Strategic regional water resource solutions: Preliminary feasibility assessment

Gate-1 Submission for Upper Derwent Valley Reservoir Expansion Strategic Resource Option

Date: 6 December 2021

Template version: Final

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Abbreviations	Terms
AIC	Annual Incremental Costs
CAP	Competitively Appointed Provider
DBFOM	Design, Build, Finance, Operate and Maintain
DCO	Development Consent Order
DO	Deployable Output
DPC	Direct Procurement for Customers
DWI	Drinking Water Inspectorate
DWSP	Drinking Water Safety Plan
EA	Environment Agency
HRA	Habitat Regulations Assessment
INNS	Invasive Non-Native Species
Ml/d	Megalitres per day
NAU	National Appraisals Unit
NPV	Net Present Value
NSIP	Nationally Significant Infrastructure Projects
SAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SPA	Special Protection Area
SRO	Strategic Resource Option
SSSI	Site of Special Scientific Interest
STW	Severn Trent Water
tCO_2e	Tonnes CO_2 equivalent
TCPA	Town and Country Planning Act 1990
UDVRE	Upper Derwent Valley Reservoir Expansion
WFD	Water Framework Directive
WRE	Water Resources East
WReN	Water Resources North
WRMP	Water Resources Management Plan
WRW	Water Resources West
WTW	Water Treatment Works
YW	Yorkshire Water

1. Executive Summary

Opening Statement

1.1 Upper Derwent Valley Reservoir Expansion (UDVRE) Strategic Resource Option (SRO) is a viable solution that offers increased storage to provide additional raw water to support existing and/or new water treatment works operated by Severn Trent Water (STW) and Yorkshire Water (YW).

1.2 The additional raw water source is intended to be transferred by gravity to the point(s) of abstraction, offering a near-zero operational carbon and OPEX support system. This will ultimately be dependent on the preferred solution identified through gate-2.

1.3 We recognise that the solution presents a significant challenge, given its geographical location in the Peak District National Park.

1.4 Nonetheless, it is precisely because of its location that we believe the solution offers a significant and unique set of benefits. These would contribute to England's National Framework for Water Resources and the UK Government's legally binding carbon net zero target by 2050.

1.5 The recent reconciliation of regional plans has confirmed the need to increase sources of raw water. Faced with unprecedented pressures on the UK's water resources, we believe the scheme warrants wider review from regulators, stakeholders and customers.

1.6 UDVRE SRO offers a robust, reliable and resilient source of raw water to support either regional or inter-regional supply-side options to increase Deployable Output. A scheme variant was selected in STW's initial Water Resources Management Plan 2024 (WRMP24) investment modelling outputs and included in the company reconciliation submission to Water Resources West (WRW).

1.7 Our high-level gate-1 assessments did not identify any environmental or water quality showstoppers. STW and YW therefore propose to partner to deliver the scheme, and recommend that it be considered as a new, additional strategic water resource option through the RAPID gated process.

1.8 The inclusion of UDVRE SRO as a new solution has been discussed with RAPID and meets the defined criteria to be included in the programme, as detailed in Chapter 16.

1.9 The ultimate recipient(s) of the water resource benefit will be determined by modelling undertaken by WRW, Water Resources North (WReN) and Water Resources East (WRE) to provide the best-value plan for customers across the three regions.

1.10 The source of raw water, an expansion of the Derwent Valley Reservoir group, is shown in Figure 1.1.

Figure 1.1: Source of Raw Water – Expansion of Derwent Valley Reservoir Group

Key Facts

1.11 UDVRE SRO would provide additional storage at the Upper Derwent Valley Reservoir group by either raising the existing dam(s), constructing a new dam immediately downstream in close proximity to the existing dam(s), or development of a fourth reservoir with the construction of a new dam. We have considered a range of new reservoir top water levels (TWL) which result in a range of benefits up to doubling the existing storage capacity of the reservoir group.

1.12 We have yet to determine the increased yield the scheme could deliver. This will be modelled for our gate-2 submission across a range of increased TWLs.

1.13 The scheme offers a low level of embodied carbon when compared to other SROs. The gravity supply to the point(s) of abstraction would offer near-zero increases in operational carbon and OPEX for both companies.

1.14 The increased storage would support existing or increased raw water abstractions used by STW at Bamford water treatment works (WTW), and YW at Rivelin WTW, through the bulk export agreement.

1.15 STW currently has a WRMP24 feasible solution to stop the bulk export to YW by 2035, in order to reduce the supply-demand deficit in its Strategic Grid Water Resource Zone. UDVRE SRO would allow STW to maintain the export for at least the remainder of the existing agreement period to 2084. It would also negate the need for YW to develop its own in-region scheme to backfill the lost Deployable Output, which is likely to be an expensive CAPEX and OPEX, and high-carbon, option.

1.16 The scheme could also allow additional releases to the River Derwent to support existing or new downstream abstractions. These could deliver multi-sector benefits, which will be investigated and quantified in gate-2.

Conclusions

1.17 UDVRE SRO offers a robust, reliable and resilient source of additional raw water at the headwaters of the existing gravity system supporting STW and YW abstractions.

1.18 The project would be construction-ready in AMP8, as per the Final Determination requirement. The earliest Deployable Output would be 2033. There is potential for this date to be brought forward, as it incorporates a three-year reservoir filling period.

1.19 The additional storage could support any combination of regional abstractions or inter-regional transfers up to the increase in yield.

1.20 STW has an existing agreement with the EA to make flood drawdown discharges at certain times. We will review this agreement in light of the increased storage to consider further flood risk mitigation opportunities.

1.21 At this stage, we have not yet considered the most likely procurement route. Procurement options will be explored in detail for our gate-2 submission, but at this stage, it is likely that this SRO would fail the discreteness test.

1.22 As detailed in paragraph 1.6, this scheme is included in STW's WRMP24. STW has therefore carried out a preliminary high-level feasibility study, which supports our view that the scheme is a feasible option. However, the scheme is still at an early stage of development and our gate-1 submission is not as mature as the existing SROs. We aim to address this and gain parity by the time of our gate-2 submission, in line with the expectation set by RAPID.

1.23 Further work is required to refine the proposal for gate-2 and, in particular, confirm:

- The optimum increased TWL, balancing the impact on the Grade II listed dams, the landscape impact in the National Park, the water resource needs identified by WRW, WReN and WRE, and the CAPEX cost of delivering the increased storage capacity.
- How the scheme will perform under a range of climate change scenarios and the extreme drought (1-in-500-year return period) to re-assess the maximum increase in yield.
- The Strategic Environmental Assessment (SEA), Habitat Regulations Assessment (HRA), and Water Framework Directive (WFD) impacts.

2. Solution Description

Outline of the Solution

2.1 The three cascading reservoirs forming the Upper Derwent Valley Reservoir group provide the raw water supply for STW's Bamford WTW and YW's Rivelin WTW through a bulk export agreement that runs until 2084. The agreement is severable by 2035 with notification by 2030.

2.2 The two upper reservoirs, Howden and Derwent, provide a gravity flow to the two WTWs. The supply from Ladybower, the lowest of the three reservoirs, requires pumping to either of the two WTWs. The reservoirs provide compensation flow to the River Derwent.

2.3 Bamford WTW has a maximum output capacity of 202 Ml/d, but in drought years output is reduced, at times as low as 80 Ml/d, to protect storage in the reservoirs . The export to YW is similarly reduced during these periods.

2.4 This constraint on a low-carbon, low-OPEX source of raw water restricts the Deployable Output of both STW and YW supply systems and increases costs for customers. It also restricts both companies' ability to deal with planned and unplanned outages across the networks.

2.5 As part of the WRMP19 process, STW identified a feasible solution that would stop or reduce the export to YW, thereby increasing Deployable Output in Severn Trent Strategic Grid Water Resource Zone. STW discussed this option with YW and it immediately became apparent that to backfill the lost export and maintain YW's own Deployable Output capability would require significant and complex investment within the YW Grid Water Resource Zone.

2.6 YW has already identified potential in-region solutions to provide a replacement Deployable Output. These solutions will be developed in sufficient detail to allow a robust cost-benefit comparison to be submitted for gate-2.

2.7 The high-level concept design behind the current proposal is relatively straightforward. It would increase the usable storage capacity within the reservoir group by one of the following:

- Increasing the TWL of the existing reservoir(s) by raising the existing dam(s).
- Increasing the TWL of the existing reservoir(s) by constructing a new dam immediately downstream, and in close proximity to the existing dam(s).
- Developing a fourth reservoir in a suitable location with the construction of a new dam.

2.8 Increased storage would allow abstractions from the reservoirs to be maintained during drought years and prolonged periods of high demand. There may also be the potential to increase abstraction to support an increase in the bulk export to YW. This could provide further benefit to YW if it allowed for reduced support to the Rivelin-supplied area from elsewhere in the region. This option will be considered in detail for our gate-2 submission.

2.9 By maintaining or increasing abstraction levels, both companies would be able to maintain output from one of their lowest-carbon and lowest-OPEX sources of treated water available to supply their customers.

2.10 In addition to maintaining supply to the two WTWs, increased storage could allow additional releases to the River Derwent. These releases could form part of a 'Put & Take' arrangement to support abstractions further downstream from the River Derwent, which could be for public water supply or other abstractors. We will consider these options for our gate-2 submission after discussing the principle with the Environment Agency (EA).

Overall Costs

2.11 The costs associated with an indicative new TWL are shown in Table 10.1. All costs are presented in 2019/2020 prices. At this stage, we assume there would be no additional OPEX cost component to this scheme. The existing OPEX costs attributable to our inspection and maintenance activities are considered sufficient, regardless of the height of the existing or new dam(s). This assumption will be reviewed for our gate-2 submission.

2.12 STW costs have not yet been presented to any of the regional groups for options appraisal. We will look to present the fixed annual charge and a variable charge to the regional groups in time for their in August 2022 regional plans.

2.13 The forecast spend for gate-2 activities is shown in Table 14.1. Further work is required to understand the activities and budget required post gate-2. We plan to have discussions with RAPID prior to our detailed proposal, which will be included in our gate-2 submission.

Resource Benefit of the Solution

2.14 UDVRE SRO offers a robust, reliable and resilient source of raw water to support direct reservoir abstractions and downstream River Derwent abstractions.

2.15 As a raw water source SRO, this scheme may have some Deployable Output benefit that has not yet been fully assessed. This benefit would be realised by continuing to support existing assets, or through the abstractions supported by the scheme as part of existing or new supply-side options delivered through the regional plans and company WRMP preferred plans.

2.16 As detailed in paragraph 1.12, we have not yet assessed the increased yield the scheme could deliver. We will determine this for our gate-2 submission and consider options to deliver Deployable Output benefits under various climate change scenarios and the 1-in-500-year extreme drought.

Summary of Social, Environmental and Economic Assessment

2.17 As a new SRO, we have yet to determine the wider social, environmental, and economic benefits that the scheme could deliver.

2.18 Acknowledging that the initial WRMP24 environmental appraisals were limited in scope, they did confirm that the scheme is feasible, and no showstoppers were revealed.

Drinking Water Quality Considerations

2.19 We do not anticipate any adverse effects on downstream Drinking Water Safety Plans (DWSP) as there would be no change in the source of raw water for existing abstractions.

2.20 The scheme would also avoid the need to change the source of water to YW customers supplied from its Rivelin WTW if STW stopped the existing export.

2.21 No specific drinking water quality considerations have been assessed at scheme level. These assessments will need to be completed for each supply-side option that makes use of existing or new abstractions.

Wider Resilience Benefits

2.22 At this stage, we have not yet considered in detail the potential wider resilience benefits that could be delivered as part of the scheme. This will form a key part of our gate-2 activity. At this stage, we believe the benefits could include additional support for STW's Carsington Reservoir using either the existing abstraction from the River Derwent or a new-piped transfer. This in turn could support STW's Tittesworth Reservoir via a new piped transfer to allow Tittesworth WTW output to be maintained during summer periods. This is a scheme selected by STW's initial WRMP24 investment modelling outputs.

2.23 We will consider potential multi-sector benefits involving new downstream abstractions, wider environmental benefits from increased compensation releases during periods of drought, and flood risk mitigation opportunities.

Interactions with Other Solutions

2.24 As a new SRO, there is currently no direct interaction with the existing SRO schemes included in the RAPID gated process. As part of the gate-2 process, we will work to understand any potential interactions with other SROs.

2.25 As a source of additional releases into the River Derwent, there is a potential interaction with SROs that abstract water from, or reduce flow in, the River Trent, e.g. South Lincolnshire Reservoir and Minworth SROs. These will be considered for gate-2 as part of the WRE regional modelling exercise.

Meeting the National Framework Requirements

2.26 The National Framework explores England's long-term water needs, aiming to increase supplies and move water to where it is needed. UDVRE SRO provides a viable, near-zero operational carbon, low-OPEX way to store large volumes of water for the benefit of public water supply across WRW and WRE regions.

2.27 We believe the UDVRE SRO represents a robust, reliable, and resilient source to help deliver resilience to the 1-in-500-year extreme drought.

2.28 The UDVRE SRO will be reflected in both water company WRMP24 plans and the WRW and WRE regional plans.

3. Outline Project Plan

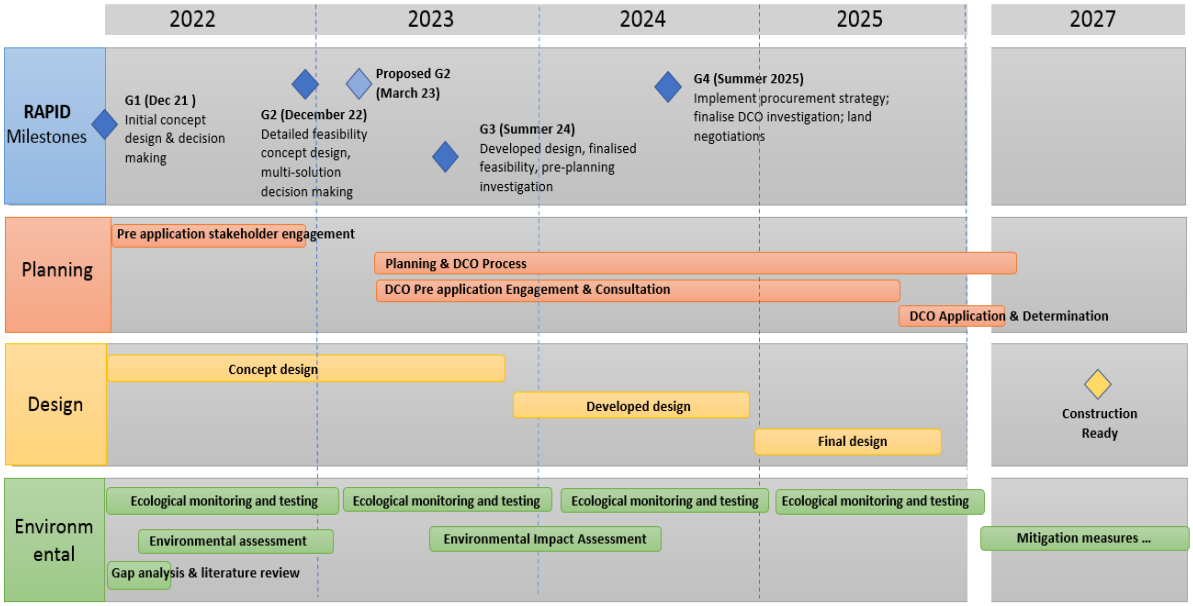
3.1 The UDVRE plan is identified in the WRMP process and is in the early stages of the development process. As a result, it has not yet been developed to the level of detail of our other four SROs. Both partner companies agree that it is appropriate for the UDVRE SRO to enter the gated process.

3.2 Experience from other SROs has enabled us to start building a programme to define a realistic timeline. At the gate-1 stage, this is presented as the 'most likely' timeline, with earliest possible dates for milestones. There is inherent risk to these dates should the 'most likely' route not be followed.

3.3 As outlined in Chapter 7, our opinion at this time is that the project would meet the criteria for a Nationally Significant Infrastructure Project (NSIP) for new dam builds and enhancement of existing dams. The Development Consent Order (DCO) process will be followed for planning purposes and applications.

3.4 Figure 3.1 shows a timeline for being construction-ready in 2027. This 'most likely' timeline has been developed to account for all the key activities being delivered in the shortest possible timeframe. This will be developed further following approval of gate-1 but is in line with the RAPID expectation to be construction-ready by the period 2025-2030.

Figure 0.1: Project-level Plan Showing RAPID Gateways



DCO = Development Consent Order

Phasing of Key Activities and Decisions

3.5 The raising of dams is not a common activity in the UK, especially those of the scale being considered in this SRO. The engineering, planning and stakeholder activities would be highly complex and require close management to ensure effective programme delivery. Further, the environmental and procurement activities present complexities and risks that will also require close management.

3.6 The timeline will be significantly impacted by the planning and final procurement routes chosen for delivery. The 'most likely' timeline shows the Deployable Output date to be 2033.

3.7 Analysis of the longest possible timeline indicates the Deployable Output date would be 2037. Further work will be undertaken following gate-1 to understand the potential of the scheme and identify risks that could impact the timeline for delivery.

3.8 Flexibility with the RAPID gate dates may be required to allow sufficient development and ensure the decision-making process can meet the 'most likely' path as identified.

3.9 To enable key activities to be progressed as a more detailed level, we propose an alternative gate-2 date of March 2023. This will ensure that we are able to make robust recommendations, fully supported by the appropriate level of investigation. It has no impact on our ability to meet the RAPID expectation of being construction-ready in the period 2025-2030.

Key Decision Points

3.10 This SRO relies upon timely output from RAPID at gate-2 and a decision on the appropriate consenting route, including any planned associated development with other SROs, to allow progression of the DCO pre-application in line with our plan shown in Figure 3.1.

Assumptions

3.11 The main assumptions at this stage are:

- There is minimal delay between gate dates: for example, gate-3 activities can commence during the gate-2 query period.
- The are no showstoppers identified during our environmental and engineering activities.
- We can successfully address any stakeholder concerns throughout the life of the SRO.
- The DCO process allows a total period of up to four years (based on information shared by the Planning Inspectorate at the RAPID Quarterly Liaison Meeting in September 2021).

4. Technical Information

Initial Concept Design

4.1 The high-level concept design underpinning the UDVRE SRO is relatively straightforward. As the existing raw water source for STW's Bamford WTW and YW's Rivelin WTW, the reservoir group (originally developed in the 1900s) is the obvious location to provide additional storage to support existing abstractions and potential new abstractions from the River Derwent.

4.2 From an engineering perspective, increasing storage capacity can be achieved in several ways, including:

- Upstream or downstream widenings of the existing dams.
- Vertical raising of the existing dams using post-tensioned anchors.
- Construction of a new dam immediately downstream, in close proximity to the existing dam.
- Development of a fourth reservoir with the construction of a new dam.

4.3 Upstream raising would require significant periods of reduced water levels, which would impact on the normal operation of the reservoir. For this reason, we have assumed either a downstream widening or vertical raising options will be developed, though this will be considered in detail for gate-2.

4.4 Construction of a new dam is assumed to be a significantly more expensive option, but will be considered in an early options appraisal for gate-2.

4.5 The design concept and costings for the dam raising are based on existing available information and reasonable engineering assumptions. None of the three dams was designed to

accommodate future raising. We propose to undertake ground investigations during gate-2 to support the next stage of the design.

4.6 The downstream widening and vertical rising options require only limited temporary lowering of reservoir water levels during the construction phase. We will determine the exact requirements, and impact on operational regimes, for our gate-2 submission.

Operations and Maintenance Considerations

4.7 The reservoirs are currently operated and maintained by STW, including the critical inspection activities required under the Reservoirs Act 1975, as amended by the Flood and Water Management Act 2010.

4.8 A new operational regime for the expanded group would be developed in agreement with the EA.

4.9 The raised dam(s) will continue to be covered by a full schedule of preventative inspection and maintenance activity as required by the Reservoirs Act 1975 and our internal standard operating procedures, which have annual Board-level oversight.

Design Life of the Asset

4.10 Details of the design life of the asset assumptions included in cost estimates are detailed in Table 4.1.

Table 0.1: Design Life of Asset Assumptions

Design life of asset groups				
Instrumentation, control & automation	**Mechanical & electrical**	**Building & civils**	**Pipelines**	**Dams & reservoirs**
10-year replacement	20-year replacement	60-year replacement	80-year replacement	100-year replacement

Initial Costing and Benchmarking

4.11 We have not yet carried out a benchmarking exercise on this new SRO. The nature of the project requires a bespoke approach to costing, as we do not have standard cost models covering the expansion of existing, or construction of new, reservoirs.

4.12 As detailed in Chapter 10, our cost estimate was developed on a ‘bottom-up’ basis by our consultant. We will continue to refine the costings for gate-2, including input from our Reservoir Supervising Engineers, Reservoir Panel Engineers and Framework Contractors, to advise on construction techniques and programme durations.

4.13 We will undertake an independent cost benchmarking exercise for our gate-2 submission.

Initial Water Resource Benefit

4.14 UDVRE SRO offers a robust, reliable and resilient source of raw water to support existing abstractions from the reservoirs .

4.15 As stated in paragraph 2.15, UDVRE may have some Deployable Output benefit that has not yet been fully assessed. This benefit would be realised by continuing to support existing assets, or through the abstractions supported by the scheme as part of existing or new supply-side options delivered through the regional plans and company WRMP preferred plans.

4.16 As a new SRO, we have not yet provided our additional yield estimate to WRW, WReN or WRE. We will continue to refine our yield assessment through gate-2 and provide an assessment to WRW for consideration of how this could be used within the region. We will also provide our assessment to WRE for the January 2022 update.

4.17 In addition, it should be noted that although the primary beneficiaries of this SRO would be WRW (STW) and WReN (YW), there may also be other beneficiaries downstream on the River Derwent. This potential benefit of the scheme has not yet been evaluated, but would form part of the work proposed for the gate-2 submission.

Initial Data Provided to Regional Groups

4.18 We have not yet made a submission to the regional groups. We will seek to provide as much of the following information as possible for the WReN at the earliest opportunity:

- Fixed annual charge £m
- Variable OPEX charge £/Ml
- Variable electricity kWh/Ml
- Fixed embodied carbon tCO2e
- Variable operational carbon tCO2e/Ml
- Construction duration
- Scheme capacity
- Resilience metrics
- Environmental metrics

4.19 The same information will be submitted for the WRW and WRE regional plans through the WRMP24 company submissions.

5. Environmental and Drinking Water Quality Considerations

5.1 The assets associated with the SROs have had environmental and drinking water quality assessments activities carried out under other current STW schemes, and these outputs have been used to inform the high-level and strategic environmental assessments. These assessments are outlined in Table 5.2. Once the scope is identified, environmental assessment activities will be carried out in gate-2.

High-level Environmental Statement

5.2 To date, the environmental assessments for UDVRE SRO have been carried out based on the available information from previous STW investigations to increase storage at this reservoir group . The most recent investigations were carried out as part of the Green Recovery scheme in 2021, which considered raising Howden Dam by 10m, and the WRMP24 scheme that considered building a new 50m dam in front of the current Howden Dam structure. Both of these focused on the high-level construction and operational effects of raising the dam height on the surrounding area. Whilst there are some construction risks, as expected with a large-scale dam raising, there are very few risks identified for the SRO once in operation. No recent investigations have considered changes to Derwent Dam or Ladybower Dam. The principles of the assessment on Howden will generally apply to Derwent and Ladybower, but specific, detailed environmental investigations will be needed throughout gate-2 to ensure parity between the options considered for within UDVRE SRO, and with other SROs, to enable fair comparison at gate-2.

5.3 The impacts of the construction, filling and operation of the reservoir on the watercourse upstream and downstream of the dam, the River Derwent, were not considered in these assessments. However, STW has extensively investigated the downstream section of the river through the Water Industry National Environment Programme (WINEP) investigations, which will provide a strong base for the SRO investigations. Potential effects on this watercourse will be investigated post gate-1, through a combination of ecological and water quality monitoring, modelling and desk-based assessments. These workstreams are shown in the gate-2 plan in Chapter 15.

5.4 We will liaise with the Environment Agency (EA), Natural England (NE) and Drinking Water Inspectorate (DWI) to agree these scopes of work once this SRO is confirmed.

Environmental Investigation

5.5 The environmental investigations summarised here were completed for STW's Green Recovery and WRMP24, so have not followed the SRO standardised ACWG Environmental & Raw Water Quality assessment methodology, which were unavailable when these assessments were carried out. These will be completed for gate-2. The Green Recovery investigations solely

focussed on Howden Reservoir, with no equivalent investigations carried out for Ladybower or Derwent Reservoirs. As part of Green Recovery, a high-level Strategic Environmental Assessment (SEA), Habitats Risk Assessment (HRA) and Water Framework Directive (WFD) assessment were completed, but the Biodiversity Net Gain (BNG) and Natural Capital (NC) were not carried out. We will complete the BNG and NC assessments early in gate-2 so the outputs can be addressed and assessments updated for the gate-2 submission.

5.6 It is important to note that the assessments have not been carried out to the same methodology as other SROs, so results are not comparable and are indicative only. However, we will build on the information we have to lead our investigations through gate-2 and complete the ACWG methodology for that submission.

5.7 The key outputs from the SEA, HRA and WFD assessments are detailed below. These include that the works are being carried out within a National Park, and the heritage impacts of potential construction on a Grade II listed structure.

5.8 A requirement of this SRO is to understand the impact of the variation in flow to the River Derwent. The investigations for STW's Green Recovery and WRMP24 focused on the impacts of the construction and operation of the raised reservoir, without consideration of downstream receptors. This area will be targeted for investigations during gate-2 to understand how it could be affected by the changes to discharges from the UDVRE reservoirs during construction and operation of the raised dam.

SEA Appraisal

5.9 An SEA was completed for the four options that were being considered as part of Severn Trent's Green Recovery submission. An SEA is a high-level appraisal that covers pre- and post-mitigation risks for the environment, as well as the social and economic effects of the scheme. This has been carried out for raising Howden Dam by 10m and will be extended to cover all options under consideration during gate-2.

5.10 The outputs will be utilised when considering construction operational effects during gate-2. The SEA assessment is based on 14 criteria scored from Major Positive to Major Negative, with Moderate, Minor and Neutral impacts attributable. This investigation found:

- There would be short-term construction related impacts on all aspects of the Site of Special Scientific Interest (SSSI), Special Protection Area (SPA) and Special Area of Conservation (SAC) that surround the reservoir. The scale of these impacts would depend on the construction technique implemented.
- The carbon footprint and other resource/water use issues would be significantly influenced by the construction technique implemented.
- Longer-term issues relate to the potential impact on reservoir levels caused by the longer refill time required to fill a bigger capacity reservoir group(180-196 days to fill the extra capacity significantly reduces refill availability).

5.11 As part of WRMP24, STW carried out an SEA assessment for building a new dam in front of the existing Howden Dam to increase the top water level. This SEA is not completely relevant, but the impacts that could apply to this SRO are shown in Table 5.2.

5.12 A key difference between the SEA completed from WRMP24 and the ACWG methodology is the consideration of mitigation measures. The SEA does not take into account mitigation measures, meaning that this SRO currently has a more negative risk profile than it would have done if the ACWG methodology had been used.

Table 5.2: SEA Appraisal – Key Considerations

Positives	Negatives
Local employment opportunities during construction.	Construction activities would take place in an ecologically sensitive area with some loss of terrestrial habitat, potentially including land that contains areas of ancient woodland or part of an SSSI.
Increased water supply reliability ensuring a resilient supply for customers and economic activity for a relatively small area footprint.	Loss of areas of ancient woodland located within 1km of the current reservoir boundaries.
Generation of renewable energy and minimal carbon/energy usage to get the water to Bamford or Rivelin WTW.	Disruption caused by construction activities in a national park, including: heavy goods vehicle movements, relocation of public rights of way and recreational facilities.
Opportunities for greater use of natural capital including improvement of leisure facilities and accessibility.	The listed status of Howden Reservoir.

HRA Appraisal

5.13 A level 1 HRA assessment was carried out as part of the Green Recovery investigation into Howden Dam raising. This found there is Likely Significant Effect from the SRO due to the reservoir being surrounded by the South Pennine Moors SAC, and the Peak District Moors (South Pennine Moors Phase 1) SPA. An Appropriate Assessment will be carried out early in gate-2 to allow the findings to be addressed through the gate, and the assessment updated prior to submission.

5.14 The loss of habitat will need to be considered due to increased TWLs, as well as due to construction activities. Permanent changes to the hydrogeology and groundwater feeds could be caused when increasing the existing dam walls. Although the additional area to be flooded appears to be just outside the designated site boundaries, we would have to consider whether this is functionally linked habitat, if so, the potential impacts on these habitats. There may be additional issues to consider if footpaths or other infrastructures need to be replaced.

Invasive Non-Native Species (INNS) Assessment

5.15 No specific INNS assessment has been carried out for this SRO to date, though the INNS risk was considered as part of the SEA. This found a potential minor adverse INNS impact due to the large groundworks required, increasing the risk of transportation of terrestrial INNS being brought to the area. This risk would be mitigated through best construction practices.

5.16 No increased risk of adverse INNS impacts was identified during the operation of the SRO.

5.17 A pathway-based INNS risk assessment will be carried out as during gate-2 in line with the guidance to be issued in September 2021 by the EA National Appraisals Unit (NAU). It is not expected that there will be any increased INNS risk to the River Derwent system from this SRO, as no new pathways will be created.

Environmental, Societal and Economic (ESE) Net Gain

5.18 An ESE benefits assessment has not been carried out for either the Green Recovery or WRMP24 investigations. The non-water resource benefits of the SRO will be investigated post gate-1.

Carbon Assessment

5.19 An SRO-led task-and-finish group, consisting of the water companies with SROs, Water UK, and, RAPID, has set the carbon ambition. The UDVRE SRO will be aligned with this stretching target. The ambition covers Scope 1, 2 & 3 carbon emissions:

- Scope 1 & 2 aligns with the Water UK stated ambition to 2030.
- Scope 3 aligns with the UK 2050 ambition, but recognises there is more to do on standardisation.

5.20 Calculation of the embodied carbon has been carried out for the UDVRE SRO in 2021 as part of a review of carbon assessments for WRMP24. The calculation takes into account the carbon embedded in construction, as well as operational carbon for the next 80 years. The results of the calculations are presented in Chapter 4. The SRO will reduce carbon through design and mitigations during future gates as necessary.

Resilience

5.21 UDVRE SRO would create a robust, reliable and resilient source of raw water in the upper Derwent Valley.

Water Quality Considerations

Drinking Water Assessment

5.22 As UDVRE Reservoir currently feeds into the Bamford WTW, it is not anticipated that the water quality abstracted for drinking water would undergo a change. This assumption will be further

investigated post gate-1, which will feed into the completion of Drinking Water Safety Plans that will be developed using the ACWG Treated Water Methodology for gate-2.

5.23 The impacts for drinking water quality investigations have been discussed with technical experts at STW. Any investigations that are required post gate-1 will be discussed and agreed with the EA and DWI.

WFD Appraisal

5.24 The River Derwent is currently classified by the EA as 'Over-licensed' during low and high flows. Although this scheme will not result in any additional dry-weather abstraction, the position of the EA on additional high-flow abstraction needs to be confirmed.

5.25 We consider that, with suitable construction design, the scale of the dam-raising construction activities should be considered WFD compliant. The three upper Derwent Valley reservoirs are WFD lake waterbodies. As these are designated as heavily modified waterbodies, in recognition of their water supply use, changes in level during operation and construction would be WFD compliant.

5.26 The change in reservoir storage volume would impact on the outflow regime from Ladybower Reservoir to the River Derwent. Change to the high-flow regime of the river system could affect geomorphological processes and aquatic habitat function. Further detailed review would be required to assess the potential significance of both this and the WFD heavily modified waterbody mitigation measures that would be required to ensure Good Ecological Potential can be achieved in the river waterbody. Increased storage within the reservoir group could also help to support compensation flows through a wider range of adverse environmental conditions, e.g. drought.

6. Initial Outline of Procurement and Operation Strategy

6.1 Guidance provided by RAPID is that all schemes are assumed to meet the PR19 criteria for Direct Procurement for Customers (DPC). If they do not, this must be explained.

6.2 DPC is a set of changes to a water company's conditions of appointment (Licence) to support the competitive procurement of infrastructure from a third party (the Competitively Appointed Provider or CAP). The CAP is awarded a contract to design, build, finance, operate and maintain (DBFOM) the asset for a set period of time, before the residual asset (if any) is taken in-house by the water company.

DPC Assessment

6.3 Ofwat provides a methodology for assessing schemes for DPC in their guidance on what constitutes an eligible DPC project. The assessment is in three stages:

- Test 1: Size – is the scheme above the £100m whole-life TOTEX threshold?

- Test 2: Discreteness – can the scheme be considered 'discrete'?
- Test 3: Value for money – does the scheme delivered under DPC represent value for money against the 'in-house' delivery counterfactual?

6.4 As this SRO is in the very early stages, a full DPC assessment of Test 1 and Test 2, as outlined above, has not been carried out. The views below are based on the initial solutions as identified to date, along with our experience from other SROs.

6.5 For the size test, TOTEX estimates will be developed at a later stage once the scheme utilisation can be determined following a new case of need. However, initial CAPEX estimates can provide some guidance as to the likely outcome. The initial estimates exceed the £100m threshold for Test 1. This indicates that the SRO will pass the size test for the option currently under consideration.

6.6 As stated in 6.5 above, a discreteness test has not been applied in full at this stage. This will be carried out in gate-2, using similar criteria to our other SROs. We will consider six criteria to determine the potential impact of a third party (the CAP) on existing assets and operations: the physical asset location; the number of interfaces; the overlap in processes; the impact on service delivery; the flexibility of the asset; and the control required over the asset.

6.7 Whilst the discreteness test has not yet been carried out, our opinion at this stage, based on the notional solution, is that the UDVRE SRO is unlikely to pass the discreteness test due to its expansion of, and reliance on, an existing asset. However, this will be confirmed at gate-2.

6.8 As agreed with RAPID, we have not undertaken the value-for-money test at gate-1.

Tender Point

6.9 Ofwat has identified four potential points in the scheme's lifecycle where it may be appropriate to put a DPC project out to tender: 'very early'; 'early'; 'late'; or 'split' with separate CAPs appointed at the 'early' and 'late' stage.

6.10 At this stage, our opinion is that a 'late' tender may better fit with the current RAPID gate process. We will consider the appropriate tender point at future gates.

Alternatives to DPC

6.11 Should UDVRE SRO not be considered suitable for DPC, we will consider a range of alternative options. These may include:

- Design, Build, Finance, Operate and Maintain (DBFOM).
- A new licensed entity as an alternative to DBFOM.
- In-house delivery with a traditional client contractor relationship.

Next Steps

6.12 As noted above, the full DPC assessment has yet to take place. Early in the next stage, we will seek expert advice to support this assessment and identify the preferred procurement route for this SRO. This will be carried out to the level of detail that RAPID expects for gate-2.

Operations

6.13 As a new SRO, we have yet to consider the operation of the expanded reservoir. This will be the subject of detailed discussions with the EA, existing and potential downstream abstractors, and other stakeholders.

6.14 Utilising DVRE as an extra source of raw water will be dictated by the needs of the downstream abstractors. Given the nature of the option, this is likely to be on a business-as-usual basis, allowing existing abstractions to be maintained for longer periods.

6.15 We will discuss utilisation and operating regimes with existing and potential users once we have determined the increased yield with more certainty across a range of climate change and extreme drought scenarios.

6.16 For this submission, we have assumed there would be no extra OPEX incurred for the expanded reservoir group. Costs have been based solely on the CAPEX required to expand the reservoir group for a 100-year design life. This exceeds the assumed contract agreement duration used in calculating the proposed water trading charges.

7. Planning Considerations

7.1 We have looked at the possible consenting routes for this SRO, which is likely to involve a reservoir expansion within the reservoir group of the Upper Derwent Valley. Submitting planning applications and/or relying on permitted development rights under the TCPA is the typical consenting route for new water infrastructure.

7.2 However, the national significance of the UDVRE SRO means that the thresholds for Nationally Significant Infrastructure Projects (NSIP) need to be considered.

7.3 Based on our initial assessment of the likely options for this SRO, we believe that it could meet the NSIP criterion for alteration/extension of a reservoir. As a result, we have assumed that the likely consenting route at this stage is the Development Consent Order (DCO) process under the Planning Act 2008. If this is the consenting route we would expect any additional infrastructure to be consented as part of the process as 'associated development' (as defined in the 2008 Act).

7.4 This SRO could potentially involve the raising of a Grade II listed dam within the Peak District National Park, amongst other options. A major development proposal like this in such a sensitive landscape is likely to meet with notable opposition from a variety of stakeholders, and consenting of the SRO, if this solution is chosen, is therefore expected to be challenging. Seeking listed building consent as part of any consenting route would raise searching questions about the necessity of the project and, if supported, it is likely that great care would need to be taken in the design and use of materials for the amended structure(s). However, all of the dams are first and

foremost operational assets and we believe that changes should be duly considered if the need case is strong enough, coupled with sensitive design and mitigation.

7.5 We are aware that the Peak District National Park Core Strategy sets out the principle that major development should not take place in the National Park other than in exceptional circumstances. We have assumed that, due to the national need for securing sufficient water resource, this SRO would be considered an exceptional circumstance. We recognise that any such development will require a detailed options appraisal involving all key stakeholders. We also understand the duty on us as a statutory undertaker (s.62 of the Environment Act 1995) to have regard for the purposes of the National Park: to conserve and enhance the natural environment and to provide access for all.

7.6 An Environmental Impact Assessment (EIA) will be carried out for any chosen solution.

7.7 If land and/or rights are required, our preference is to acquire them by agreement. However, compulsory purchase powers could be used as part of a DCO process, or separately if this consenting route is not required. Land referencing and landowner engagement will take place prior to gate-2 to inform this process.

7.8 Concept design development will ensure that any risks around environmental impact assessment and compulsory acquisition are managed appropriately.

7.9 If the detailed feasibility and options appraisal identifies a preferred option that meets the DCO threshold(s), we would allow three to four years for the DCO process. Much of this time would be required for further engagement and consultation to look at the impacts of the project and to seek feedback from relevant stakeholders.

8. Stakeholder Engagement

8.1 As this is a new scheme, we are in the early stages of stakeholder engagement. We have started to map out key stakeholders we will need to work with. This work will also take into account customers and those directly impacted by the scheme.

8.2 We understand that this is a complex issue and are keen to engage further with our key stakeholders throughout the process.

8.3 Development of this SRO between gate-1 and gate-2 will be transparent and, most importantly, informed by the wider stakeholder community. This approach will help to deliver a scheme that aspires to meet the needs of all water users, driving economic development while restoring and enhancing the natural environment. Key to this aim will be the local stakeholders.

8.4 Organisations engaged will represent a wide variety of interests, such as the environment, public water supply, agriculture, and local communities.

8.5 Due to the nature and scale of the scheme, there will be a need for extensive engagement with landowners, local authorities and communities as the design is developed.

Regional Customer Engagement

8.6 A programme of customer engagement was carried out in collaboration with other SROs and involving 10 water companies to look at customers' understanding of water resources and the need for regional solutions. This research programme was an industry first, allowing for comparable insights across companies and solutions, in addition to being cost efficient. The scope and approach were agreed in advance with a coalition of representatives from the participating water companies' Customer Challenge Groups, the Consumer Council for Water (CCW) and RAPID.

8.7 The research relevant to the UDVRE SRO is as follows:

- An evidence review of over 100 documents across the 10 companies to compile insights from PR19 and WRMP19 research to ensure new stakeholder engagement builds on existing information.
- Qualitative research with customers across the country to test broad priorities, including the proposals for sharing water between companies.

8.8 The key findings from the customer engagement research were:

- Proposals to share water between companies are seen in a positive light by customers. There is recognition that collaborative planning can be fairer and more efficient, because water is a communal resource. However, customers are keen to emphasise that schemes like the DVRE SRO should not be a substitute for demand reduction measures such as reducing leaks, saving water and localised supply options.
- The expansion of reservoirs is widely accepted by customers, with a majority view that the recreation and environmental benefits outweigh the localised impacts and disruption of construction. However, a preference to avoid negative environmental impacts strongly underscores customer views on supply options, so the level of support for this is likely to depend on the impacts to the local area.

8.9 Further customer engagement will be undertaken ahead of gate-2, incorporating the views of customers and, in particular, the local community. As outlined above, a full community consultation and engagement strategy will be developed to guide this work.

9. Key Risks and Mitigation Measures

9.1 We have established a project risk register for the UDVRE SRO, recording risk and tracking mitigation actions. We will establish a formal governance process for review and monitoring of risks within regular project board meetings during gate-2 delivery. We will also begin to formally report key risks through the RAPID quarterly reporting process during gate-2.

9.2 We have chosen to highlight those risks that we believe could impact on delivery of this SRO. Key risks are highlighted in Table 9.2 below. The project risk register will also be the source of the quarterly risk update provided to RAPID.

9.3 The risk scoring is completed based on the definitions given in Table 9.1.

Table 9.1: Risk Scoring Definitions

Probability of a risk occurring

Probability	Definition	Scale	Value
Very High	More likely to happen than not	>50 % chance	5
High	Fairly likely to occur	20 - 50 % chance	4
Medium	Possible it may occur	10 - 20 % chance	3
Low	Low, but not impossible	5 - 10% chance	2
Very Low	Very low, but not impossible	1 - 5 % chance	1

Impact of a risk occurring

Impact	Definition	Scale	Value
Very High	Could stop the project	Cannot deliever the project	5
High	Large impact on the project	Major shortfalls	4
Medium	Medium impact on the project	Some shortfals	3
Low	Low impact on the project	A few shortfalls	2
Very Low	Very low impact on the project	Few shortfalls of a limited nature	1

9.4 The mitigation status column in the risk register has adopted the RAPID report definitions, as shown in Table 9.2.

Table 9.2: Key Risks

Short description	Detailed description	Risk Score	Mitigation Strategy	Category	Mitigation Status	Residual Risk
Regional plan reconciliation	Risk that the regional plans will not align, and that a difference will exist in the selection of SROs across the regional plans. This is a gate-2 risk, but one we believe is essential to start thinking about now.	16	Active engagement with regional groups. Scenario-planning work is currently being undertaken in case this risk is realised.	Planning	Stable	12
Technical issues around raising an existing reservoir	Technically challenging task and may involve unforeseen technical issues or additional requirements under the Reservoirs Act 1975.	16	Engage specialist consultants with relevant experience and engage with appropriate panel engineers from an early stage to anticipate and technical or legislative issues.	Engineering	Stable	12
Foundation engineering	This is an existing asset and foundation/cut-off status below the existing asset will influence the technical solution required.	16	A detailed ground investigation plan will be developed during gate-2 to establish conditions below existing assets and confirm as built details.	Engineering	stable	12
Environmental impacts on downstream watercourses	Increased releases into the downstream watercourse could have environmental impact in addition to existing impacts from river regulation.	12	Assess likely downstream impacts and develop mitigation plans during gate-2.	Environment	Stable	9
Carbon neutrality approach	Lack of clarity around carbon neutrality requirements could lead to inconsistent costing across SROs and deliverables that do not meet RAPID's expectations.	12	This is being managed by a task-and-finish group, to provide a consistent approach.	Environment	Stable	6

Short description	Detailed description	Risk Score	Mitigation Strategy	Category	Mitigation Status	Residual Risk
Howden located in Peak District National Park	Howden is located in the Peak District National Park. Therefore, additional planning restrictions are likely to apply for this SRO.	12	Engage with planning specialists and local stakeholders to understand likely restrictions and any required mitigations during gate-2.	Planning	Stable	9
Heritage constraints	Historic 19th century dam could be altered by the scheme. This could influence local landscape and/or historic structure.	9	Engage with appropriate specialists to understand any likely constraints during gate-2.	Environment	Stable	6
Loss of sensitive habitat through water level raising	Raising water levels would lead to loss of mature bankside habitats around edge of reservoir.	9	Assess scale of impact and develop mitigation plans that are required during gate-2.	Environment	Stable	6
Dependency on STT System modelling and appraisal	Dependency on the outcome of STT analysis. There is a need to model the system at the upstream end of the interconnector to calculate the yield for various source configurations with associated cost, resilience and environmental characteristics.	9	STT is planning to develop a system model over the coming months. This risk should be mitigated once the model is available to remove uncertainty.	Other	Stable	6

10. Option Cost/Benefit Comparison

Summary of Solution Costs

10.1 CAPEX costs associated with UDVRE have been developed as part of the ongoing STW WRMP24 activity. They are generally in accordance with the ACWG Cost Consistency Methodology Revision C, and include an assessment optimism bias in line with the HM Treasury Green Book. They do not however include a project-specific risk register. This will be developed for our gate-2 submission.

10.2 Due to the bespoke nature of reservoir options, CAPEX estimates were produced using a 'bottom-up' cost estimation approach by our cost consultant. These were based on industry benchmark models, as-built construction costs of similar scheme elements, supplier quotations and quantity take-off calculations.

10.3 At this stage, we assume there would be no additional OPEX cost component to this scheme. The existing OPEX costs attributable to our inspection and maintenance activities are considered sufficient, regardless of the height of the existing or new dam(s). This assumption will be reviewed for our gate-2 submission.

10.4 CAPEX cost estimates have been converted to a fixed annual charge. This charge, along with scoring of agreed resilience metrics detailed below, will be provided to the potential abstractors for use in the appropriate regional investment planning model used to determine the best-value plan for customers.

10.5 CAPEX and OPEX costs are combined to derive the Net Present Value (NPV) and Annual Incremental Cost (AIC) based on an 80-year contract period.

10.6 Table 10.1 summarises the direct costs for an indicative TWL option. Financing costs have been calculated in accordance with the ACWG Cost Consistency Methodology purely for comparison purposes. We are aware that the RAPID Pricing, Incentives and Risk Working Group is considering the commercial framework for SROs, and we will review our costs in light of any outputs from this working group for our gate-2 submission.

10.7 The costs associated with providing additional, non-water resource benefits are not yet included. We will assess these costs for our gate-2 submission.

Table 10.1: Option Net Present Value (NPV) and Annual Incremental Cost (AICs)

Option Name	Units	
Option benefit	Ml/d	135
Total planning period option benefit (NPV)	Ml	1,170,935
Total planning period indicative capital cost of option (CAPEX NPV)	£m	309.2
Total planning period indicative operating cost of option (OPEX NPV)	£m	0
Total planning period indicative option cost (NPV)	£m	309.2
Average Incremental Cost (AIC)	p/m³	26.4
Embodied carbon	(tCO_2e)	61,894
Operational carbon - Maximum flow	(tCO_2e)	0

11. Impact on Current Plan

Current Supply-Demand Balance Impacts

11.1 As a new SRO, the full impact on the current regional / company supply-demand balances has not been assessed for this gate-1 submission, although the WReN (YW Grid) modelling has evaluated the impact on YW's Deployable Output should the existing export be substantially reduced or stopped completely.

11.2 Nonetheless, we are confident that the UDVRE SRO will provide a substantial water resource benefit to WRW, WRE and/or WReN. As detailed in paragraphs 2.8 to 2.10, we believe there are a number of potential uses of the scheme to support the existing direct reservoir abstractions or existing and/or new downstream abstractions from the River Derwent, which will ultimately deliver regional and/or inter-regional Deployable Output benefits as part of the regional best-value plans.

11.3 The scheme has no impacts on other solutions contained in either YW's or STW's existing AMP7 delivery plans.

12. Board Statement and Assurance

Assurance Approach

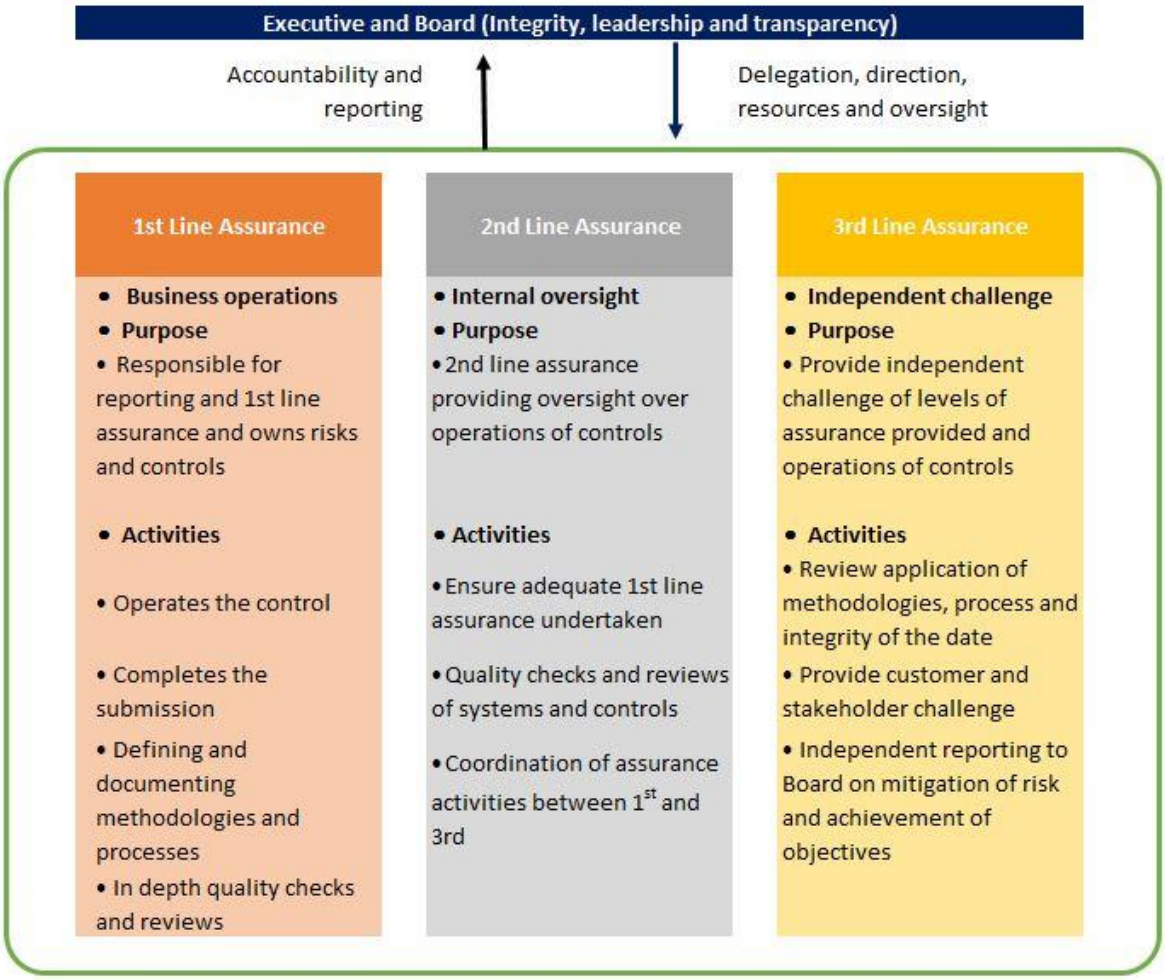
12.1 A joint Board Statement is provided in the covering letter to this gate-1 submission. The STW and YW Boards support our recommendation for progression of this SRO.

12.2 The draft submission has been assured using STW's risk-based framework, utilising first- and second-line assurance.

12.3 In addition, the outline solution has been through an assurance process as part of WRMP24.

12.4 We will use STW's assurance framework for gate-2. This will follow the three lines of risk-based assurance approach, as documented in our Regulatory Reporting and Assurance Approach document, and Appendix A14 of our Business Plan for 2020 to 2025. Details of this approach are given in Figure 12.1.

Figure 12.2: Risk Assessment and Assurance Approach



13. Solution or Partner Changes

13.1 STW and YW have agreed to work in partnership to develop UDVRE SRO if approved by RAPID for inclusion in the gated process. The two companies propose an equal funding allocation for the gate-2 budget.

13.2 Through our gate-2 activities, we will improve our understanding of the benefits the scheme could deliver at both a regional and inter-regional level.

13.3 At this stage, we do not envisage any partner changes post gate-2. As a standalone raw water source for use by downstream abstractors, we do not believe the scheme would benefit from collaboration with other water companies.

13.4 We will engage with potential regional and inter-regional companies through WRW, WReN and WRE to consider how to optimise the use of the scheme as part of the best-value plans for the three regions.

14. Efficient Spend of Gate Allowance

Efficient Spend of Gate-1 Allowance

14.1 This is a new solution proposed at gate-1 and, in accordance with RAPID guidance, all work completed to date has been funded as base activity from STW and YW budgets.

Forecast Spend to Gate-2

14.2 We have developed a gate-2 budget through engagement with workstream leads. We have referenced the gate-2 requirements published in the Final Determination, and mapped activities and deliverables to achieve those outcomes. A detailed programme for gate-2 is included in Chapter 15.

14.3 Forecast costs for gate-2 are outlined in Table 14.1 below.

Table 14.1: Gate-2 Costs Forecast

Workstream		Forecast Budget £k	% of gate allowance
Delivery Team	Programme Management	600	9%
Environment	Environment	1000	15%
Engineering	Engineering	3000	44%
Modelling	Modelling	250	4%
Stakeholder	Stakeholder	175	3%
Planning & Consents	Planning and consents	150	2%
Procurement/DPC	Procurement and DPC advice	150	2%
Assurance	Third-Line Assurance	100	1%
Third-Party costs	NAU	350	5%
	NE costs	130	2%
	Subtotal	5905	
	Contingency	885	13%
	Total	6790	

15. Proposed Gate-2 Activities

15.1 Our overarching objective for gate-2 is the efficient production of a gate-2 submission that meets the quality and timescale requirements set out by RAPID.

15.2 The outcome of our gate-2 activity will be a detailed conceptual design report, which will allow us to move forward to gate-3 if the scheme is selected to progress.

15.3 Our gate-2 activities will improve certainty of outcome and cost estimates, and develop a detailed programme for delivery.

15.4 The workstreams and key activities we plan to undertake to achieve our objective are detailed in Table 15.1 below. We will work collaboratively with the WRW and WRE to avoid duplication of effort.

Table 15.1: Gate-2 Workstreams and Key Activities

Workstream	Key activities
Environmental Assessment	Biodiversity Net Gain, Natural Capital, HRA, WFD and SEA assessments. Water quality, hydromorphology and hydrology modelling.
Environmental Monitoring	Ecological, physical and water quality monitoring.
Engineering Assessment	Detailed engineering, including flood and reservoir safety assessment of dam raising, and new build options based on detailed ground investigation. Cost estimates / qualitative risk assessment / optimism bias assessment.
Water Resources Modelling	Development and extension of the STT SRO system model. Yield / Deployable Output / Utilisation assessment.
Commercial Assessment	Develop scheme commercial and procurement strategy. including consideration of DPC.
Planning Assessment	Develop planning consents strategy. Land assessments, including land referencing.
Stakeholder Engagement	Stakeholder engagement, customer preference surveys and analysis. Technical engagement with regulators and local planning authorities.
Programme Management / Assurance / Governance	Programme management; Internal governance; External assurance; Gate-2 report authoring; Regulatory review.
Legal Support	Ongoing legal advice across all workstreams as required.

Penalty Assessment Criteria, Incentives and Consideration of Solution Delay Impact

15.5 We do not propose any changes to the penalty assessment structure for gate-2.

15.6 There are a number of stakeholders, environmental and engineering aspects which require further development.

15.7 We propose an alternative gate-2 date of March 2023. This will ensure we are able to make robust recommendations, fully supported by the appropriate level of investigation. It has no impact on our ability to meet the RAPID expectation of being construction-ready in the period 2025-2030.

16. Conclusions and Recommendations

Conclusions

16.1 UDVRE SRO is a viable solution that offers increased storage to increase raw water to provide additional support for existing and/or new abstractions from the Upper Derwent Valley Reservoir group and River Derwent. There is also the potential to provide more additional storage to further reduce flood risks in the River Derwent.

16.2 We believe UDVRE SRO offers a robust, reliable and resilient source of raw water to support either regional or inter-regional supply-side options to increase Deployable Output.

16.3 The project would be construction-ready in AMP8, per as the Final Determination requirement. The earliest deployable output would be 2033.

16.4 Further investigations are required to determine the maximum increase in yield that could be made available to benefit regional and inter-regional downstream abstractors.

16.5 In developing our gate-1 submission and our recommendation, we have been mindful of the questions for new solutions contained in RAPID's June 2021 guidance. These, along with our responses, are included below.

- *Q1: Is there value in accelerating the solution's development to be 'construction ready' for the 2025-2030 period?*
- A1: WRW, WRE and WReN have indicated that the deficit in WRMP24 is forecast to be greater than WRMP19. As an alternative or additional source of raw water capable of supporting multi-company, multi-regional solutions, we believe it is appropriate for UDVRE to join the gated process so that the scheme can be delivered at the earliest opportunity if selected as part of the best-value regional plans.
- *Q2: Does the solution need additional enhancement funding for investigations and development?*
- A2: UDVRE has only recently been selected as a feasible option for consideration in STW's WRMP24. Without additional funding to carry out further investigations essential to

the development of the scheme, we will not be able to meet the construction-ready expectation set by RAPID.

- *Q3: Does the solution need the additional regulatory support and oversight provided by the Ofwat gated process and RAPID?*
- A3: We believe RAPID's support would allow us to progress UDVRE to the same timescale as other SROs so that it can be considered as an alternative or additional raw water source to deliver the best-value plan for the WRW, WReN and WRE. It would also provide efficiencies for customers, potentially at both a regional and inter-regional level.
- *Q4: Does the solution provide a similar or better cost / water resource benefit ratio compared to current solutions?*
- A4: As this new SRO is in the early stages of development, we have not yet undertaken a robust cost / water resource benefit ratio comparison. However, as a low-carbon and low-OPEX solution based on existing efficient supply systems, we believe the scheme will provide a similar, and potentially better, benefit ratio for customers.
- *Q5: Does the solution have the potential to provide similar or better value (environmental, social and economic value – aligned with the Water Resources Planning Guideline) compared to current solutions?*
- A5: As stated in paragraph 2.22, we have yet to determine the wider, non-water resource benefits the scheme could deliver. We have not, therefore, costed delivery of the benefits, or monetised them. We will complete this work for our gate-2 submission. Potentially the most significant benefit lies in the ability to supply a significant increase in raw water supply with no increase in operational carbon.

Recommendations

16.6 Through our gate-1 investigations, we have not discovered any showstoppers and recommend this new SRO joins the RAPID gated process and proceeds to gate-2.

16.7 STW and YW Boards support the recommendation for solution progression made in this submission.