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## Gate two query process

Strategic solution(s)	Thames to Affinity Transfer
Query number	TAT008
Date sent to company	16/12/2022
Response due by	20/12/2022

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### Query

1. Please provide more information that a SESRO 100Mm<sup>3</sup> can support both T2ST, T2AT and local resource to SWOX WRZ. If SESRO 100Mm<sup>3</sup> has a Deployable Output of ~185MI/d, how can it meet the demands of a 100MI/d T2AT, a 120MI/d T2ST, and local needs in SWOX WRZ. Is it due to the conjunctive use aspects of the schemes or is it due to the timing of when T2ST or T2AT are in use?
2. Please provide further information as to how wider resilience benefits uncertainty would be mitigated.

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### Solution owner response

*This response has been written in line with the requirements of the RAPID Gate 2 Guidance and to comply with the regulatory process pursuant to Thames Water's statutory duties. The information presented relates to material or data which is still in the course of completion. Should the solution presented in the Gate 2 documents be taken forward, Thames Water will be subject to the statutory duties pursuant to the necessary consenting process, including environmental assessment and consultation as required. This response should be read with those duties in mind.*

## Resource Use Query

Thames Water have provided supplementary evidence of option utilisation for the draft WRMP24 Ofwat query “TMS-dWRMP24-004”. In the response, a ‘Thames Water Option utilisation workbook’ was provided which we have also attached to this response.

The SESRO option is used to provide water to several zones. It is important to bear in mind that the SESRO option would be used alongside the Severn to Thames (STT) option from 2049–50 onwards, and so the SESRO option yield of 184.6 Ml/d does not need to provide water to all of the zones you reference above. The water which SESRO would provide, and in conjunction with STT from 2049–50 onwards would be used in the following zones:

- Thames Water, London, from 2039–40 onwards
- Affinity Water, via T2AT, with a first phase (50 Ml/d) from 2039–40 and a second phase (further 50 Ml/d) from 2044–45 onwards
- Southern Water, via T2ST, from 2039–40 onwards
- Thames Water, Swindon and Oxford (SWOX), from 2049–50 onwards
- Thames Water, Slough, Wycombe and Aylesbury (SWA) via transfer from SWOX, from 2049–50 onwards
- Thames Water, Kennet Valley, via a new scheme associated with Fobney WTW, from 2049–50 onwards

The volume of water required in the different zones to which the SESRO and STT options could provide benefit varies over time, as demand grows/shrinks over time (due to the interaction between population growth and demand management strategies), new challenges are imposed (e.g., environmental destination), and other resource solutions are constructed to provide benefit in the many WRZs involved. In addition, there is a significant conjunctive use benefit in operating the T2AT scheme in conjunction with Thames Water’s London WRZ. This is discussed in further detail in Section 4.2.2 of the main report within the Thames to Affinity Transfer SRO Gate 2 submission.

The table below demonstrates the projected resource balance in the near-term, at 2039–40, 2044–45, and 2049–50 to show that the options selected are able to provide the resource needed. This demonstrates that being able to vary option utilisation over time creates an efficient and resilient plan – key to this is that the T2AT and T2ST are not needed at their full capacities for the whole planning period, and that water is not needed in SWOX or SWA until 2049–50 (by which time the STT would be constructed to provide additional resource).

All figures in the table below are in Ml/d and are for the Dry Year Annual Average, 'DYAA', (1 in 500-year) scenario.

	<b>2039-40</b>	<b>2044-45</b>	<b>2049/50</b>
SESRO Use	184.6	184.6	184.6
Total water from STT sources	0	0	157.4
DO Benefit from T2AT-London Conjunctive Use	25	50	50
<b>Total Resource Benefit from West Thames options, inc. conjunctive use</b>	<b>209.6</b>	<b>234.6</b>	<b>392.0</b>
SESRO/STT Water used by London (inc. conj. use)	111.5	98.9	173.7
SESRO/STT water used by T2AT	50.0	63.0	71.1
SESRO/STT water used by T2ST	48.1	72.7	69.0
SESRO/STT Water used by SWOX & SWA	0	0	59.4
SESRO/STT Water used by Kennet Valley	0	0	18.8
<b>Total resource utilisation</b>	<b>209.6</b>	<b>234.6</b>	<b>392.0</b>

## Wider resilience benefits uncertainty

We understand, following clarification from RAPID, that part (2) of the query relates to section 4.3 of the gate 2 guidance, namely that:

*“The scope and potential for wider resilience benefits is dependent on solution type, some solutions having much greater potential in this area than others. Evidence should be presented in the gate two submission that wider resilience benefits of each solution have been reassessed from gate one and refined following the regional modelling outputs, thoroughly exploring best value approaches.”*

We have assessed the resilience of the T2AT options at Gate 2, including preparing and submitting resilience metrics to WRSE for inclusion in the Regional Modelling to determine the draft Best Value Plan. These metrics may be found in Section 4 of the Gate 2 report.

The wider resilience benefits of the scheme have been assessed through the WRSE regional modelling and the draft WRMP where for the T2AT options, multiple sizes and phases exist, these scalability costs are included and considered in the WRSE modelling which has selected the optimised combination of options, considering these scalability costs and wider resilience benefits. The draft Best Value Plan takes account of a range of metrics including cost, carbon, environment, resilience and customer preference). Further details may be found at: <https://wrse.uk.engagementhq.com/our-draft-best-value-regional-plan>.

The potential resilience benefits of the scheme are highlighted in Table 4-1 of the Gate 2 submission. This highlights that the key areas of resilience benefit for the T2AT scheme would be enhanced by maximising those elements that drive high resilience, whilst mitigating those aspects that reduce resilience. We have undertaken work up to Gate 2 to start to develop a number of these elements.

The areas that would be expected to drive the highest levels of resilience are associated with:

- the low level of uncertainty of option benefit (i.e. that we may have a high level of confidence that it will deliver the water resources benefit analysed)
- the low level of vulnerability to physical hazards, particularly for the LTR option

The areas that would be expected to drive the lowest levels of resilience are associated with:

- improving the risk of failure due to operational shocks,
- the lack of modularity in the pipelines and
- the high level of reliance on external bodies

These areas have all been explored as part of the Gate 2 investigations, as summarised in the table below, with the key risks being taken forward for further analysis in the work proposed for Gate 3 Checkpoint 1.

<b>Resilience Issue</b>	<b>Scope of work undertaken at Gate 2</b>	<b>Focus for Gate 3 Checkpoint 1 to 'de-risk' future delivery</b>
<b>Certainty of option benefit</b>	<ul style="list-style-type: none"> <li>• extensive water resource modelling work to confirm DO for scheme and capacity of scheme required to deliver dry year annual average yields</li> <li>• analysis of downstream connectivity issues by Affinity water, as part of the development of their Connect 2050 strategy to ensure SRO transfer can reach customers</li> <li>• analysis of conjunctive yield of T2AT when operated with TW London system, to highlight further resilience benefits from operating the two systems together</li> </ul>	Further work to clarify connectivity into Harefield SR and efficiency of downstream network upgrades
<b>Low vulnerability to physical hazards</b>	<ul style="list-style-type: none"> <li>• Further feasibility investigations to confirm suitability of connection into existing raw water tunnel from Wraybury Reservoir, which provides buffer from outage hazards within the R.Thames system. This option is now preferred solution for T2AT.</li> <li>• The assessment of resilience at Gate 2 and for WRMP24 also included consideration of risks within the existing Affinity supply system. The additional raw water</li> </ul>	<ul style="list-style-type: none"> <li>• Further analysis of the expected sources of water for T2AT from the Lower Thames Reservoir system under different operational scenarios, to identify any residual risks and confirm mitigation required as part of updated WQRA</li> </ul>

	<p>storage provided by the LTR scheme would be a major benefit to support the Iver treatment works, which currently does not have bankside storage and hence is vulnerable to outages from pollution incidents in the River Thames. This is referenced in the Affinity Water dWRMP.</p>	
<p><b>Failure to exceptional shocks</b></p>	<ul style="list-style-type: none"> <li>The main area of work for Gate 2 has been on the siting of the water treatment works. We worked through an extensive options appraisal process, to identify sites that were outside of Flood risk zones 2 and 3, hence protected from flood risks to ensure greater levels of resilience against flood risk</li> </ul>	<ul style="list-style-type: none"> <li>Further work on site selection for the WTW, to further optimise the chosen location for both operational and planning risks</li> </ul>
<p><b>Lack of modularity in the pipelines</b></p>	<ul style="list-style-type: none"> <li>Whilst accepting that the pipelines cannot be developed in a modular way, we have explored where the critical crossings will exist, enabling later analysis of the potential to twin the most critical to enable potential future increase in transfer capacity.</li> <li>Reflecting on the timing of the schemes in the draft WRMP (see previous answer) and the current selection of the T2AT as two 50 Ml/d phases, we considered whether a two phase approach would work for the scheme. We developed the T2AT options as 50 Ml/d 'modules' so that the most optimum configuration could be selected.</li> </ul>	<ul style="list-style-type: none"> <li>Continue to develop indicative designs for the critical crossings, exploring whether twinning would be a cost effective way to enhance resilience</li> <li>Continue to explore the most optimal way to size and operate the pipeline to minimise capex cost and operational risk</li> <li>Once scheme timing is confirmed by rdWRMP in spring 2023, confirm whether a phased approach to T2AT could enhance future resilience or reduce costs.</li> </ul>
<p><b>High level of reliance on external bodies</b></p>	<ul style="list-style-type: none"> <li>We have worked closely with the SESRO team to understand the expected utilisation of that scheme, and the interactions with the other SRO and non-SRO</li> </ul>	<ul style="list-style-type: none"> <li>Develop draft Heads of Terms for CAP (assuming DPC procurement route) and Thames Water, to better define</li> </ul>

	schemes in the plan, enabling us to better understand the operational and commercial interfaces for T2AT and what reliance will be required on other Water Companies and DPC entities	mutual reliance between parties.
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<b>Date of response to RAPID</b>	20-12-22
<b>Strategic solution contact / responsible person</b>	 <a href="mailto:askT2AT@thameswater.co.uk">askT2AT@thameswater.co.uk</a>