration droughts, the DO of SESRO would be far less than that claimed by Thames Water, perhaps in the region of only 50% of the claimed amounts, when the deficiencies identified are also taken into account.

In its Statement of Response (SoR) to the WRMP24 consultation, Thames Water briefly dismissed all GARD's concerns about the validity of the Pywr modelling and SESRO's resilience in long-duration drought, with minimal supporting evidence. This was addressed at some length in GARD's rebuttal of Thames Water's SoR and discussed at the meeting with RAPID, Ofwat and the EA on 13th October 2023.

Some of GARD's concerns on this matter were recognised in Defra's letter to Thames Water in February 2024, which called for further information on the calibration of the rainfall run off model; and the stochastic data set and its reflection of long-duration droughts.

Thames Water's response to Defra on model calibration

Thames Water's response to Defra started with this elaboration of the request, which was a reasonable reflection of the concerns raised at the meeting on 13th October 2023:

⁸⁰ GARD (2023), "[GARD Addendum to dWRMP24 consultation response](#)", April, pp. 11–23.

- 6.4 The company should review the new rainfall runoff model's ability to consistently replicate winter flow recovery, particularly after severe or long-duration droughts. This should focus on the parts of the hydrograph critical at key locations, e.g. at thresholds controlling abstractions. The company should discuss consequences from uncertainties resulting from adoption of the rainfall runoff model, and investigate the impact on deployable output accordingly. The company should:
- investigate rainfall run-off model calibration fits in isolation from the DO model where possible, to provide confidence in the outputs of the rainfall runoff model
 - ensure it presents comparisons of historic and modelled time series and flow duration curves for key locations
 - provide explanations for any significant discrepancy, and consider amended inflow hydrographs if there are significant differences in flow magnitude, especially if such differences impact the drawdown of reservoir stocks as presented in the rdWRMP Appendix I
 - consider alternative representations of the rainfall runoff model to investigate improved model fits where there is significant differences, particularly over multiple years, or over severe or long duration droughts.
 - Use any improved fits from the alternative representations to reassess deployable output in the water resources model, for comparison with the current range of deployable output uncertainty within headroom.

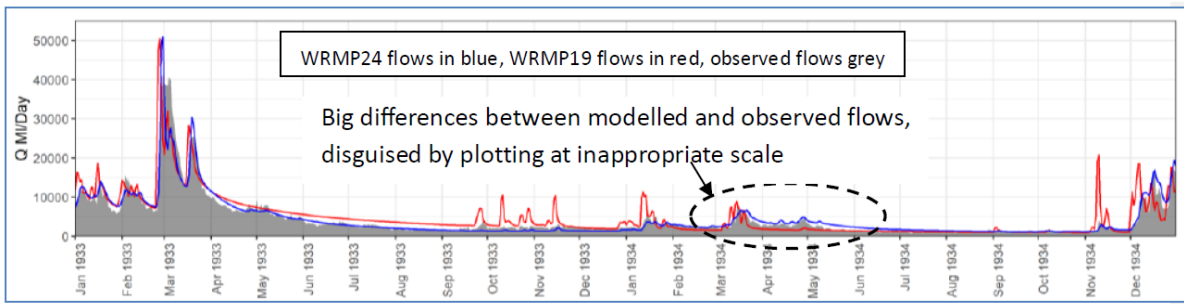
Thames Water's response to Defra included a lot of statistical data and plots, supposedly showing good fit between modelled and recorded river flows, concluding⁸¹:

The key values of Nash-Sutcliffe Efficiency (logNSE) being around 0.9 for both models [WRMP19 and WRMP24 models], logNSE (a metric which is particularly important when considering low flow calibration) also being around 0.9 for both models, and Kling-Gupta Efficiency (KGE) being >0.9 for both models indicate strong model calibration performance.

The statistical analysis fails to address the key point at the start of Defra's request, namely that: "The company should review the new rainfall runoff model's ability to consistently replicate winter flow recovery, particularly after severe or long-duration droughts." This was a major part of the concerns raised by GARD at the meeting on 13th October 2023.

The inability of the WRMP24 rainfall run-off modelling to replicate over-winter flow recovery in long droughts is hard to see on the hydrographs provided in Thames Water's response to Defra. This is because they are plotted at a scale, which disguises the amount of mis-fit, for example:

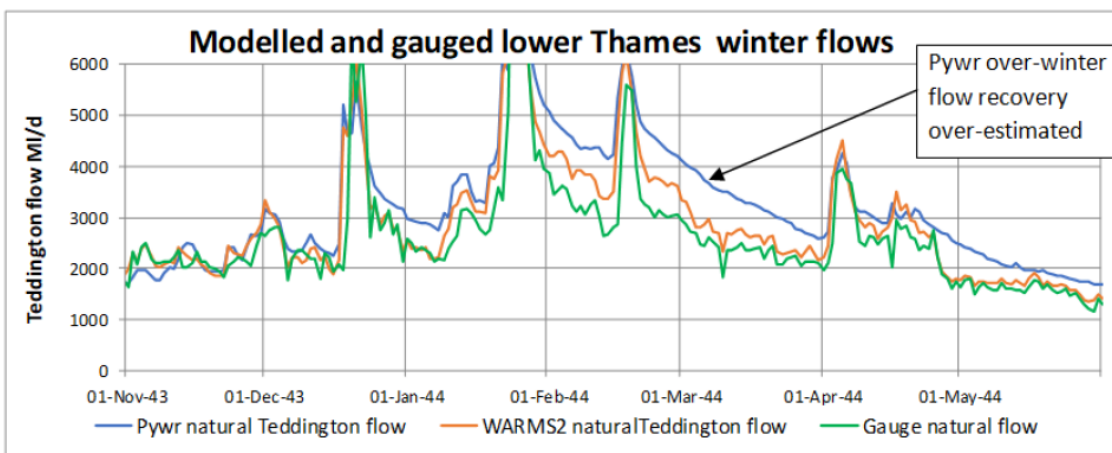
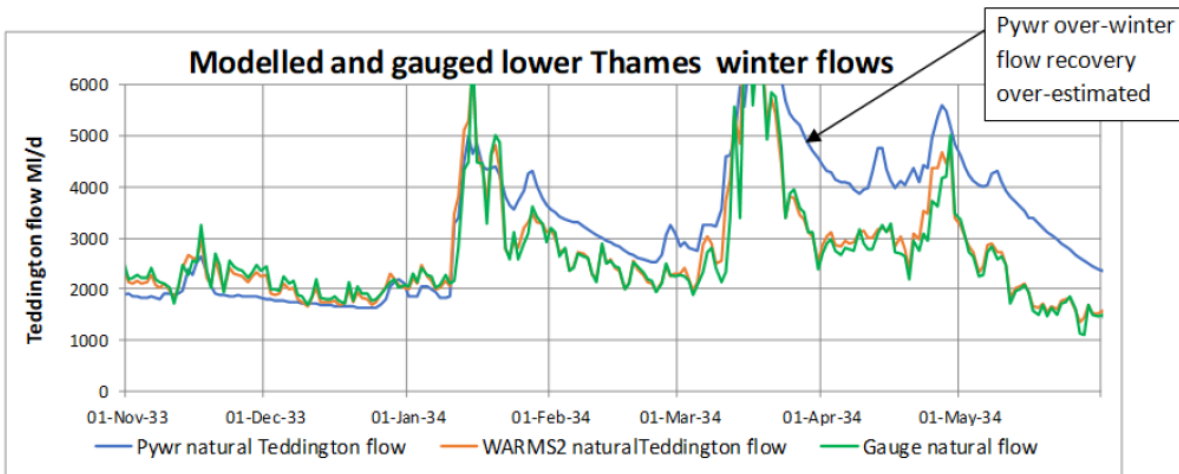
⁸¹ Thames Water (2024), "[Appendix: Defra request for further information](#)", October, paragraph 6.18.



Note: Thames Water’s plot of flows in the 1943–44 drought showed flows to the end of 1943 only, so failed to illustrate the overestimated flows in spring 1944, as shown in GARD’s plots below.

Source: Thames Water (2024), “[Appendix: Defra request for further information](#)”, October, Figure 6-5.

a) As shown in Thames Water’s response to DEFRA



b) as re-plotted by GARD and discussed with RAPID/OFWAT on 13th October 2023

Figure A6 - WRMP24 modelling over-estimation of winter flow recovery in long droughts

Comparing the latest Teddington modelled flows in the upper plot of Figure A6 with GARD's plot beneath of the previous version of WRMP24 modelled flows shows some slight changes in the latest over-winter flows in 1933–34, but they still greatly exceed the observed flows.

GARD's rebuttal of Thames Water's SoR on DO contains more details of GARD's concerns about the very poor calibration fits for the Pywr modelling of overwinter flow recovery in long-duration droughts⁸². It is extremely disappointing that, having been asked specifically by Defra to address the adequacy of modelling of over-winter flow recovery in long droughts, Thames Water has failed to do this. It is also disappointing that the Regulators seem to have failed to recognise this major weakness in Thames Water's response to Defra. GARD proposes that this should be rectified in RAPID/Ofwat's decision on the SESRO Gate 3 report.

Thames Water's response to Defra also attempted to justify the adequacy of its modelling by showing that modelling of historic droughts since 1920, using the new modelled flows, gives a London DO that is less than 1% different to the DO using WARMS2 flows based on historic data⁸³. Therefore, in the Final WRMP24, Thames Water made no material changes to the Pywr modelling that was used to generate the SESRO DO of 271ML/d.

However, the validation plots for the latest modelled London reservoir storages in the historic droughts, as shown in the plots on the next page, tell a different story.

- It is agreed that modelled reservoir drawdowns in the single-year critical drought of 1921 are almost the same, so the difference in modelled DOs is less than 1%.
- However, the Pywr modelled drawdowns in the severe 18-month droughts of 1934 and 1944 are about 25,000ML less than the WARMS2 modelled drawdowns, equivalent to DO differences of about 50ML/d.
- Winter refill of the reservoirs is still substantially overestimated in each of the 18-month droughts of the past 100 years: 1933–34, 1943–44 and 1975–76.
- There are large differences in summer drawdowns in many other years.

In GARD's opinion, the close match between modelled drawdowns and DOs in the 1921 drought was fortuitous. The widely differing drawdowns in many other years, especially the 18-month drought years, are indicative of the poor reliability of the Pywr modelling.

⁸² GARD rebuttal of Thames Water SoR on DO, pp. 7–15.

⁸³ Thames Water (2024), "[Appendix: Defra request for further information](#)", October, paragraph 6.18.

Overall, the plots of Pywr model validation on the next page⁸⁴ are damning evidence of the unreliability of the Pywr modelling, especially when simulating the long-duration droughts that are critical for the supplies using Thames Water's London reservoirs.

⁸⁴ The plots are copied from Thames Water's Final WRMP Figure I-23: Step 2 Pywr Model Validation Plots (y-axis is London reservoir storage in Ml).

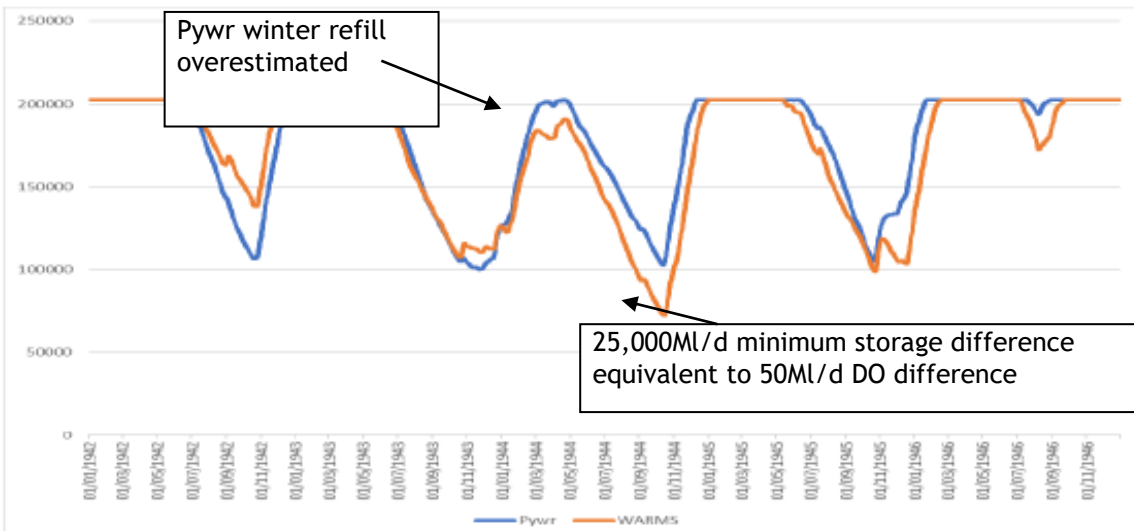
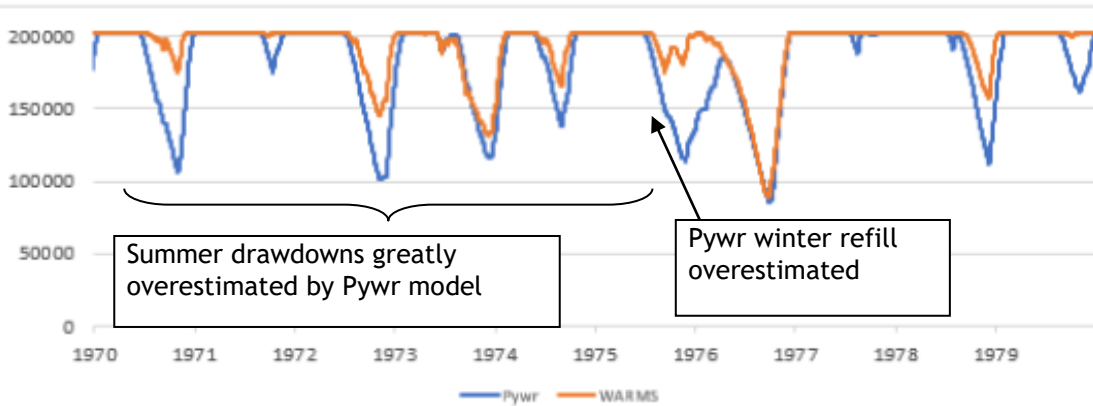
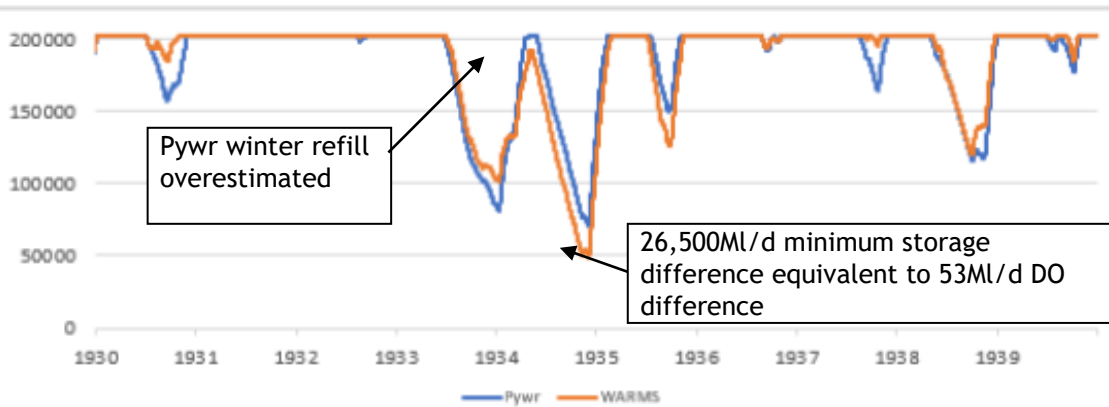
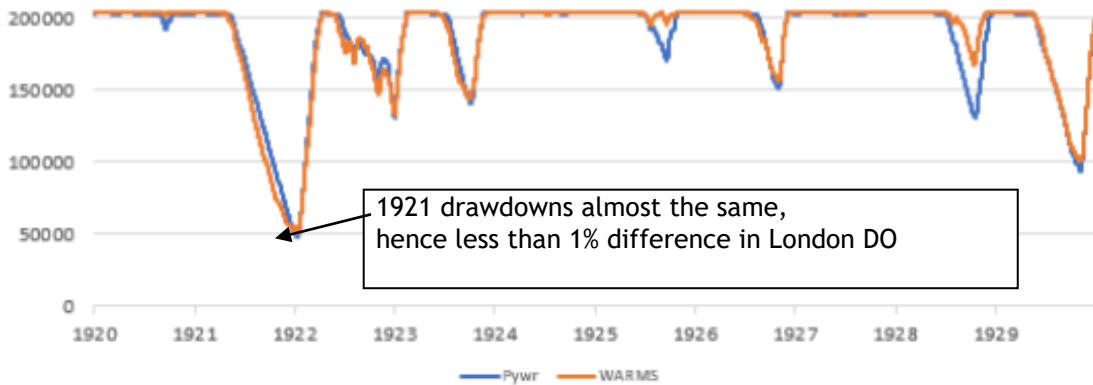


Figure A7 - Poor validation fits for Pywr modelling in historic droughts

Thames Water’s response to Defra on long-duration droughts

Thames Water’s response to Defra included this clarification of Defra’s request:

[Further elaboration of request given in annex, or clarification given subsequently](#)

Annex Issue 6

6.42 Thames Water has not provided sufficient assurance that the stochastic dataset used adequately reflects long duration droughts. Thames Water should critically assess how well the stochastic dataset represents the range of durations of critical historic droughts. Thames Water should consider investigating the model’s performance during long duration droughts, including those which may occur outside of the variants generated within stochastic replicates, and investigate the impact of such droughts on the deployable output of key supply schemes.

Thames Water has assessed how well the stochastic data set represents “*the range of duration of critical historic droughts*” by comparing rainfall accumulation plots for several stochastic and recorded data sets over durations of 1 year, 18 months, 2 years, 3 years and 4 years. It concludes that the stochastic rainfall datasets do not underestimate the likelihood of long-duration droughts, if anything overestimating their likelihood⁸⁵. In GARD’s opinion, the rainfall accumulation plots are not a valid test of the validity of the Pywr modelling of historic droughts because a) they do not test the reliability of converting the rainfall to river flows in long droughts and b) they do not take account of the complexity of the London supply system which is a mixture of reservoir, river and groundwater sources.

Thames Water has failed to address the Defra requirement to “investigate the model’s performance during long duration droughts, including those which may occur outside of the variants generated within stochastic replicates, and investigate the impact of such droughts on the DO of key supply schemes”. Instead, its response compares SESRO deployable outputs for four sets of river flow data: WRMP19 “worst historic”, WRMP19 stochastic, WRMP24 model using WRMP24 stochastics; and WRMP24 model using WRMP19 stochastics, as shown below.

Assessment	Deployable Output Benefit to London WRZ of 150 Mm ³ SESRO scheme (M/d), without Climate Change
WRMP19 – “Worst Historical”	283
WRMP19 – Stochastic	282
WRMP24	285
WRMP24 Models, using WRMP19 Stochastics	300

⁸⁵ Ibid., paragraph 6.50.

Source: Table 17 in Thames Water (2024), “[Appendix: Defra request for further information](#)”, October.

Table A4 - Thames Water assessments of SESRO deployable output using different river flow data sets

Using the WRMP19 stochastic data, which is “trained” on the historic weather of 1920–97, Table 17 (reproduced here as Table A4) shows the SESRO DO as 300ML/d. Thames Water uses this to argue that SESRO DO “*may be more linked to the underlying vulnerabilities of the London WRZ (to c.18-month drought events) rather than the specific events contained within an underlying series*”⁸⁶. In other words, Thames Water claims that training the stochastic data on historic weather including the severe 18-month droughts of 1933–34 and 1943–44 makes no difference to the DO of SESRO and its resilience to long-duration droughts.

To check the validity of Thames Water’s statement, GARD asked for Pywr model output data for the existing London scenario and the SESRO 150 scenario, showing duration of Level 4 failure (i.e. emergency supply restrictions) in each of the 15,600 years modelled using WRMP19 stochastic data. Thames Water supplied these data under EIR-25-26-420, dated 24th October 2025. GARD has analysed the failure frequency and duration data to generate the SESRO DO versus return period plot shown below:

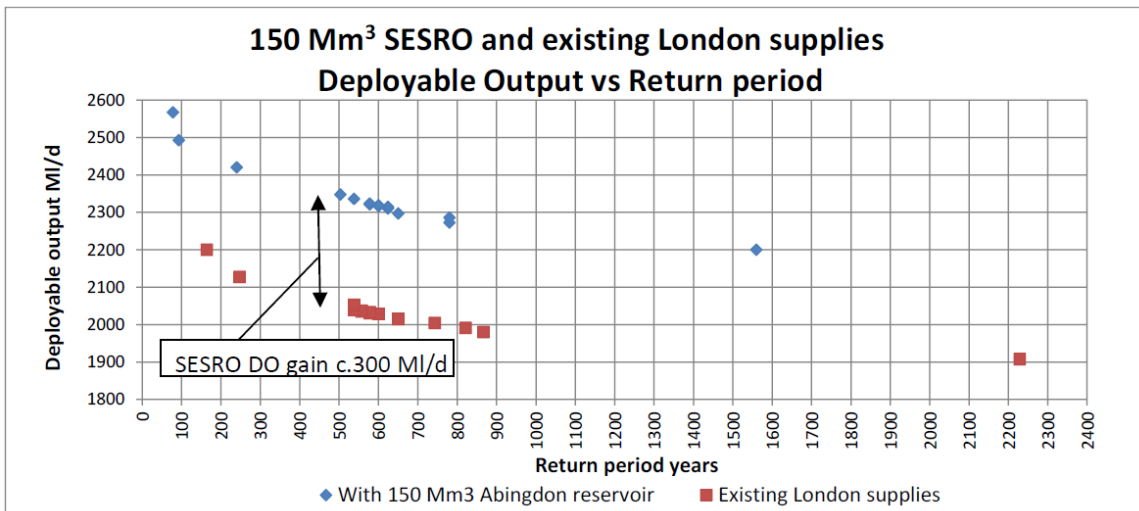


Figure A9 - DO vs return period for SESRO 150Mm³ using WRMP19 stochastic data

On the face of it, the above plot appears to show that SESRO still provides a 1:500 year DO gain of about 300ML/d when assessed using stochastic data trained on the historic period 1920–97, which includes the 18-month droughts of 1933–34 and 1943–44. However, GARD’s detailed inspection of

⁸⁶ Ibid., paragraph 6.54.

the modelled failure data provided under EIR-25-26-420 shows anomalies which undermine the credibility of the data and Thames Water’s conclusion that the data show that SESRO is resilient to droughts of longer duration than 18 months.

Firstly, the pattern of calendar years of failure using the WRMP19 data does not mirror the calendar years of the historic droughts, as was the case using the WRMP24 stochastic data. This is illustrated below:

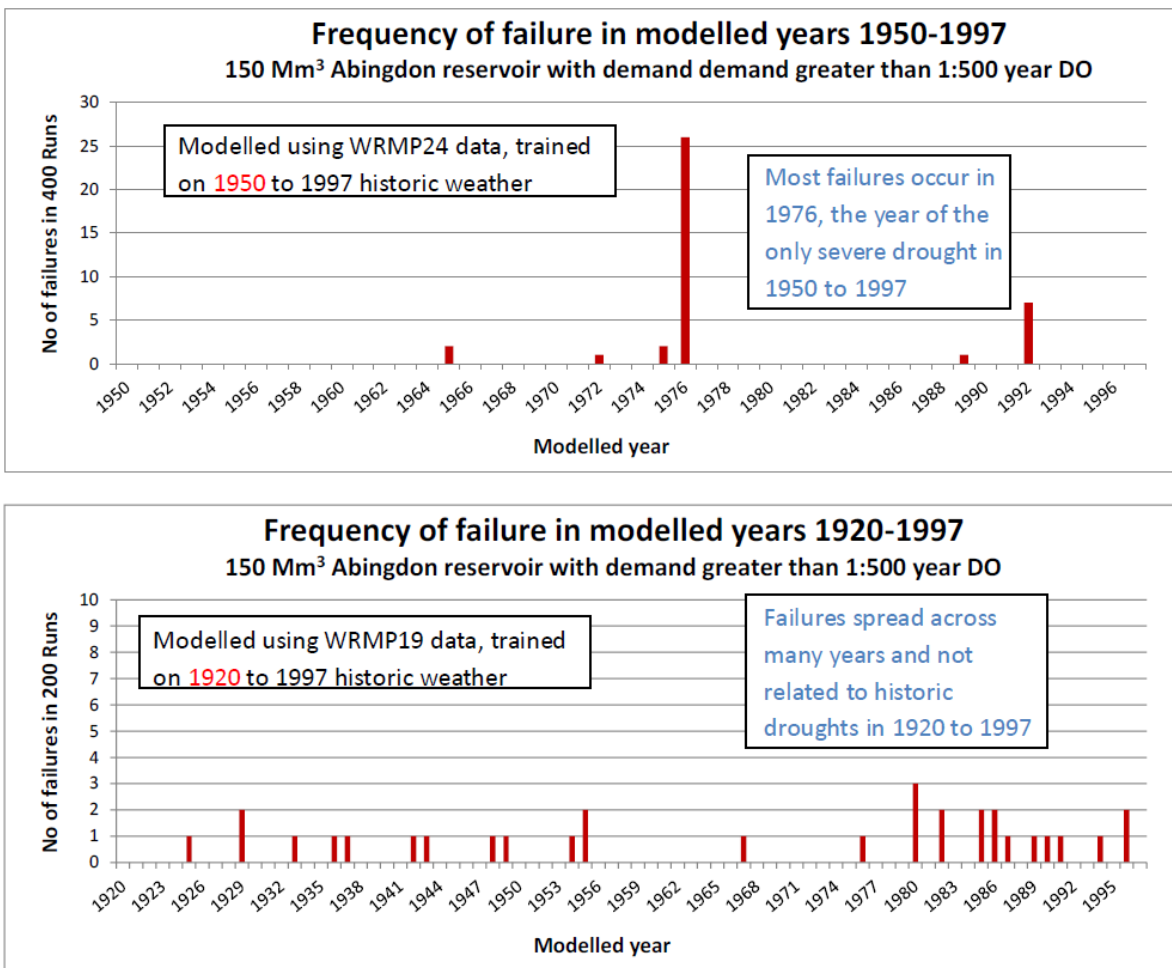


Figure A10 - Calendar-year failure frequencies using WRMP19 and WRMP24 stochastic data

The striking differences in the pattern of calendar years of failure between the WRMP19 and WRMP24 modelling suggests that there has been a fundamental change in the way that the stochastic data have been generated. This needs to be explained and justified by Thames Water.

The second concern over the validity of the analysis using WRMP19 data is that the modelled years of failure shown in the data supplied under EIR-25-26-420 bear no relationship to failure years shown by the stochastic data supplied to GARD in these files dated 29.05 2017. WRMP19:

Name	Size
Days_Weir_stochastic_flows_all	36,842 KB
FeildesWeir_stochastic_flows_all.csv	62,615 KB
Teddington_stochastic_flows_all.csv	56,003 KB

The data in these files are understood to be the data used in Thames Water’s WRMP19 modelling. However, GARD’s modelling of the London supply system using these data usually shows no significant droughts in the years when EIR-25-26-420 data show London supply failures in droughts of more than 1:500 year severity. An example is shown below:

Excerpt from EIR-25-26-420 Abingdon Level 4 failure data⁸⁷, with failure in 1975:

record	stochasti	demand	1973	1974	1975	1976	1977	1978
LTOA L4	cs	67	1.062	0	0	298	0	0

GARD modelling using WRMP19 stochastic data from Run 67, but showing no failure:

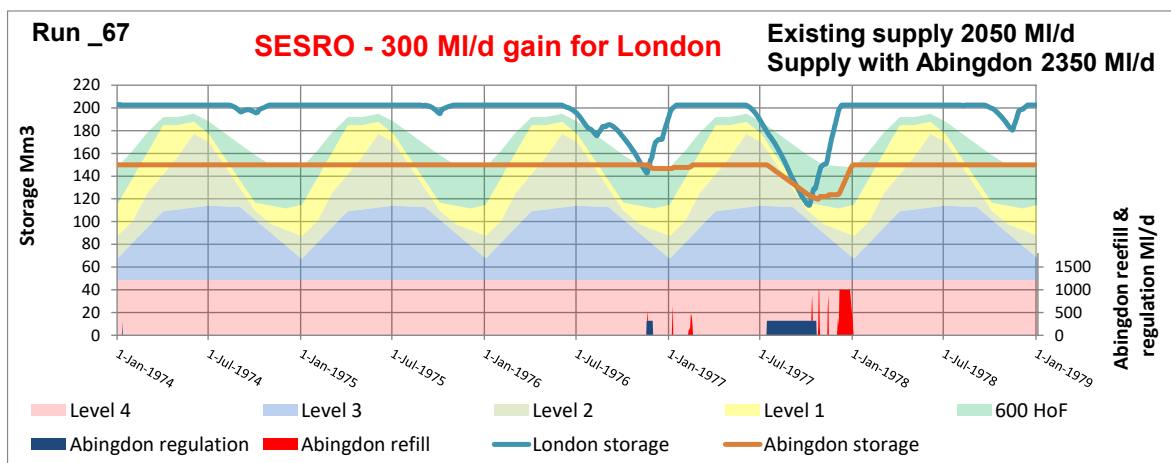


Figure A11- Example of EIR-25-46-420 data showing SESRO failure but not replicated by GARD modelling using WRMP19 stochastics

The excerpt in the upper part of Figure A11 shows a value of 298 for the year 1975, which the text of EIR -25-46-420 describes as:

⁸⁷ EIR-25-46-420 data file “tw-baseline-old stoch - SESRO DS OFF - dy-failures.csv”.

“From the information we have retained, we are not certain whether the figures represent the ‘last day under the curve’ (Apr-Mar year) or the ‘duration under the curve’, but this distinction does not impact the DO calculation.”

This is an extraordinary admission of Thames Water’s ignorance of its own analysis. If the value of 298 days was the duration of Level 4 emergency restrictions in London, it would have a catastrophic economic impact. However, GARD’s understanding is that 298 is the last calendar day of restrictions within the modelled year from April to March, i.e. 25th October.

The lower part of Figure A11 shows GARD’s modelling of the SESRO and London supply system meeting an additional SESRO-supported demand of 300MI/d with the stochastically generated river flows for Run 67 as supplied to GARD prior to WRMP19. The modelling shows little London reservoir drawdown in 1975 (or the surrounding years) and little use of SESRO storage. It appears that the stochastic data used to generate the data files provided under EIR-25-46-420 were not the same as the stochastic data provided to GARD prior to WRMP19 and which raised big concerns over the presence of long droughts that would greatly reduce the DO of SESRO.

Similarly, long droughts that existed in the WRMP19 data provided to GARD in WRMP19, do not appear to be represented in the data provided under EIR-25-46-420. An example is shown below:

Excerpt from Abingdon Level 4 failure data supplied under EIR-25-26-420 with no failure:

records	stochasti	cs	demand	1942	1943	1944	1945	1946	1947	1948
LTOA L4		151	1.062	0	0	0	0	0	0	0

GARD modelling using WRMP19 stochastic data Run 151 showing major supply failure:

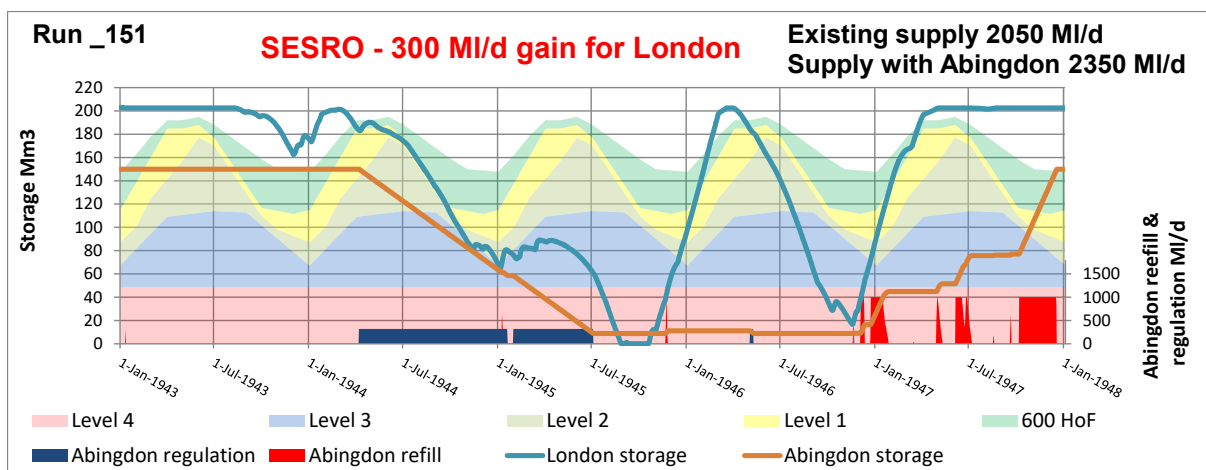


Figure A12 - Example of EIR-25-46-420 data not showing SESRO failure, when major failure is shown by GARD modelling using WRMP19 stochastics

The GARD model output in the lower part of Figure A12 shows that, using Run 151 stochastic data, SESRO would be empty by July 1945 and there would be about eight months of emergency restrictions in London, with the London reservoirs **empty** for several months. In the following winter, there would be a full recovery of storage in the London reservoirs, but no water available to refill SESRO. Consequently, with another severe drought following in 1946 and no water available in SESRO, there would be another several months of emergency restriction for London in 1946. The possibility of this nightmare scenario of a three-year drought was dismissed by Thames Water as being too improbable to contemplate. In GARD’s opinion, Thames Water has provided no analysis or data that reliably proves that a catastrophic three-year drought does not need to be considered in assessing the DO.

The danger of excluding long historic droughts from the records used to train the stochastic modelling was identified in WRSE’s Method Statement for Stochastic Climate Datasets⁸⁸:

“As with any dataset generated based on existing datasets using statistical methods, the stochastic weather sequences are only as good as the datasets on which they are trained. As stated above, the stochastic dataset is formed of 400 48-year sequences and is trained on the 1950-1997 baseline period. There is a risk that extreme, extended droughts may not necessarily be well reflected in the dataset, although quantifying this risk is extremely difficult. Companies may complement the stochastic dataset with drought artificial weather series to represent prolonged drought events (which the stochastic generator will not have been trained on).”

Despite this advice and the known concerns over long droughts, Thames Water has not followed WRSE’s advice by generating artificial long droughts *“to represent prolonged drought events (which the stochastic generator will not have been trained on)”*.

GARD’s Addendum to the WRMP24 consultation response provided an example of a long artificial drought, with the historic drought of 1933–34 being preceded by the flows of the moderately dry years 1996–97. This showed there would be catastrophic failure of London’s supplies during such an event and the DO of the 150Mm³ SESRO Reservoir, without climate change, would fall from 285Ml/d to 163Ml/d⁸⁹. GARD’s modelling to support this conclusion is shown in Figure A13 below.

⁸⁸ WRSE Method Statement on Stochastic Climate Datasets: Consultation Version, July 2020, paragraph 2.7.

⁸⁹ GARD Addendum to dWRMP24 consultation response, April 2023, pp. 36 to 37.

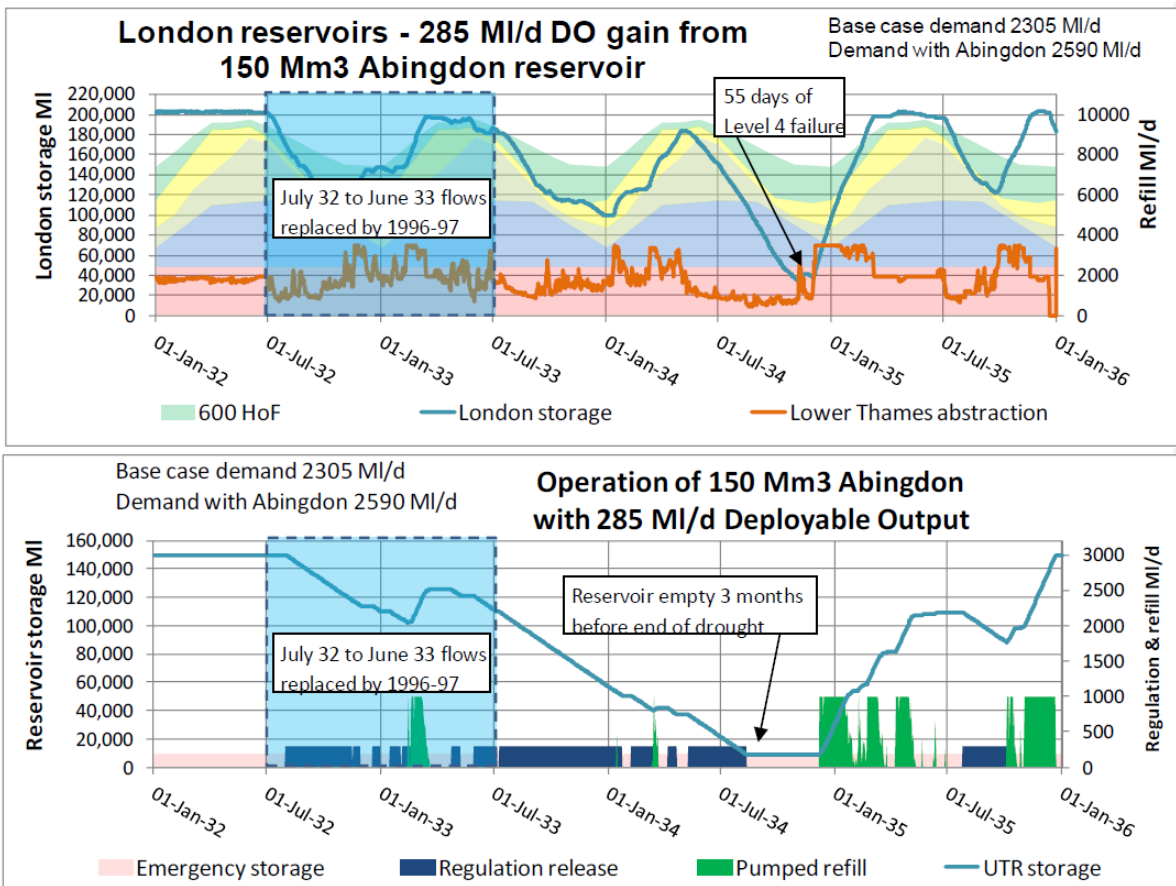


Figure A13 - Abingdon Reservoir in artificially extended historic 1934 drought

In this scenario, replacing the historic flows of mid-1932 to mid-1933 with the historic flows of mid-1996 to mid-1997 would lead to 55 days of Level 4 failures for London’s supplies, with SESRO being empty three months before the end of the drought. This would be a catastrophic failure of London’s supplies, with Level 4 restrictions starting in August 1934 at the peak of the tourism season. In this seemingly plausible scenario, the DO that can be sustained by SESRO is only 163MI/d, not 285MI/d.

4.6 Conclusion

In conclusion, the evidence demonstrates that the current deployable output attributed to SESRO lacks credibility and is not supported by a robust, transparent, or up-to-date assessment. The continued reliance on the 271MI/d figure—derived from earlier modelling, not reassessed at Gate 3, and based on assumptions that are demonstrably flawed—undermines confidence in both the scheme’s performance and the wider planning decisions that depend upon it.

The analysis set out above identifies a series of material issues, including uncorrected modelling errors, the use of inappropriate climate change scenarios, and significant shortcomings in the representation of long-duration droughts. While some of these issues may appear individually

modest, their cumulative impact is substantial and points consistently toward an overestimation of SESRO's deployable output. More fundamentally, the failure to adequately test the scheme against realistic sequences of multi-year droughts calls into question its claimed resilience under the very conditions for which it is intended.

Equally concerning is the lack of transparency and consistency in the underlying modelling, including unresolved discrepancies in stochastic datasets and the absence of clear, reproducible evidence to support key conclusions. The limited scope of Gate 3 modelling, drawing on only a fraction of available data, further reinforces the conclusion that no reliable reassessment of deployable output has yet been undertaken.

Taken together, these issues mean that neither the stated deployable output nor the associated drought resilience claims for SESRO can currently be relied upon. For a project of this scale, cost, and strategic importance, this represents a critical evidential gap.

A full, transparent, and methodologically sound reassessment of SESRO's deployable output is therefore essential. This must include correction of identified errors, consistent application of climate change scenarios, rigorous testing against long-duration and compound drought events, and publication of sufficient model outputs to enable independent scrutiny. Until such work is completed, the performance of SESRO remains unproven, and any decisions predicated on its assumed benefits would be premature and potentially unsound.

5.0 Concluding report

This submission has identified significant and interrelated weaknesses in the justification, assessment and progression of the SESRO. Across the four principal themes—consultation, cost, demand and need, and deployable output and drought resilience—a consistent pattern emerges: a lack of transparency, insufficiently robust evidence, and a failure to apply the adaptive, best-value principles required by policy and regulation.

The consultation process has not met the standards expected of a project of this scale and consequence, limiting meaningful stakeholder engagement and undermining confidence in the decision-making process.

At the same time, the economic case for SESRO has been fundamentally altered by the trebling of its estimated cost, without a corresponding, transparent reassessment of alternatives. This raises serious concerns about affordability, proportionality and whether SESRO remains the best-value option for customers and the environment.

The evidence also demonstrates that the need for SESRO has been overstated. Forecasts of demand have relied heavily on upper-bound assumptions for abstraction reductions, population growth and climate change, rather than the “most likely” scenarios recommended by planning guidance. This approach risks substantial over-provision of supply, with unnecessary financial and environmental consequences.

Finally, the credibility of SESRO’s deployable output and drought resilience claims is in doubt. The reliance on outdated modelling, combined with identified methodological flaws, calls into question whether the scheme can deliver the level of resilience it is intended to provide.

Taken together, these issues mean that the case for SESRO is not yet proven. Advancing the scheme in its current form would risk committing to a costly, inflexible solution that may not be needed, may not represent best value, and may not deliver the intended benefits.

This submission recommends that progression of SESRO be paused. A comprehensive and transparent reassessment is required, including:

- a lawful and effective consultation process;
- a full and updated comparative cost analysis of all viable alternatives;
- a robust, evidence-based review of demand and need, grounded in adaptive planning principles; and
- an independently verified reassessment of deployable output and drought resilience.

Only once these steps have been completed, and the evidence clearly demonstrates that SESRO is necessary, affordable and represents best value, should further decisions on the scheme be taken. Without this, there is a significant risk of proceeding with a project that imposes avoidable costs and irreversible impacts on both customers and the environment.

Appendix A : Glossary of Terms

Abstraction

The process of taking water from a natural source such as a river, reservoir, or groundwater aquifer for public supply or other uses.

Abstraction Reduction

A planned decrease in the amount of water taken from rivers or groundwater sources, typically to improve environmental conditions and river flows.

Adaptive Planning

A planning approach that accounts for uncertainty by developing flexible strategies that can be adjusted over time as new information becomes available.

As Low As Reasonably Practical (ALARP) principles are a safety principle requiring that risks be reduced to the lowest level possible, unless the cost or effort of further reduction is grossly disproportionate to the benefit.

Best Value

An assessment framework used in water resource planning that considers cost, environmental impact, resilience, and wider social benefits to determine the most appropriate option.

Capex (Capital Expenditure)

The upfront cost of building infrastructure, such as reservoirs, pipelines, or treatment works.

Dam Breach Analysis (DBA) is a technical engineering simulation used to estimate the potential consequences of a dam failure by modelling the resulting flood wave.

Deployable Output (DO)

The amount of water that can be reliably supplied from a water source during a drought, while meeting environmental and operational constraints.

Development Consent Order (DCO) is a type of legal instrument specifically used in England and Wales, that grants permission for the construction and operation of Nationally Significant Infrastructure Projects (NSIPs).

Drought Resilience

The ability of a water supply system to continue to meet demand during periods of low rainfall and prolonged dry conditions.

Environmental Impact Assessment (EIA)

Environmental Destination (ED)

A regulatory framework that sets long-term targets for improving the ecological health of rivers and water bodies, often requiring reductions in abstraction.

Environmental Flow Indicators (EFIs)

Benchmarks used to assess whether river flows are sufficient to support healthy ecosystems.

Gate 2 / Gate 3 (RAPID Process)

Stages in the development of Strategic Resource Options (SROs):

Gate 2: Detailed feasibility, design, and early cost assessment

Gate 3: Finalised design, updated costs, and readiness for planning approval

GARD (Group Against Reservoir Development)

A stakeholder group opposing the development of the SESRO reservoir and advocating for alternative solutions.

Ipsos-MORI are the opinion gathering organisation, they lead and assessed to pre DCO non-statutory consultation in August 2024.

Least-Cost Plan

A water resource plan that meets supply-demand needs at the lowest financial cost, often used as a baseline for comparison with “best value” plans.

MI/d (Megalitres per day)

A unit of water volume representing one million litres per day, commonly used to measure water supply and demand.

ONS (Office for National Statistics)

The UK’s official provider of population and economic statistics, often used as a baseline for population projections.

Pywr modelling

Pywr is an open-source, Python-based library for building dynamic, network-based simulation models, primarily used to manage water resources.

RAPID (Regulators’ Alliance for Progressing Infrastructure Development)

A partnership of UK water regulators overseeing the development of large-scale water infrastructure projects.

SESRO (South East Strategic Reservoir Option)

A proposed large reservoir in Oxfordshire intended to supply water to the South East of England.

Severn Thames Transfer (STT)

An alternative water supply scheme involving the transfer of water from the River Severn to the River Thames.

Strategic Resource Option (SRO)

Large-scale water infrastructure schemes identified to meet future regional water supply needs.

Water Framework Directive (WFD)

A piece of UK and EU-derived legislation aimed at improving the ecological and chemical status of water bodies.

WRMP (24) (Water Resources Management Plan) (brackets states the year)

A statutory plan produced by water companies outlining how they will balance water supply and demand over at least 25 years.

WRPG (Water Resources Planning Guideline)

Guidance issued by regulators to ensure consistent and robust water resource planning.

WRSE (Water Resources South East) The regional planning group responsible for coordinating water resource strategy across South East England.

Appendix B Expert Contributors to GARD: Biographical Summaries

John Lawson, MA, FEng, FICE, FCIWEM

John Lawson is a civil engineer specialising in water resources engineering. In 2002, he was invited to become a Fellow of the Royal Academy of Engineers in recognition of his contribution to water resources engineering.

He worked for Halcrow Group Ltd., Consulting Engineers, from 1968 to 2007. Throughout his career he was engaged on projects for water supplies, flood control, irrigation and hydropower. He has been responsible for numerous water resource planning studies in England and Wales, with a particular focus on minimising the impact of water supplies on the environment.

Since retirement from Halcrow, he has worked as a water resources adviser to many rivers trusts, helping them to combat impacts of water supplies on river environments, particularly for chalk streams in the South East.

Professor Chris Binnie

Professor Chris Binnie is a civil engineer specialising in dam design and construction. He has a degree in Mechanical Sciences and in law from Cambridge University and completed the Imperial College post graduate course in soil mechanics specialising in dam design. He has been a Fellow of the Institution of Civil Engineers (ICE) since 1976. He became a Fellow of the Chartered Institution of Water and Environmental Management (CIWEM) in 1976, and was President in its centenary year, 1995. He was elected a Fellow of the Royal Academy of Engineering in 1994. He was an Honorary Professor at Kingston University from 1995-2007 and then at Exeter University 2008-2025 lecturing on dam design.

Chris was founder chairman of the CIWEM Water Resources Expert Panel in 1992 and continued to serve on it until 2022. He was a member of the ICE Water Board from 1987 to 2019. He was a Panel Engineer under the Reservoirs Act from 1980 to 2008 including serving on the ICE Reservoirs Committee and interviewing candidates for Panel Engineer status. He has been a member of the British Dams Society since 1973.

Chris worked for Binnie & Partners, the consulting engineering company founded by his great grandfather, from 1969 to 1978 working primarily on dam design including the 70m high Marchlyn dam. He was site staff on the construction of the earth fill Grafham reservoir and the Farmoor reservoir. He then joined WSAtkins as head of their water consultancy. His work included the design of the 70m high Gargar dam, the detailed design of the 50m high Aid Zada dam, and the design verification of the 110m high Yuvecik dam in an earthquake prone area in Tukey. He reported on the raising of the existing Abberton dam, and on the Darwell dam, and on the design of 30m high Broadoak dam in Kent. He was Construction Engineer for the Norton Fitzwarren dam and

Newdale reservoir. In 1994 he became a Main Board Director of WSAtkins including floating the company.

Derek Stork – Chairman, GARD

Dr Derek Stork is Chairman of the Group Against Reservoir Development (GARD) and a highly experienced physicist with a distinguished career in science, engineering, and public policy. He holds a BSc and PhD in Physics, is a Chartered Physicist (CPhys), and a Fellow of the Institute of Physics (FInstP).

Derek's professional career includes serving as Director of Technology at the UK Atomic Energy Authority, where he was responsible for leading major programmes in complex, high-risk technological environments. His work required rigorous analytical skills, strategic oversight, and a strong focus on evidence-based decision-making—expertise he now brings to his role at GARD.

Derek has played a leading role in scrutinising the technical, environmental, and strategic case for SESRO. He has been instrumental in coordinating expert input across multiple disciplines, contributing to detailed assessments of water resource planning, engineering feasibility, environmental impacts, and regulatory processes.

Under his leadership, GARD has developed a reputation for producing robust, evidence-led analysis and engaging constructively with consultations, regulators, and policymakers. Derek's work reflects a commitment to ensuring that major infrastructure decisions are transparent, proportionate, and based on sound science and engineering.

Neil Tiley

Neil Tiley is an associate member of the Royal Town Planning Institute and has worked in the private sector for over nine years. He currently holds the position of Senior Director having previously been a Director, an Associate Director and before that a Principal Planner at Pegasus Group.

Throughout his time at Pegasus Group, he has been responsible for critiquing population and household projections prepared in support of emerging Local Plans, and for developing the methodology for preparing such projections in-house. Prior to this he was employed in Local Government for 11 years, including as a Planning Manager at Wiltshire Council for 5 years; as a Senior Planner at Wiltshire County Council for 2 years; as the Demographer at Wiltshire County Council for 2 years; and as a Senior Research Assistant responsible for monitoring and analysing housing completions and undertaking demographic modelling for 2 years.

Mike Grieg

Mike Greig is a highly experienced finance professional with a distinguished career in both the public and private sectors. He holds an MA in Natural Sciences from the University of Cambridge and an MSc in Physics from the California Institute of Technology, and has completed the Program for Management Development at Harvard Business School. He is a Fellow of the Chartered Institute of Management Accountants (FCMA).

Mike served as Chief Financial Officer of RM plc from 1994 to 2010, a FTSE 250 company, where he was responsible for finance, legal and IT functions across international operations. He also held senior roles at CASE Group plc and has been a non-executive director of several listed companies, including Aberforth Geared Income Trust plc.

Since 2015, Mike has been the finance lead for SAFERWaterS and GARD, where he has undertaken extensive independent analysis of water industry finance, regulation and investment planning. His work includes detailed modelling of long-term costs and returns, scrutiny of Water Resources Management Plans (WRMPs), and critical analysis of regulatory frameworks and company financial performance. He has contributed to numerous consultation responses and engaged directly with regulators, industry leaders and academic experts on water policy and financial governance.

Appendix C: Links to Referenced Documents

The documents listed below are referred to throughout this evidence submission and provide supporting data, analysis, and context for the points raised. They include consultation responses, and independent technical reviews.

All documents can be accessed via the links provided below or, where applicable, through the relevant organisational websites. These sources are essential for understanding the basis of the arguments presented in this report and for enabling further scrutiny of the evidence.

[GARD response to RAPID GATE 3 submission](#) – January 2026

[GARD response to Thames Water pre DCO submission](#) – January 2026

[Binnie Report on aspects of SERSO Dam Design](#) – January 2024