Thames Water Draft Water Resources Management Plan 2024

Statement of Response

Appendix G2:

Response to representations from the following organisations – Chalk Streams First, Greater London Authority, Group Against Reservoir Development, Oxfordshire County Council, Vale of White Horse District Council

August 2023

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Introduction

1.1 Appendix G contains the representations received from stakeholder organisations, along with our consideration of these representations and changes to the draft plan in response, or if no changes have been made we set out the reasons for this.

1.2 Appendix G comprises two parts – G1 and G2:

- Appendix G1 includes the majority of representations received from stakeholder organisations
- Appendix G2 includes representations from stakeholder organisations that were longer and/or included detailed technical content. The following organisational representations are included in Appendix G2 – Chalk Streams First, Greater London Authority, Group Against Reservoir Development, Oxfordshire County Council, Vale of White Horse District Council

1.3 For each representation we have extracted the specific points from the representation and provided a response. Introductory and overview text is not included in all the lines.

1.4 The Group Against Reservoir Development (GARD) submitted two documents as their representation to the consultation, a primary response document and an Addendum. These documents total 225 pages, and so including all material presented would result in an overly long response document. As such, we have copied directly the responses made in the Executive Summary of the representation and have then summarised additional points made in the main report in an additional column to ensure we have responded to all the points raised.

1.5 If you have any questions on the responses, please email info@thames-wrmp.co.uk.

Table of issues raised and our consideration

Chalk Streams First

Consultation Response	Our consideration	Changes to the draft plan, or if no changes are made, why not
Although (as shown on p10 of the TW WRMP Summary "Keep the Water Flowing") there has been a considerable reduction in Thames Water's (TW) chalk-stream abstraction since the late 1980s, amounting to 120 Ml/d across the rivers Darent, Misbourne, Wye, Bulbourne, Pang, Kennet, Og and Letcombe Brook, these were reductions from very high peak rates and there remains considerable pressure on chalk streams in the TW and other water company regions (see CaBA CSRG's report into abstraction as a % of recharge: https://chalkstreams.org/ar-abstraction-as-a-of-recharge-in-chalk-streams/). Within the TW sub-regions 20% of London's water supply comes from chalk groundwater abstractions, as does 60% of Swindon and Oxfordshire water (incl. the Cotswold limestone), 50% of Kennet valley water, and 50% of Guildford water (p5 TW WRMP Summary).	We agree that abstraction can put pressure on the environment, and recognise the sources of abstraction in our catchment. Our preferred plan includes our environmental destination scenario to achieve sustainable abstraction by 2050.	No changes made to our dWRMP - none requested
Chalk Streams First (CSF) therefore welcomes and supports the fact that abstraction reductions are an important part of the TW's WRMP, focused on "delivering environmental improvement" with many of the licence reductions in the TW scenarios in chalk streams catchments, driven by "the unique status of chalk streams as identified in the Biodiversity Action Plan".	Thank you for your support	No changes made to our dWRMP - none requested
CSF also welcomes and supports the inclusion in TW's planning of the recommendations made in the CaBA chalk-stream restoration strategy (CSRS), endorsing the requirement to "prioritise vulnerable chalk streams". Prioritisation of iconic chalk streams and a focus on delivering reductions in a way that maximises flow recovery (ie. on a scale that amounts to significant net reductions across catchments and regions, including headwaters and tributaries) is a key message from the CaBA CSRS, now included in WRSE scenario planning.	Thank you for your support	No changes made to our dWRMP - none requested

Consultation Response	Our consideration	Changes to the draft plan, or if no changes are made, why not
As described in TW WRMP Section 5. 5.33 the high-scenario figures are based on a requirement to meet the EFI in all waterbodies across all catchments. The risks to the high scenario are affordability / cost-effectiveness and the inevitable ripple of environmental impacts associated with any schemes that relocate pressure on natural resources: both have to be carefully weighed. The high-scenario reductions are therefore less certain as outcomes than the low-scenario reductions. Therefore CSF is concerned to ensure that reductions to priority chalk streams catchments are included in all three scenarios and not just the high scenario.	The reductions set out in our "High" scenario meet the requirements of the Environmental Destination scenarios set out in Appendix 4 of the National Framework for Water Resources. CSF has correctly identified that the National Framework for Water Resources (Appendix 4) notes that these scenarios ensure compliance with the EFI in all waterbodies across all catchments. The guidance document, "Long term water resources environmental destination" states, "use the 2050 BAU scenario as the starting point to ensure you comply with current statutory and regulatory requirements in the future" and "use the enhanced scenario to identify where it may be necessary to provide enhanced protection to buffer from predicted climate change impacts". Given that the DO reductions which result from the BAU+ scenario and Enhanced scenario are very similar, we have used the Enhanced scenario in our preferred plan. Whilst we accept that there is a degree of uncertainty involved in predicting the volume of licence reductions which may be required in the future, we consider that this is the correct approach for our planning because it aligns with policy, reflects the regional plan, is the advice of our regulators. Given that there is a degree of uncertainty in the volume of licence reductions required in the future, we have also considered two lower scenarios in our adaptive plan, which are reflected in pathways 5 and 6, 2 and 3, and 8 and 9. However, given that the use of the high scenario is reflective of the Regional Plan and the WRPG and the National Framework for Water Resources, we have placed most weight on this scenario which is reflected in Pathway 4 (our preferred programme), as well as pathways 1 and 7.	We have not made changes to our WRMP following this comment, as our consideration that the scenarios set out meet the requirements of policy and guidance. We have made changes to our environmental destination scenarios in some respects, following representations from our regulators, and further detail is given in Section 5 of our rdWRMP.

Consultation Response	Our consideration	Changes to the draft plan, or if no changes are made, why not
	We have responded to CSF's comments regarding the inclusion of individual sources in the "low" and "medium" scenarios in the following sections.	
CSF supports the methodology of prioritisation for the low and medium scenarios summarised in Section 5 5.39 and 5.42 leading to the reductions across all three scenarios summarised in Table 5.2, including the "vulnerable chalk catchments": Darent, Cray Wye, Misbourne, upper Lee, Wandle, Hogsmill, Pang, upper Kennet, and Tillingbourne.	Thank you for your support	No changes made to our dWRMP - none requested
The Chalk Streams First coalition – in proposing a pragmatic way of re-naturalising chalk stream flow while minimising loss to water-resource output – has also consistently emphasised the need for timely delivery of these prioritised abstraction reductions, because: a) chalk streams have been over abstracted for too long and b) because naturalised flow underpins all the other measures needed to improve or restore the ecology of our chalk streams.	We acknowledge the role of Chalk Streams First	No changes made to our dWRMP - none requested

Consultation Response	Our consideration	Changes to the draft plan, or if no changes are made, why not
"Table 1 below [in the consultation response] with data taken from the tables in TW WRMP Section 5 shows the TW proposed abstraction reductions in the chalk streams only under the three scenarios, listed by catchment in an upstream-to-downstream order (note we have not included the lowest "Kennet valley" sources which are long way downstream of the classic Kennet chalk stream reaches). The source names in bold boxes are those which CSF considers highest priority (HP) because they are sited in the upper or the classic chalk-stream reaches of the given catchments. The other sources are lower down the catchments in more highly modified environments, and in some cases very close to the main River Thames. This does not by any means preclude the need for reductions from these sources, but it does suggest an order of priority. The coloured boxes indicate how soon any reduction is scheduled: green by 2030, blue by 2035, amber by 2040 and red by 2050. As can be seen, only one chalk stream reduction is scheduled by 2030. Only three more by 2035. Five by 2040. The remainder by 2050.	We recognise the abstraction reductions highlighted. We have taken several factors into account in our prioritisation, including flow benefit, sensitivity of location, certainty of benefit and others.	No changes are requested in this comment. Between dWRMP and rdWRMP, some amendments have been made to the licence reductions listed and/or timings. Changes are presented in rdWRMP24 Section 5.
Two of the reductions directly relate to the Chalk Streams First proposal for the Rivers Colne and Lea: Hampden Bottom on the Misbourne and Northern New Wells on the middle Lea near Amwell Magna (the New Gauge source is a surface-water abstraction from the head of the New River). CSF would like to see both of these reductions in all three scenarios and to see them brought forward to synchronise with the overall Chalk Streams First Colne / Lea proposal.	Our consideration is that a licence reduction at New Gauge would be more likely to result in environmental benefit than a reduction from the Northern New River Wells, given that New Gauge is a direct surface water abstraction. A licence reduction is planned at our New Gauge source in all three scenarios, with the proposed licence reduction being from c.100 Ml/d to c.40 Ml/d to be fully implemented in the year 2035, with an interim reduction to be made by 2030 to satisfy the Water Framework Directive No Deterioration requirement. It is also worth noting that there is no associated Deployable Output reduction with the change in abstraction at New Gauge. This is because the New Gauge abstraction is located upstream of our Lee Valley reservoir surface water abstractions, and so it would be possible for us to defer abstraction downstream and thus make a licence reduction without incurring DO loss. Inclusion of a DO	We have not made changes to our WRMP following this comment, for the reasons set out in our consideration.

Consultation Response	Our consideration	Changes to the draft plan, or if no changes are made, why not
	impact of a New Gauge (in Section 5) reduction implies that we would not abstract deferred water from our New Gauge source and in effect implement a HOF on the Lower River Lee. The reason for not having made a New Gauge licence reduction sooner is uncertainty around the drinking water quality impacts of doing so, with water from our Northern New River Well sources being subject to historical bromate pollution from a nearby chemical factory. Water from the New Gauge source is required to dilute the bromate pollution. Also, because of the water from our lower River Lee abstractions being subject to high levels of nitrate, which New Gauge is used to blend we need to investigate the interventions necessary in order to be confident in the feasible licence reduction volume, and/or invest in treatment to mitigate risk. All of our scenarios include abstraction reductions at the Northern New River Well sources in 2030, in line with WFD No Deterioration requirements. Our Hampden source was subject to a significant licence reduction in 1998, with the licence reduction from around 6 Ml/d to around 2 Ml/d. This source provides a small amount of water and thus is likely to have a relatively small impact on the environment, but is important for local supplies and as such our consideration is that we should not accelerate this licence reduction ahead of our proposed schedule.	

Consultation Response	Our consideration	Changes to the draft plan, or if no changes are made, why not
With regard to the TW abstraction reductions in the Cray and Darent, CSF would like to see: • all the HP source reductions in the Darent catchment – which has been very heavily abstracted for many decades – brought forward to 2035 if at all possible. • all the HP source reductions in the Cray catchment – which has also been very heavily abstracted for many decades – brought forward to 2035 if at all possible. To facilitate the above, CSF would like to see an investigation of variations on the CSF model for conjunctive use in the Darent and Cray catchments, including the potential for: • licence relocation from upper to lower catchment / close to the River Thames. • licence swap, combining an exchange of middle and upper catchment groundwater abstraction for lower-catchment surface-water abstraction. • the potential for a groundwater insurance scheme similar to the West Berks Groundwater Scheme to ensure water-resource resilience in drought and low-flow conditions, whilst allowing large-scale reductions in the middle and upper catchments outside drought conditions.	Regarding sources in the Darent catchment [noted HP sources in CSF response being Westerham, Sundridge, Lulllingstone, Eynsford and Horton Kirby], Westerham and Sundridge are currently included in 2050 in the Medium and High scenarios while Lullingstone, Eynsford and Horton Kirby are currently included for 2035 under all three scenarios. Our consideration is that investigation and solution design is required at these sources before reductions can be made at these sources. It may be possible to accelerate licence reductions at Westerham and Sundridge, with investigations at these sources being planned during AMP8/9, but this would be contingent on network infrastructure development to ensure supplies are maintained . The reason for planning most reductions in South East London at the 2050 “backstop” date is that,, a very large network infrastructure solution would be required to ensure resilient supplies in South London. The area is currently primarily supplied by lots of small groundwater sources; as such, our consideration is that it would be much more efficient for us to conduct investigations to determine the aggregate licence reductions required, in order to design an efficient and effective network solution. Regarding sources in the Cray catchment [noted HP sources in CSF response being Green St Green, Orpington, and Bexley], our consideration as above, is that we should not apply a fractured approach to sustainability reductions where we accelerate sustainability reductions in certain locations, as this inhibits the ability to plan in a comprehensive manner to ascertain the optimum overall solution when considering new water resources and new infrastructure.	We have not made changes to our WRMP following this comment, for the reasons set out in our consideration.

Consultation Response	Our consideration	Changes to the draft plan, or if no changes are made, why not
	We will be making a licence reduction at the North Orpington source, planned for March 2028 (being prioritised above Bexley and Orpington on the basis of being more likely to have environmental benefit) and will use learning from this reduction to inform future reductions. Regarding the proposal for licence swaps from upper catchment to lower catchment sources, the abstraction reductions calculated by WRSE which result in compliance with the scenarios from the National Framework for Water Resources were calculated using an approach which prioritised upstream abstractions. As such, where downstream abstraction reductions are highlighted as necessary, this will already have accounted for licence reductions which could have been made upstream. We note also that relocating abstraction licences downstream would involve major investment (e.g., new boreholes at sources with licences to be increased would be required, upgrades would be required to treatment works, and significant network interventions would be required to keep our customers in supply) due to the nature of our supply system, and would require environment agency agreement, The WBGWS scheme is designed to 9 augment local streams and provide water for abstraction to our lower Thames reservoirs. No such reservoirs exist in the Darent catchment and so water discharged to the river would not benefit PWS with current infrastructure. In addition, the proposed “groundwater insurance scheme” would require very significant network infrastructure in order to implement, as sources in South East London provide a constant supply direct to customers and changes to our	

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	network would need to be made to ensure that these constant supplies could be maintained. We would need to invest in new abstraction points, new treatment facilities, and new network infrastructure if we were to implement such a scheme, on a scale similar to the case where full licence reductions would be made, though we note that there would be a reduced need for new water resources. As such, we do not consider that this scheme would represent a viable way to make environmental improvement without requiring large-scale investment.	
Elsewhere CSF would like to see: • all the HP source reductions included in all three scenarios • all the HP source reductions brought forward to 2035 if possible	The additional CSF HP sources not referenced specifically above, and which are not included in medium/low scenarios are Ashdown Park, Fognam Down, and Albury. Regarding Albury, a flow constraint exists which inhibits abstractions when flows on the Law Brook are very low. A licence reduction would be required to meet the EFI, but the existing flow constraint provides environmental protection and so in this case we do not consider that inclusion of a licence reduction in the low/medium scenario is warranted. Regarding Fognam Down, no reduction is included in the High scenario, as no reduction is needed to meet the EFI. As such, we do not agree that inclusion in the low/medium scenarios is warranted. Regarding Ashdown Park, the reduction included in the “High” scenario, required to meet the EFI, is only around 1/3 of the existing licence. As such, we do not agree that	We have not made changes to our WRMP following this comment, for the reasons set out in our consideration.

Consultation Response	Our consideration	Changes to the draft plan, or if no changes are made, why not
	inclusion in the low/medium sources is warranted, particularly bearing in mind the small abstraction volumes from this source (current licence volume = 2.73 Mld). Regarding acceleration to 2035, as above, our consideration is that we should not apply a fractured approach to sustainability reductions where we accelerate sustainability reductions in certain locations, as this inhibits the ability to plan in a comprehensive manner to ascertain the optimum overall solution when considering new water resources and new infrastructure.	
It should be noted that up to 80% of the source reductions on the Rivers Kennet, Lambourne, Pang, Wye and Tillingbourne will add – via flow recovery to the chalk streams and the Thames – to the deployable output available for London via surface abstraction from the main River Thames.	We acknowledge that reduction in abstraction from groundwater sources would result in flow gain to rivers, and thus result in more water being available for abstraction in London. Abstraction reductions from our Kennet Valley and SWOX zones may, however, require replacement resources more locally.	No changes made to our dWRMP - none requested
CSF has commissioned an independent investigation – https://chalkstreams.org/flow-recoveryfollowing-abstraction-reduction/ – into flow recovery from abstraction reductions. Our analysis suggests that at the average percentiles through the duration of 1921 and 33/34 droughts 50% to 60% of upper catchment groundwater reductions would translate into increased deployable output to downstream reservoirs. Across the flow-duration curve the average flow recovery is around 80% of the reductions, although this can fall to <30% in extreme low-flow periods.	We agree that flow recovery from groundwater abstractions will vary according to flow conditions, and the modelling conducted by Affinity Water which is used to inform Deployable Output benefits resulting from abstraction reductions adopts similar flow recovery proportions to the values stated in this comment across the flow duration curve. Our consideration is, however, that this is uncertain and that the 50-60% DO return value stated in the consultant report is too high to be reliably used in our planning. Our water resources planning for the long term is based on “1 in 500-year drought” conditions. The 1933/34 and 1920/21 events were approximately 1 in 100-year events and flows will be lower for longer during 1 in 500-year events and thus returns will be lower. 1933/34 is also notable for a considerable period of relatively higher flows during the winter, which will impact these	No changes made to our dWRMP - our consideration is that our calculations of flow gain for the London WRZ from upstream reductions are appropriate considering the extreme drought scenarios we must plan for.

Consultation Response	Our consideration	Changes to the draft plan, or if no changes are made, why not
	figures. It is also important to note the distinction between DO reduction and abstraction reduction. Affinity Water's groundwater resources are not required at a full ”DO” level of output at all times, and thus 1 Ml/d of DO reduction will not translate to 1 Ml/d of abstraction reduction and so the quoted figure of 17% in the consultant report could be misleading. For abstractions made at Thames Water groundwater sources (where Thames Water have information on abstracted volumes), we have made an assumption of 30% DO gain, as a proportion of abstraction reduction, in line with estimates around flow gain from reductions under low-flow conditions. For abstractions made at Thames Water surface water sources, we have made an assumption of 100% DO gain as a proportion of abstraction reduction. We note that the consultant employed by CSF is also employed by the Group Against Reservoir Development, a stakeholder group whose purpose is to argue against the SESRO scheme, and so who argue (using evidence provided by this consultant) that we have overstated the need for new sources of water.	
For all the TW chalk streams, except the Darent and Cray where there is no reservoir, this flow recovery means only a fraction (albeit variable) of the abstraction reductions is lost to deployable output.	Deployable Output is calculated subject to water availability under “1 in 500-year” drought conditions and thus, as explained above, we are most concerned with flow gains which will arise during extreme, extended periods of low-flow conditions. As such, our consideration is that our allowances for Deployable Output gain from groundwater sources are appropriate.	We have not made changes to our WRMP following this comment, for the reasons set out in our consideration.

Consultation Response	Our consideration	Changes to the draft plan, or if no changes are made, why not
The uncertainty in implementing the reductions (ie. if they currently only feature in the high scenario) and the delay (ie if they are currently not scheduled until 2040 or 2050) are therefore unnecessarily precautionary	Our consideration is that the dates of implementation set out in our Environmental Destination profiles are not unnecessarily precautionary. There is a process of investigation, solution design, benefit analysis and implementation which should be undertaken, and which takes time.	We have not made changes to our WRMP following this comment, for the reasons set out in our consideration.
CSF support all of the options that add to water-supply resilience in the south east (p16 TW WRMP Summary)	Thank you for your support	No changes - none requested
CSF believes that the Chalk Streams First proposal, especially if combined with a groundwater insurance scheme, should be regarded as a strategic resource option both on its own (with the groundwater scheme it can actually add to deployable output) or in conjunction with other strategic resource options, because the eventual % of flow recovery contributes deployable output to London and therefore frees up a commensurate amount of water from the given strategic resource option ie. we do not need to offset 100% of the abstraction reduction from chalk sources).	We would welcome further discussion with Chalk Streams First, which we understand to be a proposal aligned with the Thames to Affinity Transfer SRO, enabled by flow gains made from upstream reductions. Our consideration is, however, that this proposal is broadly already captured within WRSE's regional planning options appraisal. We account for deployable output gain arising from upstream abstraction reductions, and Thames to Affinity Transfer options are considered (and indeed selected) in the Regional Plan. Our consideration is that a Thames to Affinity Transfer supported only by flow gains from upstream reductions would not provide sufficient resilience to be an acceptable solution, due to the increased pressures on our raw water storage assets. In addition, our supply-demand balance profiles demonstrate that surplus to enable a Thames to Affinity Transfer does not exist in the London WRZ. As such, Thames to Affinity Transfers are, in the regional modelling, dependent on either a supported STT or new reservoirs in the Thames Valley. While our consideration is that new resource is required to provide reliable support for the Thames to Affinity Transfer, our inclusion of DO gain from upstream reductions means that we do not plan to offset	We have not made changes following this comment as our consideration is that our programme appraisal process is robust.

Consultation Response	Our consideration	Changes to the draft plan, or if no changes are made, why not
	100% of the abstraction reduction from chalk sources with new sources of water.	
Of the TW waters supply options it is important to consider the fundamental need for more water in the water-stressed south east. In the short and medium term, water transfers – provided they do not create a new environmental pressure elsewhere – offer a certainty of increased supply via relatively discreet infrastructure works that tend to be less controversial. The delays caused by local resistance and enquiries should be factors in the decision-making process. Water transfers from North Wales to London – as a way to relieve pressure on the Chilterns chalk streams and ensure resilience of supply to a growing city – were first proposed in the mid-nineteenth century: it's about time we built them.	We have conducted a robust and detailed options appraisal process. Our consideration is that our preferred plan presents best value to customers and the environment. We have incorporated consenting process timelines into our feasible delivery schedule for each option and consider them to be appropriate. We note that there is complexity in the Severn Thames Transfer (supported by Vyrnwy) proposal, which we understand to be the "North Wales to London" water transfer which is perhaps not recognised in this response. To facilitate a transfer from lake Vyrnwy to Thames Water, a large pipeline would need to be built to protect the vulnerable River Vyrnwy from environmental risks associated with discharges, and in addition United Utilities would also need to invest in new sources of water, as Lake Vyrnwy is currently used to provide supplies to their customers. It is not the case that there is spare water waiting to be transferred. While the wetter north-west and drier south-east may make it seem as though the Severn-Thames Transfer is an implicitly good idea, water resources infrastructure has been developed over the years to provide the appropriate level of service to customers around the country. There are also environmental issues which our regulators have highlighted surrounding the STT, indicating that the environmental permitting and consenting process for the STT may not be as straightforward as it may appear.	We have not made changes following this comment as our consideration is that our options appraisal process is robust.

Consultation Response	Our consideration	Changes to the draft plan, or if no changes are made, why not
CSF welcomes the emphasis on leak reduction and water efficiency and supports the Thames Water scheduled roll-out of smart metering. However, this roll-out is due to be staggered over 15 + years and could arguably be more ambitious. As cited in the WRSE draft plan, consumption data indicate that smart metering quickly leads to consumption within the target of 110 litres per person per day. Relative to creating new supply, smart metering must be very cost-effective. With all chalk-stream regions now designated as water stressed, there is no reason not to roll out smart metering quickly in all the areas where abstraction reduction is ecologically urgent (as recommended in the CaBA Chalks Stream Restoration Strategy).	We agree that leakage reduction and smart metering are very important. Our metering programme is one which we consider to be ambitious but deliverable. In AMP8 we will complete our main compulsory metering programme. In addition, in AMP8 we will undertake a significant programme of upgrading “basic” meters to “smart” meters. The remaining properties without smart meters would then primarily be those which have been deemed previously unmeterable (for the most part involving going into people's homes to install). We do not consider that we could reliably plan on the basis of significantly accelerating this already ambitious programme. We agree that smart metering is cost-effective, in particular when considering the additional interventions which we can make once a property is metered (e.g., customer-side leakage fixes, visiting people's homes to fix wastage issues, and digital engagement).	We have not made changes following this comment as our consideration that our metering programme is appropriate.
Therefore, CSF urges that this programme should be front-loaded in such a way that the results of the early roll-out can be quickly and accurately monitored. There should be enough flexibility in the planning to accelerate the roll out if the metering is shown to be as cost-effective as data thus far suggest it will be.	We are confident in the benefits of our smart metering programme. As referenced, the pace of delivery is primarily constrained by deliverability.	We have not made changes following this comment as our consideration that our metering programme is appropriate.
Smart meters should be visible on a daily basis (by the kitchen sink and not in a cupboard) with usage correlated to cost, like a petrol pump.	In our demand management programmes, we include “digital engagement” measures. These measures would use smart meter data to display customers' usage data to them using online tools, which we think will encourage them to use less water (by, for example, highlighting wastage issues and water-hungry appliances). While our smart metering interventions do not include smart meters with visible digital displays, this digital engagement will give significant visibility of customers' water use.	We have not made changes following this comment as our consideration that our metering programme is appropriate.

Greater London Authority

Stakeholder response	TW consideration of the stakeholder response	Changes made to the plan/ If no changes, why not
The Best Value Plan for Thames Water is based on a combination of demand management (in the short term) followed by bulk supply transfer schemes and supply side infrastructure schemes in the longer term. Like the other plans it takes an adaptive pathways approach and sets out a variety of pathways which allow the water company to adjust investment depending on the changing conditions. Monitoring progress in this area over the coming years will be essential, to trigger changes to take an alternative pathway, at the right time. Thames Water does not have an adequate clear monitoring plan to monitor success all the proposed programmes and we expect much more detail and transparency in the final submission of the WRMP. In line with our response to WRSE, we would appreciate clarity on the engagement of customers and stakeholders on all information “as live” as possible, as well as the annual review of water resources management plan. For example, the Plan currently uses old Census data and it should incorporate the more current figures from 2021 census data.	We thank the GLA for their comments. An enhanced monitoring plan has been included in our revised draft plan. 'As live' assessments of a plan focussed on strategic timescales and planning scenarios equivalent to drought conditions (as opposed to year on year conditions) are problematic, but we are open to suggestions. We receive regular updates to our population and property information from our external providers and include the latest data whenever we update the plan.	The Programme Appraisal for the revised draft plan has been re-done and Sections 10 (Programme Appraisal and Scenario Testing) and 11 (The Overall Best Value Plan) have been re-written following comments received and updates to the input data.
While it is critical that we double down on leakage and reduce demand for water, it is clear the southeast needs new strategic water resources to bolster resilience to climate change, accommodate growth and increase our regional supply capacity to allow us to tackle environmentally damaging water abstraction. I welcome the regional approach to planning for water resources, ensuring greater connectivity between companies and regions will help secure resilience. Much greater assurance is needed to ensure the supply demand gap can be met with high likelihood (by 2075, the water companies will need to increase how much water they supply by 40% to replace what is no longer available and meet future demand).	We agree that we need to reduce leakage, use our available water resources wisely and invest in new water sources to ensure we have a resilient and sustainable future water supply for future generations. In our revised draft WRMP24 we have set out the combination of these measures that we consider provide best value for our customers and a secure water supply for the future. In our revised draft plan we have extended our activities to reduce demand and tackle leakage and these measures, alongside temporary drought restrictions, now make up around 80% of the water shortfall by 2050.	We have made changes to our draft plan to extend the demand reduction measures. Please see Section 8 to read more detail on demand reduction and Section 11 of the revised draft plan to understand the overall programme of measures.

Stakeholder response	TW consideration of the stakeholder response	Changes made to the plan/ If no changes, why not
Recognising the historic underinvestment by the private owners of water companies they or Government should be the first port of call rather than recourse to customers.	We welcome the positive comment regarding the collaborative approach to plan future water supply at a regional level and the work that GLA has undertaken with WRSE, and the South East water companies, in developing the South East regional plan. We look forward to continuing to work with GLA, both as Thames Water and as part of the WRSE Regional Group. We note the GLA's comment that greater assurance is needed regarding meeting the forecast water shortfall. The regulatory guideline, the Water Resources Planning Guideline, requires us to build in a factor for uncertainty in our long term plan, recognising the uncertainties in planning 50 years ahead; this uncertainty factor or buffer is called Target Headroom. We closely monitor the forecasts that underpin the WRMP and progress with the delivery of measures set out in the WRMP as outlined in the monitoring plan, which is set out in Section 11 of our revised draft WRMP24. We are also required to produce an annual report, called the Annual Review, to track progress and every five years we are required to produce an updated plan to take account of new information, further regulatory and government guidance, and review the levels of benefit each option has achieved. These actions ensure we keep a good overview of progress and allow us to take additional action if required to ensure we maintain a secure water supply. Currently our shareholders are putting in significant additional funding to the business to support the business turnaround and improve our performance. However, the expenditure that we need to invest in our future water resources, to meet our changing climate	

Stakeholder response	TW consideration of the stakeholder response	Changes made to the plan/ If no changes, why not
	and growth, will need to be funded through customers' bills. If there are cases where there is funding that should have spent to meet obligations that we've had in the past, that we haven't met, that bill will fall on our shareholders.	
Cost of Plan The cost of the plan is indicated to be £13 billion over the next 25 years. Up to 2050, this is shown to represent a yearly increase in cost of £14 on annual customer bills up to 2030 and then £37 up to 2035. I note the intention to consider the impacts on financially vulnerable customers and those with additional water use needs such as a medical condition – this is imperative given the financial pressures Londoners are already facing due to the cost of living crisis. The Mayor seeks assurance that you will address the impacts on financially vulnerable customers and those with additional water use needs such as a medical condition. This should include offering more customers a social tariff "Water Help" and making it easier to apply for these, making eligible customers on a water meter aware of the scheme (which allows bills to be capped) and ensuring all eligible customers are signed up to water companies' Priority Services Register to receive extra help – these last are particularly urgent given the financial pressures Londoners are already facing due to the cost of living crisis. **Data Sharing** The Mayor has made it repeatedly clear in responses to the water companies that more should be done to share data and information with the GLA and TfL (or indeed other local or statutory authorities) to better plan infrastructure maintenance and delivery. It is disappointing that the plans do not adequately commit to improving data sharing with us, other utilities or highways operators. The GLA hosts a number of forums and data sharing platforms such as the Mayor's Infrastructure and Water Advisory Groups for water companies across London to do more sharing of future plans and data, to improve coordination and minimise disruption. Better data sharing also enables better targeting of vulnerable customers for Priority Services Register (PSR)/emergency response, improves London wide efficiency/drought and emergency communications, enables better understanding of London wide consumption patterns to inform future policies and	Cost of the plan: Our water resources are under pressure and this will only increase with time. We need to plan ahead to ensure we have a safe and dependable water supply, the consequences of not having a secure water supply for our economy, society and the environment are huge. That said, we recognise the financial pressures on some of our customers and we currently put around £110 million a year to support our vulnerable customers. We have been looking at affordability and additional support we can provide to our customers as part of the development of our Business Plan. Whilst our proposals are still being finalised, we aim to enable support to customers with an average value of over £142 million per year, totalling over £700 million during the period 2025 to 2030. Around £500 million of this will be applied to reducing water bills and debt, but we also intend to expand our support beyond the water sector and seek wider benefits for our customers, such as those achieved through Income Maximisation. We also plan to continue with Shareholder support to fund our Thames Water Trust Fund and debt support schemes. Data sharing: We are closely engaged with the GLA and TfL on data sharing initiatives and our London Operations Director, Nevil Muncaster, sits on the Mayor's Water Advisory Group.	We have provided information in response to your comments, there are no changes to the plan as a result of your representation.

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programmes, better targets retrofit activities and allows sharing of results of water company pilot programmes (such as those on water efficiency). The Mayor strongly recommends this issue is addressed, and that data should be shared publicly through open data portals, similar to the Mayor's London Datastore or the Government's Open Data initiative. Please treat this response as an extension to our earlier comments. I remain concerned that some of the issues previously raised have not been addressed – e.g. around the process for monitoring and hence triggering of different adaptive pathways, ensuring customers and partners are regularly kept up to date on any changes to the Plan as well as the need for greater focus on nature based solutions.	By way of an example, Thames Water were in the initial group of signatories to the GLA Collaboration Partnership and were the first utility to recruit a dedicated Collaboration Lead to manage our interface with others, including the GLA. The partnership currently consists of Thames Water, Affinity Water, UKPN, SGN, Cadent, and TfL. These companies are all signatories to an NDA where they agree to share data and future plans with each other via the GLA's IMA (Infrastructure Mapping Application) We have been a part of this partnership for the past 3 years and have had success including our entry alongside the GLA and others winning the Highway Partnership Award at the 2022 Highways Awards. Our joint approach to data sharing has already reduced network disruption in London by approximately 770 days. Through these collaborative schemes we have also increased resident wellbeing by over £4.8 million. All these statistics have been calculated through the use of the GLA's own monitoring and Evaluation tool. We continue to share and update data with the GLA and endeavour to reduce disruption and increase the wellbeing of our customers and residents and are currently working on our 2025-30 Business Plan which we plan to start to update into the IMA over the coming year. We actively work with the GLA and the boroughs on further data sharing initiatives – we said in our recent Drainage and Wastewater management Plan (DWMP) response that "GIS data is available for stakeholders on a GIS portal and all stakeholders who attended engagement workshops were automatically subscribed	

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	to the portal as well as others who requested access. The GIS portal will be updated and enhanced in line with the release of our fDWMP". We also clarified in the same document that "We routinely share data with stakeholders and use a variety of means including Environmental Information Requests (EIR's) and bespoke data sharing agreements." We are aware of further data requests from the GLA and certain London boroughs for further data – especially to be shared in the public domain. For example, it has also become clear in recent discussion around sewer depth/condition data that the sheer volume of data requested (video surveys of sewers for example) would overwhelm the receiving systems and the receiving bodies are unable to receive, process and manage the quantities of data involved. In these cases, we have requested more information on the exact intention of the specific requests so that we can tailor the data to focus on the requestors' specific objectives and work with them to develop a practicable data sharing approach. We remain committed to working with the GLA and all of the boroughs and councils we supply to ensure data is shared to meet the purposes of the requestees in the best way we are able to. We will continue to work to understand the purposes of each request, to enable us to identify appropriate processes to share, process and maintain all such datasets on a case by case basis. Adaptive planning and monitoring - In response to monitoring and triggers for different adaptive pathways. The WRMP is a long-term plan that requires us to forecast the future. The further ahead we look the more	

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	uncertain the future is. We counter this uncertainty by using an adaptive planning approach that considers a wide range of potential futures and seeks solutions that are robust to those futures. Over the planning period, two regionally significant decision points were identified, which could trigger a change of pathway. The first decision point is associated with the level of population growth and the second with climate change and the level of abstraction reduction needed to improve the environment. We have also included an enhanced monitoring plan in Section 11 of our revised draft plan which explains how we monitor our progress against the forecasts and the mitigating actions that can be undertaken if required in response. The plan has been designed with two phases to reflect the risks we face in the short-term, such as leakage reduction, and the risks we face in the longer-term e.g. reducing household water use to 110 l/h/d. • The short-term monitoring plan aims to ensure that the decisions to progress with the selected strategic resource options are robust, and that consenting is successful. It has two sub-phases focused on obtaining planning consent for the Teddington DRA scheme in west London (Stage 1a) and obtaining planning consent for the SESRO scheme (Stage 1b). • The long-term monitoring plan aims to identify whether additional investment,	

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	beyond our preferred programme, is required to ensure resilient supplies. We will prepare and publish an annual progress review of our WRMP24 and undertake a detailed review of the WRMP24, in collaboration with WRSE, in five years time and will engage and consult widely as part of this. We recognise the interest in planning our future water supply and will continue to engage with customers and stakeholders to ensure they are kept up to date on changes to the WRMP24 and have an opportunity to comment and input. In relation to nature based solutions (NBS), while there exists a good body of evidence regarding the feasibility of using nature-based solutions in flood mitigation, more limited evidence exists to suggest that nature-based solutions can 'hold water back' in catchments to the degree which would be required to offset drought risk. We have considered a wide range of catchment options across our supply area, and have ascertained those nature-based solutions which we can be confident will deliver supply benefits. In AMP8 we will consider nature-based solutions in more detail, as part of the Water Industry National Environment Programme (WINEP), with a particular focus on establishing where nature-based solutions may mitigate the environmental need for abstraction licence reductions. In addition, it is important to note that the WRMP is not the only area of Thames Water which is considering nature-based solutions, with multiple workstreams across the company considering and funding them to solve different problems. Different workstreams considering nature-based solutions have	

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	different drivers, and we map catchment vulnerabilities to understand where interventions will have the biggest impact. Drivers include water quality, improving urban drainage, river restoration and community engagement and education. Many of these programmes have recently been expanded to cover more of our supply area, built on a solid foundation of working over a number of years with community stakeholders. We know that we have further work to do to integrate our view of drivers for and benefits of NBS, and this is something that we will continue to do in future planning cycles.	
Demand Management Your proposed demand management measures include a mix of leakage reduction, smart water meter rollout, helping households and businesses to use less water, working with the wider water industry to campaign for wider water efficiency standards and taking measures to deal with drought if needed. This will happen early on in the plan. Thames Water proposed to reduce demand, with government interventions, to achieve 123 litres of water per person per day on average. This is above the government's national target of 110lppd, when other water companies propose achieving the government target. Reducing leakage must be accelerated. It is unacceptable to expect Londoners to play their part in reducing demand when London's water companies are failing to meet their leakage targets. Leakage reduction measures include Active Leakage Control (with the highest percentage happening post 2050), Pressure Management (front loaded to 2030) and targeted mains renewal/rehabilitation (highest percentage happening 2030 – 2050). We are supportive of the measures to reduce leakage, particularly the inclusion of measures to renew /rehabilitate mains infrastructure. Mains replacement should be the focus for leakage reduction and should happen earlier in the Plan period. It is key that Thames Water make the progression from reactive leak management to proactive and whilst we know Thames Water are starting work on this the Mayor expects this to go faster with clear measures and timelines so we and the public can assess whether good	**Household water use and the national target** Since we published the draft WRMP24 government confirmed that the national target for per capita consumption (PCC) of 110 litres per head per day (l/h/d) should be applied at a water company-level. As such our revised draft WRMP24 has been revised to plan to achieve this target. In Section 8 of our revised draft WRMP24 we set out how our water company-led interventions such as smart metering, water efficiency and customer engagement will contribute to the overall 110 l/h/d target, plus outline how Government policy, future regulation and wider non-water-company action is also required if we are to successfully meet the target. **Leakage reduction** Reducing leakage is a priority for us. Right now, around 24% of the water put into our distribution network is lost through leaks from our own network of pipes and our customers' pipes. We know it's not acceptable to be	Our demand management and leakage reduction proposals have been extended in our revised draft plan and make up a significant contribution, around 80%, of the water shortfall by 2050. Please read Sections 8 and 11 for more detailed information.

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progress is being made. We support the use of innovation and new technology to better deal with burst water mains / leaks. The Mayor suggests the draft plan misses an opportunity to set out the ambition to reduce demand by prioritising focus on excessively high water users. A large proportion of customers use close to the average Per Capita Consumption (PCC). There are then a smaller number of very high users – in Thames Water case 25% that use more than 300 litres per person per day, which may skew the demand average. The Mayor supports Thames Water's focusing on these users with specific interventions – including targeted communications and in due course when meter penetration is sufficient, consider how variable tariffs can help with incentivisation later in the plan period. Any such tariffs must be supported by safeguards against unfairly penalising customers with genuine high water use requirements such as people who use a lot of water for medical reasons or where the household has a certain number of school age children. We note and support the proposed continued smart metering programme (from 2025) and the plans to test ways to reduce consumption through new tariffs incentivising less wastage – we strongly recommend these remain as preferred options in the plan. To maximise efficiencies we recommend coordinating smart meter visits with wider retrofit programmes (e.g. energy efficiency, smarter home visits) and recommend that smart meter installation be combined with home visits. We strongly support your intention to fit smart meters as the default in the meter replacement programme, with priority given to properties where the largest savings to can be made (which should include particularly high users). Where meters are being installed, their use must not unfairly penalise customers with genuine high use requirements, for example those with medical conditions, nor increase the financial burden on households given the cost of living crisis. We are encouraged to see that the demand management programme also includes measures to improve water efficiency in non-households. It is essential that measures and costs to reduce water demand fall equally on non-households such as retailers, offices and schools as well as everyday householders. We would be happy to share early outputs and learning from the Climate Resilient Schools programme [Climate Resilient Schools | London City Hall] we are working with you on. It appears the smart meter programme will commence for non-household users in 2025 at the same time as	losing so much precious water and we're investing significantly to tackle this. The weather conditions during 2022/23 have challenged us operationally and we're not where we'd like to be on leakage. The hot and dry summer last year created an unprecedented 'soil moisture deficit' and as the ground dried out, our pipes and our customers' pipes moved and cracked, leading to an increase in leakage. Furthermore in the winter we experienced freezing temperatures which caused the water in our pipes to freeze and expand followed by a rapid increase in temperature which meant that our pipes thawed quickly, causing them to move and crack, impacting our leakage performance with a 37% increase in operational reported leakage and an increase of more than 1,000 visible burst mains. To get us back on track we're making changes to the way we work but the significant impact of these weather events on leakage means we have missed our 2022/23 leakage target. As annual leakage targets are based on a 3-year rolling average, the impact of this year will be felt, not just this year but for the next 2 years' performance. Despite this we remain committed to doing everything we can to achieve our regulatory target to reduce leakage by 20.5% by 2024/25. In response to feedback to the consultation from our customers and stakeholders in our revised draft WRMP we have considered different scenarios and targets which has led us to extend our goal of reducing leakage by more than 50% by 2050 (from 2017/18 levels). This is extremely ambitious and will need us to look at new approaches and innovate to achieve this target.	

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household but little detail is provided, coordination with the Greater London Authority and London's boroughs is important for good planning. Drought Orders and Drought Permits (that allow water to taken, or abstracted, from the environment during droughts) will be phased out by 2040, unless a more severe drought, is experienced more serious than a 1in500 year event. Improving our resilience to droughts will reduce the need for abstraction and other reactive costs and economic disruption, protect the environment, and reduce the risk of water shortages impacting on our society. **Government Action** The Draft Plan acknowledges that it partly relies on Government taking action to reduce demand for water for the long term e.g. improved water efficiency standards for new homes. The Mayor expects Thames Water to continue to work with and support industry groups such as the Water Efficiency Strategy Steering Group and the NGO Waterwise to encourage ongoing progress (per capita consumption is currently nearly 143 litres per person per day and above the national average of around 142). We recommend you include further demand measures within your draft WRMP now Government action has been outlined on water efficiency as set out in the recently published Environmental Improvement Plan which considers a new standard for new homes in England of 110 litres per person per day where there is a clear local need, such as in areas of serious water stress as is the case in your water area. The GLA is keen to support you and Water Resource South East with wider advocacy to Government. For example, supporting Government to deliver the mandatory water efficiency labelling scheme and the Review of the Building Regulations linked to the water labelling and to implement a fittings based approach as set out in the Government Environmental Improvement Plan published this year. Action is needed earlier than 2040 (the date estimated in the draft Plan).	**Water tariffs and high users** We are planning a pilot of new innovative tariffs to both domestic and commercial customers and will include safeguards to ensure that vulnerable customers and efficient users of water are protected from bill increases. The innovative tariff structures may also consider variable tariffs for the dry summer month periods to help reduce peak water demand. **Support of Vulnerable Customers** We are very aware that some of our customers are more vulnerable to large scale changes in water use. When discussing policies such as tariffs and non-essential use bans, we need to make sure that these customers are protected, and that everyone has access to the water that they need. We currently maintain a priority services register of customers who may require more support, and will continue to extend this into the foreseeable future. **Education and campaigns to promote water efficiency** Our proposals include both small-scale (smarter home/business visits) and large-scale (advertising campaigns) educational campaigns, with the former utilising smarter home and business visits to educate customers on water efficiency and prevention of wastage. For the latter, media campaigns are considered as part of our wider household innovation and we note the enthusiasm of some NGOs and organisations to partner on these.	

	Non-Household (commercial) water use The government has confirmed targets to reduce business water demand of 9% by 2038 and 15% by 2050 and we have committed to achieve these targets in our revised dWRMP24. We are leading a smart metering rollout on business properties and water consumption data services for the UK and are working closely with stakeholders including MOSL (Market Operator Services Limited) and OFWAT. We have shared our insights with wholesalers and retailers and have fed into the metering committee to help build the UK non-household (NHH) metering strategy. We are committed to rolling out smart meters to all of our NHH customers and have already installed smart meters to approximately 18% of businesses and plan to proactively replace all meters (small, medium and large) for smart meters achieving around 75% smart meter penetration by the end of AMP8 (2029-30). In addition to this, we launched our new Digital Data Dashboard and Service in 2022 - to allow Retailers and third parties to access NHH smart meter data on a live dashboard. The dashboard includes real time data showing any meter with continuous flow, which can be used by retailers to contact the end user/business quickly to help reduce the impact of leakage or wastage and reduce water demand and high bills. We will continue to contact businesses directly as well as through retailers to notify of any continuous flow alerts from our smart meter data, enabling businesses to self fix. **Government-led water use reduction policies** In addition to the actions we can take, the government is planning to introduce measures including labelling all water-using products, bringing in new standards for	

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	these products and updating building regulations for new homes and retrofits. We are working with several government-led steering groups to scope future mandatory water labelling and strengthen the water efficiency standard of new build properties and tighten water regulations. These standards may see alignment with the proposed mandatory water labelling scheme, and fitting of grey and rainwater harvesting systems become business as usual. Expectations that the government will take future action are included in our forecasts.	
New Strategic Water Resources Options The Mayor has previously supported a number of the proposed strategic resources options, part of the last price review process. South East Strategic Reservoir Option (SESRO) (the proposed new reservoir near Abingdon, Oxfordshire) and the Grand Union Canal (GUC) transfer option are key schemes for Thames Waters London customers. The Mayor recognises their key role in securing future water supply resilience. The reservoir is demonstrated to be a significant part of the WRSE Regional Plan, and the draft WRMPs for Thames Water (alongside Affinity and Southern) which is supported. Delivery of this scheme will help bolster London's (alongside the southeast) future resilience to drought and support the needs of neighbouring water companies that also supply London. With a proposed completion deadline of 2040 for SESRO it is critical that early work to take this forward is prioritised and investment ringfenced to ensure the reservoir is operational for the target date. Alongside this should be early and ongoing engagement with the communities affected to help shape the plans and secure the most wider benefits. As previously stated, we expect low / zero carbon energy sources to be deployed for construction and operation of water resource options such as this. To align with London Plan Policy SI 2 the Draft Plan should calculate whole lifecycle carbon emissions for the scheme and other options through a nationally recognised Whole Lifecycle Carbon Assessment and demonstrate actions taken to reduce lifecycle carbon emissions (we expect this to include embodied emissions i.e. those associated with raw	Strategic Water Resources Options Working with WRSE we have reviewed our programme for new water sources particularly in view of the extended focus on leakage and demand reduction measures. We can confirm that our revised draft WRMP24 includes a number of small new water sources plus two strategic water resources – the new supported river abstraction in West London in 2033 and the reservoir in Oxfordshire in 2040. South East Strategic Reservoir Option The inclusion of SESRO in the revised draft WRMP24 is confirmed as an integral part of the best-value plan for the South East. It provides a new source of water for the region by providing the storage for excess winter flows in the River Thames, to enable them to be converted into potable supplies during lower flow periods. In effect this is a new source of water during lower flow summer periods that would otherwise not be available for use. The reservoir size selected is the larger size – at 150	We have provided information in response to your comments. Our plan includes investment in new water sources, including the new supported river abstraction in west London from 2033 and the 150 Mm3 reservoir in Oxfordshire from 2040. Please read Section 11 for further details.

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material extraction, manufacture and transport of building materials and construction). In addition, the Mayor would suggest carefully examining the 100 vs 150Mm3reservoir capacity options to check whether the latter larger size option could be the better investment for customers in the longer term, particularly if we progress down a path of more intense climate related weather disruption than expected. The proposal to use the Brent Reservoir by 2045 (repurposing an existing Canal & River Trust reservoir) for public water supplies, may have significant impact on the ecological designations of this valuable area (SSSI) and any proposals should align with the developing vision for the area and in full consultation with Canal and River Trust who manage the site. The site is also a key recreational resource and local green space for Londoners, this should be protected and enhanced. The plan includes the Teddington Direct River Abstraction by 2031. This water recycling scheme has been reduced in size to 67ml/d compared with the version initially included in WRMP19 300ml/d plans and then removed. Its focus now being to support resilience of supplies rather than the larger strategic supply option proposed five years ago. We understand that the reduction in size should allow the mitigation of any environmental impacts associated with the larger scheme, but the Mayor's support for this scheme is conditional on the scheme satisfying the relevant regulators (including the Environment Agency) including any impact on river quality and ecology. Relevant organisations such as Natural England should also be consulted. A key issue will be also to look at how carbon emissions should be addressed given the requirement to meet net zero (in London by 2030) for example the use of water company generated renewable energy and be transparently monitored in addition to any process it goes through to obtain an Environment Agency permit. **Water Transfers** We note the intention late on the Plan period (AMP12 2045-2050) to support Thames Water resilience through the Cheam to Merton Transfer Scheme and support this. Sharing more water with neighbouring companies to make water supplies across the region more resilient is positive and needed. However it is important that this is screened	Mm3 - from 2040. Detailed information on the decision making and rationale for the scheme is set out in Sections 10 and 11 of the revised draft WRMP24. The larger reservoir is a better option than a transfer from the River Severn, as it is: • Less expensive overall, with lower running costs; • Is more resilient - in a drought, it's hard to predict exactly when we'll need extra water supplies. The lead time to get water from the west of the country would be between three and four weeks, whereas it would be readily available from the reservoir and it is more resilient to our changing climate • Forecasts suggest we'll see more droughts occurring at the same time across the whole country, so when the South East is in drought, the water for the transfer may actually be needed by customers in the Midlands and North West • The reservoir also has the potential to provide a wide range of economic, social and environmental opportunities – boosting biodiversity, natural capital and recreational benefits beyond those that can be offered by the water transfer. This is why many	

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for any impacts and mitigations proposed appropriately before the final WRMP is published. We note that Essex & Suffolk Water currently have an agreement in place to export 20Ml/d of raw water to Thames Water from 2015-2035, and that they have asked you if this could be terminated early. We understand that you have not agreed given that you will not have alternative supplies in place before 2035. We are supportive of ESW request once you are able to confirm there is a secure replacement supply for London, as the water provider for the majority of Londoners. **Catchment management / Nature based solutions / Sustainable Urban Drainage** We highlighted the wider benefits of Nature Based Solutions in our response to WRSE last year, and remain concerned that these are not factored sufficiently into the modelling undertaken, and so there is a continued reliance on grey solutions. Although WRSE is recommending a balanced approach to supply reduction to deliver improvements to the environment and looks at a range of scenarios and the benefits that abstraction reductions can deliver, there are consequences to reduced abstraction that must be considered as part of a systems approach. The Government Guidance on WRMP states that "Best value plans must be reframed to prioritise and include more significant investment in catchment management measures / nature based solutions (NBS) and Sustainable Urban Drainage (SuDs)". There are also clear benefits from NBS and catchment management measures for water resources which the Plan should seek to capture. The Sub Regional Integrated Water Management Strategy (SRIWMS) funded by the Mayor for the Lee Valley has highlighted some interesting conclusions. The Strategy provides the evidence that water quality investment options are still focused on grey solutions delivered outside of London and that although these will deliver environmental improvements it will not result in a transformation in water body status to Water Framework Directive equivalent standards. To do this, a broader catchment management approach to nutrients and pollutants is needed. Despite references to nature based solutions and SuDS in plans (including in the Draft WRSE Regional Plan) they have not adequately been included in modelling undertaken. The SRIWMS also highlights the interdependencies of policies and actions. For example, Natural Flood Management schemes and SuDS implemented to improve water quality will help improve resilience in London's water supply by reducing the need for raw water transfers	customers tell us they'd prefer a new reservoir over other schemes. The Severn to Thames Transfer (STT) is no longer required from 2050 in the revised draft WRMP24 due to the updated requirement in the Water Resources Planning Guideline to reduce average per capita consumption (PCC) to 110 l/h/d by 2050. However we have proposed to continue to develop the STT as an adaptive option to mitigate the risks that SESRO could not be developed, or if government water efficiency policies do not reduce demand (or PCC) to the levels anticipated. In relation to the Severn Thames Transfer, we have collated and summarised responses in the Statement of Response Technical Appendices Appendix J. We continue to investigate water recycling schemes in London as part of the RAPID process. Our revised draft WRMP24 includes a new river abstraction at Teddington supported by water recycling from 2033. We will continue to undertake studies to address concerns raised by the local community in respect to the impact on the water quality and ecology of the River Thames, and public health impacts and will share this information openly and transparently with the local community when it is available. **Carbon:** The analysis undertaken to derive the best value plan for both WRSE and our WRMP takes account of the operational and embodied carbon footprint of the options, and optimises the plan, to provide the best value overall, including taking account of the carbon footprint of the plan. The carbon emissions resulting from the	

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and blending to manage water quality risk. Without the increased delivery of SuDS and other catchment solutions, proposed sustainability reductions in the Lee catchment could drive an increase in flood risk in the long term. Best value plans must be reframed to prioritise and include more significant investment in SuDS. Furthermore, the forthcoming Drainage and Wastewater Plans must also prioritise the support needed to deliver SuDS (including investment, and resource / skills gaps). The multifunctional benefits of SuDS are well known and include addressing the increasing surface water flooding problems as recently highlighted by the National Infrastructure Commission. In section 2 of the Technical reports, on Environment. Thames Water has proposed 3 schemes to investigate low flows, two in London on the Hogsmill in 2023 and River Lee in 2025. We urge this to be brought forward to align with work on the Subregional Integrated Water Management Plans. The Mayor recognises the need for the water industry to move toward a more sustainable model for abstracting water from the environment. Current practices are damaging sensitive river ecosystems, some of which are particularly valuable and vulnerable, such as chalk streams. However, given current cost of living pressures, and the lack of resilience of London's water supply network, the Mayor encourages Thames Water to work with neighbouring water companies, WRSE and the Environment Agency to ensure that environmental improvement measures, through sustainability reductions and the Water Industry National Environmental Programme (WINEP) programme, are balanced against the cost. These include tensions between the impact of environment programme measures on customer bills in the short term, and availability of funding for resilience, including critical investment in ageing infrastructure. Linked to above, the high pathway scenario indicates that more desalination schemes are needed including a new plant in London. As these are energy intensive, costly to operate and would produce more carbon emissions than most other options, the other more sustainable options must continually be prioritised given the Mayor's objective for London to be a net zero city by 2050. We support the work in the draft regional plan that has identified new transfers to increase how much water can be moved around the region, to increase the resilience of the region's water supplies.	SRO options have been appraised in detail, with further information available through our Gate 2 submission to RAPID. **Catchment management and NBS solutions** – Please read the answer provided in the preceding section. **Sustainable abstraction:** We have worked closely with the Environment Agency (EA) to prioritise the sustainability reductions that are required and to develop a programme to meet our regulatory requirements by 2050. The implementation of these reductions takes into account costs and benefits where there is not an overriding driver such as a Site of Special Scientific interest (SSSI) or European Directive. We have worked closely and collaboratively with other water companies in relation to our abstraction reduction proposals, including Sutton and East Surrey Water (SES Water) in relation to the River Hogsmill in the last 4 years. We included reductions in abstraction at our Epsom sources in our WINEP submission in November 2022, however the EA determined to reject the option on the grounds of cost/benefit and the lack of a specific Water Framework Directive (WFD) driver in the right location. The EA are now reviewing the cost benefit guidance and the WFD drivers to consider if we can include the reduction in our WINEP for AMP9. In the meantime we will continue to work with SES Water to identify any options that might be deliverable at much reduced cost and will also work on delivering river restoration options for the Hogsmill between 2025-2030.	

Group Against Reservoir Development (GARD)

Consultation Response - verbatim from Executive Summary	Consultation Response – Summary of additional points raised outside the Executive summary	Our consideration	Changes to the draft plan, or if no changes are made, why not
The overall conclusion of this consultation response is that Thames Water have grossly overestimated the need for new sources and there is probably no need for any major new water supply like Abingdon reservoir. However, we propose that a modest portfolio of adaptable schemes should go ahead, including the first phase of a 300 Ml/d Severn to Thames transfer, as an insurance against population growth or climate change being much worse than current reasonable expectations.	GARD's role and the scope of the response are outlined in an introduction	We do not agree that the need for new sources has been overestimated, for the reasons set out below. The supply-demand balance trajectory set out in the preferred programme pathway of our dWRMP and rdWRMP, as we describe in responses to the individual criticisms raised, is one which we consider meets the requirements of national policy, the water resources planning guideline and the requirements of our regulators. The supply-demand balance trajectory pathway proposed by GARD would not meet the requirements of the Water Resources Planning Guideline (WRPG) and is thus unsuitable to use as the basis for planning. As examples which are discussed later, the population growth forecast proposed by GARD does not consider Local Authority plans (as is required by the WRPG) and the forecast of licence reductions would not meet the scenarios set out in Appendix 4 of the National Framework for Water Resources, which the Water Resources Planning Guideline requires that we consider. As is described in response to later points, the approach which GARD have applied when identifying their proposed alternative plan is unsuitable.	No changes to our WRMP have been made as a direct result of this feedback. We consider that our supply-demand balance trajectory meets the requirements of the Water Resources Planning Guideline and thus the plan determined to ensure that supply-demand balance is achieved under this trajectory is reasonable.

Consultation Response - verbatim from Executive Summary	Consultation Response – Summary of additional points raised outside the Executive summary	Our consideration	Changes to the draft plan, or if no changes are made, why not
From our reassessment of the drivers of future water supply deficits, we have concluded that Thames Water have over-estimated the deficits in 2075 by: • 430 Ml/d in the London water resource zone • 33 Ml/d in the SWOX water resource zone • 90 Ml/d in the other Thames valley water resource zones	• The drivers behind Thames Water's supply-demand balance deficits in London, SWOX and other WRZs are identified • Thames Water has over-stated the Baseline supply-demand balance needs due to having excluded benefits from demand savings measures that would be implemented during a drought • The adoption of "high" scenarios for several supply-demand balance components represents over-provision of a safety margin in Thames Water's plan • Thames Water should consider a supply-demand balance trajectory which adopts a growth forecast using ONS data, the abstraction reduction scenario proposed, the removal of climate change impacts up to the present day and adoption of a "medium" scenario with a baseline of the present day, and a move to a "1 in 500-year" level of resilience in 2035. This results in a supply-demand balance trajectory with a	We do not agree with GARD's conclusion regarding over-estimation of deficits. Reasoning is given in relation to specific criticisms as they are raised. Regarding additional points raised: • The analysis set out in Section 2.1 of GARD's consultation response identifies the supply-demand balance challenges that we are facing in the "reported pathway" (situation 4) of our adaptive plan, although it is not clear how GARD has identified the supply-demand balance challenge introduced by 'population growth'. The increase in Baseline Distribution Input, accounts for both population growth and growth in non-household demand. In the dWRMP our baseline distribution input increases by 221.6 Ml/d between 2025 and 2075. • Regarding the identification of our supply-demand balance forecast, GARD has included only the 'abstraction reductions' under the "Environmental Destination" banner and has therefore excluded licence reductions identified as being required in AMP7 through WINEP • As GARD notes, we have been required to remove the supply-demand benefits afforded by demand savings that would be implemented during a drought event (e.g., media campaigns, TUBs, NEUBs) measured from our baseline supply-	We have not made changes to the supply-demand balance pathways considered as a result of GARD's comments on this issue. More detailed reasons are given in reference to responses on individual supply-demand balance components.

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	reduced overall requirement of 430 Ml/d, 30 Ml/d and 90 Ml/d by 2075 in London, SWOX and Thames Valley Water Resource Zones respectively.	demand balance. We have not intended to 'over-state' the magnitude of the deficit that we are facing, and in Section 6 of the WRMP (Figure 6-29 and Table 6-25) we have shown the magnitude of the supply-demand deficit faced when accounting for the benefit associated with demand savings measures • We do not consider that the supply-demand balance trajectory presented by GARD would meet the requirements of the Water Resources Planning Guideline and it is thus not appropriate for use in planning. • Even if the supply-demand balance trajectory were to be a reasonable basis for planning (i.e., if it were to comply with the requirements of the Water Resources Planning Guideline) there is no consideration paid to the fact that alternative trajectories should be considered as a basis for producing an adaptive plan (per the requirements of the WRPG). GARD have made comments and proposals on the different component parts of our supply-demand balance which are summarised in this response point. Rather than summarise or repeat our consideration of GARD's criticism of our calculation of supply-demand balance impacts of different components, we have addressed these points as they are raised.	

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The largest source of over-estimated deficits is abstraction reductions for environmental improvements. In GARD's opinion, allowances for sustainability reductions in the Plan are unrealistically large and not economically or environmentally justifiable, especially when the costs and impacts of replacement sources are taken into account.	• GARD has analysed the narrative of Section 5 of the dWRMP where it describes how the 'High', 'Medium', and 'Low' scenarios of licence reductions required under Environmental Destination have been derived. Thames Water should not adopt scenarios based on EFI compliance as the preferred supply-demand balance trajectory and should instead adopt those generated through expert judgement. • Spending a lot of money on enabling licence reductions risks there being less money available to spend on other environmental improvement, such as sewage network improvements and sewage treatment capacity improvements. Reference is made to the Oxfordshire County Council's response to the WRSE plan in which it is argued that the scenario of licence reduction which is adopted should be more focused on improving chalk stream environments. • Thames Water should push back on regulators' requirements in	We do not agree with GARD's suggestions in this response, for the reasons set out below. The National Framework for Water Resources, published in March 2020 sets the environmental ambition required to address unsustainable abstraction between 2025 and 2050 on a national scale. The Framework sets out that Regional Water Resource Plans are required to develop an agreed environmental destination to achieve sustainable abstraction by 2050. WRSE worked with the Environment Agency and all water companies in the South East region to develop agreed Environmental Destination scenarios. They developed five scenarios, Low, Medium, High, BAU+ and Enhanced. We have integrated the Low, Medium and High, into our supply forecast. These scenarios are known as scenarios of 'Environmental Destination'. For Thames Water the High scenario equates with the Enhanced scenario, and this is common with most of the WRSE water companies. Within these scenarios, we are required to consider the Environmental Destination scenarios set out in Appendix 4 of the National Framework for Water Resources (WRPG says that companies in England should use guidance titled "Long term water resources environmental destination", and in this guidance it says that companies should use the BAU and Enhanced scenarios). The guidance document, "Long term water resources environmental destination" states, "use the 2050 BAU scenario as the starting point to ensure you comply with current statutory and regulatory requirements in the future" and "use the enhanced scenario to identify where it may be necessary to provide enhanced protection to buffer from predicted climate	We have made changes to our profiles of Environmental Destination licence reduction as a result of comments from our regulators and stakeholders (main changes being accelerating licence reductions, where we had proposed licence reductions after 2050). We have not adopted the profile of licence reductions suggested by GARD as the resultant plan would not be acceptable to our regulators or meet the requirements of policy or guidance.

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	considering scenarios of future abstraction reductions which may be required.	change impacts". Given that the DO reductions which result from the BAU+ scenario and Enhanced scenario are very similar, we have used the Enhanced scenario in our preferred plan. As such, use of only the scenario presented by GARD is not compliant with guidelines and would not be appropriate for our planning. Given that there is a degree of uncertainty in the volume of licence reductions required in the future, we have also considered two lower scenarios in our adaptive plan, which are reflected in pathways 5 and 6, 2 and 3, and 8 and 9 of our plan. However, given that the use of the high scenario is reflective of the Regional Plan and the WRPG, we have placed most weight on this scenario which is reflected in Pathway 4 (our preferred programme), as well as pathways 1 and 7. Whilst we accept that there is a degree of uncertainty involved in predicting the volume of licence reductions which may be required in the future, we consider that this is the correct approach because it aligns with policy, meets the requirements of guidance, and is the advice of our regulators. We do not consider that it is prudent to rely on the medium and low scenarios for the purposes of this plan. Regarding whether licence reductions are environmentally or ecologically justified, for present planning purposes, it is most appropriate to plan in accordance with policy requirements and the Water Resources Planning Guideline, and this accords with our regulator's advice. Significant weight should be applied to the guidance, which is authored by our regulators. Regarding GARD's comments about money being spent on enabling licence reductions meaning less would be available for improvements elsewhere, the requirements of Sections 37A-	

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		37D of the Water Industry Act 1991, which set out the legal basis on which a Water Resources Management Plan should be produced, do not allow water companies to make discretionary decisions on whether to prioritise expenditure on water resources or sewage infrastructure and treatment. We must consider the relevant guidance from our regulators and demonstrate how our plan ensures a resilient water supply subject to the requirements of that guidance.	
If the abstraction reductions are focused on the ecologically sensitive chalk streams, as proposed by the CaBA chalk stream group, the loss of deployable output would be about 270 Ml/d less than Thames Water's allowance. GARD proposes that the remaining and much needed reductions should be brought forward to the early 2030s, without needing to wait for Abingdon Reservoir.	• Licence reductions in Thames Water's London WRZ other than those in the Darent and Cray, being mainly from heavily modified sections of the River Lee, are less worthwhile. Suggestions are made regarding alternatives • Licence reductions that would be made by Affinity Water in the upper parts of the Lee catchment remove the need for licence reductions in the Lower Lee catchments • Thames Water should adopt the 'low' abstraction reduction scenario for the London WRZ except the Darent and Cray, and adopt the 'medium' scenario for sources in the Darent	As per our response to the previous comment, our consideration is that the scenarios of licence reduction put forward by GARD would not meet the requirements of the Water Resources Planning Guideline, would not align with the scenarios in Appendix 4 of the National Framework for Water Resources (which informs the Regional Plan and subsequently our Plan), would not reflect the Regional Plan, and would not accord with our regulator's advice. Whilst we acknowledge that a number of the licence reductions in the London WRZ would be for the benefit of Highly Modified Water Bodies (HMWB), the mere fact that an EFI is being applied to an HMWB does not mean that environmental benefit would not be conferred. As such, we cannot disregard sustainability reductions in HMWBs. Moreover, we do not agree that it is appropriate to apply a fractured approach to sustainability reductions where we accelerate sustainability reductions in certain locations as this inhibits the ability to plan in a comprehensive manner to ascertain the optimum overall	We have made changes to our profiles of Environmental Destination licence reduction as a result of comments from our regulators and stakeholders. We have not adopted the profile of licence reductions suggested by GARD as the resultant plan would not be compliant with the WRPG.

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	and Cray, prioritising sources in the middle and upper Darent, with reductions in the middle and upper Darent brought forward to 2035 • Making licence reductions at Thames Water's Farmoor surface water source would result in additional flow being made available for London • Thames Water should make licence reductions in SWOX as per the 'High' scenario, but enact all licence reductions by 2035 • Question over the need for licence reductions at groundwater sources near the Thames • Question over the need for abstraction licence reductions in the Pang catchment. The licence for Thames Water's Pangbourne site expired in 2005 and that Thames Water has not abstracted from the source since then. • Abstraction reductions in the Wey (excluding Shalford), Enbourne [sic] and Misbourne should be planned for by 2035.	solution when considering new water resources and new infrastructure. The calculations which have been used in our planning to derive the required licence reductions in the Middle and Lower Lee assume that abstraction reductions made by Affinity Water would be 'left in the river' after 2050, i.e., we would not re-abstract water left in the river as a result of licence reductions made by Affinity Water upstream. The scenarios provided to us suggest that, even if Affinity Water were to make the licence reductions set out in their "High" scenario and we were to defer increased abstraction from resultant flow gains, the abstraction reductions set out in our "High" scenario would be required in addition, in order to satisfy the EFI. As such, relying on licence reductions made by Affinity Water in the Upper Lee catchment would not be sufficient for our planning. GARD have highlighted that abstraction deferred at Farmoor would be available for abstraction in London. This is incorporated into our calculation of downstream DO benefit in London WRZ, with DO reduction from Farmoor licence reductions added to London's DO on a 1:1 basis. There appears to be some misunderstanding around the status of our Pangbourne source from GARD. We have been issued with several new licences for the Pangbourne source since 2005, all of which have been licence renewals on the same terms. We utilise our Pangbourne source to provide a significant quantity of water supply to the Kennet Valley WRZ, usually in the range of 30-40 Ml/d. When flows in the River Pang are low, abstraction from some boreholes at the Pangbourne source is prohibited through a flow constraint, for the protection of the Sulham Brook.	

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	• Licence reductions being planned for 2040 or 2050 are due to a preference for the Abingdon reservoir • Question over the need for abstraction licence reductions in the Wye catchment • Question over the need for abstraction licence reductions at Thames Water sources in the Loddon and Lower Wey catchments • Proposal of an alternative scenario of licence reductions, resulting in a total of 145 Ml/d of licence reduction, compared to the 417 Ml/d set out in the 'High' scenario used in the dWRMP • Question over the validity of the figures used to determine the flow returns to the Thames	GARD question the need for licence reductions to be made at many of the sources which are included in the "High" scenario of reductions (Loddon, sources near the Thames, Pang, etc.). Reductions at sources included in these catchments are required in order to comply with the scenarios set out in Appendix 4 of the National Framework for Water Resources. We do not consider that we should exclude these from consideration within our Environmental Destination scenarios, as to do so would result in a plan which would be non-compliant with guidance. We have also considered whether there are opportunities to accelerate the process of investigation, identification of required abstraction reductions, design of solution, cost-benefit analysis, and implementation of solutions, and we have considered whether we could adapt our schedule of licence reductions. We do not agree that it is appropriate to apply a fractured approach to sustainability reductions where we accelerate sustainability reductions in certain locations as this inhibits the ability to plan in a comprehensive manner to ascertain the optimum overall solution when considering new water resources and new infrastructure.	

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In view of the dominance of environmental improvements in deficit forecasts, no decisions should be taken on the need and choice of new resource schemes until the proper and transparent prioritisation of abstraction reductions has been completed.	None	We do not consider that a decision on the need and choice of new resource schemes should be delayed. The National Framework for Water Resources and Water Resources Planning Guideline sets out transparently the reductions in abstraction which we are required to plan for to ensure compliance with current statutory and regulatory requirements in the future. Moreover our plan is an adaptive plan which has been developed considering the three profiles of licence reduction set out in Section 5, High, Medium and Low.	No changes have been made to our WRMP following this representation, for the reasons set out in our consideration. Sections 10 and 11 of our rdWRMP set out our revised programme appraisal, in which we describe how we have determined the pathway for our preferred programme, and how our adaptive plan considers different scenarios.

The 2020 Office of National Statistics (ONS) population projection for England indicates that the Thames Water's population figures are too high by 1.2 million by 2050 and 1.8 million by 2100. We think it would be reasonable, ie reasonably cautious, to make a central planning assumption for population growth as for the ONS 2020 forecast for England, with an added 30% increase in the growth rate as a safety factor. This reduces the 2075 deficits by about 190 Ml/d.	• Identify that the Water Resources Planning Guideline states the following: "For companies supplying customers in England you should base your forecast population and property figures on local plans published by the local council or unitary authority". • Use of "should" rather than "must" indicates that this is not mandatory - GARD have raised this suggestion with senior Ofwat staff and it has not been rejected • Companies are free to propose alternative methodologies - Many local plans are based on ONS14 data and as such include out of date data • Over-estimation of population occurs due to using these forecasts. • GARD have long argued that less than 50% of planned development is achieved, and so it makes sense to adopt a central ONS projection when undertaking strategic planning • Use of ONS projections alongside a headroom allowance for growth would be preferable to use of local authority demand forecasts	• In the Water Resources Planning Guideline, the words "should" and "must" have specific definitions. These are: "In this guideline we have used the word 'must' where the action is related to a statutory requirement. If you do not follow a 'must' there is a high risk you will produce a plan that is not legally compliant. We have used the word 'should' where we believe this action is needed to produce an adequate plan." This demonstrates that use of the word "should" means that the guidance should be followed unless there is a very good evidential reason not to do so. • The Water Resources Planning Guideline states that we should base our forecast population and property figures on local plans published by the local council or unitary authority. Expert consultants have produced population and property forecasts for us using data from local plans. As such, our consideration is that our property and population forecasts meet the requirements of the WRPG. • Our adaptive plan takes account of a wide range of demand forecasts, including ONS projections. The adaptive plan which we have developed 'branches' on population at the first opportunity, with different demand forecasts considered from this point. • The ONS18 scenario used in situations 7 and 8 of our plan uses ONS forecasts of growth. • We do not agree that we should discount the OxCam scenario. The scenario could have a significant impact on population in our supply area	We have not made changes following these comments as our consideration is that the methods we have applied in deriving and using population forecasts meet the requirements of the WRPG. However, the following changes have been made between dWRMP and rdWRMP. • All changes have been made to ensure that we are using up to date data. • We have changed our base year from 2019/20 to 2021/22. • We have used revised population and property forecasts, produced by Edge Analytics. Census 2021 information has been used by Edge Analytics where it is available, but it should be noted that Census 2021 with sub-national population

	• The use of local authority data in the production of the WRMP is a worst case and so results in a plan which is not adaptive. Use of ONS data would allow a more adaptive plan. • Regarding longer term population projections, GARD suggest that we should update our population forecasts using interim figures from the national-scale ONS projections (released for the UK in 2022 and England in January 2023) • Applying percentage growth rate figures from ONS projections to projections which begin with local authority forecasts compounds the problem of population forecasts being too high. • Population growth forecasts for developed countries are being downgraded and most population experts agree that UK population will start to fall from the middle of the century onwards • Population growth in the UK is forecast to be mainly the result of migration, rather than because the births will be higher than the death • Analysis conducted by GARD is presented on page 26 of their	and so it is important that it is considered. This scenario is considered within our adaptive plan and is not the basis for our preferred programme. • Discussion of other demand forecasts in Section 3 of our WRMP is not pointless, as our WRMP24 is an adaptive plan which considers different demand forecasts. • We note that our regulators have not raised concerns with our population forecasts. • The approach proposed by GARD, using ONS2020 forecasts and adding 30% is unsuitable for planning purposes, and no technical evidence is given as to why 30% is a reasonable figure. The Water Resources Planning Guideline is clear that we should use Local Authority plan figures.	projections (SNPP) and national population projections (NPP) has not been released by ONS in time for inclusion in rdWRMP24. We therefore continue to use the most recent release of these forecast which are the ONS 2018 SNPP and 2020 interim NPP. • Edge Analytics updated growth forecasts based on local authority plans in December 2022. Therefore any changes in local plans since 2020 have been captured as part of this process. We have updated the population forecast data based on the updated forecasts prepared by Edge Analytics utilising the most

	consultation response in which they compare population figures derived by applying percentage growth figures for England taken from the ONS 2020 projections against population figures from Thames Water's dWRMP local authority plan-based population forecast. These show a difference of 1.2 million people by 2050 and 1.8 million people by 2100. • Criticism of the discussion and presentation of population forecasts in Section 3 of the TW WRMP. • Thames Water have only considered the local authority plan-based demand forecast in producing our plan (rendering discussion of other forecasts pointless). • Review of population growth forecast figures from the local authority plan-based demand forecast concludes that growth suggested in our Thames Valley WRZs is too high • Thames should discount the OxCam growth corridor in its WRMP24 planning • GARD suggest an alternative approach to population growth forecasting whereby Thames Water		recent ONS population and household data, and updated information from local planning authorities.

	adopt the ONS2020 population forecast for England and add a 30% increase to the growth rate as a factor of safety		

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The records of the past 100 years show no evidence of a reduction in London deployable due to climate change and suggest that wetter winters and higher groundwater levels at the start of summer are increasing the deployable output of London's supplies. The historic evidence suggests the 'Low' climate change impact scenario is much more likely than the 'High' scenario. We can see no justification for the 'High' scenario being the central planning assumption for the climate change allowance in the preferred plan. We propose that it would be reasonably cautious to assume the 'Medium' scenario as the central planning assumption. This reduces the London deficit in 2075 by about 70 Ml/d.	• The impact of climate change incorporated into Thames Water's supply-demand balance projections is identified • Three severe droughts, of the type which impacts London's supplies (two dry summers separated by a dry winter), occurred during the period 1920-1950. Only one such event has occurred since (being 1976) and no events of the same severity have occurred since 1976. This shows that climate change is having a net positive effect on London's supplies. It is suggested that Thames Water should assume no supply-demand balance impact from climate change for the period up to the present day • An analysis of a 'worst historical' DO assessment subject to a shorter historical period shows an increased Deployable Output for London • The likely forecast outcome of climate change (being warmer, wetter winters and hotter, drier summers) will mean higher groundwater levels in spring, increasing base flow, and	We do not agree with GARD's proposed approach to assessment of climate change impacts in our supply forecast, as it not based on evidence from climate projections and would not meet the requirements of the WRPG. There is no climate change evidence which suggests that splitting the twentieth century in two is a reasonable approach (GARD have split the twentieth century into two halves, identifying 3 major droughts before 1950 and 1 since). While it is true that three severe drought events occurred during the first half of the twentieth century and only one severe drought has occurred since, this does not indicate that climate change caused a change in drought risk over this period, and GARD present no climate change evidence to back up their claims. Instead, GARD rely solely on qualitative analysis, effectively repeating the point that there were three drought events in the first half of the twentieth century and one in the second half. GARD's approach is misaligned with the Water Resources Planning Guideline. The Water Resources Planning Guideline supplementary guidance on stochastics states that it is appropriate to use a baseline period up to the year 2000, on the basis that monthly precipitation records demonstrate stationarity up until around 2010 and on the basis that the ten warmest years have occurred since 2002. GARD's consideration that climate change influenced drought risk up to the year 2000 is misaligned with this guidance from our regulator, to which significant weight should be applied. The argument that GARD present to assert that the "warmer wetter winters, hotter drier summers" overall climate change trend will necessarily result in a diminished drought risk for Thames Water's supplies is biased and reductive. GARD assert	No changes have been made to our climate change impact forecasts used for the WRMP following this consultation response, as it is based on flawed understanding which does not meet the requirements of the Water Resources Planning Guideline and biased narrative. We have made a change to Appendix U of our WRMP. In rdWRMP24, a more detailed explanation is given to demonstrate that, while impact scenarios were initially calculated using data from the 28 spatially coherent projections, the scenarios adopted in our WRMP are representative of the full range of data (i.e., both the probabilistic and spatially coherent projections).

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	thus result in a reduced drought risk for London • GARD made this point in response to the WRSE Emerging Plan consultation but no acknowledgement was made • GARD criticise the use of a 'high' climate change scenario in Thames Water's preferred plan • Thames Water have derived 'high' and 'low' climate change impact forecasts, but 'high' and 'low' forecasts are both taken from RCP8.5 projections. Criticism is raised of Thames Water's use of the spatially coherent projections from RCP8.5. Thames Water should take greater consideration of the probabilistic projections, recognising Ofwat's LTDS guidance. • Comparison is made between Thames Water WRMP narrative and quotes from the Met Office UKCP18 release notes. • GARD suggest that adopting the 'medium' climate change impact	that the impact of wetter winters will be to ensure fuller aquifers at the beginning of summers, and that the vulnerability of the London supply system (correctly identified as c.18-24 month drought events) means that this will result in a reduced drought risk. GARD fail to recognise key complexities. The impact of the "warmer wetter winters, hotter drier summers" trend will be to, on average, lead to an autumn/winter period beginning with a higher soil moisture deficit. This means that a larger volume of rainfall will be required over the winter period before significant groundwater recharge can begin. While winters will, on average, be wetter, not every winter will be wetter and the requirement for greater soil wetting prior to recharge and elevated year-round temperatures impacting potential evapotranspiration will mean that there may be a shorter winter recharge period (with the risk that, if rain doesn't fall at the right time, groundwater levels may not see recovery), and that relatively dry winters could result in less recharge than at present. Complexity in hydrological response to different climate change impacts and the uncertainty around the impact of climate change on precipitation trends is the very reason that we have conducted extensive modelling into the impacts of climate change to establish the range of impacts that we may see. This analysis is presented in Appendix U of our WRMP. The GARD climate change analysis does not acknowledge the uncertainty which is present regarding climate change impacts. GARD present a single climate change impact forecast which they state that we should consider, ignoring the wide range of climate change impacts that could occur in the future. In our investment modelling we can only have a limited number of 'branch' points in our adaptive plan due to computational	

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	scenario would be most appropriate for our long term planning	power available (2 branch points, with 3 branches created at each branch point), and, as per earlier comments, guidance leads us to consider a "high" Environmental Destination scenario in our preferred programme. We feel that we should "branch" as late as possible on climate change uncertainty, but should consider different climate change scenarios, and so have branched into "high", "medium" and "low" climate change scenarios at the same time as we branch on licence reduction scenarios. The abstraction reduction scenarios set out in Appendix 4 of the National Framework for Water Resources include climate change impacts consistent with a severe climate change projection (see p.20 of Appendix 4 of the National Framework for Water Resources). As such, our consideration is that it is consistent to align the “High” environmental destination scenario (developed to comply with the scenarios from Appendix 4 of the National Framework for Water Resources) with the “High” climate change scenario. Furthermore, we have conducted a sensitivity run where the median climate change scenario is used in all branches throughout the plan. In this run, SESRO is selected in 2040. GARD have presented a biased comparison of narrative in the WRMP with that contained within the UKCP18 documentation. Thames Water’s WRMP suggests that newer climate models (those from the newest iteration of the Hadley Model, Hadley Model 3) may be more reliable than those from an older iteration of climate projections (Hadley Model 2, used in CMIP5). The Met Office comparison is between probabilistic projections (which show a broader range of climate change impacts) against spatially coherent projections. GARD have presented two different arguments (one being newer models likely being an improvement on older models, and the second being one type of projection representing something different to another type of	

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		projection) as contradictory when they are not. GARD have also ignored the fact that all of Thames Water's climate change projections have been scaled back such that the scenarios within the WRMP are representative of the probabilistic projections (with high, medium and low being aligned with 75th, 50th and 25th percentile values of all projections considered).	
Thames Water falls far short of achieving the Government's PCC target of 110 l/person/day by 2050, especially in the London zone. This contrasts with United Utilities' plan to meet the PCC target in their Strategic Zone, which covers a comparably large and heavily urbanised region, including Manchester and Liverpool. If the 110 l/person/day target is met in London by 2050, the need for new sources in 2050 is reduced by 134 Ml/d. Outside London in Thames Water's Thames valley zones, achievement of the PCC target by 2050 would save a further 26 Ml/d compared with Thames Water's plan.	• Thames Water's dWRMP does not include hitting the 110 l/h/d by 2050 target. • A comparison of PCC reduction profiles set out in the WRMP Tables for London WRZ and United Utilities' Strategic Grid WRZ. Scepticism of TW PCC forecasts on the basis that Thames Water's metering penetration rises rapidly, but PCC does not fall as fast United Utilities' (who have a similar meter penetration forecast). • A PCC of 110 l/h/d is forecast to be achieved by 2075 and question why it wouldn't be possible to achieve this by 2050? • Achieving the 110 l/h/d PCC target would reduce the volume of new supplies required by 234 Ml/d across	Since our draft plan, the Water Resources Planning Guideline has been updated to state that the 110 l/h/d PCC target is to be set at the company level. Our rdWRMP24 preferred programme includes achieving this target. We are unable to comment on the assumptions underlying United Utilities' PCC reduction profiles. Our assumptions around PCC reduction are evidence-led, as described in Section 8. A key factor in hitting the 110 l/h/d target is government action. In our draft plan, when the 110 l/h/d target was not referenced in the Water Resources Planning Guideline, we made a set of assumptions around the interventions that government would make. With the introduction of EIP targets and inclusion of the 110 l/h/d target in the Guideline, we have changed these assumptions to assume that the government will take more action more quickly. We consider that there is risk around this, which is discussed in the main Statement of Response document.	The demand management programme and assumptions around government-led intervention within our preferred programme in the rdWRMP24 result in achievement of the 110 l/h/d target, in order to comply with the WRPG revisions and EIP targets.

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	Thames Water's WRZs and Affinity Water's central region		

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Most of Thames Water's proposed leakage reductions are in London, where the planned reduction is 60% and well ahead of the Government's 50% reduction target. However, Thames Water's proposed leakage reductions in the zones outside London are all well short of the 50% target, including just 14% in SWOX zone. Outside London, the planned leakages in 2050 are still in the range 90 to 135 l/property/day and far higher than the typical 40 l/property/day planned elsewhere in the South East. GARD proposes that leakage in zones outside London should be reduced to 40 litres/property/day by 2050 to be in line with the leakages planned by other SE water companies. This would give a total saving of 74 Ml/d in the zones outside London compared to Thames Water's plan.	No further points are raised in the more detailed text	We do not agree with the proposed changes to our leakage reduction programme, because the target set by the government and our regulators is to achieve 50% leakage reduction at the company level, compared to 2017/18 levels, by 2050. Our plan achieves this target in what we consider to be the most cost-effective way. Sensitivity runs in which we have explored the implication of achieving more than 50% reduction at the company level demonstrate that such a plan would not be cost-effective. Our leakage reduction programme has been derived to hit the target at the company level while minimising cost. For mains rehabilitation (the main leakage reduction activity in the long-term), we looked at district meter area (DMA) level estimates on how much leakage could be reduced by replacing pipework, with the cheapest DMAs per Ml/d of water saved to be renewed the quickest in deriving these programmes.	We have not made changes to our demand management programmes following this comment, as our plan includes achievement of the government target of 50% leakage reduction by 2050. Between dWRMP and rdWRMP we have revised our leakage reduction programmes. Details are presented in the main Statement of Response document and Sections 8 and 11 of our WRMP.

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In GARD's opinion the Thames to Southern transfer is not needed. The primary drivers for the scheme are the perceived need to reduce groundwater abstractions in the upper Itchen and Test valleys and the removal of lower Test and Itchen drought orders from Southern Water's drought plan. The CaBA report on abstraction reductions as a % of catchment recharge concluded that no abstraction reductions were needed in the upper Itchen and Test valleys. The drought orders would only rarely give substantial reductions in abstractions and it is hard to see how the occasional benefits could justify the huge c.£2 billion cost of the scheme. GARD proposes that the Thames to Southern transfer should be abandoned at Gate 2 due to its minimal benefit and disproportionate cost.	- Results from Thames Water/Southern Water pywr modelling show that the transfer would be used at a low level for the majority of the time, with higher volumes transferred during drought events. • Criticism of the licence reductions included in Southern Water's WRMP. The Test and Itchen drought permits should be maintained.	We do not agree that the Thames to Southern Transfer is unnecessary. The Thames to Southern Transfer has been identified as being required through the WRSE Regional Plan. This response is of primary relevance to the WRSE plan and Southern Water WRMP, rather than the Thames Water WRMP. Working as part of the WRSE Regional Group, Thames Water has, however, ensured that compliant and aligned methods have been applied in this regard. While we have not considered in detail the need for licence reductions in the Test and Itchen (these being outside the Thames operating area and Thames catchment), our consideration is that licence reductions identified as being required by Southern Water, who have adopted approaches aligned with the WRSE Regional Group and in accordance with the requirements of the National Framework for Water Resources and Water Resources Planning Guideline, are appropriate. We note that a single independent hydrological technical consultant works on behalf of the Chalk Streams First and GARD stakeholder groups, and has proposed the "Abstraction as a % of recharge" method of determining licensable volumes through the CaBA Chalk Stream Group. The proposed approach to determining required licence reductions does not meet the requirements of the scenarios set out in the National Framework for Water Resources and so is not appropriate for use in our planning. The likely operating regime of the Thames to Southern Transfer, with peaks in use during summer drought periods, is correctly identified.	No changes have been made to our plan as a result of this response, for the reasons set out in our consideration. The Thames to Southern Transfer remains an important part of the WRSE Regional Plan.

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In our response to Affinity Water's WRMP, we showed that all their needs to 2075 could be met by a 50 Ml/d Thames to Affinity transfer combined with the Grand Union Canal transfer and metering to achieve the Government's 110 l/p/day PCC target. GARD proposes that the 50 Ml/d transfer should be brought forward to the early 2030s, connecting Affinity Water to Thames Water's London supply system. This would allow all the planned upper Colne/Lea chalk stream reductions to be in place by the early 2030s.	• GARD's consultation response to the Affinity Water WRMP shows that Affinity Water have over-estimated their need for new sources of water by 200 Ml/d. • GARD propose an alternative investment plan for Affinity Water in which a transfer from Thames Water to Affinity Water would not need any new supplies to support it	We have not examined in detail GARD's response to the Affinity Water WRMP because our consideration is limited to responses submitted to our WRMP consultation, and so cannot comment on the validity of the points raised regarding Affinity Water's supply-demand balance. However, Affinity Water have provided supply-demand balance impacts associated with the same factors as Thames Water (i.e., scenarios of climate change impact, Environmental Destination licence reductions, and population growth) and using methods aligned across the South East. The WRSE Regional Plan has worked to develop a Best Value plan for the South East and WRSE member companies have assured data to ensure that it is appropriate for use in the Regional Plan. As such, our consideration is that the data underlying Affinity Water's WRMP is appropriate for use. Our supply-demand balance calculations show that we do not have sufficient surplus to transfer water to Affinity Water without new supplies being provided.	No changes have been made to our plan as a result of this consultation response point, for the reasons set out in our response. As is described in the WRSE Regional Plan, the Grand Union Canal and Thames to Affinity Transfer are both important schemes in ensuring a resilient water supply for the whole South East.

The Chalk Streams First report on re-naturalising chalk stream flows showed deployable output recovery should be around 60% of the abstraction reductions and not the 17% assumed in Thames Water and Affinity Water's plans. This substantially reduces the Thames to Affinity transfer's net demand on London's supply system. GARD recognises that there is uncertainty in the amount of deployable output recovery and suggests that an insurance against recovery being less than expected should be provided by introduction of drought support schemes in the upper Colne and Lea chalk streams similar to the existing West Berkshire Groundwater Scheme.	• The issue of flow recovery from abstraction reduction is an important factor in determining the need for additional supplies in the future • A 17% 'flow recovery' is assumed in linking upstream reductions with downstream DO benefits • GARD cite a "Chalk Streams First" (CSF) report where several conclusions are drawn. The primary conclusion referenced is that "recovery will vary substantially across the range of flows, perhaps from less than 30% recovery in droughts to well over 100% recovery at times of high groundwater levels" with an "average [of] about 80% of the abstraction reduction" • Analysis is presented from a CSF report which shows that the DO recovery from a scenario of licence reductions derived by CSF would be 58% of the abstraction reduction, using the historical event of 1933-34 as the basis for this analysis	We recognise that the issue of downstream flow gains associated with upstream abstraction reduction is important, but we disagree with the interpretation that has been made of our WRMP. We also do not agree that a DO recovery of 60% is appropriate for use in our planning, and consider that the factors which we have applied are reasonable and have been determined robustly. We agree that there is uncertainty in deployable output recovery from abstraction reduction, which is why we consider making prudent and conservative assumptions is appropriate, to ensure resilient water supplies. The 17% figure has been used to link Affinity Water DO reduction with a Thames Water DO gain. The 17% figure is an output of a '1 in 500-year' DO run in which there is an approximately 30% return figure associated with abstraction reduction at Q95. There appears to be confusion in the GARD response which we believed to be clarified through correspondence with WRSE: • The 17% figure is a figure used to convert between Affinity Water DO reduction and London DO gain - this is an output of a DO run where percentage returns across the flow-duration curve were used to derive Deployable Output impacts. • The 30% figure is a figure used to convert between Affinity Water abstraction reduction and London flow gain at relatively low flows (Q95). The 17% figure being less than the 30% figure will most likely be due to a combination of two factors: firstly, the 30% figure is for flows at Q95; during severe drought periods flows are at Q99 or below for long periods and at these very low flows returns significantly less than 30% are predicted by both	No changes have been made to our WRMP as a result of this consultation response, as we do not consider that the analysis presented is more robust than the analysis on which the WRSE Regional Plan and our WRMP is based.

		TW/WRSE/Affinity and CSF reports; secondly, in DO runs for the London WRZ (where Affinity Water abstractions are at rates required to meet current demand levels, rather than DO levels), Affinity's abstractions at many sources will be less than current DO. Comparison of the 17% and c.60% figures is therefore a comparison of figures which are intended to represent different things. It appears that the comparison of flow gains from abstraction reduction at different points on the FDC is similar between the data used in the CSF report which GARD reference and the analysis on which the 30% and 17% figures is based. We agree that flow gains could be in the range of less than 20% at low flows to over 100% at high flows, but using the appropriate conversion factor (abstraction to flow, abstraction to DO, DO reduction to DO increase) is important and it appears that the GARD analysis is mistaken in this respect. GARD have used 1933-34 as an example from which to draw a DO impact, whereas the estimation used in the WRSE regional plan and our WRMP is based on a 1 in 500-year DO impact. As the WRSE/TW/Affinity work considers the full stochastic dataset rather than an individual historical event (this historical event being of less than 1 in 500-year severity) we consider that our analysis is more robust. We note that a single independent hydrological consultant advises GARD and CSF, and that this consultant was the author of the cited CSF report. Our consideration of the proposed Colne/Lee augmentation scheme is detailed in response to the more detailed comment made regarding this proposal.	

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GARD's analysis, with no allowance for chalk stream flow recovery, shows that neither Abingdon reservoir nor the Severn to Thames transfer is required to meet the needs of London and Affinity Water, even bringing forward the 1:500 year resilience to 2035. Without Abingdon reservoir or the Severn to Thames transfer, there would be a surplus of about 150 Ml/d in London's supplies continuously from 2040, if leakage and PCC reduction are on a trajectory to meet the Government targets by 2050. This shows the danger of creating a costly and environmentally damaging white elephant, if a decision to build Abingdon reservoir is made in the current cycle of business planning.	No further points are raised in the more detailed text	As is discussed in response to other consultation response points raised, we do not agree with the supply-demand balance trajectory proposed by GARD. .	We have not made changes to our WRMP as a result on this consultation response point as the supply-demand balance trajectory proposed by GARD would not meet the requirements of the Water Resources Planning Guideline.

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However, GARD recognises that there is uncertainty over the amount and timing of the leakage and PCC reductions. Therefore, it could be prudent to provide extra supply capacity as early as possible to give a cushion against accelerating climate change and bring forward the date for 1 in 500 year drought resilience. On that basis, we propose the following schemes should go ahead, even if not strictly needed under our realistic assessment of reduced future needs: By early 2030s: the Teddington DRA scheme (67 Ml/d), the first phase of the GUC transfer (50 Ml/d) and the 50 Ml/d Thames to Affinity transfer to allow early chalk stream relief By 2035/36: the 1st phase of the 300 Ml/d (pipeline capacity) Severn-Thames transfer and the 2nd phase of GUC transfer, if not included in the first phase GUC transfer. Thus about 300-400 Ml/d of 'over-provision' would be deployed early to 'hedge' against climate change or population growth being substantially higher than the forecasts.	• No new sources are required in the SWOX WRZ if 50% leakage reduction and govt PCC targets are achieved in the SWOX WRZ, but GARD suggest inclusion of the STT as a risk mitigation measure • Under GARD's proposed supply-demand balance trajectory, no supply-side solutions would be needed in the Thames Valley WRZs	We have not considered in detail the merits of the programme of options proposed by GARD as the supply-demand balance trajectory that the GARD plan is designed to meet would not meet the requirements of the Water Resources Planning Guideline and is thus inappropriate for use in strategic planning. However, we note that GARD do not dispute the need for Strategic Resource Options. We consider that the programme appraisal approach which GARD have taken in identifying their preferred programme is flawed and inappropriate for planning. GARD have determined a single supply-demand balance trajectory and proposed "over-provision" of supply options to "hedge". This approach is inappropriate for water resources planning, as efficiently meeting future supply-demand balance requirements which are robustly determined is required when deriving a plan. GARD have also not given evidence to support their proposed programme to identify whether it would be least cost or best value. We agree that demand management measures are somewhat uncertain and have factored this into our programme appraisal approach, as described in Sections 10 and 11. Our consideration is that the approach taken in identifying climate change impacts in our rdWRMP24 is robust and meets the requirements of the Water Resources Planning Guideline, and that the proposed approach of "hedging" to an unspecified degree is not appropriate. We have explored the implication of later and earlier delivery of 1 in 500-year resilience, as is detailed in Section 10 of our rdWRMP24.	We have not adopted the programme of options set out by GARD, as our consideration is that our best value planning approach is robust, and our preferred plan is the best value plan for our customers.

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Thames Water's plan says that the choice between the 150 Mm3 and 100 Mm3 Abingdon reservoir is a key topic for this consultation. The plan puts forward two spurious reasons for choosing the larger version. Firstly, the 150 Mm3 reservoir "has lower regrets if the future is worse than predicted" – it seems highly improbable that the future will be even worse than Thames Water's overly-pessimistic predictions. Secondly, the 150 Mm3 reservoir "Provides additional headroom for changes in environmental policy requiring further abstraction reductions or improved levels of service" – it seems inconceivable that the abstraction reductions will need to be more than the High scenario that Thames Water has assumed or that a future level of service will be more severe than a 1:500 drought. If an ill-judged decision was made to build a reservoir at Abingdon, we can see no valid reason for it to be the 150 Mm3 version, apart from benefits to Thames Water's shareholders.	• GARD agree with the statements in the Thames Water WRMP that 'the 100Mm3 option has 'lower regrets if the future is better than predicted' and that the 'smaller footprint provides for more opportunity for landscaping and mitigation of visual aspects of the scheme'. However, the 100Mm3 reservoir would still carry a large risk of being a white elephant. • An advantage of a 100Mm3 reservoir over a 150 Mm3 reservoir would be that a 100Mm3 reservoir would require less water to fill it, reducing the risk of failure to fill during dry winters • Some positives of the smaller reservoir option over the larger option include impacts from construction on Natural Capital and Biodiversity, and a smaller embedded carbon footprint • Points are raised which are elaborated on in later sections, including negative views on the construction impact of the reservoir option (of any size), safety concerns, and carbon footprint	We agree that the phrasing that has been picked up on could have been improved upon. Rather than "worse than predicted" we should perhaps have made clear that we were referring to the more challenging supply-demand balance trajectories we have considered and instead of saying "Provides additional headroom for changes in environmental policy requiring further abstraction reductions or improved levels of service" we should instead have said something along the lines of "Would be preferable under the scenarios of larger licence reduction requirements". Our Deployable Output estimates incorporate reservoir refill and so include the risks raised around the potential of non-refill of the reservoir. Thames Water acknowledges that the reservoir construction would have local impacts. We are working hard to ensure that these will be minimised, will conduct all required environmental assessments and want to work with the local community. It is true that a Severn-Thames Transfer scheme could be built more quickly than SESRO. Our modelling incorporates this, but the STT is nonetheless not selected. We have responded to points on reservoir safety carbon footprint later, when they are raised in more detail.	We have amended our phrasing in respect of the phrases "worse than predicted" and "Provides additional headroom for changes in environmental policy requiring further abstraction reductions or improved levels of service", in Section 10 of the rdWRMP. We have made changes to our plan between dWRMP and rdWRMP as a result of consultation feedback from regulators, stakeholders, and individuals, and as a result of changes to the Water Resources Planning Guideline. This has resulted in a revised programme appraisal process being carried out. Regarding the decision of whether a 100Mm3 or 150Mm3 reservoir would be preferable, the judgement made in our rdWRMP24 is that a 150 Mm3 reservoir is the best value option, for the reasons set out in Sections 10

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	• The 100Mm3 reservoir would still have significant local impacts, including a long construction period with dust and fumes being a problem during this period, loss of biodiversity and loss of agricultural land. • A Severn-Thames Transfer scheme could be built more quickly		and 11 of our revised draft plan.
Most of the information on water resources modelling requested by GARD in mid-December 2022 has still not been received. Therefore, we have been unable to address various concerns relating to the deployable output of Abingdon reservoir, particular those related to its resilience to long duration droughts and, consequently, its deployable output. We expect the information to be available soon and will use it in an Addendum to this response, and in our submission to the RAPID Gate 2 process.	A significant amount of detail is presented in the Addendum to GARD's consultation response – these points are detailed later in this document. Preliminary findings are presented of deployable output analysis: • Thames Water's stated Deployable Output for the reservoir is too high due to a lack of resilience to long drought events • New stochastic datasets contain fewer long droughts • There was an error in the modelling of the SESRO deployable output relating to the minimum river flow	There were difficulties in sending and receiving data which GARD requested. GARD submitted an addendum to their consultation response on 02 May 2023. Please see later responses to the modelling addendum for more detail. However, in summary: • We do not agree that the SESRO option's DO has been over-estimated. Our modelling is robust, and uses methods which we consider comply with the water resources planning guideline. Water companies across the UK are using stochastic datasets generated using the same methods in production of their WRMPs and they are the best tool currently available for examining the impacts of droughts more severe than those in the historical record. • We acknowledge the error which was present in some model runs. When this error was corrected, we found no Deployable Output impact.	Please see later responses to modelling addendum.

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The proposed Abingdon reservoir still only allows 6% of emergency storage, as compared to typically 20% for other major UK reservoirs. The last 6% of water will probably be of very poor water quality and is likely to be unusable. Increasing the emergency storage to a more prudent 20% would reduce the yield of the reservoir by about 15% or 30 Ml/d.	• The concern around having a 6% emergency storage allowance is that, when the reservoir would be significantly drawn down, it would be of a sufficiently poor quality that it could not be discharged into the River Thames	As is pointed out in GARD's consultation response, the 6% emergency storage in SESRO is calculated as 30 days' worth of reservoir throughput. Given that this is the standard on which other TW emergency storage requirements are determined, in the absence of other evidence we do not see a reason to amend this. The reservoir water quality modelling that was undertaken for the Gate 2 submission suggests that an acceptable level of water quality can be achieved with the current concept design and associated inlet / outlet and mixing arrangements. This will continue to be reviewed and re-analysed as the design progresses, to reflect the latest design of the reservoir and borrow pit, and appropriate inlet, outlet and mixing arrangements included as required.	We have not amended the WRMP on the basis of this comment as this assumption is consistent with our other deployable output modelling, and water quality modelling indicates that it is appropriate.
In GARD's opinion the Natural Capital Assessment of the reservoir is based on unrealistic aspirations of the site post-construction. It fails to take proper account of the large scale habitat destruction and the time needed for postulated improvement. The assessment is not transparent and it is riddled with unexplained inconsistencies. We conclude the Natural Capital Assessment is not fit-for-purpose.	• The attribution of positive Natural Capital stocks to the creation of Lakes and Standing Waters (on the basis of the introduction of recreation and amenity value) biases the Natural Capital Assessment in favour of all reservoir options. Quotation of a previous consultation response in which GARD made the point that different reservoirs have different possibilities for the exploitation of Natural Capital • The Natural Capital assessment is based on an aspirational, rather than	The Natural Capital assessment for SESRO has been carried out in line with an industry standard methodology (ENCA) and reflects the current scheme design. This design includes plans for mitigation of habitat loss, to achieve an overall net gain, by creating habitat on a like-for-like basis (aiming to replace with a higher quality) in relation to the types of habitat lost. As such, we do not agree with GARD's opinion regarding the Natural Capital assessment. The assessments do not take account for any potential advanced planting of hedgerow and tree lines which is likely to occur in order to maintain connectivity across the site during construction. Opportunities for advanced planting will be discussed during further iterations of SESRO's masterplan. The inclusion of "Food production" in the "total future value" Natural Capital assessment results for SESRO is due to the	No change has been made to the plan as a result of this response for the reasons set out in our consideration.

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	realistic, design for the reservoir. This is raised in relation to positive values in the Natural Capital assessment being associated with 'Broadleaved, Mixed and Yew woodland', 'Costal and Floodplain grazing marsh', and 'Ponds and linear features'. • The long construction period and resultant delay in creation of Natural Capital stocks makes the assessment unreliable • The presence of "Food production" in the "total future value" calculation of the SESRO option Natural Capital assessment - there must be an error in the assessment - "It is not clear, and is nowhere explained, why the loss of 65% of the food production land, has only resulted in an 8.5% drop in the food production value. This must surely be an error." • Criticism of the flooding assessment that has been undertaken for the reservoir option - the lack of a "proper flooding assessment" has resulted in water regulation being claimed as a positive factor in the NC assessment	creation of cereal crop habitat, as detailed in the Gate 2 reports for SESRO. The flood risk analysis completed for and summarised within the RAPID Gate 2 submission is appropriate for the current stage of development for SESRO. The initial surface water and groundwater models have been through a first technical review by the Environment Agency and all associated recommendations will be addressed as we develop the design and assessment of the scheme after Gate 2. The level of flood risk analysis completed for Gate 2 and the WRMP is sufficient to inform the options appraisal at a strategic level and to inform the costing and appraisal of appropriate mitigation measures that may be required. Based upon our initial flood risk analysis and modelling, we can conclude that the SESRO options would result in areas of existing floodplain being removed. In line with prevailing legislation and best practice, this would be mitigated through the development of level-for-level floodplain compensation, as part of the reservoir proposals. This would be designed to ensure that the flood risk to areas upstream and downstream was not worsened by the SESRO proposals. All such work would need to be reviewed and agreed by the Environment Agency before consent for the scheme is allowed. Our initial findings at RAPID Gate 2 are that the scheme could result in a slight betterment to the flood flows passing downstream to Abingdon and negligible impacts on groundwater flooding. This will be subject to further modelling, appraisal and scrutiny as the design progresses. The Natural Capital assessment conducted at Gate 2 for SESRO for the Natural Hazard management ecosystem service is quantitative, and fully aligns with the WRPG SG and WRSE	

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	• The use of qualitative assessments in Natural Capital assessment is criticised, particularly in the case of Natural Hazard Management. A concern that a "Major Beneficial" rating is applied in the case of an assessment without quantitative assessment having been undertaken	regional NCA methodology. Natural hazard regulation has been quantified based on the change of woodland natural capital assets within the indicative location for the largest SESRO option that intersect with an active floodplain. This method is based on the Joint UK Land Environmental Simulator (JULES) model approach developed by Forest Research. As with the Gate 1 assessment, this approach is an approximation based on habitat type only, however, to refine the approach, the Gate 2 assessment uses the project's hydraulic modelling rather than the Environment Agency's Indicative Flood Risk Areas to identify the floodplain and the relevant habitats contained therein, both for the baseline and post development. As a further refinement of the Gate 1 assessment, upper and lower replacement costs were considered alongside central values for sensitivity analysis. Replacement costs in this case represent the average capital and operation costs of flood reservoir storage that would be required in the absence of the ecosystem service. The assessment was deliberately precautionary owing to limitations in availability of industry standard data for certain habitats, and so represent the lower bounds, or likely an underestimate, of the potential benefits in this area from the scheme, though overall these are expected to be minor. In the Natural Capital assessment for SESRO in our draft plan, this ecosystem service was scoped out for SESRO. The 'Major Beneficial' rating described was a result of qualitatively assessing the combined effects of all of the options selected within the best value plan (rather than just the SESRO option) on the flow regulation ecosystem service, a separate ecosystem service to Natural Hazard Management.	

Similarly, the Biodiversity Net Gain assessment lacks clarity and suffers from aspirational and unfounded assertions of habitat creation with many inconsistencies and errors. Thames Water should be asked to revisit this work and make it consistent with the RAPID Gate 2 documentation in accuracy and transparency.	• Concern at the exclusion of 'scale-length' and 'time-duration' factors from the Biodiversity Net Gain assessment, referencing the long construction time of the SESRO option • The BNG values presented in the dWRMP and Gate 2 reports are different, and from conversation at stakeholder events GARD believe that the Gate 2 documentation is more up to date. GARD's initial review indicates errors in the dWRMP documentation. • The need to interpret excel spreadsheets results in the BNG assessment lacking transparency • The larger the reservoir, the more destructive the biodiversity loss and the more difficult restoration and improvement will be	The full methodology followed for environmental assessments of the draft WRMP24 (and WRSE regional plan) and the Gate 2 submissions for the SROs are by their nature different, as they are dictated by different requirements and are specified to suit different stages of option development and planning. This being said, the same industry standard methodologies for BNG and NC have been followed in the preparation of these assessments across both the draft plan and the Gate 2 submission. There are differences in outcomes, partly caused by using a previous version of the BNG and NC metric in the draft plan as compared with the Gate 2 submission. This is due to the different stages in the planning process in which these assessments were carried out, and the guidance available at each stage. The assessments prepared as part of the Gate 2 submission used more detailed data available later in the process as part of the preparation of the Gate 2 submission. Some differences in outcomes are caused by different granularity of source data being used and nuances in application of methodologies relating to the higher level of detail inherent in preparing a Gate 2 submission for an SRO. We have reviewed for opportunities to further align assessment outcomes, including updating to use the same version of the metrics and guidance, and have actioned these within Appendix AA of the revised draft plan.	Changes made to the plan are as per our consideration. Please see Appendix AA of our rdWRMP24 for further details.

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Abingdon Reservoir is the strategic resource option with the largest carbon footprint in the construction phase and realistically it can only be built in a single phase. The carbon footprint is dominated by the construction of the embankment works, which would involve a huge fleet of earth moving equipment and transport to site of large quantities of materials, especially as rip-rap.	• The level of detail presented in the dWRMP is insufficient with respect to carbon emissions calculations • The breakdown of the capital and operational emissions associated with the construction and use of the reservoir option is discussed • An STT scheme would have a smaller embedded carbon footprint than an equivalent SESRO scheme • Comparison should be made between a SESRO scheme and a phased STT scheme, rather than between a SESRO scheme and a whole STT scheme	We do not agree that an insufficient amount of detail is available regarding carbon emissions. Section 7 of our WRMP describes the approach taken in estimating carbon emissions (though we have expanded the detail included between dWRMP and rdWRMP), our WRMP tables (4, 5, 5a, and 5b) contain a significant amount of detail regarding carbon emissions, and the Gate 2 carbon reports provide considerable detail on carbon emissions for the strategic resource options. Carbon is calculated for all options; this is estimated using Thames Water Engineering Estimating System (EES) models. The output from these models is fed into the WRSE investment model and is a key criterion in the model's selection of options. We acknowledge that the 150 Mm3 SESRO option has the greatest carbon emissions associated with initial construction. However, the emissions associated with the construction of the STT option would not be significantly lower when factoring in the required elements of support, and it is important to also note that the ongoing emissions associated with STT are higher than SESRO. Our consideration is that our primary comparison should be of programme-level carbon comparisons, rather than option-level comparison, as it is not the case that the STT and SESRO can simply be substituted for one another, particularly when considering the Regional Plan. Appendix X and Section 10 of our dWRMP and rdWRMP give comparison of programme-level carbon emissions, and these figures demonstrate that SESRO-centric plans are significantly lower in carbon emissions than STT-centric plans.	Between dWRMP and rdWRMP we have enhanced the amount of information presented regarding carbon emissions assessment, which is presented in Section 7 of the rdWRMP. We have not amended our plan beyond this in response to this comment, as our consideration is that programme-level, rather than option-level, assessment is the most appropriate way to compare different solutions to ensuring the resilience of our supplies, and that this is the approach that we have applied.

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The carbon reports make weak claims for reduction in construction carbon through technological developments and carbon sequestration: • over-optimistic and aspirational claims for reduced carbon in construction materials such as steel (for pipelines) and concrete, without any timetabled technology-development roadmap for any of these materials • unrealistic claims for availability of low emission plant for earthworks, quarrying and riprap transport and placement, which dominate the embodied carbon for a reservoir • carbon sequestration 'opportunities' of limited scale and uncertain impact which are no more than could be achieved by local initiatives (funded by new DEFRA rules and Local Authorities) at vastly less cost The 'analysis' is woefully lacking in substance and hopelessly optimistic. There are no details of existing technologies, industry-accepted roadmaps, or indeed of anything that could not be found from a Google search. Instead, anecdotal discussions are cited, with manufacturers suggesting, for example, that hydrogen powered	It would be better if the reservoir construction were to be delayed until at least 2035-45, in order for the development of low-carbon construction to be further developed	This point is irrelevant – we have not incorporated forecast reductions in emissions into our programme appraisal. We are, however, committed to investigating low-emissions approaches to the development of new sources. Further detail is provided below. In April 2019, UK water companies agreed to a Public Interest Commitment, which included committing to achieve net zero operational carbon for the sector by 2030. The Net Zero Routemap was produced to provide strategic guidance and options to decarbonise the sector. A baseline was established from historical emissions, finding that the main source of operational emissions was from power use, primarily using grid based electricity. This was followed by process emissions, predominantly methane (CH4) and nitrous oxide (N2O) from wastewater and sludge treatment processes. The Routemap analysed three 'pathways' to illustrate how effective different approaches to net zero could be in the context of future market forces, supply chains, policy and the availability of funding. These were created to align with the emissions reduction hierarchy, which is a means of prioritising decarbonisation interventions by encouraging tangible emissions reductions before pursuing renewable technology or offsets. One of the pathways identified was Technology led. This pathway assumed the acceleration of technological innovations, with large investments in renewables, process technologies and sustainable transport systems, targeting decarbonisation in the largest emissions contributing areas. Due to the high proportion of operational emissions coming from the use of grid-based electricity and from process emissions, the routemap identified the technology led pathway as having the	No changes have been made in response to this consultation response point, although we have updated narrative around carbon emissions associated with our plan as a result of Environment Agency feedback, in Section 7 of the rdWRMP24.

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large excavators are being developed and are potentially available. Such 'analyses' are used to derive an astounding (for its chutzpah) conclusion that a 'mid-case' scenario could result in a 60% reduction in embodied carbon in the 2025-2040 timeframe.		highest percentage reduction against the baseline before requiring offsets. However, this comes at the highest cost, requiring investment in innovation planning, technology acceleration and business case development. 'The information presented in the Gate 2 submission to RAPID provides insight into the direction of travel for the construction industry with regard to the reduction of carbon emissions during major construction activity, associated largely with material and fuel choice. These are presented in response to the relatively high construction carbon footprint of the strategic options, to represent a vision of what might be possible to mitigate such impacts and where future efforts should be focused. However, the carbon emissions for each option in the draft WRMP and WRSE plans are based upon a 'worst-case' construction phase, i.e. assuming that no reductions in construction phase carbon emissions take place. In this scenario, SESRO is still selected in the best value plan. Therefore, any further reduction in construction phase carbon that may occur in the future will simply be an improvement on this otherwise optimised plan. It would be expected that future construction phase carbon emissions would change for all major options. As we continue to develop the options, we will further develop work on carbon reductions and continue to work with the industry to bring about reductions as far as possible with technological advances.	

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There are also crucial carbon footprints omitted including the Abingdon water treatment works, the loss of about 40 MW of existing solar farm within the site and failure to allow for greenhouse gas emissions arising from decaying vegetation and the inevitable algal blooms arising from nutrient rich water filling the reservoir. GARD calls for the GHG emissions for the Abingdon reservoir to be included with the carbon budget, as well as a statement regarding the treatment of water pumped into the reservoir and the policy for extraction from the Thames at times of sewage spills	• GARD present evidence that reservoirs are net carbon sources (arising from methane production through anoxic breakdown of organic material in deep water) and thus argue that emissions arising from the ongoing existence of the reservoir should be factored into the emissions estimates. Operational emissions arising from the reservoir are under-estimated due to the absence of consideration of this factor • The issue of cyanobacteria (blue-green algae) production associated with the reservoir option is a safety concern	Currently, the construction phase carbon emissions on SESRO do not take account of the loss of renewable energy generation from the impacts on the solar farms currently operating on the site. However, as noted in our Gate 2 submission, our consideration is that renewable energy generation via solar panels on SESRO's surface presents a real opportunity. The operational carbon analysis on SESRO does not take detailed account of GHG emissions from the reservoir itself. We do partially take this factor into account within the Natural Capital (NC) metric, calculating the contribution to NC that changes to land use would have on carbon sequestration. However, considering that a mid-point estimate from the figures GARD present in their response (around 3900 tCO2e per year), multiplied by the 35-year period (2040-2075), is 136,500 tCO2e, and that the difference in emissions between our preferred plan and a STT-centric plan are around 1 million tonnes CO2e, our consideration is that this factor is not material to our programme appraisal outcomes. With regard to the refill of the reservoir using water from the River Thames that might be contaminated with sewage spills, the modelling work we have completed for RAPID Gate 2 takes this into account, being based upon actual recorded water quality data in the river, hence inclusive of the long-term impacts of any previous spills. In the future, any abstraction of water to the reservoir during operational periods would be closely monitored, as at all TW reservoirs, and abstraction stopped should water quality fall below acceptable levels, for whatever reason. Such detailed operational procedures would be developed later as part of the detailed design of the assets.	We have not made changes to our plan following this response, for the reasons set out in our consideration.

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		As part of our work up to RAPID Gate 2, we have undertaken detailed modelling of the computational fluid dynamics and algal growth conditions in the largest SESRO option, and concluded that the current mixing arrangements should be sufficient to manage algal bloom risks during a full range of hydrological conditions, even allowing for future climate change. We will continue to review and update this modelling and assessment, as the scheme design progresses.	
We believe that Thames Water has failed in its duty of due diligence in safety matters. The issues we raise should have already been investigated, especially as the reservoir has been on the table, essentially in the current format, for at least 15 years. That studies have not been done (or at least remain secret) is a real scandal and cannot be allowed to go unchallenged. These issues include [items listed below]:	• Mitigating the safety issues raised would have implications for cost, delivery schedule, or deployable output	Our overall consideration is that the matters raised in the degree of detail suggested is not appropriate for the stage of development for an option to feature in our WRMP. As such, we do not agree that we have failed in matters of due diligence. In our Gate 2 submission to RAPID (Table 4.3), we have explained the various measures that we will take to ensure the reservoir is designed, constructed and operated safely. Thames Water has an exemplary record of safety at its existing 59 reservoirs which fall within the remit of the Reservoirs Act 1975. Thames Water also has several comparable reservoirs to the SESRO. King George VI, Queen Elizabeth II, Queen Mary, Queen Mother and Wraysbury all have dam heights of 12-20m and crest lengths of 4.3-6.3km. At between 15m and 25m high, the earth embankments for the proposed SESRO scheme are well within the parameters of other similar schemes in the UK. The British Research Establishment (BRE) Register of UK Dams lists 370 embankments with a height of at least 15m and 105 over 25m. Most embankment dams in the UK are built as impounding reservoirs (i.e., impounding a watercourse, and therefore abutting either valley side). The non-impounding nature of the SESRO does mean that its total crest length is unusually long.	No changes to the WRMP have been made as a result of this consultation response point, as we consider that our WRMP is based on robust assessment in this regard

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		However, the length of the dam has no bearing on the maximum stresses within it, which equate to the height, as this defines the scale of the loading induced by the self-weight and the loads applied by the water. A longer dam is typically more likely to encounter variety in the ground conditions which are to support the dam, but the ground conditions at the SESRO site have been found to be highly consistent around the perimeter. Globally, there is a World Register of Dams maintained by the International Commission on Large Dams, which highlights that there are many dams around the world of comparable or greater scale to the SESRO. Within the 2020 register there are, internationally: • Over 1,950 earth embankment dams impounding a reservoir volume of at least 150Mm^3 • 121 earth embankment dams with a crest length of at least 10km In an international context the proposals for SESRO constitute a large reservoir but there are many which are larger. Far from being untested, the use of earth embankments of such scale to impound reservoirs is very well established.	

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Engineering design of the embankment and associated structures to deal with slope stability, internal seepage, wave protection, settlement and pore pressure monitoring – all matters of crucial importance in design of large earth dams, but given minimal coverage in the skimpy conceptual design report.	No further discussion of this point is presented in the detailed text	As above, our consideration is that the assessments outlined in GARD's representation do not need to be considered in the suggested degree of detail at this conceptual design stage. We have no reason to consider that a safe reservoir cannot be constructed at this location. More detailed assessments will follow as we progress through option development phases. As part of our work towards RAPID Gate 2, we have investigated a wide range of engineering issues with the embankment design including geotechnical design, embankment stability and settlement, pore water pressures, wave protection and others. All these issues are built into our costing of the scheme for the draft WRMP. We plan to undertake additional geotechnical investigations ahead of Gate 3 to further improve our understanding of these issues and inform the refinement of the embankment design. The level of work undertaken at this conceptual stage is reasonable given the current stage of the planning process for SESRO and sufficient to confirm the key costs, risks and issues to be resolved during later design stages.	No changes have been made in response to this consultation response point, as we consider that the SESRO design is sufficiently progressed for the current stage in the planning process.

Consultation Response - verbatim from Executive Summary	Consultation Response – Summary of additional points raised outside the Executive summary	Our consideration	Changes to the draft plan, or if no changes are made, why not
The threat of dam breach and associated catastrophic flood of downstream communities – there is no reference to any consideration of this.	• Briefly sets out the legal context within which dam/reservoir safety is assessed • The SESRO options would fall under the "high risk" category. Methods intended to be used in assessing 'small dams' are applied as more complex assessments require more detailed design information • The long perimeter of the embankment, volume of water held above-ground, micro-fissures in embankments (stated as being exacerbated by climate change) and the proximity of communities render the proposed reservoir mean that SESRO would be higher risk than other reservoirs • In Appendix B, a simplified breach assessment is presented from which it is concluded that safety issues exist which Thames Water should investigate	As above, our consideration is that the assessments outlined in GARD's representation do not need to be considered in the suggested degree of detail at this conceptual design stage. We have no reason to consider that a safe reservoir cannot be constructed at this location. More detailed assessments will follow as we progress through option development phases. Under the requirements of the Reservoirs Act, there is an obligation on the owner and operator of a reservoir to produce an On-Site Plan prior to the reservoir being filled for the first time, which would detail breach failure and inundation extents for use by first responders and civil contingency planners. This plan is a critical part of the certification of the reservoir by the Construction Engineer, who would be appointed under the Reservoirs Act. This type of inundation information would not normally be produced ahead of DCO consent. There are no direct requirements of either the Water Resources National Policy Statement or in the 2008 Planning Act for inundation mapping to be provided for a reservoir.	No changes have been made in response to this consultation response point, as we consider that the SESRO design is sufficiently progressed for the current stage in the planning process.

Consultation Response - verbatim from Executive Summary	Consultation Response – Summary of additional points raised outside the Executive summary	Our consideration	Changes to the draft plan, or if no changes are made, why not
The effect of emergency drawdown on potential flooding of downstream communities and need for evacuation.	• Figures of flow required in emergency drawdown situations mean that increased flood risk is the outcome. Need for consideration of flood risk in the near term is raised.	As above, our consideration is that the assessments outlined in GARD's representation do not need to be considered in the suggested degree of detail at this conceptual design stage. We have no reason to consider that a safe reservoir cannot be constructed at this location. More detailed assessments will follow as we progress through option development phases. The nearest flow gauge to Culham, which is the proposed outfall location for SESRO into the River Thames, is at Sutton Courtenay. Flow statistics for this gauge may be found in the National River Flow Archive (NRFA Station Mean Flow Data for 39046 - Thames at Sutton Courtenay (ceh.ac.uk)). The Flow Duration Curve at this location shows that the flow in the River Thames at this point is at or below approximately 40 cu metres / second for 80% of the time of the gauged record (1973 – 2021). The data records that the highest flood during that data record reached a peak of just over 200 cu m / sec. A flood event with a return period of 1 in 10 years would have a peak flow of just over 66 cu m/ sec. The exact emergency discharge flow rate of the 100 Mm3 option is yet to be established, as the exact footprint, depth and outfall configuration is not yet designed. However, the scale of the scheme is such that the operation of the emergency discharge facility at SESRO would, effectively, add the equivalent of a winter flood event into the River Thames. The drawdown capacity for the configuration of the 100 Mm3 option that was considered in the draft WRMP has been estimated at approximately 58 cu metres / second. We would expect to carry out flood modelling of the effect of this discharge event, to determine the impacts on the downstream catchment, as part of future Flood Risk. This work is not	No changes have been made in response to this consultation response point, as we consider that the SESRO design is sufficiently progressed for the current stage in the planning process.

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		expected to simulate the combination of emergency discharge with an extreme flood in the Thames, due to the extremely low combined probability of such an occurrence. As a result, we would expect the combined flooding effects of the emergency discharge with average flow conditions in the Thames to be broadly equivalent to a large winter flood event and hence not cause any additional flooding risks or risks to life.	

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The threat of terrorism to the embankment and associated structures – there appears to have been no consideration of this and the limitations it might pose on the use of the reservoir for the recreation uses, which are supposedly a major benefit	• GARD have had an 'off the record' discussion with an "expert in counter-terrorism". An assessment of terrorism risk may result in prohibition of vehicles from the reservoir bund • A 500 kg vehicle-borne improvised explosive device could risk breach of the embankment • The dangers of terrorism should be thought of at this stage in the design process in order that the Natural Capital assessment can be updated accordingly	As above, our consideration is that the assessments outlined in GARD's representation do not need to be considered in the suggested degree of detail at this conceptual design stage. We have no reason to consider that a safe reservoir cannot be constructed at this location. More detailed assessments will follow as we progress through option development phases. We have undertaken an initial assessment of security risks as part of our work towards RAPID Gate 2, in order to ensure that the indicative master plan we developed would be in accordance with Thames water asset safety and security standards. Table 4.3 in our Gate 2 submission confirms that "There is a need to ensure the constructed infrastructure is robust and secure. In keeping with other reservoir sites, access to vulnerable assets will be tightly controlled. Access points, namely at the pumping station and riverside shaft, shall be tightly controlled as per all other Thames Water / Affinity Water infrastructure. The emergency drawdown siphons would be almost entirely buried, with the stilling chambers made secure by local access barriers / fencing. Thames Water currently allows safe public pedestrian access at Farmoor Reservoir and the Walthamstow wetlands site and similar arrangements are envisaged for SESRO. However, vehicular access to the dam crest at SESRO shall be controlled to manage the risk of damage." We will continue to develop the design of the scheme to reflect all relevant and required safety and security issues, as we progress through the next stages of scheme development.	No changes have been made in response to this consultation response point, as we consider that the SESRO design is sufficiently progressed for the current stage in the planning process.

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The limitations that wave protection and upstream erosion prevention will place on the potential for recreation use and habitat creation.	• Thames Water have paid greater consideration to minimising embankment height in order to appease local residents than to ensuring a safe reservoir design • GARD have undertaken a simplified approach to estimating the safe freeboard height associated with an embankment and conclude that the design of the reservoir include 0.5m too little freeboard. Thames Water should state why a 1m freeboard has been adopted in the conceptual design of the reservoir	We do not agree that inadequate consideration has been given to required freeboard height. The concept design for SESRO has been developed to a reasonable stage for the RAPID Gate 2 submission. This includes the assessment and design of sufficient freeboard (difference in level between maximum operating level and top of wave wall / dam crest) to take account of long-term settlement of the dam, and the risk of large waves breaking over the dam. To calculate the potential wave heights that could be generated at the SESRO site during extreme storm events, established equations were used, initially based on historic wind speed measurements. These have been updated using the outputs from a Computational Fluid Dynamic (CFD) model, which has modelled the effects of the perimeter embankment shape on winds as they pass up and over the dam prior to generating waves on the water surface. Wave height estimates have therefore been based on wind speeds which have been factored to account for the CFD modelling outputs and also for potential increases in storm wind speeds which may be induced by climate change. The conceptual design of the embankment crest, erosion protection and associated freeboard and wave wall all take account of the detailed wind and wave modelling. Based upon this detailed wind and wave data, the concept design for Gate 2 includes a minimum of 1m of freeboard between the top water level and the crest elevation, suitable wave protection measures and an additional concrete wave wall to prevent overtopping. Further work is planned ahead of Gate 3 to review this critical design element, including review of previous wind estimates and modelling to verify or update wind speeds associated with a range of extreme wind events (up to 0.1% AEP) including	No changes have been made in response to this consultation response point, as we consider that the SESRO design is sufficiently progressed for the current stage in the planning process.

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		allowance for climate change. We also plan to use any updated wind estimates to undertake 3D Physical Laboratory wave modelling (both linear and oblique) of the reservoir configuration to verify / optimise the design of the inner face protection and associated wave protection and freeboard. The output from this modelling will inform the design at Gate 3 which will be used for subsequent consultation and DCO submission. We will also use this information on wave and wind modelling, as well as the water level fluctuation data we have from modelling the operational phase of the reservoir, to design the recreational and habitat creation elements of the scheme.	
These are all matters that appear to have been left to later investigation in Gate 3 (if at all), thereby removing them from the public eye and the next stage of decision making. GARD views this as unacceptable, and has carried out its own assessment of consequences of dam breach, which highlights the dangers and point to the need for risks to 'peripheral' and 'downstream' communities to be evaluated at the present stage in the RAPID process, before progress to Gate 3.	No further points are raised in the detailed text	As noted in the answers to previous points raised, we have developed the design of the SESRO scheme to a suitable standard to meet the requirements of the options appraisal process for WRMP and for the Gate 2 submission to RAPID. Further design development and environmental appraisal will be undertaken as the scheme progresses towards DCO application. As noted previously, inundation mapping required prior to the commissioning of the reservoir and to inform the On-Site Plan, but would not normally be produced ahead of DCO consent. There are no direct requirements of either the Water Resources National Policy Statement or in the 2008 Planning Act for inundation mapping to be provided for a reservoir.	No changes have been made in response to this consultation response point, as we consider that the SESRO design is sufficiently progressed for the current stage in the planning process.
The high capital cost of Abingdon reservoir would give a large increase in Thames Water's Regulatory Asset Value with a guaranteed big increase in shareholder returns throughout the 250-year long asset life term. It would also drive a substantial increase in customer bills. The WRMP documentation and Gate 2 reports give no	No further points are raised in the detailed text	Our investment modelling and programme appraisal incorporates payments to associated with RCV increase. As such, our programme appraisal takes proper account of these factors. Three oversights are made in this response, which are described in more detail below:	We have added additional content into Appendix W of our rdWRMP (Programme Appraisal) to describe the investment modelling approach taken to ensure that stakeholders are aware that

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indication of these effects and there is no recognition of the perverse effect of the regulatory regime in creating this situation.		• Construction of the SESRO and STT options would be undertaken by a separate entity (a special purpose vehicle), and so there is not an incentive for Thames Water's shareholder to promote the reservoir • If the reservoir were to be constructed by Thames Water, it would not be funded solely through equity increases, and a proportion of payments to capital would be made to service interest payments on debt. • Payments to capital are considered explicitly within the annuitized cost which is calculated in investment modelling calculations. As such, our programme appraisal appropriately considers the costs of different options (whether opex or capex weighted) to our customers. Returns on capital value, whether payment to service debt or returns to equity investment, are an acknowledged part of a privatised water industry. GARD in their response have made the assumption that return on capital value would be made in order to fund dividends to Thames Water shareholders. This response makes three oversights. The first is that Thames Water's shareholders would not benefit from returns on capital associated with construction of SESRO or STT. The most likely delivery mechanism for the most significant capital projects in the WRMP would be a special purpose vehicle, the finances of which would be separate from Thames Water (similar to the model used for the Thames	we explicitly account for payments on equity/debt within the determination of the costs of different options.

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		Tideway). The SPV set up would fund new infrastructure through a combination of equity and debt, with a return paid on capital. Thames Water (and other infrastructure users, e.g., Affinity Water and Southern Water) would make payments to this SPV. As such, there is not an incentive for Thames Water to promote high capital expenditure options on the basis of providing returns to shareholders. The second oversight is that payments made to service RCV are to service capital value increase, not equity increase. Water company capital investment is funded through a mixture of equity investment and debt. Where new investment is funded through debt, payments would be made to service debt obligations, not to deliver returns to shareholders. The third oversight in this response is that, in building our Water Resources Management Plan, our objective is demonstrably weighted against profit maximisation. When determining our investment plan, where options involve capital investment, the WRSE investment model accounts for payments associated with depreciation and payments to RCV increase (agnostic to whether capital would be funded through equity or debt) when determining the costs of each option. The objective function of the investment model is, initially, finding the programme with the lowest overall cost to customers (accounting for the social cost of carbon emissions, and discounting future costs according to treasury guidance). As such, if faced with two options - one purely capex and one purely opex - which deliver the same outcome, the investment model would select the opex option ahead of the capex option. As such, while there may be a perceived incentive for water companies to invest in capital-intensive solutions in order to boost returns, the fact that the investment model has an objective function which looks to	

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		minimise cost (net present) while also accounting for costs to capital means that the model would weight explicitly against capital-intensive solutions.	

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GARD believe that there is a fundamental and extremely perverse incentive in the Water Industry regulatory regime that encourages investment in "big concrete" projects as the solution to any and all problems. GARD believe this flawed incentive structure explains why Thames Water keep proposing an unneeded reservoir. The alternatives to the reservoir include fixing leaks, installing smart meters, the Severn to Thames Transfer, reuse and desalination. All these alternatives involve lower capital expenditure and shorter life assets. Consequently, all these alternatives look less attractive from the perspective of Thames Water shareholders. GARD calculate that customers would pay £4.8 billion in today's money for the reservoir, this is £3.0 billion more than the cost of the reservoir and £3.0 billion more than customers would pay if the same money was spent on operating expenditure fixing leaks and reducing demand instead of the reservoir. These aspects of costs to consumers and benefits to shareholders should be made explicit in any evaluation of dWRMP and Regional Plans. The only way this can be done is if they are transparently laid out by WRSE and the companies in these plans. The matter should be used in a metric as input to the establishment of a Best Value Plan, perhaps through the 'Inter-generational Equity' metric.	• In Appendix C, GARD present a more detailed description of their criticisms of the UK Water Industry's regulatory regime • In this appendix, the sources of revenue to a water company are presented, and the details of a spreadsheet financial model are discussed. One of the sources of water company revenue is noted as the return on Regulatory Capital Value (RCV). The existence of a return on Regulatory Capital Value results in an incentive to invest in large capital projects.	We do not accept that the choice of the reservoir is based on an increase in shareholder return for three key reasons: 1. The reservoir has been selected through a robust process which selects the best value plan for our customers. The best value plan process begins with the development of a "least cost" plan, where "cost" means the cost to customers and incorporates payments to capital which would be made under the current regulatory regime. This point is expanded on in our response to the previous comment. 2. In all likelihood, the reservoir would be delivered through a Special Purpose Vehicle, and as such the profit motive which GARD contends exists does not exist in reality. This point is expanded in our response to the previous comment. 3. GARD present a false choice when presenting alternatives as requiring low capital cost. Additional metering expenditure beyond that in our plan is infeasible (with meter penetration maximised as soon as we consider is deliverable), leakage reduction above our preferred programme would require more capital investment per Ml/d benefit than the reservoir (our proposed mains rehabilitation programme, for example, would require £1.6bn of capital investment (not operating expenditure) for the return of 84.9 Ml/d in leakage reduction), and all supply-side investments involve significant capital investment.	We have added additional content into Appendix W of our rdWRMP (Programme Appraisal) to describe the investment modelling approach taken to ensure that stakeholders are aware that we explicitly account for payments on equity/debt within the determination of the costs of different options.

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We do not agree with Thames Water's proposal to delay the STT to beyond 2050 in their preferred plan. In Thames Water's own words, the scheme provides a modular, adaptable source of water, whereby water from support sources can be introduced as and when necessary. We propose that the STT transfer aqueduct should be built as quickly as possible, initially with only a modest amount of support sources, but with the capability of adding new sources if needed.	No further points are raised in the more detailed text	We have made changes to our plan between dWRMP and rdWRMP as a result of consultation feedback from regulators, stakeholders, and individuals, and as a result of changes to the Water Resources Planning Guideline. Some of these changes, notably the requirement that we plan on the basis of a 110 l/h/d PCC by 2050, change the need for water in the different scenarios that we are considering. This changes the status of STT in our plan. Analysis of the outputs of investment modelling undertaken demonstrated that a plan based around the STT would be more expensive and more carbon-intensive than a plan in which the SESRO option. In addition, our consideration is that the STT scheme is either modular and adaptable, or resilient, but cannot be both. In the drought of 2022 we saw that an unsupported STT scheme would have brought little benefit (c.7 Ml/d) with flows in the Severn being below the "Hands off Flow" condition for almost all of the duration of the drought in the Thames Catchment. The yield of an unsupported STT would vary considerably between years. As such, in order to ensure the resilience of supplies, we would be very unlikely to adopt a lightly supported STT scheme and would instead require significant support from Vyrnwy and Minworth to be confident in the scheme. This would, in turn, remove the modularity benefits and mean that the scheme is much less adaptable.	We have detailed our revised programme appraisal in Sections 10 and 11 of the rdWRMP. Due to the requirement to plan on the basis of achievement of the 110 l/h/d PCC target, the STT is no longer selected in our preferred programme.

The WRMP should recognise that there is a strategic need to transfer water from the relatively wetter and less populated north and west of the country to the dry and heavily populated South East. This need has been a primary conclusion of every national strategic water resource study of the past 50 years. By delaying the Severn to Thames Transfer to 2050, Thames Water is removing the possibility of any major transfer into the South East for another 30 years.	No further points are raised in the more detailed text	We do not agree that there is a strategic need to transfer water from the North West to the South East, for the reasons set out below. Our programme appraisal is robust and properly evidenced, and a nebulous “strategic need” would not be an appropriate basis on which to plan. We also do not agree that not including the STT in our preferred plan rules out its inclusion in future plans. Policy requirements can change over time, and should, for example, demand management efforts not result in achievement of the 110 l/h/d target, the STT could form an important part of our plan. It is important to note that the description of the West and North West as "wet and less populated" presents a somewhat misrepresentative picture. The North West contains urban areas such as Liverpool and Manchester, which are significant population centres. Of more relevance to the WRMP is that the North West does not have 'spare water' that can be transferred to the South East. If water were to be transferred from the North West from Vyrnwy reservoir, United Utilities would need to invest in new sources (identified in their WRMP) as lake Vyrnwy is currently used to provide water supplies to United Utilities’ existing customers. As such, while SESRO involves investment in one new asset, investment in the STT involves investment in at least two new assets (interconnector to transfer water, and sources to replace water which UU would trade). This is demonstrated in the North West Transfer Gate 2 documentation (detailed feasibility and concept design report, p.13), where United Utilities state that 167 Ml/d of new sources would need to be developed in order to facilitate a 205 Ml/d trade.	We have not made changes as a direct result of this consultation response as we consider that we have appropriately appraised different options within our WRMP. We have, however, made changes to our plan between dWRMP and rdWRMP as a result of consultation feedback from regulators, stakeholders, and individuals, and as a result of changes to the Water Resources Planning Guideline. The outcomes of our programme appraisal are detailed in Sections 10 and 11 of the rdWRMP24.

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We think that the proposed initial STT aqueduct capacity of 500 Ml/d is too high. We think it inconceivable that this amount of transfer would ever be needed, especially if abstraction reductions for improved river flows are properly prioritised, with account taken of the costs and environmental impacts of replacement sources. We suggest that a 300 Ml/d aqueduct capacity, or at most 400 Ml/d, would be sufficient for a reasonable insurance against climate change and population growth being much worse than expected. A 300 Ml/d aqueduct could also be provided by the Cotswold canal transfer, with its potential for a lot of secondary benefits through the canal restoration, although we recognise the higher risk of this option in both construction and operation. We propose that the first phase of the scheme should comprise the 300 Ml/d aqueduct, support from Netheridge and both phases of the 115 Ml/d support from treated Minworth WWTW effluent. This would give a deployable output of 195 Ml/d using Thames Water's figures	• Surprise at the phasing of STT options. Minworth, rather than Vyrnwy, would be the better option to provide support initially Deployable output of 500 Ml/d unsupported scheme should be more than 134 Ml/d	There would be significant periods of time when it would be possible to convey flows in excess of 300Ml/d and restricting the pipe size reduces the water resource benefit of STT. We are not convinced that a decision to restrict the transfer capacity would be in the best interests of providing long term water resilience, should the STT be selected. The WRSE investment model is freely able to select STT pipeline sizes of 300, 400, and 500 Ml/d and, should the 300 Ml/d be the best value option, it would be selected. As such, we do not consider it necessary to screen a larger pipeline size out of consideration. This comment is predicated on a supply-demand balance trajectory which we do not agree with. The approach which GARD use to derive their plan is also unsuitable for use in Water Resources Planning, for reasons highlighted earlier. We recognise that canal restoration could bring wider benefits, however, the Cotswolds Canal option is not the preferred solution for providing an STT on two grounds: • The size of the option is limited to 300 Ml/d • The option is significantly more costly than a pipeline alternative Regarding phasing of the STT options, in production of the dWRMP, the STT SRO team undertook an optimisation exercise to establish the logical order in which STT options should be selected. This exercise suggested that Netheridge, followed by Vyrnwy and then Minworth would be the most logical order for support to be provided. The order that STT options would be selected in was then fixed within the WRSE investment modelling, in order to reduce the size of the computational problem. In the revised draft of the WRMP, the fixed phasing has	We have not made changes as a direct result of this consultation response. We have, however, made changes to our plan between dWRMP and rdWRMP as a result of consultation feedback from regulators, stakeholders, and individuals, and as a result of changes to the Water Resources Planning Guideline. Due to the WRPG requirement to plan on the basis of achievement of the 110 l/h/d PCC target, the STT is no longer required in our preferred programme.

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		been removed and the investment model is free to select phases of Minworth or Vyrnwy support as it determines best meets the needs of the South East. The Deployable Output of 134 Ml/d accounts for climate change impacts.	
We have noted a number of inconsistencies in Thames Water's assessment of deployable output from the scheme, but, as for Abingdon reservoir, we will provide more comment on this through an Addendum to this response, once the requested Pywr model information is available.	• Concern over the DO values presented for the STT options, as they are different to those from Tables in the Gate 2 Report and a report written on STT DO modelling • The STT DO modelling report suggests that the STT's DO is higher when considering DO gain under more severe drought periods. Unsure whether this is an error.	The DO values for STT schemes in the dWRMP are aligned with Gate 2 reports and there are not inconsistencies between our rdWRMP and Gate 2 reporting of DO benefit. Between dWRMP and rdWRMP, re-formulation of STT options has been undertaken, including revision of option phasing for support from Vyrnwy. The option DO calculations are consistent, but different DO values will be stated as the different phases represent different size release steps We have considered GARD's addendum to their consultation response with respect to DO modelling of the Abingdon reservoir and STT schemes, and our responses to points raised in the addendum are detailed later.	Between dWRMP and rdWRMP, re-formulation of STT options has been undertaken, including revision of option phasing for support from Vyrnwy. The option DO calculations are consistent, but different DO values will be stated as the different phases represent different size release steps. We have considered GARD's addendum to their consultation response with respect to DO modelling of the Abingdon reservoir and STT schemes

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Neither Thames Water's WRMP nor WRSE's regional plan has provided the clear cost comparison that is needed to support the choice of Abingdon reservoir instead of the STT as the first major new source in the development programme.	No further points are raised in the more detailed text	We do not agree that a cost comparison between SESRO and STT is useful as a decision-making step. The options are not a like-for-like substitution for one another, and the WRSE investment modelling demonstrates that, should SESRO be ruled out of consideration, introduction of the STT is not the only change. We are confident in the cost assessments for both the SESRO and STT schemes, and cost information is transparently available in both our WRMP tables (4, 5, 5a, 5b), and the RAPID Gate 2 reports. As stated above, our primary comparison between programmes should come from comparison of programme-level costs, i.e., "what is the cost of two different programme of options, each of which solve the regional planning problem?", rather than a direct comparison of scheme costs. This reflects that different schemes deliver different levels of supply-demand balance benefit, and that there are many knock-on impacts associated with individual selection decisions that are not captured when comparing schemes side by side.	We have not made changes to our WRMP following this response, for the reasons identified in our consideration.
GARD welcomes the cost information that has been made available in the WRMP tables and Gate 2 reports. However, making cost information available is not the same as presenting it transparently to justify choices between options. Failure to present clear cost comparisons is just as bad as failing to provide cost data at all.	It is good that more transparent cost data is available in WRMP24 tables than has previously been available, but some things (e.g., splitting costs of the reservoir option between three companies) make the costs untransparent Thames Water have been untransparent by failing to provide data to GARD, requested on 15th January	We do not accept that the presentation of cost information is not transparent. Resource options cost comparisons are available in WRMP data tables 4 and 5a-b and in the case of SROs, also in the RAPID Gate 2 reports. We have shared a detailed breakdown of the SESRO cost estimate as reported in WRMP and Gate 2 with GARD on 14th April 2023 to support analysis of how the estimate has been prepared for inclusion in the WRMP data tables. The selection of options for an overall best value plan is described in sections 10 and 11 of the WRMP.	We have not made changes to the WRMP as a result of this feedback, as we consider that the costs presented are transparent

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In the absence of any Thames Water cost comparisons, GARD has compared the 100 Mm3 Abingdon reservoir with the 300 Ml/d Severn to Thames transfer, supported by Netheridge and both phases of Minworth support. Both schemes give about 190 Ml/d of deployable output and we assumed both would be operational from 2040 to give a like-for-like comparison, as shown below: (See table on page 113). This shows the STT option to be about 10% less costly than Abingdon reservoir overall, if costed with realistic operational use. Even this is not a fair comparison, because the 300 Ml/d STT aqueduct can potentially deliver another 100 Ml/d of deployable output, whereas Abingdon reservoir deployable output is fixed at 185 Ml/d. This shows the misleading nature of Thames Water's statement that removal of Abingdon reservoir from the programme would add over £500 million to the NPV costs (WRMP paragraph 11.62).	• The programme-level cost comparisons presented in Section 10 of TW's WRMP do not present a side-by-side comparison of the costs of the reservoir and STT options • Criticism is raised of programme-level cost comparisons presented which compare the cost of programmes in which SESRO is constructed in 2040 with those in which STT is constructed in 2040 • Criticism is raised of the '1 in 500-year resilience by 2035' sensitivity run, as it does not contain the STT at 2035. Further investigation of programmes which could deliver a higher level of resilience sooner is needed The sensitivity runs consider a supply-demand balance trajectory which is unrealistic. Thames Water should use the supply-demand balance trajectory which GARD suggest. This trajectory would demonstrate a need for only one or other of SESRO and STT. Thames Water have presented misleading cost comparison figures in their narrative. Thames Water have compared a 500 Ml/d STT run cost	As stated above, our primary comparison between programmes should come from comparison of programme-level costs, i.e., "what is the cost of two different programme of options, each of which solve the regional planning problem?", rather than a direct comparison of scheme costs. This reflects that different schemes deliver different levels of supply-demand balance benefit, and that there are many knock-on impacts associated with individual selection decisions that are not captured when comparing schemes side by side. Our consideration is that our programme appraisal approach is robust and appropriate, and that our narrative is correct. In addition, we do not agree with the opex values presented by GARD. As is demonstrated in our rdWRMP24 Tables (Table 5b), the fixed opex (i.e., irrespective of option utilisation) associated with selection of the 300 Ml/d pipeline & Netheridge (c.£13m/y), along with the full Minworth (c.£16m/y) solution, which totals c.£29m/y, is greater than the £18.3m/y figure stated by GARD for the total (i.e., including utilisation) opex. Similar values were present in our dWRMP (though we note that the fixed opex values in the dWRMP were different – c.£18m/y for Minworth and c.£5m/y for the unsupported 300 Ml/d transfer and Netheridge, totalling c.£23m, noting that the TW dWRMP tables presented 74% of the total STT costs due to the utilisation of the STT by different WRSE companies). Given that the fixed opex in the dWRMP and rdWRMP tables exceeds the total opex stated in GARD's cost comparison, we do not accept the conclusions of GARD's comparison. If utilisation is included, the gap between figures presented by GARD and those which would be appropriate for use in our WRMP will only grow. Our consideration is that the costs used in the WRMP have been robustly calculated, and are appropriate for use in our planning.	The Minworth option has, in our rdWRMP24, been considered as being either a single phase (115 Ml/d) option, or a two-phased (58+57 Ml/d) option. The single-phased option is cheaper than the sum of the two-phase option phases. We have not made changes to our WRMP other than this, following this response, for the reasons identified in our consideration.

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	with a SESRO 100 run cost but should have compared the 300 Ml/d or 400 Ml/d run costs instead. • A direct cost comparison between the SESRO 100 Mm3 option and GARD's preferred combination of STT sub-components is presented. An alternative opex figure is used to the one adopted in the Thames Water WRMP, which GARD state they feel is more realistic The lower opex figure is used because the utilisation used in Thames Water/Severn Trent/United Utilities' costing is over-stated. • Simultaneous delivery of the Minworth and GUC options could result in a lower overall cost for the two options United Utilities have over-estimated the costs of providing replacement sources	We also do not agree with the Deployable Output figures used in this comparison, as the Deployable Output figure GARD have adopted for the STT does not include climate change impacts. We have adopted DO values which reflect a median climate change impact forecast for supply options where climate change is likely to have a significant impact on DO. The deployable output figure we have used for the 300 Ml/d unsupported scheme is 80 Ml/d, compared to 101 Ml/d that GARD have used. In Section 10 of our dWRMP and rdWRMP we have discussed "sensitivity" investment model runs conducted to establish the impact of aiming for a higher level of resilience earlier in the planning period. We discussed why our consideration was that this plan did not represent best value for customers. It is correct that a single-phase build of the Minworth support option would be less costly than building it in two phases. This is reflected in our rdWRMP24. United Utilities have provided prices to Thames Water for use in WRMP24, and the calculations behind these prices have not been disclosed to Thames Water for commercial reasons. However, we are aware that the prices provided reflect the need to develop sources to replace water, as supplies from Vyrnwy are currently used to provide water to United Utilities' customers. This is demonstrated in the North West Transfer Gate 2 documentation (detailed feasibility and concept design report, p.13), where United Utilities state that 167 Ml/d of new sources would need to be developed in order to facilitate a 205 Ml/d trade.	

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The construction of the 100 Mm3 Abingdon reservoir and the 300 Ml/d STT supported by Netheridge and Minworth, as proposed by GARD, both have capital carbon of about 400,000 tCO2eq. About 60% of the STT's capital carbon comes from the construction of the pipeline and the rest from the support sources. If the Cotswold canal is used for the aqueduct, the capital carbon for the STT would be a lot less	• Presentation of a discussion of materials to be included in the STT option and concern over the suggestion in the ACWG report that it may be possible to use low-emissions construction materials in projects to be built by 2040 • The capital carbon emissions associated with the STT 300 Ml/d interconnector are 243,191 tonnes, around 60% of the capital emissions associated with the SESRO 100Mm3 option	For 100 Mm3 SESRO, base capital carbon is 326,769 tCO2e. Taking account of replacement construction carbon over the 80 year NPV assessment, this rises to 403,152 tCO2e as a whole-life capital carbon assessment. This is quoted in Gate 2 report and supporting carbon report. A carbon assessment formed part of the Interconnector Options Appraisal, this concluded that the direct pipeline option has the lowest whole life carbon and the lowest canal based option (Option 02 Sapperton) is 9% higher in total whole life carbon. As such, we do not agree that the use of the Cotswold Canal would be a lower carbon option for the STT. The lower whole life carbon for the pipeline option than the canal is driven primarily by the lower capital and capital replacement carbon associated with the pipeline option over the canal. This reduced capital carbon is driven by a reduced overall length of the pipeline option which leads to a lower overall absolute capital carbon intensity.	We have not made changes to our WRMP following this response, for the reasons highlighted in our consideration.
As cited above, the lack of availability of the detailed resources modelling, has not only disabled our ability to make definitive evaluations of drought resilient deployable output, and cost comparisons between strategic options, but has also made it very difficult to compare operational carbon budgets for the 'equivalent' Abingdon Reservoir and STT options. Thus we have not compared detailed operational carbon, but note that, if the GARD realistic usage of the STT Phase 1 scheme is assumed, the operational carbon budget drops to around 38% of that estimated in the RAPID Gate 2 documentation.	The utilisation of the STT in carbon assessments is too high, meaning that carbon emissions are over-stated	We do not accept that the utilisation that we have used to calculate cost and carbon is too high. We note also that the utilisation assumption and associated values presented in the Gate 2 report, which are the focus of GARD's criticism in this area, are irrelevant, as in our WRMP operational carbon is assessed considering fixed operational carbon (tonnes CO2e per year) and variable operational carbon (tonnes CO2e per Ml), and that operational carbon according to utilisation is calculated according to the need for water in different scenarios.	No changes are made in response to this consultation response for the reasons highlighted in our consideration.

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There are further drops (to around 34%, if a consistent assumption of electricity grid decarbonisation is use across the STT subsystems, and around 28% if initiatives currently under examination with the STT project team and the Environment Agency come to fruition.	Consideration should be decarbonisation of chemicals supplies, which contribute a significant amount to the operational carbon budget of the STT Decarbonisation of the grid may not have been accounted for in consideration of the Minworth option. Non-technological development options are being considered for the Netheridge option, reducing the operational carbon emissions	GARD's criticism here is of Gate 2 documentation, not of Thames Water's WRMP and is thus irrelevant. In our WRMP, electrical power required is calculated according to utilisation, and carbon emissions resulting from electrical power requirements are calculated in the investment model. As such, a single, consistent electrical carbon emissions factor is used for all options. The potential for the decarbonisation of water treatment chemicals has been investigated but the information available at present is too limited to be able to make reasonable estimates on future decarbonisation. As such, we do not accept that it is appropriate to make assumptions around the future decarbonisation of chemical supplies. Decarbonisation of chemical supplies is something that the SROs will continue to monitor and improve their assessment over time. Regarding Netheridge there are a range of options being considered, but no preferred option at this stage. Our carbon assessment must be robust and thus we should base carbon assessments on the design of solutions that have been identified as being feasible. As GARD have highlighted in their response regarding the emissions associated with SESRO, we should not make aspirational assumptions around design when undertaking carbon assessment. We note that GARD criticise all decarbonisation proposals in the context of SESRO, but criticise a lack of consideration of decarbonisation in the context of the STT.	No changes have been made, for the reasons set out in our consideration.

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One overriding conclusion about assessment of the STT is that it is currently too fragmented in its assessment, between separate teams (at least 3 teams, and 4 sets of documentation), for a proper optimisation of the system to be performed. For a water transfer system, representative of a type which has been promoted by the National Infrastructure Commission, this is no longer acceptable, and GARD calls on the Regulators to bring about a rationalisation.	No further points are raised in the more detailed technical text	The Severn Thames Transfer is a complex option, involving multiple companies. Our consideration is that assessment is not too fragmented, and that the STT SRO team have properly rationalised information for use in our WRMP. Information regarding costs and emissions associated with the different STT options as we should consider them in our plan are transparently presented in our WRMP. Working within the STT group, Thames Water has worked closely with UU and STW to provide an optimised view of the use of their respective sources to provide to the WRSE planning activity. This has allowed WRSE to include the STT in their optimised regional planning against the many other options that are available to be utilised to deal with deficit in the south east. Therefore, although there are three water companies and a series of reports provided covering the STT option and the various source options, the modelling brings all this together. To ensure standardisation across the options, Ofwat required methodological consistency across costing, environment and water quality which have been employed. The structure of the RAPID gated process was determined by Ofwat in the PR19 final determination and was not proposed by water companies.	No change to our WRMP has been made following this response point as it is about RAPID documentation. As highlighted in our consideration, we do not consider that assessments are too fragmented.

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GARD proposes that 50 Ml/d of the Thames to Affinity transfer should be brought forward to the early 2030s, connecting Affinity Water to Thames Water's London supply system. Combined with the GUC transfer, this would allow upper Colne and Lea chalk stream renaturalisations to be in place by the early 2030s. This would be much better than waiting until 2040 (or even later) for Abingdon reservoir to be built and filled.	The T2AT should be a direct connection from Thames Water's existing reservoirs into Affinity's supply system. Queen Mary reservoir is suggested as an access point	Thames Water's supply demand balance does not have sufficient surplus to transfer 50 Ml/d to Affinity Water in the early 2030s. As we have explained in response to earlier points raised, we do not agree with the supply-demand balance proposals made by GARD. We note that Queen Mary would be a poor choice of access point within our raw water network for the Thames to Affinity Transfer. Levels in Queen Mary are frequently relatively low in comparison to other TW reservoirs as the abstraction point for Queen Mary is in a part of the River Thames where levels are sensitive (and we are thus often required to suspend abstraction into Queen Mary). As such, placing an additional draw on this reservoir would bring major resilience issues. The Thames to Affinity Transfer would, as per Gate 2 documentation, best be supplied by the Wraysbury and/or Queen Mother reservoirs, there being an existing raw water tunnel which can transfer water to Affinity Water from these reservoirs (currently used mainly as an emergency transfer to deal with water quality issues).	We have not made changes as a result of this consultation response point for the reasons set out in our consideration of the response point

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GARD does not accept the above argument that Abingdon reservoir is a pre-requisite for the Thames to Affinity transfer because without it Thames Water with have a reduced volume of strategic storage. The 50 Ml/d demand from Affinity Water on the London supply system would be no different to any other London demand and can be enabled by the planned Teddington DRA scheme in conjunction with existing reservoirs.	No further points are raised in the more detailed technical text	In the WRSE modelling, the Abingdon Reservoir is not a pre-requisite for the Thames to Affinity Transfer. Our supply-demand balance does not have 50 Ml/d of surplus which could be transferred to Affinity Water without new options being developed. As per earlier points, we do not agree with the supply-demand balance proposed by GARD. The Thames to Affinity Transfer has potential pre-requisites of: • Abingdon Reservoir • Supported Severn Thames Transfer (tan unsupported Severn Thames Transfer would not be acceptable, due to the year-to-year variability in available water from the unsupported transfer, rendering it an unreliable source of water for the T2AT) • Teddington DRA (if accompanied by other necessary infrastructure) • Beckton reuse - T2AT East option only The investment model is able to support the T2AT with water from any of these sources.	No changes are made in response to this consultation response point, as the T2AT is not dependent on Abingdon reservoir.
GARD's analysis of the London supply/demand balance shows that the Thames to Affinity transfer can go ahead from the early 2030s, even accepting Thames Water's unrealistically low estimates of deployable output recovery from enhanced chalk stream flows.	No further points are raised in the more detailed technical text	Thames Water's supply demand balance does not have sufficient surplus to transfer 50 Ml/d to Affinity Water in the early 2030s. As per earlier points, we do not agree with the supply-demand balance proposed by GARD.	No changes are made in response to this consultation response point, as we do not agree that there is available surplus which could be transferred to Affinity Water

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			without the development of alternative supplies.
GARD recognises that there is uncertainty in the amount of flow recovery from the planned chalk stream abstraction reductions that can be converted into additional deployable output from London's reservoirs. However, this uncertainty can be managed, and with a possible net increase in deployable output from downstream reservoirs, if the chalk aquifer is used for drought support schemes similar to the existing West Berkshire Groundwater Scheme, which contributes nearly 100 Ml/d to existing London DO. GARD proposes that the WBGWS concept should now be investigated as a matter of urgency for potential replication in the Chilterns chalk streams, with the aim of implementing one or more pilot schemes in AMP8 and full implementation in AMP9.	An overview of the WBGWS is presented GARD reference the 'Chalk Streams First' report produced on the proposal for a Lee/Colne version of the WBGWS • An initial proposal is presented for a river augmentation scheme in the Colne/Lee which would discharge up to 245 Ml/d • GARD cite Chalk Streams First in considering that the combination of licence reductions, flow gains from reduced abstraction and the proposed river augmentation scheme could result in a net increase in London's DO of 55-60 Ml/d Anglian Water and Affinity Water are investigating a similar scheme for the River Ivel.	In order to protect the environment, action has been taken in the Colne and Upper Lee catchments to reduce groundwater abstraction where it negatively impacts environment. Affinity Water has made significant reductions across these catchments, with further reductions planned to be delivered in the future. Thames Water has also committed to reductions in these catchments. The Environment Agency Abstraction Licensing Strategy indicates "No Water Available" for licensing, and seeks to reduce licences further across these catchments. Consequently, Thames Water consider that it is very unlikely that a scheme similar to the WBGWS would be licensed in these catchments, and so it is not an option that we should consider in our WRMP24. We note that the Environment Agency have expressed uncertainty over the continued viability of the WBGWS on environmental grounds, and have requested that we undertake sensitivity tests in which the WBGWS is considered unavailable from 2040 and 2050. We note also the outcome of the public inquiry into the Candover augmentation scheme (among other schemes), which was to reduce the licence associated with an augmentation scheme similar to the augmentation scheme proposed by GARD.	No changes have been made to our WRMP following this consultation response, for the reasons set out in our consideration.

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Although the GUC transfer is primarily an Affinity Water scheme, Thames Water will benefit from "new water" coming into the lower Thames and Lea via enhanced chalkstream flows and STW effluent. The larger versions of the GUC transfer also have the potential for Affinity Water to transfer surplus water to Thames Water. Although our analysis shows that a 50 Ml/d GUC transfer would be more than enough for Affinity Water's needs and re-naturalising chalk stream flows, there would be additional security of supplies for both Affinity and Thames Water, if the GUC carrying capacity can be increased to 100 Ml/d at relatively little additional capital cost, via the 'Phase 2' of the scheme for completion by 2035. Early completion of both phases of the GUC transfer would also allow more and earlier reduction of some of Thames Water's abstractions in the lower Lea valley, which probably have a low priority, but would be feasible if the second phase of the GUC generates extra headroom for Affinity Water. The earlier reduction of Thames Water's abstractions in the lower Lea would also allow the Deephams re-use scheme to be brought forward, if needed, perhaps to facilitate abstraction reductions in the River Darent.	The reasoning given for not adopting the '1 in 500-year resilience by 2035' sensitivity run, which includes use of the GUC by Thames Water, is criticised.	We have considered the flow benefits that may result from reduced abstractions by Affinity Water and have incorporated these into our baseline supply-demand balance calculations. Importing water from another region would not alter STW discharges and so additional water would not be available in the river due to STW discharge changes. When considering flow available from sewage treatment works effluent, it is also important to bear in mind that Affinity Water has significant PCC reduction programmes as part of their WRMP. We have considered the option of surplus generated through the GUC to allow for a licence trade with Affinity Water in the Lower Thames. It is selected in the revised draft WRMP. While Thames Water may utilise this in the 2030s, it would not be available in the 2040 due to Affinity Water's forecast of significant supply-demand deficit. We note again that we do not agree with the supply-demand balance trajectory proposed by GARD, and consider that use of this supply-demand balance projection is inappropriate for use in our planning. Our consideration is that our programme appraisal approach is robust. In Section 10 we have considered a programme with achievement of a 1 in 500-year resilience by 2035.	No changes have been made to our WRMP following this consultation response, for the reasons set out in our consideration.

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GARD welcomes the planned Teddington DRA scheme delivering 67 Ml/d of deployable output for London. Although shows that this would not be needed after about 2040 if the Government's leakage and PCC targets are met, the early construction of this scheme would ensure water availability from London's supplies to be transferred to Affinity Water, allowing early re-naturalisation of Colne and Lea chalk stream flows. Spare headroom after 2040 could be used to bring forward some of Thames Water's lower priority abstraction reductions in the lower Lea, which would open the door for earlier implementation of the Deephams reuse scheme	It is highlighted that Lower Lee licence reductions are a pre-requisite for the Deephams reuse scheme. A cost comparison between SESRO and Deephams reuse is presented	GARD's comment is based on a supply-demand balance trajectory which we do not accept, for reasons detailed earlier. As such, we do not agree with the proposals in this comment. The Teddington DRA is selected in the early 2030s due to a forecast supply-demand balance deficit and the scheme could not be used to facilitate the proposals set out by GARD.	No changes are made in response to this consultation response point, for the reasons set out in our consideration.
GARD recommends that the 67 Ml/d capacity Teddington DRA scheme now proposed should be planned as the first stage of a potentially larger scheme and there should be more investigation of the limits that the EA has put on the size of the scheme due to concerns over water temperatures.	No further points are raised in the more detailed technical text	We do not agree that a larger Teddington DRA scheme should be considered in our WRMP24. The 75 Ml/d scheme is the largest size of Teddington DRA scheme which is considered promotable due to concerns around breaching of environmental standards and legislation. The Environment Agency have questioned whether the 75 Ml/d scheme is environmentally acceptable, and so we do not consider that a plan with a larger Teddington DRA scheme would be acceptable.	No changes have been made to the WRMP on the basis of this comment, as we do not agree that we should plan to include larger Teddington DRA scheme variants.

Consultation Response - verbatim from Executive Summary	Consultation Response – Summary of additional points raised outside the Executive summary	Our consideration	Changes to the draft plan, or if no changes are made, why not
Thames Water's plan appears not to have seriously considered new desalination schemes and they were not part of the Gate 1 or 2 investigations nor do they appear to have been seriously considered as part of Thames Water's plan. In GARD's opinion a modest sized desalination scheme should be properly investigated for rapid implementation to relieve the over-abstraction in the Darent.	Concern is expressed that desalination option 3a (Crossness - Erith Southern Grazing Marshes) has been rejected	We do not accept that we have not seriously considered new desalination schemes. We have included two large desalination options in our Constrained List of options for consideration for inclusion in the Regional Plan and our WRMP: up to 150 Ml/d of desalination at Beckton and up to 300 Ml/d of desalination at Crossness. These options can be developed in phases to allow capacity to be developed incrementally as required and to provide flexibility and adaptability within the programme appraisal. The treated water from the Beckton and Crossness desalination options would be conveyed via a tunnel to Coppermills WTW, where it would be blended with water from Coppermills WTW prior to distribution. Blending will mitigate the risk of customers' perception of a difference in the taste of the water when the desalination plant outputs are increased during droughts. From Coppermills the blended water can be distributed via the London ring main. Investigations at WRMP19 identified that the cumulative impact of developing multiple water reuse, desalination and DRA schemes could increase salinity in the Thames Tideway, resulting in moderate, probably reversible impacts on potentially sensitive ecological receptors as a result of disruption of communities. To mitigate this the decrease in freshwater inputs to the Tideway should be limited to no more than 275-366 Ml/d. The total additional capacity of water reuse and desalination options, that remove fresh water from the Thames Tideway, has therefore been limited to a maximum of 366 Ml/d in the regional water resources plan. We have included options that would provide more desalination capacity than this cumulative limit in to provide the WRSE investment model flexibility in option selection.	No changes have been made to the WRMP following this consultation response, as we consider that appropriate investigation of potential desalination options has taken place.

Consultation Response - verbatim from Executive Summary	Consultation Response – Summary of additional points raised outside the Executive summary	Our consideration	Changes to the draft plan, or if no changes are made, why not
		We also considered a smaller 65 Ml/d desalination option at Crossness which would supply Northumberland Heath service reservoir with desalinated water. This option was rejected at WRMP19 due to substantial dis-benefits against the promotability, deliverability and resilience dimensions at WRMP19 fine screening. This was reviewed at WRMP24 and the rejection reasoning was found to still be valid. We have not considered desalination schemes through the gated process because only options that were included as Strategic Regional Water Resource Solutions (SROs) by Ofwat in PR19 Final Determination or have been subsequently accepted by RAPID as SROs are following the RAPID gated process and therefore have Gate 1 and Gate 2 submissions.	
Not referenced in Executive Summary - "Improved Resilience Standard and Safety Margins"	• GARD support the adoption of a 1 in 500-year resilience standard • Thames Water's groundwater-dominated zones are less impacted by a move to ensuring supplies are available in a more severe drought scenario • Criticism is raised of the inclusion of a significant amount of Target Headroom. Compared to WRMP14, our Target Headroom allowance has increased. • The most important component of target headroom previously was an	We are glad that GARD are supportive of providing a higher level of resilience in our water supplies. We agree that our groundwater sources tend to be more resilience to the impacts of drought. Regarding Target Headroom, when producing WRMP24, we considered that the allowance for uncertainty that we have previously made for Target Headroom in the short-term was too small for our surface water sources, for two key reasons. Firstly, the prediction of what '1 in 100', '1 in 200' and '1 in 500' year droughts would entail is fraught with uncertainty. Secondly, modelling river flows brings with it significant uncertainty. In WRMP19, the allowance made for surface water DO uncertainty was +/- 2%; we have conducted a more thorough investigation into surface water DO assessment uncertainty and have determined an alternative profile with a considerably greater range. This is described in Section 6 of our WRMP and was present in Section 6 of the dWRMP. We feel that it is also	We have not made changes to our plan as a result of this consultation response as we consider our Target Headroom allowances to be reasonable and robust.

Consultation Response - verbatim from Executive Summary	Consultation Response – Summary of additional points raised outside the Executive summary	Our consideration	Changes to the draft plan, or if no changes are made, why not
	allowance for droughts more severe than the "worst historical" drought • The inclusion of a Target Headroom allowance alongside a higher level of resilience results in over-provision of safety margins	important to note that, while our Target Headroom allowance is greater in the short-term (to be more certain that we are providing an adequate level of resilience to our customers), the long-term allowance that we have made for Target Headroom has not increased compared to WRMP19 in order that we do not build resources solely to offset uncertainty. We are unsure why GARD have chosen to use WRMP14 Target Headroom as the comparator rather than WRMP19 Target Headroom. Our Target Headroom across the company in the dWRMP is initially 7% of DI, rising to a peak 10% of baseline DI in 2031/32, and then falling to 6% of DI by 2040. Our long-term Target Headroom allowance in the London WRZ of around 100-110 Ml/d is less than the long-term allowance made in WRMP19 (130 Ml/d). Comparison against WRMP14 It is true that Target Headroom is there to provide a buffer. Despite a higher resilience standard, uncertainty still remains and it is right to make an allowance. The Water Resources Planning Guideline states that we should include an uncertainty allowance. As such we do not agree that making a headroom allowance results in over-provision of safety margins.	

Consultation Response - verbatim from Executive Summary	Consultation Response – Summary of additional points raised outside the Executive summary	Our consideration	Changes to the draft plan, or if no changes are made, why not
Not referenced in Executive Summary - reasons that GARD believe Thames Water prefers a reservoir over the STT in Appendix C of their consultation response, not mentioned elsewhere in their response	• The reservoir requires less co-ordination with third parties as the construction works are on a single site, within the Thames Water region • The reservoir is a clearly identifiable asset • The raw water source is within Thames Water's control. There is no need for raw water from another company and no need for price negotiations • The reservoir would have a long service life and bring in a steady cash flow, whereas the STT would require a variable revenue requirement • Export to Affinity Water and Southern Water would provide a guaranteed income stream	We agree that the reservoir would require less co-ordination with other water companies. The STT is a more complex option than SESRO in this respect. While it is true that the SESRO option would be easier to manage and operate than the STT, being a source of water over which we would have a greater degree of control, the reservoir being an identifiable asset is irrelevant to its selection. As discussed in response to another point raised, the reservoir would not bring cash flow to Thames Water, due to the proposed procurement method being a Special Purpose Vehicle, through the Specified Infrastructure Project Regulations. Given that Thames Water would not own the asset, transfers to Affinity and Southern Water would not generate profit.	We have not made changes to our plan as a result of this consultation response as we consider that the justification made in Sections 10 and 11 of our WRMP explains why we have selected our preferred plan.

Consultation Response - verbatim from Executive Summary	Consultation Response – Summary of additional points raised outside the Executive summary	Our consideration	Changes to the draft plan, or if no changes are made, why not
Not referenced in the Executive summary - GARD's criticisms of the UK Water Industry regulatory regime	GARD are concerned about the complexity of the regulatory and technical process used to derive WRMPs. The complexity of the process and project evaluations means that it is difficult for stakeholders to understand what is going on. The complexity means that water companies can promote schemes favoured for nefarious reasons.	Water companies have a statutory duty to ensure a secure water supply for our customers. Water resource planning is essential to deliver this obligation. Every five years all water companies are required to produce a statutory water resources management plan which sets out the company's intended approach for at least the next 25 years. For this round of plans (WRMP24) the company-level plans have been supplemented by regional water resource plans that cover England and part of Wales. Our water resources are facing increasing pressure from population growth, economic development and climate change. Society also expects that water will be available for users whilst also improving the environment. To address these pressures water companies and regional planning groups have worked together to plan ahead in a timely way and identify ways of reducing demand and increasing supplies of water. Alongside the water resources management plan regulatory process, some companies have been examining strategic water resource options, under the guidance of RAPID, a partnership of three water regulators Ofwat, Environment Agency and Drinking Water Inspectorate, which was formed to help accelerate the development of new water infrastructure and design future regulatory frameworks. RAPID is working with the industry to promote the development of national water resources infrastructure that is in the best interests of water users and the environment. We recognise the regulatory framework is complex, and have endeavoured to work openly and transparently with stakeholders to share information on the process and technical work and provide the opportunity for scrutiny and feedback at a formative	Explanatory text provided to respond to the feedback. No changes are made to the draft plan due to the reasons set out in the explanatory text.

Consultation Response - verbatim from Executive Summary	Consultation Response – Summary of additional points raised outside the Executive summary	Our consideration	Changes to the draft plan, or if no changes are made, why not
		stage of plan development, which includes this stage of formal statutory public consultation. Our draft plan has been developed to meet legal and policy requirements, comply with regulatory guidelines, and is based on best available evidence. We have presented the plan clearly with tiered documentation to explain the work completed and the decision-making process to derive the best value plan for our customers.	
Not referenced in the Executive summary - other items	Capital cost figures for the SESRO scheme are currently under-estimated, as other capital projects have previously had their costs under-estimated. Ground investigations have not yet been conducted	We do not agree that cost figures for the SESRO scheme have been underestimated. As noted in our response to comments made by Ofwat, the cost estimate for SESRO is based upon a high level of design maturity that has been updated for each stage of the design process to date and benchmarked against wider industry standards. Recent consideration of other ongoing reservoir projects in the UK has identified that a number of the key elements that led to the under-estimation of concept level costs compared to contracted costs for recent schemes have already been taken into consideration in assessing the costs of SESRO. The costs for SESRO are also informed by extensive previous ground investigations. There have been four separate rounds of previous ground investigations associated with SESRO in 1991/92, 1993/95, 2002 and 2005/06. In addition, there are also approximately 360 No. boreholes stored on the British Geological Survey that are not associated with the scheme but are nevertheless of varied use. All of this previous data provides a robust picture of the geological conditions at the site and	No changes have been made as a result of this response as we consider the cost assessment to be robust

Consultation Response - verbatim from Executive Summary	Consultation Response – Summary of additional points raised outside the Executive summary	Our consideration	Changes to the draft plan, or if no changes are made, why not
		associated construction phase risks, which have been taken into consideration in deriving the overall capex costs for SESRO. Further ground investigations are planned ahead of Gate 3, particularly associated with obtaining targeted additional data at the key structures, such as the pumping station or tunnel, to allow contiguous and up-to-data monitoring of groundwater levels and to investigate the geotechnical parameters of the clay when excavated, reworked and compacted. This data will all feed into the Gate 3 design, and into an updated cost risk register. However, we are confident that the level of risk and cost associated with ground conditions is reasonable and appropriate for the current level of design development and scheme planning and well informed by previous field investigations.	
Not referenced in the Executive summary - STT costs	Further work is required to investigate the possibility for energy recovery from the STT scheme. GARD note conversations whereby the inability for recovery of energy from the downhill pipeline section was referenced as not being feasible. The stated operating costs for the STT are inflated due to this factor.	Regarding the potential to recover gravitational potential energy as the water flows downhill from the summit of the pipeline in the Cotswold Hills to Culham, this option was looked at in Gate 2 as a potential opportunity, but it does not form part of the core Gate 2 solution. An optimisation exercise during Gate 2 reviewed the diameter of the gravity pipeline to minimise whole life cost. This resulted in a reduction in the diameter of the gravity pipeline, reducing CAPEX costs, and increasing the energy required for the flow to pass through the pipe, making use of the available gravitational potential energy. As such, when the pipeline operates at peak flows there will be little remaining available energy for recovery. However, at lower flows, the potential energy required for the flow to pass by gravity through the pipeline will be significantly lower, resulting in available energy for recovery. This will be considered again during scheme	No changes have been made to the plan as a result of this response as we consider the assessments undertaken to be suitable for this stage in the process

Consultation Response - verbatim from Executive Summary	Consultation Response – Summary of additional points raised outside the Executive summary	Our consideration	Changes to the draft plan, or if no changes are made, why not
		development for RAPID Gate 3 and the opportunity for the installation of a hydro turbine will be investigated further.	
Not referenced in the Executive summary - carbon emissions associated with demand options	Thames Water has presented reservoirs as low-carbon options while not presenting demand management options (leakage and water efficiency activities) in the same way	We do not agree that we have presented a biased narrative in this regard. We have made clear that demand reduction, through both leakage reduction and meter installation, is a vital part of our plan. We have also explained why we do not think that we should plan to reduce demand further than is set out in our revised draft plan. Our discussion of options is concerned determining our plan and as such considering alternative ways of ensuring resilient supplies. As such we describe SESRO as a low carbon option in the context of alternatives to SESRO, i.e., that plans which do not include SESRO result in more carbon emissions. We note that leakage reduction through mains rehabilitation is not a particularly low carbon option, as discussed in reference to another consultation response point.	We have not made changes to our plan, as we consider that our narrative is appropriate.

Consultation Response - verbatim from Executive Summary	Consultation Response – Summary of additional points raised outside the Executive summary	Our consideration	Changes to the draft plan, or if no changes are made, why not
Not referenced in the Executive summary - Environmental Assessments	The environmental assessments are desk-based, and this is not acceptable considering the amount of time that has been devoted to the development of options. Insufficient weight placed on 'corridors' of reasonable quality untouched environment which connect networks of 'special' habitats, such as SSSIs.	It is appropriate at this stage of the planning process that environmental assessments are based on data that are already available rather than those predominantly collected by survey work. A number of survey programmes have been undertaken for the SROs to collect further data; those with sufficient datasets collected have been reported on at Gate 2; for some areas, work needs to continue to provide a dataset of recommended length in terms of duration, and these will be reported on in the Gate 3 submissions. The industry standard recommended BNG methodology followed (Defra's BNG metric, across all versions used) specifically accounts for the strategic significance (of habitat lost, retained and created), in terms of connectivity to sites important for wildlife such as SSSIs. It also accounts for the time to target condition for any habitat creation, as well as the difficulty of creating this habitat. Version 3.0 of the tool also considers any advances or delays in implementing mitigation. The tool doesn't account for duration of loss, because it examines any permanent loss and treats it as such.	No changes have been made to our WRMP following this point, as we consider that the degree of detail applied in our environmental assessments is appropriate for the current planning stage.

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Modelling Addendum – Introduction: GARD's response to the consultation on Thames Water's draft WRMP24 was incomplete for various topics that were dependent on receipt of Thames Water's new Pywr model output, as requested through EIR-22-23-390 on 12th December 2022. The requested data were not received in full until 22nd March 2023, the day after the WRMP consultation closed. Therefore, this Addendum to GARD's WRMP response covers the following topics: • Review of validation of Pywr and GARD modelling, using previous Thames Water's previous WARMS2 modelling as a benchmark • Review of validity of stochastically generated river flow data • Review of Abingdon reservoir deployable output (DO) and drought resilience • Review of Severn to Thames Transfer (STT) deployable output	There has been little time available for GARD to review the model output due to late receipt of the data. Thames Water's response to information requests associated with the emerging plan feel short of what was requested, and Thames Water did not follow up after meetings held regarding emerging plan data requests. Email correspondence is included.	GARD received the Pywr model data on 22nd March. As per the correspondence in GARD's consultation response, Thames Water sent a link to GARD's technical consultant for the data to be downloaded on 9th February. This link went to the consultant's spam folder and this went unnoticed by the GARD consultant until 11th March when a member of the Thames technical team noted that correspondence from the GARD technical consultant indicated that he was not reviewing the pywr data sent on 9th February. A new link was sent on 13th March, but this time a technical issue meant that the link did not work. Thames Water accepted GARD's modelling addendum after the consultation period had ended, recognising that GARD had not received the data that was requested. We do not accept that the period 22nd March to 30th April (5 and a half weeks) left little time for review of model output data. The addendum includes detailed analysis of the data that has been sent.	No changes made to the plan – none requested.

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Modelling Addendum – Pywr model validation: When comparing Pywr modelling with WARMS2 modelling using the same historic river flow data, Thames Water's description of "a very close match" is not justified. There is a large difference in modelled London storage drawdown in the critical 1934 drought. In critical droughts there is a very poor match between WARMS2 historic simulations and Thames Water's Pywr output when it uses different historic flows from the same hydrological model that generated the 19,200 years of stochastic river flow data. For example, the Pywr maximum London reservoir drawdowns in the droughts of 1933-34 and 1943-44 were about 25,000-30,000 Ml less than the WARMS2 modelled drawdowns, equivalent to over-estimating the London deployable output by about 50-60 Ml/d. The main reason for the poor fit between Pywr and WARMS2 modelling is the large differences between the WARMS2 historic flows and the historic flows generated by the hydrological model that created the stochastic flow data. When simulating naturalised Teddington flows, the flows used in the Pywr model grossly overestimate winter flow recovery during the 2-year droughts of 1933-34 and 1943-44. The WARMS2 modelling of the naturalised flows is a much better fit to the naturalised gauged flows.	The pywr model was validated using two steps. 1. Validation of the model using flow inputs taken directly from WARMS2 2. Validation of the model using flow inputs making use of hydrological models which were then used for the stochastic modelling.	**Criticism of validation using WARMS2 flow data (paragraphs 1 and 2 of response summary point)** We do not agree that, using historical river flow data, the description of a "very close match" is not justified, for two reasons: 1. Our consideration is that the figure which GARD criticises (Figure I-6 of the dWRMP) does, in fact, demonstrate a close match in the storage validation between pywr and WARMS2. The Thames Water supply system is complex, and the pywr model considers the whole of the Thames catchment, and as such differences between different modelled representations are to be expected. 2. GARD have used a figure taken from Appendix I of the dWRMP. An equivalent figure was provided to them in the data provided in March 2023 which demonstrated that, due to ongoing model improvements, the pywr model validation had improved since the figure used in Appendix I was produced. GARD cite a storage difference of 25,000-30,000 Ml at the end of the 1933-34 and 1943-44 drawdowns. The data provided to GARD demonstrate differences between pywr and WARMS2 of c.1,300 Ml (0.5% of London's total storage volume), and c.4,300 Ml (2% of London's total storage volume) at the end of the 1933-34 and 1943-44 droughts respectively. As such, the description of a "very close match" is appropriate. GARD have correctly identified the two-step pywr model validation process.	We have not amended any Deployable Output values following this consultation response, as our consideration is that the methods used are robust. We have updated the figures in Appendix I of the WRMP to reflect the more recent validation of the Pywr model.

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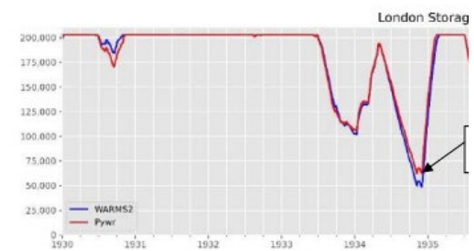
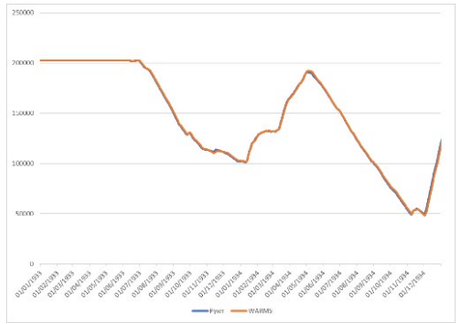
The Pywr model over-estimation of winter flow recovery after droughts has profound implications for assessing the deployable output of Abingdon reservoir and STT options: • For Abingdon reservoir, the over-estimation of winter flow recovery disguises the reservoir's lack of resilience in long duration droughts. • For the Severn to Thames transfer, over estimation of winter flow recovery in the Thames diminishes the benefit of the unsupported transfer		The two figures below demonstrate point two above. Figure 1: dWRMP24 Figure I-6  Graph from data sent to GARD in file "WARMS Flows validation.xlsx", now included in rdWRMP24 Appendix I 	

		Criticism of model validation using data from new hydrological models We do not agree that the hydrological models used in our stochastic modelling "grossly overestimate" winter flow recovery in their validation and as such we do not agree with the conclusions drawn in respect of impacts of over-estimation of SESRO DO values and under-estimation of STT DO values. The hydrological models used have Nash-Sutcliffe Efficiency (NSE) and logNSE flow statistic values (commonly used flow statistics to ascertain hydrological model performance, with logNSE particularly applicable for low flow prediction) of around 0.9, indicating strong performance. While we agree that WARMS2 flows are a closer match to gauged naturalised records, that is because WARMS2 uses gauged naturalised flows as an input. In WARMS2, the gauged naturalised flows are used to estimate flow contributions from ungauged catchments and those with “fast” hydrological responses. It would not be possible to use only the hydrological models in WARMS2 on their own for use in stochastic modelling. GARD have presented evidence from the events of 1933-34 and 1943-44 to demonstrate events where flow over-prediction during winter occurs. The figure below demonstrates that during 1975-76 (an event which GARD make much of in their later analysis), the hydrological models used in our flow modelling under-predict winter flows, compared to WARMS2. This demonstrates that it is not the case that the hydrological models used in our stochastic modelling systematically over-estimate flows during winter recharge periods, rather it is that hydrological modelling is challenging, perfect model validation cannot be achieved, and thus that variance between observed and models flows, and between flows produced by different models, are to be expected. Our consideration is that our hydrological models are fit for purpose.	

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		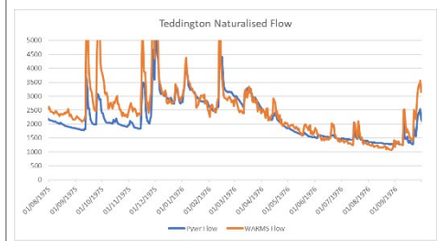	
<u>Modelling Addendum – Validity of Stochastic River Flow Data:</u> In addition to the over-estimation of winter flow recovery for stochastic flows, we have major concerns about the use of the 48 year period 1950 to 1997 as the basis for generating 19,200 years of stochastic river flows. The use of historic climate data only for 1950-1997 means the exclusion of the three most severe droughts of the past 100 years (1921, 1933-34 and 1943-44), as well as the past 25 years of most rapid climate change. Analysis of Pywr model output shows that about 75% of all severe droughts in the 19,200 year record occur in the calendar year 1976, which is the most severe drought in the historic record for 1950-1997. It appears that the method of generating the 19,200 years of flow data replicates the pattern of droughts in the historic record. The historic drought of 1975-76 was not particularly	No additional points are raised in the more detailed text, though supporting evidence, tables and/or graphs are presented.	**Criticism of use of 1950-1997 as the "training period" for the stochastic weather datasets** We do not agree that the stochastic weather datasets adopted in our WRMP24 modelling of Deployable Output are not fit for purpose. The datasets are shown in the WRSE technical note accompanying their production (Regional Climate Data Tools Final Report) to provide a good fit to historical data (when considering different rainfall deficit durations, and when considering the historical period 1920-1997, as shown in Section B.4.3 of the WRSE/Atkins report), the stochastic datasets have been widely adopted across the UK Water Industry, and the Deployable Output figure for 1 in 100-year Deployable Output is close to the figure from our existing "Worst historical" (1920-2013) modelling. The stochastic weather datasets are generated using statistical processes in which rainfall is linked to climate drivers (e.g., the North Atlantic Oscillation Index, or sea surface temperature anomaly indices), but including an element of randomness. Statistical models are fitted based on "training" datasets of these	We have not made changes to our WRMP24 following this response, as our consideration is that our Deployable Output modelling is robust, and that the datasets used are fit for purpose.

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severe because it ended in September 1976, whereas the droughts of 1921, 1934 and 1944 extended into the early winter. The historic drought of 1975-76 was not preceded or followed by dry years. Therefore, the Pywr modelling cannot generate the type of long drought that tests the resilience of Abingdon reservoir. This problem was identified in WRSE's method statement on stochastic climate data in 2020. They advised that "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)". TW have not followed that advice and the impact of long duration droughts on the deployable output of Abingdon reservoir has not been assessed in the WRMP or Gate 2 reports. Analysis of naturalised flows in the Thames since the 1880s shows that that low flows have increased steadily and significantly over the past 140 years, which have also been the period of rapid global temperature increases. This suggests that selection of different periods of historic climate data as the basis for generating the stochastic data could have a material effect on the stochastic flows generated by the hydrological modelling. In our opinion, the base historic data should have included all available climate data since 1997, thereby covering the recent period of rapid climate		climate drivers and rainfall volumes. The trained models are then used to generate different versions of what rainfall could reasonably have fallen when considering the climate drivers over that period, and considering the semi-random nature of rainfall. In the generation of stochastic rainfall datasets, historical rainfall datasets are not reproduced, and rather different rainfall time series are produced which represent what could have happened. As can be seen from the results in the WRSE/Atkins report, and as is explicitly stated in that report, the stochastic rainfall records provide a good match to the historical records, when considering the historical record of the full twentieth century. Furthermore, recognising the potential criticisms which GARD now raise (i.e., that the first half of the twentieth century contained three severe droughts and thus a rainfall generator based on only the second half of the twentieth century would not adequately produce drought events), in the stochastic datasets project, a model was trained using a training period which also included the early part of the 20th century (noting that, for the reasons noted in the next paragraph, this model was compromised in terms of climate-driver data availability). The report includes the statement that "The analysis concluded that while the [training set of the] 1950s [1950-1997] model does not include some of the key droughts in the 20th Century, in most cases this model performed as good [well] as, or marginally better [than the model trained on the longer 20th Century period], when viewed against the observed data in the 20th Century", i.e., the model used in the production of our WRMP24 stochastic rainfall datasets provides as good as, or a better match for the rainfall of the whole 20th Century than a model trained on data from the whole 20th Century. The reason for use of the 1950-1997 training period was that significantly improved climate-driver data was available from	

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change Our conclusion from review of the validity of the stochastic data is that the stochastic river flow datasets used to determine deployable outputs for existing supplies and strategic resource options in Thames Water's plan are not fit for purpose		1950 onwards. The stochastic datasets adopted in WRMP19 were produced using similar methods to those in WRMP24, but required a larger degree of bias correction (which is undesirable) in order to ensure that they adequately represented historical records. We note also that what GARD refer to as "advice" from WRSE is not advice, and is instead an allowance from WRSE to diverge from the preferred methodology should companies consider that a key vulnerability of their supply system is omitted. Our consideration is that the stochastic datasets properly consider drought events which may occur and to which our supply system is vulnerable. We also note a point that we return to in a later response, which is that the metric of interest is not the Deployable Output of a given intervention, but rather the Deployable Output benefit which that intervention brings to a given supply system which should be our primary concern (i.e., the "Deployable Output of the reservoir" is irrelevant, and it is the "Deployable Output of London, including the reservoir" which we should primarily concerned with). SESRO is particularly effective in drought events to which the London supply system is particularly vulnerable, and which GARD state that the London system is particularly vulnerable to (see p.38 of the main GARD representation), "two dry summers and an intervening dry winter". **Criticism of lack of consideration of the period since 1997 in the generation of stochastic datasets** We do not agree that we should use data from 1997 to present in our assessment of baseline Deployable Output, as to do so	

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		would go against the guidance from our regulator (WRPG Supplementary Guidance on Stochastics). GARD's proposed approach is misaligned with the Water Resources Planning Guideline. The Water Resources Planning Guideline supplementary guidance on stochastics states that it is appropriate to use a baseline period up to the year 2000, on the basis that monthly precipitation records demonstrate stationarity up until around 2010 and on the basis that the ten warmest years have occurred since 2002. In line with this guidance, we have assessed a baseline deployable output using stochastic datasets representative of the climate up to 2000 (a period demonstrating stationarity), and we have then assessed climate change impacts on deployable output using UKCP18 data with a baseline period of 1981-2000 to assess the impacts of climate change from this point forward. The assessment based on this data is that drought risk has increased between this 1981-2000 baseline and now, It is not relevant that an extreme drought has not occurred during that period (extreme droughts being very rare).	

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Modelling Addendum – Validation of GARD's modelling: When using the same historic river flows as WARMS2, GARD's modelling almost exactly matches the WARMS modelling (a much better fit than the Pywr modelling of the 1934 drought). When using the same stochastic flows from the 19,200 year record, GARD's model is generally quite a close match to the Pywr modelling. In view of the differences between Pywr and WARMS modelling using historic flows, differences between the GARD modelling and Pywr modelling seem likely to be due to flaws in the Pywr modelling. For example, we have identified that the Pywr model simulates the West Berkshire Groundwater Scheme incorrectly.	No additional points are raised in the more detailed text, though supporting evidence, tables and/or graphs are presented.	As per our earlier response, our consideration is that the pywr model provides a very good fit to the WARMS model, and that this has been improved since the dWRMP. When considering the data presented to GARD (i.e., the chart included in the earlier response), we do not agree that GARD's modelling is a better fit to WARMS than the pywr model. We note also that the geographical scope of GARD's model is different, as the GARD model considers only the London WRZ whereas the pywr model considers the whole Thames supply area (and can be linked with other models to consider a wider part of the WRSE region). We note also that the GARD model requires Thames Water to send river flow data in order for the GARD model to run. GARD are incorrect in their interpretation of the WBGWS representation in the Pywr model. The representation of the WBGWS in the Pywr model is correct. The net contribution from the WBGWS is calculated as a gross abstraction profile, then subtracting losses. GARD have plotted the gross contribution from the pywr model against the net contribution from WARMS. The profile of net contribution in pywr matches that from WARMS.	We have not made changes to our plan in response to this comment, for the reasons stated in our consideration.

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Modelling Addendum – The Deployable Output of Abingdon Reservoir – Thames Water's assessments of deployable output without climate change Thames Water calculates deployable outputs for London by using the 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 failures in 19,200 years of simulation is then the 1:500 year deployable output (19,200 ÷ 500 = 38.4). We agree that this is the correct way of determining deployable output. However, on some occasions droughts in which failures extend into two different years have been counted as two failures instead of one. This error causes the deployable output of the Abingdon reservoir (without climate change) to be over-estimated by 6 Ml/d for the 150 Mm3 reservoir and 4 Ml/d for the 100 Mm3 reservoir. There is another serious Pywr modelling error in assuming that, when refilling Abingdon reservoir, the minimum required flow (MRF) in the River Thames at Culham is set at only 450 Ml/d instead of the true value of 1450 Ml/d. TW recognises this error and provides a correction in an appendix to the modelling technical report, showing that it only reduces deployable output by 2 Ml/d. Our modelling shows a similar DO reduction due to this	No additional points are raised in the more detailed text, though supporting evidence, tables and/or graphs are presented.	**Counting failure events in different years** 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. **Culham MRF** The error noted around the representation of the Culham MRF was fixed in the Deployable Output modelling prior to publication of rdWRMP24, and as GARD note the Deployable Output impact was very minor (2 Ml/d). We agree that a HOF of 1450 Ml/d rather than 450 Ml/d in the modelling reduces the speed of refill after drought events. However, our consideration should be the Deployable Output benefit of the reservoir to our supplies, and this is what our Deployable Output calculations are designed to do. GARD's comments around the potential risks during events which may occur are hypothetical, and do not consider the	We have not made changes to our plan as a result of this response, as our consideration is that the Deployable Output of the reservoir has been calculated robustly and in line with guidance.

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error, when simulating stochastic versions of the 1975-76 drought. Although the Culham MRF error does not appear to have a big impact on Abingdon reservoir deployable output, it can greatly affect the speed of reservoir refilling after droughts. The main Gate 2 report for Abingdon reservoir claims that the reservoir refills in 5 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. For some of the relatively few droughts in the stochastic record which are not versions of the 1976 drought, GARD's modelling shows that Abingdon reservoir is less than half full at the start of the next summer and vulnerable to failure if another dry summer follows.		resilience/vulnerability of our existing system. SESRO is particularly effective in drought events to which the London supply system is particularly vulnerable, and which GARD state that the London system is particularly vulnerable to (see p.38 of the main GARD representation), "two dry summers and an intervening dry winter".	
<u>Modelling Addendum – The Deployable Output of Abingdon Reservoir – Thames Water's assessments of deployable output with climate change:</u> In the main WRMP report, the widely quoted deployable outputs for Abingdon reservoir are 271 Ml/d for the 150 Mm3 reservoir and 185 Ml/d for the 100 Mm3 reservoir. These are TW's assessments for the 'median' climate change scenario. However, TW's preferred plan assumes the 'high' climate change scenario, so the	No additional points are raised in the more detailed text, though supporting evidence, tables and/or graphs are presented.	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	We have not made changes to our dWRMP following this response, for the reasons set out in our consideration.

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assessed DOs for Abingdon reservoir should also be for the 'high' climate change scenario. Using TW's figures, the deployable output of the 150 Mm3 reservoir with 'high' climate change allowance should have been 252 Ml/d, not 271 Ml/d. The equivalent deployable output of the 100 Mm3 reservoir with 'high' climate change should have been 169 Ml/d, not 185 Ml/d. This is another serious flaw in Thames Water's deployable output assessment for Abingdon reservoir.		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.	
Modelling Addendum – The Deployable Output of Abingdon Reservoir – Reservoir Resilience in long-duration droughts In GARD's response to TW's WRMP19, we showed that the stochastic flow records in use at that time (based on historic flows including the long droughts of 1921, 1934 and 1944) included a number of droughts in which the 150 Mm3 Abingdon reservoir was only able to deliver deployable outputs of about 100 to 150 Ml/d. TW's method of assessing deployable outputs in WRMP19 was unable to take account of these droughts, so there was no recognition that Abingdon reservoir had poor resilience to long duration droughts. The new Pywr modelling of the full 19,200 year stochastic record and TW's method of assessing deployable output has the capability of assessing the resilience in long droughts, but the method of generating the stochastic flows has excluded long	Supporting evidence, figures and tables are used to support the arguments made. The fundamental problem with the resilience of Abingdon reservoir in long droughts is that there is minimal water available to refill it in even moderately dry winters. Therefore, it is vulnerable to a succession of 3 or more dry years.	The approach GARD have taken to assessing the Deployable Output benefit of the reservoir is incorrect and does not comply with the Water Resources Planning Guideline. We do not agree that we should amend our Deployable Output assessment of the reservoir to focus on long-duration droughts, for the reasons set out below. The Water Resources Planning Guideline states clearly (Section 5.1) that, in our calculation of Deployable Output, we should use a 'system response' approach, viz., when assessing our Deployable Output, or the Deployable Output benefit that new interventions may bring, we should consider how our different sources work together to provide resilience to drought. This guidance reflects the fact that some systems are particularly vulnerable to "short, sharp" drought events, while other systems are vulnerable to more extended but less intense drought events and thus assessment of supply capability should reflect the vulnerabilities of a given supply system. It follows that a given intervention will provide different benefits within different supply systems, according to the existing vulnerabilities of that supply system.	No changes have been made as a result of this response, as our consideration is that the Deployable Output of different schemes has been calculated robustly and in accordance with the Water Resources Planning Guideline. GARD's proposed method for DO assessment is unsuitable for the reasons noted in our consideration.

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droughts from the record, with most of the stochastic droughts being based on the relatively short drought of 1975-76. However, a few of the droughts in the stochastic record, not based on 1976, do show some lack of resilience in long droughts, even though they were not severe or numerous enough to influence the DO assessment. As already mentioned, TW have 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)". We have provided an example of this, with the historic drought of 1933-34 being preceded by the flows of the moderately dry years 1996-97. This shows there would be catastrophic failure of London's supplies during such a drought and the deployable output of the 150 Mm3 Abingdon reservoir, without climate change, would fall from 285 Ml/d to 163 Ml/d. We conclude that, if proper consideration is given to the occurrence of long duration droughts, the deployable output of Abingdon reservoir would be far less than that claimed by Thames Water, perhaps in the region of only 50% of the claimed amounts.		GARD's focus solely on the Deployable Output "of the reservoir" is, as such, irrelevant, and it is the "Deployable Output benefit that the reservoir brings to our supplies" which we should consider. As GARD highlight in an earlier section of their response, the critical vulnerability of the London WRZ is to events of two consecutive dry summers with an intervening dry winter. SESRO is of particular benefit during events of this duration, and the proposed release volumes have been tuned to ensure that the scheme would have maximum benefit when considering the vulnerabilities of the existing London supply system. As a related point, the use of "dry" does not capture the range of "dryness" which could occur. If there is a 1 in 500-year drought event of 18 months duration, while longer droughts could occur, they would either be: • Equally dry (in terms of mm rainfall per month) for a longer duration, and thus more severe than a 1 in 500-year event (each month of very low rainfall being an unlikely event) • Less dry (in terms of rainfall per month) and thus not as much of a risk for the existing London supplies GARD have presented modelling of an event which is a composite of 1996-97 preceding the 1933-34 event. According to the Standard Precipitation Index (12m accumulation period) data available from the UK CEH Water Resources Portal, the SPI-12 for the Thames catchment for Jul 96 to Jun 97 was minus 1.4, meaning that the event was a c.1 in 10-year event from a rainfall deficit perspective. Preceding the c.1 in 100-year	

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		1933-34 event with a 1 in 10-year event means that this event could represent something more like a 1 in 1000-year event, i.e., an event less likely than we should consider in our planning. As noted in our previous responses, we do not agree that the stochastic dataset under-represents long-duration droughts. As also noted in a previous response, what GARD refer to as "advice" from WRSE is not advice, and is instead an allowance from WRSE to diverge from the preferred methodology should companies consider that a key vulnerability of their supply system is omitted. Our consideration is that the stochastic datasets properly consider drought events which may occur and to which our supply system is vulnerable. We note again the lack of an even-handed approach in consideration of Deployable Output assessment by GARD. GARD have presented individual events during which the SESRO scheme could bring less benefit than the stated DO, but have not taken the same approach in assessing the Deployable Output calculations for the Severn Thames Transfer, a scheme with much more significant year-to-year benefit. In the 2022 drought, a real example of a drought from recent history, data available publicly from the Environment Agency shows that the unsupported Severn Thames transfer would have provided only very minimal benefit to the London supply system (c.7 Ml/d during the drawdown of the London reservoirs), due to the coherence of drought between the Severn and Thames catchments in that event. Our consideration is that a consistent and even-handed approach should be taken in the calculation of deployable output, as we have done, and that the approaches proposed by GARD are thus unsuitable.	

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Modelling Addendum – The Deployable Output of Abingdon Reservoir – Allowances for dead and emergency storage: In our main response to the consultation on TW's WRMP24, we proposed that TW's proposed 6% emergency storage allowances for Abingdon reservoir should be increased to be in line with the emergency storage allowance in other major UK reservoirs. It is also vital that all of the water in emergency storage should be of sufficiently good water quality to be useable, recognising the increased threat of algal blooms and poor reservoir water quality in severe droughts, especially with climate change. Therefore, we propose that the allowances for dead and emergency storage should be: • Dead water should be based on an average residual water depth of 5m, not an average depth of 2.5m as proposed by TW • Emergency storage should be 15% of live storage to be in line with Llyn Brianne, Clywedog and the Welsh Dee regulating reservoirs With these proposals for dead storage and emergency storage, GARD's modelling shows that the deployable outputs for the 150 Mm3 and 100 Mm3 reservoir would reduce by 44 Ml/d and 25 Ml/d respectively.	Thames Water have said that 5m depth of dead storage has been left in the central trench in the reservoir's design, because a water depth of 5m would likely lead to water quality issues. However, analysis of the reservoir cross section shows that a maximum depth of 5m has been left, meaning an average of 2.5m. An average depth of 5m should be left, not a maximum depth of 5m. The 2017 reservoir feasibility report shows that the design of SESRO would include less than 5m average depth when SESRO enters the emergency storage, meaning that none of the emergency storage in SESRO would be usable and thus should be considered dead storage. If the dead and emergency storage depths are increased in line with GARD's recommendations, the storage available for normal operation (i.e., live storage not including emergency storage) would be reduced to 116.8 Mm3 and 80.4 Mm3, compared to the current assumptions of 141.0 Mm3 and 93.0 Mm3 for the 150 Mm3 and 100 Mm3 reservoirs respectively.	We do not agree with the amendments which GARD suggest to the dead/emergency storage provisions for SESRO, for the reasons set out below. As such, we do not agree the Deployable Output reductions suggested. The 6% emergency storage in SESRO is calculated as 30 days' worth of reservoir throughput, in line with other Thames water reservoir emergency storage calculations. Given that this is the standard on which other TW emergency storage requirements are determined, in the absence of other evidence we do not see a reason to amend this. The reservoir water quality modelling that was undertaken for the Gate 2 submission suggests that an acceptable level of water quality can be achieved with the current concept design and associated inlet / outlet and mixing arrangements. This will continue to be reviewed and re-analysed as the design progresses, to reflect the latest design of the reservoir and borrow pit, and appropriate inlet, outlet and mixing arrangements included as required. Our consideration is that GARD have taken the suggestion of 5m being required to ensure good water quality out of context. GARD have assumed that 5m depth is required, on average, to ensure good water quality, when this was intended to apply to the depth of storage required in the central trench to ensure good quality, considering the rest of the design of the reservoir (i.e., including the sloping banks of the borrow bit) and accounting for the aeration system which encourages mixing.	We have not amended our WRMP in response to this comment, as our consideration is that appropriate allowances have been made for dead and emergency storage.

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<u>Modelling Addendum – The Deployable Output of Abingdon Reservoir – Conclusions</u> In our opinion, the deployable output of Abingdon reservoir has been grossly overestimated for WRMP24 and the Gate 2 reports. In addition to failure to properly consider resilience to long duration drought, we have found the following flaws in Thames Water's deployable output assessments [TW note: DO reduction figures for 150 Mm3 and 100 Mm3 respectively included in table, are stated in brackets below]: • Double Counting of droughts (-6 Ml/d, -4 Ml/d) • Wrong value of Culham MRF (-2 Ml/d, -1 Ml/d) • Wrong climate change scenario (-19 Ml/d, -16 Ml/d) • Inadequate dead & emergency storage (-44 Ml/d, -25 Ml/d) [TW paraphrase] The corrected deployable output for the Abingdon reservoir should be 200 Ml/d for the 150 Mm3 reservoir (rather than TW's value of 271 Ml/d), and 139 Ml/d for the 100 Mm3 reservoir (rather than TW's value of 185 Ml/d). In addition, we consider that the deployable output of Abingdon reservoir will be a lot less than shown in the table above, perhaps only half these values, when proper consideration has been given to the	No additional points are raised in the more detailed text	For the reasons set out in the points above, we do not agree with the amendments to the Deployable Output of SESRO which GARD propose, and as such we have not amended the Deployable Output values for the SESRO scheme.	We have not made changes to our plan following this response, for the reasons given in our consideration and as discussed in more detail in response to the points above.

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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 major drought.			
Modelling Addendum – Deployable Output of Severn to Thames Transfer and Support Sources – Conclusions Thames Water's Pywr modelling has grossly under-estimated the deployable output of unsupported STT options. Our modelling shows that the 1:100 year DO of the unsupported 300 Ml/d transfer should be 129 Ml/d compared to Thames Water's figure of about 90 Ml/d. For the 500 Ml/d unsupported transfer, we estimate the 1:100 year DO to be 182 Ml/d compared with Thames Water's figure of about 130 Ml/d. Thames Water's under-estimation of deployable outputs is highly significant because the unsupported transfer would be a viable first phase of the STT, not dependent on the Minworth or Vyrnwy support sources. The additional London deployable output from unsupported transfers would allow all the Chilterns chalk stream abstraction reductions to go ahead as soon as the Severn to Thames aqueduct is built, potentially in the early 2030s. The reason for Thames Water's underestimation of deployable outputs appears to be inadequacies in the stochastic river flow data which over-estimate the speed of flow recovery in the River Thames	No detailed output from the pywr modelling of the STT has been made available to GARD, so GARD are unable to identify the reasons for disparity between	We do not agree with the Deployable Output figures stated, for the reasons stated below. GARD have undertaken modelling to identify a Deployable Output using historical flow data and not including the impacts of climate change. A "worst historical" Deployable Output assessment is not appropriate for ascertaining the DO benefit of the STT when planning for "1 in 500-year" conditions, and it is also not appropriate to ignore the impact of climate change in this case. As such, GARD's modelling is inadequate for the production of Deployable Output benefit figures for the STT for use in WRMP24. The modelling undertaken to produce the DO benefit values adopted in our WRMP is robust. GARD have made much of the reduced yield of the SESRO scheme in long-duration droughts but have not applied similar critical consideration to the vulnerability of yields from the Severn-Thames Transfer, and so we note again the lack of even-handedness in GARD's consideration. In the 2022 drought event, during almost all of the period that London's reservoir levels were falling, flows in the Severn at Deerhurst were below the "Hands off Flow" level which would apply to the unsupported Severn Thames Transfer at Deerhurst. Had the Severn Thames Transfer been available during the drought of 2022, it would have delivered an approximate benefit of 7 Ml/d, compared to the DO estimated of 80-140 Ml/d for the 300-500 Ml/d pipeline sizes for the unsupported scheme. The year-to-year/event-to-event variation in yield delivered by the unsupported STT would	No changes have been made to our plan following this response, for the reasons highlighted in our consideration.

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after long droughts and under-estimate the frequency of occurrence of long droughts. These deficiencies negate the unsupported STT's ability to provide substantial refill of the London reservoirs during long droughts, due to differences in geology between the Thames and Severn catchments. The under-estimation of deployable outputs for the unsupported transfer will also affect the DOs for options with modest amounts of support, but the amount of underestimation will diminish as the amount of support increases.		be significantly greater than the variation in yield delivered by SESRO. As such, our consideration is that the yield of the reservoir is more resilient than that of the STT. Nonetheless, in the WRSE investment modelling we have adopted the "1 in 500-year" Deployable Output figures generated by our Deployable Output modelling because, as per our considerations above, it is the Deployable Output benefit to our existing supplies which is of primary importance. We note that GARD have been sent detailed pywr model data which could have used to undertake the checks that they state they have been unable to undertake. This data includes: - Flows for the Severn at Deerhurst for the stochastic river flow timeseries - Control Curve Crossing data for DO calculations from an unsupported and fully supported STT - A timeseries of utilisation from an STT DO run using the full stochastic dataset	
Modelling Addendum – Deployable Output of Severn to Thames Transfer and Support Sources – The need for Vyrnwy replacement sources Thames Water appear to have assumed that at least 80% of the nominal support from Vyrnwy reservoir will require replacement of deployable output through new United Utilities sources. GARD's modelling shows that only about 50% replacement deployable output is needed. This would mean that the costs of STT options with Vyrnwy support may have been inflated by the	In the WRMP and Gate 2 documents GARD have found no statement of the assumed annual amounts of STT operation for assessing operational costs. No time series data have been supplies for Pywr modelling of operational use of the STT. This is another failure of transparency, particularly as the high pumping costs and energy use of the STT are frequently touted as factors against the scheme.	Thames Water have not made any assumptions about the resource which United Utilities would need to invest in, in order to replace water traded to facilitate a supported Severn Thames Transfer. These calculations have been undertaken by United Utilities. Instead, United Utilities have provided Thames with prices for water from Vyrnwy, which incorporate the need to invest in new sources, making use of utilisation series from WRSE (which have been provided to GARD). We have not, however, been provided with information regarding the derivation of these prices for reasons of commercial confidentiality.	We have not made changes to our WRMP following this response. Thames Water have been provided with prices for water from Vyrnwy by United Utilities, but for reasons of commercial confidentiality have not been provided with information regarding how those prices have been derived. Our consideration is that this is an issue which should have been raised in

Consultation Response - verbatim from Executive Summary	Consultation Response – Summary of additional points raised outside the Executive summary	Our consideration	Changes to the draft plan, or if no changes are made, why not
cost of up to about 70 Ml/d of unnecessary replacement sources.		Our consideration is that this is an issue which should have been raised in relation to the United Utilities WRMP24 consultation. Operational costs of the STT are presented in the WRMP Tables, including fixed opex (£/yr) and variable opex (£/Ml). These figures are used in our WRMP programme appraisal. Appendix W of the dWRMP included weightings applied to different scenarios considered in the investment modelling. We note that elsewhere in GARD's response they have criticised the utilisation assumptions which they have found in the Gate 2 reports, while here they criticise not being able to find the same utilisation assumptions. We note that GARD have been sent detailed pywr model data: • Flows for the Severn at Deerhurst for the stochastic river flow timeseries • Control Curve Crossing data for DO calculations from an unsupported and fully supported STT • A timeseries of utilisation from an STT DO run using the full stochastic dataset	relation to the United Utilities WRMP24 consultation.

Oxfordshire County Council

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
Introduction 1. Oxfordshire County Council is responding to this consultation: • Thames Water's draft Water Resource Management Plan 24 (WRMP24) consultation1 (this response). 2. We also responded on 20th February 2023 to the following related consultations: • Affinity Water's draft Water Resource Management Plan 24 (WRMP24) consultation. • Water Resources South East (WRSE) draft regional plan consultation. • Water Resources West (WRW) draft regional plan consultation. • Water Resources East (WRE) draft regional plan consultation. 3. Water Resources Management Plans are statutory plans prepared by water companies every five years. The last ones were dated 2019 i.e. WRMP19. These next ones will be dated 2024 i.e. WRMP24. Oxfordshire County Council commented on the draft Thames Water WRMP19 in April 2018 and on the revised draft in November 2018. We raised concerns, particularly about the proposal for a South East Strategic Reservoir Option (SESRO) in Oxfordshire. We sought a public inquiry on the Thames Water and Affinity Water WRMP19s, but that did not materialise, and the WRMP19s were eventually agreed by the Secretary of State. The final Thames Water WRMP19 was published in April 2020. 4. During the development of the WRMP19s there was no regional planning process. Since then, regional water resources plans (which are non-statutory) have been developed and consultation on the Water Resources South East draft	These are introductory remarks. We agree with OCC's statements with respect to the WRMP and their involvement in previous WRMPs, and their statements around Thames Water's supplies are correct. The decision on a public inquiry is one for the Secretary of State, and is not something which Thames Water can comment on. We have responded to OCC's more detailed comments throughout this response.	No changes – none requested Changes made, or the reasons why no changes are made, are stated in response to more detailed points as they are raised.

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
regional plan closed on 20th February 2023. The draft WRMP24s are designed to be consistent with the draft regional plans. 5. Oxfordshire County Council's response on the Water Resources South East consultation is Appendix 1 to this response, and therefore forms part of this response on the Thames Water draft WRMP24. We would also refer you to our other responses and Council resolutions in respect of the SESRO. 6. Oxfordshire County Council has numerous concerns and objections on the Thames Water draft WRMP24 and seeks that there be a public inquiry. 7. Thames Water provides both water supply and sewerage services to Oxfordshire as well as other areas in the South East. Thames Water supplies over 10 million customers with around 2.6 billion litres of water per day. Figure 1 shows the area and explains where water is currently taken from.		
Consultation Question: 'We've chosen to aim for the highest level of environmental improvements. This is supported by our regulators. We'll be tracking the benefits of our work as we carry it out and will adapt our approach as we learn more. Do you have any comments on our approach?' 8. Oxfordshire County Council considers that some environmental improvements can better be achieved through alternative means than that proposed, for example by achieving higher levels of reduced leakage in pipes and investing in catchment management which will reduce the need for irrigation. 9. The consultation question specifically relates to the three scenarios about abstraction reduction. These scenarios are described as high, medium and low and Thames Water is proposing that their Plan is based on the high scenario. The diagram on page 11 of the summary consultation document shows that in some rivers there would be no difference in the scenarios, but the total abstraction reduction in the high scenario is 536.5 Ml/d; the medium scenario is 228.4 Ml/d; and the low scenario is 169.3 Ml/d. In other words, the medium scenario involves 35% more reduction than the low, and the high scenario 217% more reduction than the low (and the high compared to the medium is 130% more reduction). As stated in our response to the WRSE	We do not agree with the conclusion of this point, *"We do not think there is a clear cost-benefit reason for choosing a high environmental scenario. The high environmental scenario involves significantly higher levels of abstraction reduction than the medium scenario. We do not agree with this Plan including the SESRO on the basis of needing to aim for high levels of abstraction reduction"*, for two main reasons: 1. The "High" Environmental destination scenario meets the requirements of the Water Resources Planning Guideline, as it corresponds to the scenarios identified in Appendix 4 of the National Framework for Water Resources and is the primary scenario considered in the WRSE Regional Plan. Our regulator, the Environment Agency, has also advised us that adopting the "High" scenario is the correct approach. As such, we have not used the "High" scenario on the basis of cost-benefit assessment, and have instead done so in order to comply with national policy and	No changes made to the plan on the basis of this consultation response, due to the reasons set out in our consideration.

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
consultation (paragraph 7) we are not convinced there is a good cost-benefit analysis behind selecting the high scenario. We understand the priority to reduce abstractions from chalk streams, but the extent of that needs to be considered in the round with other environmental issues, for example the rest of the river network where there are discharges of raw sewage. It may be that the cost-benefit ratio for the 'high' versus 'medium' is very poor. There is a limit to the amount bill payers can be expected to fund and we think there is likely to be more benefit from using the funds elsewhere. 10. Special mention is made in the consultation question about the highest level being supported by regulators. As stated in our response to the WRSE consultation (paragraph 15), we consider that there is a need to push back on any narrow focus and maximalist expectations from regulators. We are prepared to work with Thames Water, convening interested parties. 11. Although the Thames Water draft Plan and the consultation question mention that the approach might change based on evidence over time – meaning that an aim for the high scenario might not result in the anticipated abstraction reductions – the immediate effect of aiming for the high scenario is that Thames Water will start developing new infrastructure to provide more water sooner rather than later. While developing some new infrastructure soon is likely to be needed, we do not agree with progressing the SESRO. If Thames Water (and WRSE) were not aiming for the high environmental scenario, then that would help with a decision not to include SESRO within the WRMP24. 12. Summary point of above: • We do not think there is a clear cost-benefit reason for choosing a high environmental scenario. The high environmental scenario involves significantly higher levels of abstraction reduction than the medium scenario. We do not agree with this Plan including the SESRO on the basis of needing to aim for high levels of abstraction reduction.	guidance, to which significant weight should be applied and which is supported by our regulators. The EA guidance document, "Long-term water resources environmental destination: Guidance for regional groups and water companies", makes clear that the scenarios defined in the National Framework should take precedence and also highlights that use of the National Framework scenarios is to ensure compliance with current/future regulatory requirements. Whilst we accept that there is a degree of uncertainty involved in predicting the volume of licence reductions which may be required in the future, we consider that placing most weight on the "High" scenario is the correct approach because it aligns with policy, accords with guidance and is the advice of our regulators. 2. Our plan is an adaptive plan, and we have considered different scenarios of abstraction reduction (medium and low scenarios) in building our plan. While our preferred programme is designed to meet the "High" scenario, and our programme appraisal places weight on this scenario, other scenarios have been considered when designing our adaptive plan. Regarding paragraph 8, we agree that environmental benefit can be achieved through leakage reduction, with reduced leakage leading to a lower amount of abstraction required. We're investing significantly to tackle the amount of water that is lost from our water pipes. We remain committed to reducing total leakage by 20% by 2025, and in our draft plan we have committed to halve the amount of water we lose through leaks by 2050. This is a challenging and ambitious target and will require innovative approaches and significant investment. We	

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
	do not agree that making further leakage reduction beyond that set out in our preferred plan is the right approach (with further leakage reduction being extremely costly and requiring mains rehabilitation), nor that catchment schemes to reduce irrigation requirements would present best value (abstraction for irrigation not being a significant factor in the Thames catchment). Regarding paragraph 9 and 10, as above, our consideration is that our scenarios should be (and have been) designed to ensure compliance with national policy and guidance (to which significant weight should be applied), rather than on the basis of cost-benefit. Guidance from our regulators should attract significant weight, as should national policy set out in the National Framework. Regarding paragraph 11, the SESRO reservoir proposal is consistently selected in investment model runs undertaken for the WRSE regional plan as a necessary and appropriate key scheme within the overall regional plan solution to the future water resources challenges that the region is facing. Our programme appraisal considers a wide range of scenarios, including “low” and “medium” scenarios of abstraction reduction. However, our consideration is that a plan which did not include the “High” scenario as a core assumption would not meet the requirements of policy or guidance, would not align with the regional plan and would not meet the expectations of our regulators.	

Working Towards the National Target for Water Use **Consultation Question: 'We've set out our plan for reducing demand, with government interventions, to achieve 123 litres of water per person per day on average. This is above the government's national target, but we think it's the right approach. We'll monitor and develop this by building on our learnings and evidence. Do you have any comments on our approach or suggestions for additional measures we could take?'** 13. Oxfordshire County Council considers that Thames Water's Plan should be to achieve the government's national target of 110 litres of water per person per day (l/p/d). 14. We are not convinced by Thames Water's consultation document which states they are not seeking to comply with the national target 'due to a lack of evidence that achieving such a target is realistic, or that it presents best value to customers'. Many other companies have a target lower than 110 l/p/d (for example Portsmouth Water, SES Water, South East Water and Southern Water). The government's Environmental Improvement Plan envisages potential water efficiency standards for new homes of 105 l/p/d or even 100 l/p/d; and indicates the government expects to reduce household water use to 122 l/p/d by March 2038 on the way to the 110 l/p/d target. 15. More can be done to help people reduce their water use. For example, it is understood that only some 50% of Thames Water's householder customers have a water meter. Thames Water report that their research indicates that having a meter helps people use around 13% less water. The process of rolling out water meters, if done speedily, will help achieve the government's national target sooner. 16. **Summary point of** above: • We think that the Plan should seek to achieve the government's national target of 110 l/p/d by 2050 or sooner.	Between the publication of our draft and revised draft WRMP, the water resources planning guideline has been updated to require that companies plan to achieve the 110 l/h/d target under the DYAA scenario. The Environmental Improvement Plan has also been published, which sets out a national target of 110 l/h/d by 2050. Our plan has been revised to include achievement of this target. Our revised plan clearly outlines (in Sections 8 and 11) how our water company-led interventions such as smart metering, water efficiency and customer engagement will contribute to achievement of the overall 110 l/h/d target. However, significant government action will be required if we are to achieve the 110 l/h/d target and our plan clearly sets this out. We agree that smart metering is an effective way of helping customers reduce their water use. Both our dWRMP and rdWRMP include ambitious metering programmes, with the primary factor governing the speed of implementation of our metering programme being deliverability (i.e., we could not confidently deliver the programme more quickly). We took an industry leading role in opting for smart water meters to increase the leakage and usage reduction benefit. Our installation of smart meters in homes and businesses is already delivering a measurable reduction in usage and water loss across household and business customers, but there is more to do and our plan sets out the completion of the smart metering programme. By 2034/35, over 80% of the households on our network will be metered, and by 2039/40 this will increase to over 90%. Due to the complexity of older and converted buildings in London and Thames Valley, there will be a small component that will be deemed unmeterable, however the water use on these sites will be monitored through non-revenue bulk meters.	Changes made as are highlighted in our consideration.

Approach to Reducing Demand for Water Consultation Question: '*Measures to reduce demand for water make up over 50% of our forecast shortfall by 2050. Some of the activity is untested and not within our direct control. Do you think this is the right approach? Should we plan for additional new sources of water in case these measures don't deliver the water we've forecast?'* 17. Oxfordshire County Council welcomes the recognition that reducing demand for water can make a big difference to the need for additional strategic infrastructure. The key measures to reduce demand for new water identified in the consultation document are reducing leakage, household and non-household water efficiency, innovation and new tariffs, water efficient government policies and temporary drought measures. Our comments on these can be found in our response on the WRSE consultation appended. 18. There is no need for some of the new sources of water suggested in the Thames Water draft WRMP24, and we do not accept that there would be a need to plan for additional new sources of water just in case the anticipated demand measures don't deliver. Indeed, it may be that the demand measures identified are conservative, and there will be a lot more water savings if Thames Water makes concerted efforts, for example by targeting more leaks more quickly. We understand, for example, that there is a lot of scope for more leakage reduction in parts of the Thames Water area where the targets allow for much more leakage than the 32 to 42 litres per property per day that other companies in the South East expect to achieve. We do not accept many of the other figures and estimates in the Thames Water draft WRMP24; we note that the Group Against Reservoir Development (GARD) has set out evidence against these in their response on the WRSE consultation. 19. Summary point of above: • We don't think that Thames Water should plan for additional sources of water on the basis that measures such as reducing leakage might not deliver as well as forecast. We think the Plan should include targets for Thames Water reducing leakage more and quicker.	Regarding paragraph 17, we agree that reducing demand is an effective way of meeting our future challenges, and our plan includes ambitious leakage and usage reduction programmes. Regarding paragraph 18, we do not agree that there is no need for some of the sources in our plan as our programme appraisal approach is robust and meets the requirements of guidance. Our consideration is also that, while our preferred plan includes the achievement of ambitious targets, it is right to consider the risk that the 110 l/h/d targets might not be achieved, as the amount of water customers use is, to an extent, beyond our control. Our regulator, the Environment Agency, have (in their consultation response to our plan) highlighted the reliance on demand management in our plan and have noted the risk that this poses. Our leakage reduction plan has been designed to reduce leakage to achieve company and government targets in the most economical way. We have explored the possibility of further leakage reduction and have identified that additional leakage reduction would not represent Best Value for our customers, as additional leakage reduction beyond our preferred plan would be very expensive per Ml/d of benefit delivered (much more expensive than new supply options). We have responded to GARD's representation and do not repeat our consideration of the points raised by GARD in this response. Regarding paragraph 19, we have not planned for additional sources of water on the basis that we would not meet leakage targets and so do not recognise this criticism. Our consideration is that our leakage reduction plan delivers best value for our customers, as is described in Section 8 and 11 of the rdWRMP24.	

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
The WRSE regional plan should require Thames Water to reduce leakage further and faster and amend its targets accordingly.		

The Size of a Proposed New Reservoir **Consultation Question: '*A new reservoir is an integral part of our best value plan for the South East. Do you have any comments on the size of a new reservoir?'*** 20. Oxfordshire County Council does not accept that there is a need for any new strategic reservoir in Oxfordshire. The SESRO and its constituent parts which include pipelines, outfall structures, etc should not be 'an integral part' of the Thames Water WRMP24. It is disappointing that this draft Plan includes the SESRO when Oxfordshire County Council and a significant proportion of respondents have consistently opposed its inclusion with reasoned arguments throughout the consultative stages of this WRMP24 and the regional plan. 21. There is a conceptual design drawing of the 100 Mm3 option contained as A.3 in Appendix 3 of the RAPID gate 2 SESRO concept design report. In that conceptual design the reservoir covers less land than the 150 Mm3 option, although the land take may be similar, involving some 7km2. Significantly less land is indicated in the conceptual design for a 75 Mm3 option, contained in the same appendix. We recognise that some reduction in the anticipated adverse environmental effects is possible with reductions in size, but the 100 Mm3 included in this Plan is larger than any other proposed reservoir in England and will still have significant adverse effects. 22. This Thames Water consultation document includes a summary of perceived advantages of both the 100 Mm3 and the 150 Mm3 sizes and indicates that although the Plan opts for the 100 Mm3 size that 'it's a very close call'. Benefits of the largest 150 Mm3 size are said to be 'extra resilience and flexibility to cope with whatever the future holds'. However, on the same page the consultation document notes that the 100 Mm3 size would 'result in fewer regrets if the future turns out better than we predict'. In this response, our previous responses, and GARD's responses, we have set out why the figures the water companies have used to predict future need are over-inflated. We are arguing for a 'resilience first' approach which includes bringing in water to the South East rather than building a strategic reservoir.	Regarding Paragraph 20. The inclusion of SESRO in the plan is reflective of the fact that this drives the overall best-value plan for the South-East. It provides a new source of water for the South-East by providing the storage for excess winter flows in the River Thames, to enable them to be converted into potable supplies during lower flow periods. In effect this is a new source of water during lower flow summer periods that would otherwise not be available for use. The draft WRMP plan selected SESRO 100Mm3 in 2040, after Teddington Direct River Abstraction, and in advance of the Severn to Thames Transfer (STT) which was required from 2050. Our work showed that a new reservoir is a better first option, ahead of a transfer from the River Severn, as: • it is less expensive overall, with lower running costs and carbon emissions; • it is more resilient - in a drought, it's hard to predict exactly when we'll need extra water supplies. The lead time to get water from the west of the country would be between three and four weeks, whereas it would be readily available from the reservoir and it is more resilient to our changing climate; • forecasts suggest we'll see more droughts occurring at the same time across the whole country, so when the South East is in drought, the water for the transfer may actually be needed by customers in the Midlands and North West • The reservoir also has the potential to provide a wide range of economic, social and environmental opportunities – boosting biodiversity, natural capital and recreational benefits beyond those that can be offered by the water transfer. This is why many customers tell us they'd prefer a new reservoir over other schemes.	Changes have been made to the WRMP as highlighted in our consideration. Our revised programme appraisal is detailed in Section 10 and Section 11 of the rdWRMP.

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
23. As set out in our response to the WRSE consultation (paragraphs 23 to 47 in the appendix), Oxfordshire County Council considers that the size, effectiveness, time to construct, completion date, environmental effects, cost to construct, ongoing operation costs, lack of clarity on how the water will be shared and the effects of related pipelines, are all reasons why a SESRO should not be included in the WRMP24. Although the water companies see the SESRO as potentially helping to address climate change, it will have a huge carbon footprint and there are better options. The effort being put into progressing the SESRO should be diverted to progressing various other options, including the Severn Trent Transfer (STT). 24. Summary point of above: • The proposed 100 Mm3 SESRO is too large. It will have significant adverse environmental effects, is unlikely to be effective, and will be costly both in monetary terms and in the opportunity costs of not proceeding with other options. New Water Sources Consultation Question: '*Do you have any comments on the new water source options included in our draft plan?'* 25. Oxfordshire County Council has many comments on the new water source options and we would refer you to our response to the WRSE consultation appended for more detail. 26. Overall, we are concerned that the total quantum of need for new water source options is exaggerated. This is because the population projections are over- estimates; there is insufficient calculation of credits to the flow of the Thames arising from the restored rivers in the Chilterns; and there should be reduced leakage and reduced demand in future. 27. Some new water sources are needed. The Severn Thames Transfer (STT) should be brought forward earlier. The November 2022 RAPID gate 2 main report for STT indicates that STT could be construction ready by 2028 and	For the revised draft WRMP we have further examined the range of possible future scenarios and have considered the wide range of risks that we may encounter in the future and given the range of risks which exist, have selected SESRO 150Mm3 in 2040 to provide security for the regions supplies. The STT is no longer required from 2050 due to the updated requirement in the Water Resources Planning Guidelines to reduce average per capita consumption (PCC) to 110 l/h/d by 2050. We will however continue to develop the STT as an adaptive option to mitigate the risks that SESRO could not be developed, or if government water efficiency policies do not reduce demand (or PCC) to the levels anticipated. Regarding Paragraph 21, the environmental impacts of the proposed SESRO options have been assessed by Thames Water and presented in both the Strategic Environmental Assessment that accompanies the draft WRMP and also within our Gate 2 submission to RAPID (section 6). This strategic level appraisal of impacts has been taken into account when deriving the best value plan. Furthermore, any future promotion of one of the SESRO options would need to be subject to a formal Environmental Impact Assessment (EIA) and suitable mitigation identified and agreed with regulators before any consent was approved. Detailed information on the landscape impacts, environmental impacts including biodiversity and heritage impacts, flood risk issues and watercourse impacts (including complete appraisal of the compliance of the scheme under the Water Framework Directive) have been completed as part of our Gate 2 submission to RAPID, and agreed with the Environment Agency.	

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
completed in 2033. While we have environmental concerns about STT, mostly in respect of the effects of construction, we consider that STT is a good water source option because it will bring water into the South East and the water will be transferred either by pipeline or by canal, therefore having few if any adverse effects in the long term. STT is a drought resilient option as much of the water is to be sourced from water recycling at the Minworth treatment plant. As explained in our response to the WRSE consultation appended (paragraphs 69 to 80) STT can proceed as an alternative to SESRO. It can proceed in a phased way, while still providing more water at the first phase than the current SESRO proposal. 28. We note that the summary consultation document records (page 25) the potential for recreational benefits as being one of the advantages of SESRO over STT. Recreational benefits are however not guaranteed. We would expect to see recreational benefits gained from STT as well, for example with new active travel opportunities along its route. 29. The Thames to Southern Transfer (T2ST) is a proposal for a pipeline from Oxfordshire to provide the Southampton area with up to 120 Ml/d. However, it is understood that it would not often be used, and we therefore think that it would not be good value for money nor for the environment. There are other options for water supply closer to where it is needed in the Southampton area, and Thames Water should not be proposing to provide a pipeline from Oxfordshire. We agree with GARD's opinion in its response to the WRSE consultation that the T2ST should be abandoned due to its minimal benefit and disproportionately high cost. 30. Summary point of above: • The timeframe of the STT should be brought forward in the WRMP24 to replace the SESRO. The T2ST should not be part of the Thames Water WRMP24. The draft regional plan does not take on board the outcome of the previous consultations which indicated substantial direct opposition to the SESRO.	Regarding Paragraph 22. See answer to point 20 above. We do not agree that forecasts of water required are over-inflated. Forecasts for the amount of water required in the future, including for factors such as population growth, are derived in accordance with the Environment Agency's Water Resource Planning Guideline, to which significant weight should be applied and which is supported by our regulators. We have responded to criticisms on individual components of the supply-demand balance as they are raised. We do not agree with the proposed "resilience first" programme appraisal approach as it does not appear to involve any detailed appraisal of different options or any programme appraisal. We do not consider that the proposed approach would meet the requirements of the Water Resources Planning Guideline. Regarding Paragraph 23. See answer to 20 above – the factors referenced in the consultation response have been incorporated into our programme appraisal. Regarding Paragraph 24. See answers to more detailed points above. Regarding Paragraph 25. Noted. Regarding Paragraph 26, we do not agree that we have exaggerated the total quantum of need for new water source options. Forecasts for the amount of water required in the future, including for factors such as population growth) are derived in accordance with national policy and/or the Environment Agency's Water Resource Planning Guideline to which significant weight should be applied and which is supported by our regulators. We do not agree that we have under-estimated the flow benefits arising from abstraction reduction – assessments undertaken are robust	

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
While the 100 Mm3 size is better than the previously suggested 150 Mm3 size, it is still much bigger than other reservoirs and too large in this location. • The SESRO effectiveness is queried, given that in times of drought it will be difficult to fill and rapidly emptied. • The lengthy construction timeline means that the SESRO does not offer an early solution to water supply issues. It's pre-selection crowds out early prioritisation of more resilient, lower risk options. • Building the SESRO before other options means the plan is not adaptive or responsive on this point, and it will have a higher carbon footprint than if it was built later. • The SESRO will have significant and potentially unacceptable environmental effects. • The build cost of the SESRO and associated infrastructure is high. • The SESRO will have ongoing operation costs, which appear not to have been factored in correctly or accurately compared with other options. The SESRO is designed to enable transfers of water to other areas in the South East, but it may be that those areas have other better options to utilise. • Given the concerns, the SESRO should be removed from the WRSE regional plan and the company plans, and not pursued as a strategic resource option. The WRSE regional plan should be based on achieving 110 l/p/d on average by 2050 rather than 115 l/p/d. Additional work should be done to ensure that can be achieved, particularly in the Thames Water area. The GUC proposal is supported as it brings new water into the South East, utilises existing canal infrastructure, can be constructed quickly, is resilient to drought, and is an alternative for Affinity Water to sourcing water from the River Thames via SESRO. The early timeline is also supported. Evaluations of pipeline route options north-south from the Water Resources East area to the Water Resources South East area should be completed so that, if needed, this can be progressed enabling a transfer of water between Anglian Water and Affinity Water (A2AT), to supply water from around 2040.	and consider the extreme drought scenarios that we are required to plan for. The WRMP includes an industry wide commitment to reduce leakage by 50% (from 2017 levels) by 2050 and our plan includes achievement of this target. This is a critical element of our overall plan, alongside extensive demand management measures. Even with these ambitious targets built into our plan, there is still a need to develop new sources of water to meet projected future demands. Regarding Paragraph 27. See answer to 20. above Regarding Paragraph 28. As noted in our Gate 2 submission to RAPID (section 3 and Figure 3.1), we have developed an Indicative Master Plan for the largest SESRO option. As stated in that document, this is to "provide a first illustration of how the engineering requirements of the scheme may be integrated with the expected environmental mitigation and with possible recreational uses of the site. This vision will be subject to change and refinement if SESRO progresses through scheme promotion, through future consultation, environmental assessment and associated design iterations, but provides an initial overview of how the largest SESRO option could be conceptualised." This indicative master plan, and the associated costs, impacts and benefits is based upon a scheme that could enable extensive recreational activity including terrestrial footpaths and bridleways, controlled water-based recreation (e.g. sailing club), a visitor centre, a small education centre and a cafe facility. None of these aspects has been designed in detail at this early stage, but all are included in the concept design at this stage, integrated with the required engineering and environmental mitigation works. Local and regional opportunities: The reservoir has the	

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
The WRSE regional plan should bring forward the STT earlier than indicated in this draft plan.	potential to provide a wide range of economic, social and environmental opportunities – boosting biodiversity, natural capital and recreational benefits beyond those that can be offered by the water transfer. Regarding Paragraph 29. The inclusion of the Thames to Southern Transfer (T2ST) is part of the overall best-value plan for the South-East. A considerable deficit has been identified in Southern Water's Western Area meaning that the T2ST is the best value option for the region. We do not agree that it should be abandoned as resolution of Southern Water's supply demand balance has been shown, through sensitivity testing, to be dependent on the construction of the T2ST. 30.Summary point of above: • We do not agree that the STT should be brought forward - see answer to 20, above We do not agree that the draft regional plan did not take on board comments from the emergency plan consultation. WRSE considered comments in detail when developing the draft plan. • Regarding questioning of the effectiveness of SESRO, the Deployable Output for the SESRO options have been assessed during a 1 in 500 year drought, using a wide range of hydrological conditions. The reservoir would be available to supply this amount of water during the design drought conditions. • Construction time, carbon emissions, environmental impacts, capital costs and operational costs have all been considered within our programme appraisal. Conclusions are detailed in answer to paragraph 20. We do not agree that the factors referenced should lead us to remove	

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
	SESRO from the plan and consider that it is the centre of the best value regional plan, as described The regional plan and our rdWRMP include achievement of the 110 l/h/d target, as described in response to an earlier point. The GUC forms part of the Best Value Regional Plan and Affinity Water's WRMP. Anglian to Affinity Transfer options have been explored as part of the WRSE Regional Plan. The consideration of these options is detailed in Affinity Water's WRMP and the Regional Plan.	

Best Value for Customers **Consultation Question: '*Do you think our draft plan represents the best value plan for you, your community and the environment?'*** 31. Oxfordshire County Council does not think that the draft WRMP24 represents the best value plan. 32. We also question the use of 'best value' criteria. We consider that all the water resources plans should have policies to prefer low carbon and least environmentally damaging water supply solutions. We refer to the shared regional principles for protecting, restoring and enhancing the environment in the Oxford- Cambridge Arc and Oxfordshire's Environmental Principles[1]. 33. This question in the consultation document (page 28) comes after a table indicating that the cost of investing in the future water supply is around £13 billion between 2025 and 2050 and this will result in increases to the average household bill over time – said to be some £100 per year more by 2050. The additional bill impact from investment in other services, such as wastewater, is separate. We question the inter-generational equity from ramping up charges over time based on the cost of infrastructure. We note that the GARD response on the WRSE consultation provides detail on how water companies are financially structured to favour long- term investment in capital schemes over what might be described as maintenance when fixing leaks for example. Our concerns over the predicted cost of the SESRO, and the fact that large infrastructure projects often over-run their predicted costs, is one of the reasons why the SESRO should not proceed and there should be more focus on early delivery of diverse resilient schemes including water recycling, transfers and groundwater schemes, many of which will be relatively small scale. We seek that Thames Water adopts an approach which prioritises resilience in our water supplies as early as possible. 34. Summary point of above: We do not think this Plan is good for our community or the environment. There should be more focus on early delivery of diverse resilient small-scale schemes. Cost is one of the reasons why the SESRO should not be included in the Plan.	The companies in the South East of England have defined best value on the basis of comparison of a set of cost, environmental and resilience metrics. We consider that we have considered Best Value on a robust, transparent and rigorous basis. As described in response to other points, our consideration is that our rdWRMP24 presents best value to our customers. In order to fund necessary new resource options, capital investment is needed. Our bill impact modelling reflects the anticipated bill increases that would be required to enable this investment under the existing regulatory regime. We have addressed GARD's points regarding the regulatory regime in response to the point that they have raised in their representation. The best value planning approach does not include specific metrics on potential profit, dividends, commercial considerations or RCV. The risk of large infrastructure projects overrunning is common to most of the Strategic Regional Options under development. It is not unique to SESRO. Each option has its short and long-term risks and benefits and we have balanced these in our proposed programme.	The Programme Appraisal for the revised draft plan has been re-done and Sections 10 (Programme Appraisal and Scenario Testing) and 11 (The Overall Best Value Plan) have been re-written following comments received and updates to the input data.

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
The 'best value' approach of the draft regional plan is not supported and instead there should be an approach that is 'least risk and least environmentally damaging'.		

[1] Both available with the Oxfordshire County Council Cabinet report 9 November 2022 https://mycouncil.oxfordshire.gov.uk/ieListDocuments.aspx?CId=115&MId=6886

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
Other comments Consultation Question: '*Do you have any other comments on our draft plan?*' 35. Oxfordshire County Council considers that a public inquiry is needed on the draft WRMP24 given that it is a statutory document. We think that the Secretary of State for Environment, Food and Rural Affairs needs to consider the matters more fully than anticipated by Thames Water. The consultation document (page 31) sets out that Thames Water will prepare its report on the feedback and submit it to the Secretary of State with any changes to the draft. The process of the Secretary of State considering that report as well as original responses and any advice from the Environment Agency, will not be clear without a public inquiry. This is a key decision point about whether a SESRO is seen through a Development Consent Order process as being needed by virtue of its inclusion in the WRMP24, and therefore these objections should be heard in an appropriate public inquiry forum. 36. Summary point of above: There should be a public inquiry on the Thames Water draft WRMP24.	We acknowledge that Oxfordshire County Council's view that a public inquiry is needed on the draft WRMP24. We outlined the process for review of our draft WRMP24 in the WRMP documentation and the decision on the next steps will be made by the Secretary of State for Environment, Food and Rural Affairs.	No changes made as a result of this comment – the decision on finalisation of WRMP or public inquiry is for the Secretary of State to decide.

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
Conclusion 37. Changes should be made to the Thames Water WRMP24, along with changes to the WRSE regional plan, including addressing the following key points: • We do not think there is a clear cost-benefit reason for choosing a high environmental scenario. The high environmental scenario involves significantly higher levels of abstraction reduction than the medium scenario. We do not agree with this Plan including the SESRO on the basis of needing to aim for high levels of abstraction reduction. • We think that the Plan should seek to achieve the government's national target of 110 l/p/d by 2050 or sooner. • We don't think that Thames Water should plan for additional sources of water on the basis that measures such as reducing leakage might not deliver as well as forecast. We think the Plan should include targets for Thames Water reducing leakage more and quicker. • The proposed 100 Mm^3 SESRO is too large. It will have significant adverse environmental effects, is unlikely to be effective, and will be costly both in monetary terms and in the opportunity costs of not proceeding with other options. • The timeframe of the STT should be brought forward in the WRMP24 to replace the SESRO. The T2ST should not be part of the Thames Water WRMP24. • We do not think this Plan is good for our community or the environment. There should be more focus on early delivery of diverse resilient small-scale schemes. Cost is one of the reasons why the SESRO should not be included in the Plan. • There should be a public inquiry on the Thames Water draft WRMP24.	We have addressed the points raised in this conclusion when responding to the individual points as raised above.	Changes made as per previous responses.

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
Introduction 38. The County Council is responding to the following consultations: • Water Resources South East (WRSE) draft regional plan consultation[2] (this response) • Water Resources West (WRW) draft regional plan consultation • Water Resources East (WRE) draft regional plan consultation • Affinity Water's draft Water Resource Management Plan 24 (WRMP24) • consultation • Thames Water's draft Water Resource Management Plan 24 (WRMP24) • consultation 39. This response on the WRSE draft regional plan follows the Oxfordshire County Council response on the emerging regional plan which was sent in March 2022 and is available on the County Council's website with a press release . The County Council also sent officer responses on several earlier consultative documents. Oxfordshire County Council has consistently questioned the water company attempts to progress a proposal for a strategic reservoir in Oxfordshire. In addition to this response, we would refer you to our previous reports and responses and the County Council's resolutions of 10th July 2018 and 2nd November 2021.	These are introductory remarked to OCC's representation on the Regional Plans	No changes made – none requested in introductory remarks

[2] https://wrse.uk.engagementhq.com/

Executive Summary 40. Our responses challenge this draft plan and the other draft water resources plans. Some of the bases of future water need calculations are questioned, for example the future population figures. We consider that the draft plans have not prioritised the available options correctly. We are asking that the plans take a 'resilience first' approach recognising the benefits of water catchment management, given climate change, and have policies indicating a preference for low carbon and least environmentally damaging water supply solutions. Existing infrastructure should be used wisely and refurbished. We seek more attention to reducing leakage and reducing demand. We recognise that proposals to bring water into the South East region should be progressed, such as the Grand Union Canal transfer (GUC) and the Severn Trent Transfer (STT) and ask that there be provision for them being brought forward quicker. Water transfers, together with water recycling, desalination and smaller water storage schemes should make up the package of new infrastructure measures needed. We conclude that there is no need for a South East Strategic Reservoir Option (SESRO), which would be environmentally damaging due to its size and location; it would be unduly costly and take overly long to construct, in the meantime 'crowding out' more rapidly-deliverable, climate resilient schemes. Importantly, we also question whether such a reservoir is an effective proposal, given that it would be unlikely to be filled in times of prolonged drought. We consider that provision for the SESRO should be removed from the plans. 41. Oxfordshire County Council's vision is 'working in partnership to make Oxfordshire a greener, fairer and healthier county'[3]. We seek a holistic approach to water management, with solutions that are based in nature and are readily adaptable to the reality of an increasingly water scarce environment.	40. Oxfordshire County Council has provided a detailed representation submitted to Thames Water's draft WRMP24 consultation and we have provided below responses to the main points raised. Population forecasts: We, and the WRSE region, have developed population forecast data based on the updated forecasts prepared by Edge Analytics, independent demographic experts, utilising the most recent ONS population and household data, and updated information from local planning authorities. We have complied with regulatory guidance for water resources planning, and the population forecast adopted in our "reported pathway", (the supply-demand balance trajectory) which underlies our preferred programme pathway, and remains based on local authority plan-based population projections. Our plan would not be supported by EA and Ofwat if we did not adhere to the regulatory guideline. The "reported pathway" is a single potential future, within our adaptive plan, we have prepared a range of forecasts which cover a wide range of potential levels of population growth that we could experience, so we have planned for best case, worst case and others in between, ensuring that the plan is capable of adapting over time to levels of growth that are experienced. Greater focus on leakage reduction and demand reduction: We have reviewed and included additional demand reduction options for both household and business customers in our revised draft plan. Leakage reduction and demand reduction measures make up almost 100% of the forecast water shortfall by 2030 and around 80% by 2050 in our revised draft plan. These measures, whilst ambitious, will not be sufficient on their own and we will still need to develop new sources of water to ensure we can meet our statutory duty and provide a secure and sustainable water supply to our customers.	OCC have raised points points made in this comment which are subsequently raised in more detail through their response. Where changes have been made we detail these in response to the more detailed points, and where changes have not been made we again explain why in response to the more detailed points.

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
	Proposals to bring water into the SE should be progressed, specifically naming GUC and STT: Water transfers have been considered as one of the potential options in the development of the SE regional plan and accordingly our WRMP. The GUC scheme is part of the SE regional plan as are other transfers across the SE region and with neighbouring water companies. The STT is not included in our revised draft plan, with the extended programme of leakage and demand reduction it is not selected as part of the best value plan but we have recommended that we should continue to progress work on this scheme should it be required in the future. Regulators, in their representations to the draft plan, set out the need for further studies and assessments on the STT, particularly in regard to resilience and environmental impacts, to ensure the scheme is compliant with all the required legislation. Preference for alternative schemes rather than the proposed reservoir in Oxfordshire: We have considered a wide range of options including tackling leakage, making the best use of our water resources and catchment schemes alongside developing new sources of water including national and regional water transfers, desalination, water recycling treated wastewater and, reservoirs in the development of the regional plan and our company WRMP. We have assessed the costs and benefits of different solutions and we have used decision support tools, alongside other factors, in order to formulate a best value adaptive plan. This process has led to the selected programme of leakage and demand reduction, as well as developing new sources of water including the DRA scheme in west London and a new reservoir in Oxfordshire. WRSE has determined that the best value plan investment model run with	

[3] See Oxfordshire County Council's vision and strategic plan: https://www.oxfordshire.gov.uk/council/our-vision-0

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
	the SESRO reservoir proposal at 150Mm3 is the preferred basis as it produces better average best value plan metric scores, and is more resilient to dealing with known potential future risks. To read further information on the approach to identify and assess new water supply options please go to Section 7 of our the WRMP and information on the assessment and decision making process to determine the best value plan is presented in Sections 10 and 11 of the WRMP. Resilience of SESRO: Regarding the resilience of the reservoir to long-duration drought events, we have applied advanced methods in assessing the supply capability of the reservoir. It is important to bear in mind that it is not the resilience "of the reservoir" which is our primary concern in assessing the supply benefit, and rather it is "the benefit that the reservoir brings to our supplies" which is our concern. Our existing supplies are vulnerable to c.18-24 month drought events of a high intensity, and SESRO brings resilience to events of this nature.	
Key Concerns 42. We find this consultation deeply flawed, through unrealistic assumptions about population and climate change; a lack of clarity over both costs and benefits, particularly of the largest single item, abstraction reduction; and proposals which indicate an uncritical acceptance of wasteful interventions with poor cost-benefit ratios. The regional plan does not reflect what should be an integrated approach to water management and supply. 43. We regard it as unacceptable for WRSE, regulators and water companies to use outdated population projections. Using the 2022 ONS projections based on the 2021 census, we calculate that achieving the population for the preferred pathway modelled in the draft WRSE plan would now require the entirety of the predicted population growth for the whole of England to 2050 to be located in the South East and on top of that for over half a million people to move in from other regions. We have not found it possible to cross-check the projections	Paras 42 and 43: Regarding population growth, we do not agree that the forecasts are unrealistic. The Water Resources Planning Guideline requires that we consider a population growth forecast which is based on local authority plans. An expert consultancy has produced such a forecast on our behalf, alongside many others, using the most up to date information available which fulfils the requirements. While our preferred programme is based on a local authority plan-based demand forecast, we have also adopted an adaptive planning approach whereby we have considered a demand forecast based on ONS projections. Para 42: Regarding climate change, we do not consider that our projections for climate change are	Regarding population data, we have not made changes following these comments as our consideration is that the methods we have applied in deriving and using population forecasts meet the requirements of the WRPG. However, the following changes have been made between dWRMP and rdWRMP. • All changes have been made to ensure that we are using up to date data. • We have changed our base year from 2019/20 to 2021/22. • We have used revised population and property forecasts, produced by Edge Analytics. Census 2021 information has been used by

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
using the figures given for population, climate and environment in the main document and this lack of clarity is a shortcoming of the consultation. 44. We regret that bill-payers seem effectively to be being asked to sign a blank cheque, with no clear cost-benefit analysis or justification behind the selection of the 'preferred pathway'. We understand the priority to reduce abstractions from chalk streams, but the extent of that needs to be considered in the round with other environmental issues, for example the rest of the river network where there are discharges of raw sewage. It may be that the cost-benefit ratio for the 'high' versus 'medium' environmental pathway is very poor. There is a limit to the amount bill payers can be expected to fund and using those funds to maximum impact is vital. We judge that there will be vast environmental benefits achieved through not discharging sewage into rivers. 45. We are facing a climate emergency. We note the rapid and unexpected acceleration of extreme climate events, in the UK and across the world. We are concerned about resilience of water supplies resulting from an early reliance on the giant reservoir, which is not scheduled to complete until 2040. This crowds out much more resilient and environmentally intelligent projects for the first part of the plan. We consider that the plan should prioritise the transfer of water to this severely stressed South East area from less stressed regions to the North and West. We note that all of the transfer schemes from the North and West connect at least in part to water recycling schemes, giving both geographical and water source resilience. The repurposing of Vrynwy reservoir adds even more geographical resilience, as the west coast of Wales is likely to retain high rainfall even in extreme climate scenarios. 46. We add to our long-term scepticism about the value of the South East Strategic Reservoir Option (SESRO), very serious questions on the proposal to embed an early decision to progress the reservoir. The UK is currently in a situation of historically high levels of uncertainty over both climate impacts and population. It is baffling that such a destructive scheme, both environmentally and in its impacts on local people, should ever have been ranked highly enough to be pre-selected, when the consultation itself notes other schemes such as the Severn	unrealistic. We have considered a wide range of climate change scenarios in producing our WRMP, using data from the UKCP18 projections and adopting methods for assessment aligned with the Water Resources Planning Guideline supplementary guidance on the subject. Our 'high', 'medium', and 'low' scenarios of climate change represent approximately 75th, 50th and 25th percentile forecasts for climate change impacts that we may see, and all three are considered within our adaptive plan. Para 42: Regarding licence reductions, the "High" Environmental destination scenario meets the requirements of the Water Resources Planning Guideline, as it corresponds to the scenarios identified in Appendix 4 of the National Framework for Water Resources and is the primary scenario considered in the WRSE Regional Plan. Our regulator, the Environment Agency, has also advised us that adopting the "High" scenario is the correct approach. Para 43: We do not agree that our plan, nor the WRSE regional plan, displays a lack of clarity. A great deal of information is presented in the plan, both in the technical report and the tables which accompany the plan. Para 44: We do not agree that bill-payers are being asked to effectively sign a blank cheque or that there is a lack of justification for the "preferred pathway". Our regulators jointly produce the Water Resources Planning Guideline, and it is from this guidance that we determine the supply-demand balance trajectory	Edge Analytics where it is available, but it should be noted that Census 2021 with sub-national population projections (SNPP) and national population projections (NPP) has not been released by ONS in time for inclusion in rdWRMP24. We therefore continue to use the most recent release of these forecast which are the ONS 2018 SNPP and 2020 interim NPP. • Edge Analytics updated growth forecasts based on local authority plans in December 2022. Therefore any changes in local plans since 2020 have been captured as part of this process. Regarding climate change and licence reductions, we have not made changes to our plan following this consultation response, as our consideration is that our plan meets the requirements of the guidance. We have made changes to our profiles of licence reduction in response to comments from our regulators. These changes are detailed in Section 5 of the rdWRMP. Regarding our decision making processes, we have not made changes to our programme appraisal approach between draft and revised draft, as our consideration is that the approach applied is robust and meets the requirements of guidance.

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
Trent Transfer (STT) could deliver more water and earlier, and with greater resilience. 47. Of the 1,150 responses to the emerging WRSE regional plan consultation earlier in 2022, we understand that about half of the responses indicated opposition to the SESRO[4], and we understand that is the unanimous position of those with a local interest, yet this has not resulted in its removal from the draft plan. Too much weight is given to customer surveys indicating that customers might generally prefer reservoirs to some other forms of new infrastructure. We observe across the UK an increase on direct action as a form of protest and are concerned that might happen if the SESRO is progressed. We note an increasing level of frustration among sections the local population which has resulted in destructive and threatening behaviour within Oxford, including some directed at local politicians. We note also that the area whose residents' lives will be blighted by the SESRO is already experiencing a lot of development. 48. Finally, we are disappointed that 'best value' appears to put a very low weighting on public amenity, negative impacts on local people, environmental impacts (except where mandated by other bodies) and use or reuse of existing assets. We believe the plan needs to move from 'best value' appraisal to an approach of 'least risk and least environmentally damaging'. Key points above: • The consultation documents and evidence are flawed in their assumptions about population and climate change, there is a lack of clarity over costs and benefits, and the resulting proposals are not sound. • The draft regional plan does not take on board the outcome of the previous consultations which indicated substantial direct opposition to the SESRO. • The 'best value' approach of the draft regional plan is not supported and instead there should be an approach that is 'least risk and least environmentally damaging'.	of the preferred programme. This is explained in the plan (draft and revised draft) in Section 11. We do not consider that cost-benefit analysis of the preferred pathway is required, and instead consider that compliance with policy and the guidance is what should be ensured. Para 45: Our plan includes forecasts of climate change impact which are produced according to methods described in the Water Resources Planning Guideline, including supplementary guidance. Significant weight should be applied to the guidance. We incorporate the forecast of climate change impact on our supplies and demand into the supply-demand balance, which we then ensure is satisfied. We do not agree that the reservoir "crowds out" other schemes and instead consider that the reservoir has been demonstrated to be a better scheme for ensuring resilient supplies, with plans involving the reservoir being less costly, resulting in fewer carbon emissions, and being better able to deal with the risks which our planning is faced with. We do not agree that prioritisation of transfer schemes should be a factor considered within our programme appraisal, and instead consider that an objective comparison of the costs and benefits has been undertaken in our programme appraisal assessments, and that this is the right approach. We note also that the Vyrnwy reservoir is used to provide supplies to United Utilities' existing customers, and that repurposing the reservoir to provide supplies to	

[4] See https://www.wrse.org.uk/media/wbdj0jdd/wrse-emerging-regional-plan-consultation-response-document-may-2022.pdf e.g. paragraph 10.16, 14.4

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
	the south east would require United Utilities to provide replacement sources to ensure the resilience of their supplies. Para 46: The reservoir has not been "pre-selected" in our planning, it has been identified as the best value solution to the long-term planning problems which the WRSE region faces. We agree that there are uncertainties in our planning, but our consideration is that our planning approach takes this into account. Para 47: We understand that some local people oppose the proposed reservoir. We have received representations to the public consultation which set out opposition to the development of the reservoir and raise specific concerns in relation to the reservoir. However, we have also received representations which set out support for the development of the reservoir and have spoken to local people who have expressed support for the scheme, as such we do not agree with OCC's statement that opposition is the unanimous position of those with a local interest. We have listened to the concerns raised in relation to the reservoir and in February this year we published a statement which outlined our commitments to the community, we have also responded in detail in the Statement of Response to concerns raised. We are committed to work openly and proactively engage with local politicians, councillors, council officers, parish councils and local communities as the reservoir is taken forwards.	

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	In regard to the customer surveys, we undertook customer research as part of the public consultation on our draft WRMP to ensure we understood the views of a representative sample of our customers. Respondents to public consultations are self-selecting and generally have a specific view or concern that they want to raise, as such their views are not always representative of the general population or our customers, and the research ensures we hear the preferences of our customers and take these into account in determining our long term strategy. We have a statutory duty to provide a secure and sustainable water supply and to meet the challenges of our changing climate, growing population and protect the environment we need to invest in our future water supply and need a combination of demand reduction as well as new water sources. The work we have completed, together with WRSE, to develop the best value plan has shown that the reservoir is an integral part of the solution for our customers and the wider South East. Further detail on the decision making and our overall plan is provided in Sections 10 and 11 of our revised draft WRMP24. Para 48: We do not agree that we have excluded consideration of reuse of existing assets. Our plan sets out our baseline supply capability and assumes that our existing assets are available through our planning period. Our consideration is that the Best Value Planning approach is appropriate and considers the decision-making factors in the round.	

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	We are also required by the Water Resources Planning Guideline to adopt a "Best Value" approach in our planning. The SEA and Natural Capital assessments consider environmental impacts and public amenity and have factored into the decision-making process.	
Calculation of water need and policies **Need calculations** 49. The South East is the most water-stressed region in England and faces bigger issues than the other four regions required to prepare regional water resource plans following a recent government guideline[5]: North, West, East, and West Country. 50. The WRSE six water companies together currently supply some 6 billion litres of water to customers each day. The draft regional plan estimates an additional need for between 1 billion litres and 2.8 billion litres of water per day by 2075. The 'reported pathway' is defined as the 'best value way of meeting the regulatory and policy guidance' and requires finding an additional 2.7 billion litres of water to supply per day by 2075[6]. We do not accept these figures which appear to be skewed and reflective of much greater population growth than is likely. We consider that the 'reported pathway' should be towards the lower end of the estimates at 1 billion litres. 51. Oxfordshire County Council expects the water companies to plan for sufficient water supply. We recognise the absolute need to get the 'right answer' and the potentially desperate consequences of failure to do so. We note again our concern that no consideration seems to have been given around ensuring early	Paragraphs 49-51: We agree with the facts presented, but we do not agree that the needs highlighted in the WRSE Regional Plan are over-stated. We respond to the individual criticisms in the points below. Population Growth: We do not agree with the proposed approach for considering population growth, as the proposed approach would not meet the requirements of the Water Resources Planning Guideline. Forecasts for the amount of water required in the future (including for factors such as population growth) are derived in accordance with the Environment Agency's Water Resource Planning Guideline to which significant weight should be applied. The Water Resources Planning Guideline states that we should base our forecast population and property figures on local plans published by the local council or unitary authority. Expert consultants have produced population and property forecasts for us using data from local plans. As such, our consideration is that our property and population forecasts meet the requirements of the WRPG. Our adaptive plan takes account of a wide range of demand forecasts, including ONS projections. The adaptive plan which we have developed	We have not made changes to our supply-demand balance forecasts nor our programme appraisal methods in response to the comments raised, for the reasons set out in order consideration, which are in summary: • Forecasts of population growth, abstraction reduction and climate change impact have been calculated in line with the requirements of guidance. We do not agree with the approaches that OCC have produced as they would not meet the requirements of guidance. • The WRSE plan has followed a Best Value Plan methodology which we consider to be robust, and we do not agree with the proposed alternative approach which OCC have proposed.

[5] Water Resources Planning Guideline https://www.gov.uk/
[6] Page 20 and 21 of the draft WRSE regional plan https://wrse.uk.engagementhq.com/

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resilience to unexpectedly rapid climate breakdown. The Oxfordshire Infrastructure Strategy (OxIS) and Local Plans in the county recognise that reliable future water supply is needed. The issue is urgent, exacerbated by historic underinvestment and the climate change emergency. However, the difference between low and high estimates, and their progressive drift out of ONS population ranges we consider to be unacceptable. It seems that the amount of additional water need being forecast is excessive. 52. The WRSE forecast water need figures are based on four drivers, comments on each are as follows: • Population growth: We understand these figures were derived by an independent specialist company. However, models are only as good as the input assumptions. The forecast used is outdated and we disagree with its use. The choice of the 'housing plan' appears to assume an extra 4.5m people in the South East between 2020 and 2050, whereas the Office of National Statistics 2018 estimates an extra 1.9m people over the same period and the lowest estimate is for only an extra 0.4m people living in the area by 2050. The 2021 Census / 2022 ONS projections are for only 4.1 million extra people by 2050 in the whole of England. These differences are further exacerbated in the WRSE plan looking out to 2075. Our view is that it is high time the industry, regulators and government cut through the confusion by publishing models based on the most recent three Office of National Statistics (ONS) projections. It is our reluctant view that a responsible, non-monopoly industry that could not rely on captive customers, would long since have rejected any other figures. • Environmental improvement through abstraction reduction: There should be a focus on ecologically important chalk streams and reducing abstractions to enable those environments to be rehabilitated. However, we understand that the ratio of the marginal cost and utility of the highest of the three environmental options is very poor, and believe bill-payers would expect this to be weighed against the benefit of an equivalent shift in resources to reducing raw sewage discharges in other rivers. We consider that this plan should push back on any narrow focus and maximalist expectations from regulators. We would be interested in working together or convening interested parties to derive evidence-	'branches' on population at the first opportunity, with different demand forecasts considered from this point. Environmental Improvement: The "High" Environmental destination scenario (that adopted in our preferred programme) meets the requirements of the Water Resources Planning Guideline, as it corresponds to the scenarios identified in Appendix 4 of the National Framework for Water Resources and is the primary scenario considered in the WRSE Regional Plan. Our regulator, the Environment Agency, has also advised us that adopting the "High" scenario is the correct approach. As such, we have not used the "High" scenario on the basis of cost-benefit assessment, and have instead done so in order to comply with the requirements of policy and/or guidance. The EA guidance document, "Long-term water resources environmental destination: Guidance for regional groups and water companies", makes clear that the scenarios defined in the National Framework should take precedence and also highlights that use of the National Framework scenarios is to ensure compliance with current/future regulatory requirements (on page 10 of the guidance document it states, "*use the 2050 BAU scenario as the starting point to ensure you comply with current statutory and regulatory requirements in the future*"). Whilst we accept that there is a degree of uncertainty involved in predicting the volume of licence reductions which may be required in the future, we consider that placing most weight on the "High" scenario is the correct approach because it aligns with policy and guidance, and is the advice of our regulators. We note also that our plan is an adaptive plan, and we have considered different scenarios of abstraction reduction (medium and low scenarios) in building our plan. While our preferred programme is designed to meet the "High" scenario, and our programme	

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based recommendations to optimise the health of all rivers. The water companies need to carefully calculate how much water can still be abstracted from rivers, streams and underground sources in locations which are not environmentally sensitive. The draft plan contains unspecified totals for groundwater abstraction and storage; (17 schemes with order of magnitude ranges 0.5 - 5/ 0.5 - 9 Ml/d), making it difficult to assess their potential total impact. These would appear to be schemes which have low impact and high resilience, but which seem scheduled as an afterthought. A 'resilience first' approach would reverse that. The table below [included in the response but not pasted here] shows an indicative pathway, derived by bringing forward low impact, high resilience schemes. • Increasing resilience to severe drought events: The government has a target for a 1:500-year resilience level by 2040. It is accepted that the water company plans must provide for this, but the amount of water needed will be less if individual household water use is reduced and pipe leakage is reduced further from that anticipated by WRSE. Given the acceleration of extreme weather events from climate change (see below), we are extremely concerned about the wisdom of plans that take this length of time to develop resilience. By 2040, global temperatures will be well past 1.5C over preindustrial levels under any feasible emissions pathway. Given the level of extreme weather disturbance including multi-year droughts at the current 1.1C above preindustrial, we urge a complete re-evaluation and reordering of schemes to prioritise those maximising resilience. We find it irrational to contend that a vital component of resilience proposed in these plans is building a reservoir in a seriously water stressed area and hoping reliably to fill it from within that same seriously water-stressed catchment. We fail to understand how such a scheme passes 'best value', never mind 'least regret' calculations when set against increased recycling or transfers from out of area. • Climate change: The escalating and unexpectedly severe impacts of climate change are a key reason to provide a more resilient water supply network. The natural world responds in a non-linear manner to temperature change and the rate of heating is likely to increase in this decade for a number of reasons. We are already seeing 1000+ year events regularly across the world. One of them, the heat dome that affected British Colombia in 2021, would have been a 1 in 150,000-year event before climate change, and will be, globally, a 1 in 10 year event at 2C. The critical resilience test will be dealing with prolonged extreme	appraisal places weight on this scenario, other scenarios have been considered when designing our adaptive plan. Increasing resilience to severe events: We have set out our supply-demand balance and programme appraisal in our plan, and the approaches applied meet the requirements of the Water Resources Planning Guideline. The proposed approach of maximising resilience as soon as possible is not a suitable programme appraisal approach, and would not meet the requirements of guidance. Such an approach would involve scheduling those schemes which can deliver new resources as soon as possible, without giving consideration to costs or environmental impacts. Climate change: Our plan includes forecasts of climate change impact which are produced according to methods described in the Water Resources Planning Guideline, including supplementary guidance. Significant weight should be applied to the guidance, and application of the guidance is supported by our regulators. We incorporate the forecasts of climate change impact on our supplies and demand into the supply-demand balance, which we then ensure is satisfied. We have also included climate change impacts into our calculations of Deployable Output benefit of different options, where appropriate. We do not agree that prioritising new resources in the basis of a qualitative "climate resilience" assessment would be appropriate and instead consider that the approaches that we have applied in determining the costs, benefits and impacts of different new resources are appropriate. We also note that OCC have not set out any specific criticism of the climate change impact assessments that have been undertaken and instead point to general, qualitative concern.	

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events such as a sequence of exceptionally dry winters followed by extreme droughts and hot summers. There is no sign that the draft plan has considered what we believe would be the appropriate prioritisation of climate-resilient schemes (especially recycling, water transfers that include recycling / connection to existing reservoirs, aquifer management, and, to a lesser extent, given its high power demands and environmental impacts, desalination). We see this as a fundamental flaw and regard the de facto 'bet' on reservoirs delivering in the late 2030s/ 2040s as complacent, short-sighted, and backward-looking. 53. The combination of the above leads us to conclude that the draft plan fails adequately to address major, glaring risks for three main reasons: a. The first is the persistent folly of greatly overestimating population growth. b. The second, that of badly underestimating the pace, unpredictability and degree of climate change in the period out to 2040. This leads to prioritisation errors and failure to prepare early enough for extreme weather disturbances. c. The third (related to the second) is prioritising a 'best value' over a 'lowest risk' or 'least regret' way of assessment. We believe that the potential for crystallisation of catastrophic risks strongly militates towards a risk-based methodology. 54. This leads to two serious potential outcomes in future: a. First, that water needs will be greatly over-estimated, and the cost of completely unnecessary infrastructure loaded onto fewer bill-payers. b. Second (and conversely) that there is a potentially catastrophic and difficult-to-quantify risk of unpredictable extreme climate-related disruption to supplies in the next two decades. 55. If realistic water need estimates and risk-averse climate projections are used, there will be (i) less need for a significant amount of additional infrastructure, with all its associated financial costs and environmental costs including carbon	Para 53: As per our statements above, we do not agree with OCC's criticisms of the forecasts included in our plan, nor with the criticisms of the programme appraisal methods and as such do not agree with the conclusions which are reached. The Water Resources Planning Guideline states that we "should produce a best value plan". We note that OCC do not provide specific detail on what their proposed programme appraisal methodologies would involve, aside from the prioritisation of their preferred schemes. We note also that OCC criticise our plan for having over-estimated the amount of water that is required while simultaneously suggesting that new resources are needed as soon as possible. Para 54: As per the points above, we do not agree that we, nor the WRSE region, have over-estimated the supply-demand balance needs. The forecasts have been produced in accordance with national policy and/or guidance to which significant weight should be applied and which is supported by our regulators. Our response to points raised regarding criticism of climate change impact assessment have been detailed earlier in this response. Para 55: As per our statements above, we do not agree with OCC's criticisms of the forecasts included in our plan, nor with the criticisms of the programme appraisal methods and as such do not agree with the conclusions which are reached. Para 56: We agree that uncertainties are present in our planning, and our consideration, as discussed in response to other points raised, is that the methods applied are appropriate and robust.	

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costs, and (ii) a very different build-out schedule, emphasising early delivery of the most resilient sources of water as indicated in the table below. 56. We have some sympathy for the industry in its attempts at prediction at the current juncture. We note that the uncertainties around both population growth and climate change are currently very great: (i) The next set of local plans, which are in development across the region, will factor in the impacts of Brexit, the pandemic, supply chain disruption from the Ukraine war, other geopolitical and climate-related realignments and the last four ONS reports, which have serially decreased estimates of population growth; (ii) The latest climate models suggest a wetter future for the UK and the next generation climate models, added to other advances in predictive and explicative analysis, will reduce the uncertainties around likely weather patterns as well as provide much sharper understanding of the probability and nature of extreme events. However, despite the draft plan being badged as an 'adaptive plan', it does not appear to be adaptive to the changes predicted.		
Policies 57. Oxfordshire County Council sought at the emerging regional plan stage that WRSE adopt principles or policies to prefer low carbon and least environmentally damaging water supply solutions. This draft 'best value' plan does not include such policies, and indeed flies in the face of them. Over the intervening period, our understanding and concern about climate risks has greatly increased. The plan should explicitly prioritise solutions that give maximum resilience to unexpected and unpredictably severe water shortages in the short as well as medium term. Secondary to this, we repeat our preference for policies to use existing or refurbished infrastructure, followed by a preference for infrastructure which is underground, as the environmental effects tend to be limited to construction. Restorative and low-impact schemes should also be prioritised over complex engineering solutions. 58. The consequence of not including these policies is a reliance on individual strategic resource options put forward by water companies, rather than a	Para 57: Our consideration is that the WRSE Best Value Plan methodology gives appropriate consideration to carbon emissions and environmental impacts. Carbon emissions are incorporated into the Net Present Cost calculations which are used by the investment model to identify programmes of options, and environmental assessments have resulted in the calculation of metrics which are used in the programme appraisal. We note also that, as explained in the draft and revised draft plans, exclusion of the SESRO option would result in a plan which is most carbon intensive. Para 57: The suggested programme appraisal approach would not be suitable. Water Resources Planning in the UK involves the calculation of a supply-demand balance, with components of that balance calculated according to national policy and/or guidance. Ensuring supply-demand balance ensures the resilience of supplies in line with guidance.	We have not made changes to our plan as a result of this response, as our consideration is that the WRSE Best Value Plan methodology is robust. Further details are given in our consideration.

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whole-system approach which is adaptive to change. Key points above: • The WRSE draft regional plan water need calculations are too high. All the pathway options should include lower figures and the selected pathway in the plan should be for close to the lower end of the current estimates at 1 billion extra litres per day by the end of the plan period. • The plan fails to factor in the possibility of severe disturbances to weather patterns before 2040 (by which time we would expect global average temperatures to be significantly beyond 1.5C over preindustrial). We are of the opinion that conditions of 'Radical Uncertainty' strongly militate towards a 'resilience first' approach. • The plan should have policies indicating a low carbon approach with a preference for existing or refurbished infrastructure, followed by a preference for infrastructure which is underground. Restorative and low impact schemes should be prioritised over complex engineering solutions.	Para 57: Our plan includes use of our existing supplies. If this criticism is in relation to network infrastructure and leakage levels, our plan includes a significant programme of mains rehabilitation which results in achievement of the 50% by 2050 leakage reduction target. We do not consider that infrastructure being underground is an appropriate prioritisation method, rather a rounded and robust cost, emissions and environmental appraisal method should be employed, and our consideration is that this is what we have done through the WRSE plan at both the draft and revised draft stages. Para 58: Inclusion of strategic resources options in the regional plan is the result of a robust programme appraisal approach. As noted above, our consideration is that the prioritisation approaches set out above are not appropriate for planning purposes. Key points are addressed in response to the more detailed points above.	
59. Figure 1[7] [included in the response but not pasted here] is a diagram dated August 2022 of the strategic water resource options being considered in England. Strategic water resource options are large schemes designed to deal with more than local water needs. Submissions have been made to the Regulators' Alliance for Progressing Infrastructure Development (RAPID)as part of a gated process. The most recent submissions were made in November 2022 at 'gate 2'[8]. Some of these are discussed further in this response below. The gate 2 submissions listed on the RAPID website at the time of writing are:	Para 59: Accurate representation of the Strategic Resources Options	No changes – none requested

[7] Diagram of proposed solutions as at August 2022 https://www.ofwat.gov.uk/regulated-companies/rapid/the-rapid-gated-process/
[8] 12 strategic water resource solution submissions at gate two are available at: https://www.ofwat.gov.uk/regulated-companies/rapid/the-rapid-gated-process/gate-two/

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i. Anglian Water to Affinity Water Transfer (A2AT) ii. Fenland Reservoir iii. Grand Union Canal Strategic Transfer (GUC) iv. London Water Recycling v. Minworth Water Recycling vi. Severn to Thames Transfer (STT) vii. Severn Trent Sources (STS) viii. South East Strategic Reservoir Option (SESRO) ix. South Lincolnshire Reservoir x. Thames to Affinity Regional Transfer (T2AT) xi. Thames Water to Southern Water Transfer (T2ST) xii. North West Transfer xiii. Poole effluent recycling and transfers (not available at the time of writing) xiv. Cheddar Two Reservoir (not available at the time of writing)		
The South East Strategic Reservoir Option (SESRO) **Size** 60. Figure 2 [included in response but not reproduced here] is an indicative masterplan for the South East Strategic Reservoir Option (SESRO) taken from the gate 2 main report lodged with the Regulators Alliance for Progressing Infrastructure Development (RAPID) on 14th November 2022. The indicative masterplan is for a bunded reservoir capable of holding 150 million cubic metres (Mm3) of water. It would be located, as shown on the figure, between East Hanney, Steventon, Drayton, Marcham and Abingdon and cover an area	Para 60-62: Correct identification of SESRO and inclusion within Gated documents and regional plans Para 63: Correct identification of correlation between reservoir capacity and land requirement. We agree that SESRO is the largest reservoir currently being proposed, but it would not be the largest reservoir in the UK.	No changes have been made to the plan as a result of this response as no specific changes are requested here, aside from criticism of supply-demand balance forecasts which have been responded to in response to more detailed points raised.

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of almost 7 km2. 61. The draft WRSE plan sets out proposals for a SESRO in each of three alternative defined 'pathways' at a size to hold 100 Mm3 of water. This size is less than that in the emerging plan consultation earlier in 2022, and the size on which the gate 2 reports to RAPID were prepared in respect of, where 150 Mm3 was referred to. 62. The possibility of some reduced effects from the reduction in size is welcome. There is a conceptual design drawing of the 100 Mm3 option contained as A.3 in Appendix 3 of the gate 2 SESRO concept design report. In that conceptual design the reservoir covers less land than the 150 Mm3 option. Significantly less land is indicated in the conceptual design for a 75 Mm3 option, contained in the same appendix. 63. At 100 Mm3 this remains the largest reservoir being proposed anywhere in the country and the scale is of concern. These concerns are not new as 100 Mm3 was the size proposed at the time of the public inquiry in 2010. The next largest reservoir proposals are The Fens and South Lincolnshire proposed reservoirs in the Water Resources East (WRE) area, discussed later in this response, which are both identified for 55 Mm3. The other five new reservoir proposals in the WRSE area are comparatively small. While the 100 Mm3 option is clearly better than the 150 Mm3 option, we consider that the 100 Mm3 option remains as an overly large size, covering too much land close to East Hanney and Steventon, and continue to question whether, were more realistic and evidence-based input assumptions used, there would be any need for a reservoir at all.	Para 63: We have responded to OCC's criticisms of the supply-demand balance forecasts as individual points are raised and do not repeat our response here.	
Effectiveness 64. The 100 Mm3 reservoir would be designed to provide for up to 185 Ml/d of water into the network, partly via pipeline and partly via return to the River Thames and subsequent abstraction. (The option of a 150 Mm3 reservoir has been referred to as providing for up to 270 Ml/d of water.) 65. Reservoirs such as this fill in the winter and are used in the summer. This	Para 64: We agree with the representation of the reservoir and how it would provide supplies to the South East. We do not agree that the reservoir would not provide a drought resilient source of water. The benefit of the reservoir has been calculated according to robust methods, including the use of stochastic weather datasets and climate change projections.	No changes have been made in response to this comment, for the reasons set out in our consideration.

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reservoir will not be able to be filled during periods of prolonged drought which continue through a winter. At times the reservoir could be rapidly emptied. The SESRO is therefore unlikely to be able to reliably provide a source of water and be an effective option in terms of resilience to future drought.	These calculations include consideration of the water available for abstraction. We note also that the primary metric of concern should be the benefit that the reservoir brings to our supplies. The reservoir provides a strong level of resilience to c.18 month drought events, which our existing supply system is currently vulnerable to.	
Time to construct 66. We are extremely concerned that the opportunity cost of the water companies making an early choice for this massively destructive prestige project, is that risks to water supplies remain at unnecessarily high levels throughout its development, as it 'crowds out' multiple smaller, and / or much more resilient, more diverse, more rapidly deliverable schemes. This can be clearly seen in the consultation document schedules, where highly resilient, low environmental impact recycling, natural enhancement and transfer schemes are delayed or scheduled almost at random. We note a global trend towards unexpectedly severe events, sometimes over multiple years. We note the expected acceleration in global temperature rises through this decade and the 'Radical Uncertainty' associated with the departure of our Earth system from any conditions in recorded (or even unrecorded) human history. 67. A Development Consent Order (DCO) needs to be sought through the National Strategic Infrastructure Project (NSIP) process and, should consent be granted, construction will then commence. The SESRO project delivery plan[9] anticipates baseline survey work and EIA scoping in 2023 leading to a DCO being awarded in 2028, construction commencing on site in 2029 and continuing to around 2037 with the project completed and commissioned by 2038. 68. Given the complexity of the consent process, the need to purchase land, likely opposition to the proposal, and the lengthy construction timeline, the SESRO	Para 66: We have established a supply-demand balance prior to identifying the preferred plan options. The options in the WRSE plan ensure supply-demand balance across the region and as such we do not agree that risks to supplies are at unacceptably high levels during the reservoir construction period. We do not agree that the reservoir crowds out alternative options, and has instead been identified as the preferred option within the best value plan, being appraised alongside alternatives. Para 67 and 68: We agree that a DCO would be sought, and that the proposed SESRO scheme would be an NSIP. The Gate 2 documentation sets out the proposed schedule for SESRO's development. The programme timelines identified in through the Gated process have been robustly determined. We do not agree that time and resources have been inappropriately directed to consideration of this project over others – the RAPID Gated process has, as OCC have pointed out, resulted in the detailed consideration of many supply solutions, including alternatives to SESRO, and investigation of several options will continue in case options within our preferred plan are denied consent.	We have not made changes to our plan as a result of this response, for the reasons set out in our consideration.

[9] see F-1 Project Delivery Plan for SESRO https://affinitywater.uk.engagementhq.com/strategic-resource-options

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does not offer an early solution to water supply issues. Indeed, the water companies will likely have their time and financial resources inappropriately directed to this project when other options could more quickly and sustainably meet the need for future water supply.		
Completion date 69. The WRSE draft plan requires the SESRO to be built ready to provide water from 2040. Given the consent process and construction time, this means that a very early decision must be taken to proceed with this massive project, and therefore the plan is not adaptive or responsive to change on this point. 70. The 2040 completion date also means that the SESRO will have a higher carbon footprint than if it was constructed at a later date, because the national electricity network has not yet been decarbonised, and construction vehicles will still be petrol or diesel powered.	The date by which SESRO is needed "on line" is correctly identified. We do not agree that the plan is not adaptive – we have considered different pathways of supply-demand balance in the development of our plan. The reservoir would be able to provide water to different parts of the region as needs arise and so would be an adaptable base for the region's supplies. While we agree that ongoing decarbonisation is likely to occur, our supply-demand balance indicates that the reservoir is the best value option for construction by 2040 and as such it is included. We note that the alternative schemes which OCC propose involve significant emissions which would be higher if constructed in the near-term. Through the SRO process, opportunities for decarbonisation are being sought, as highlighted in the Gate 2 report.	No changes have been made to the plan, for the reasons set out in this response.
Environmental Effects 71. The SESRO is located in an area adjoining two settlements (East Hanney and Steventon), and in close proximity to other settlements (e.g. Drayton, Marcham and Abingdon) and therefore will impact on many more people than more rural reservoirs. 72. Oxfordshire County Council has formed some views on the SESRO over the several years that it has been proposed. In addition to concerns about the carbon footprint, including the embodied carbon of construction materials and activities, environmental concerns include:	Our consideration is that appropriate environmental assessments have been undertaken for SESRO's inclusion in the WRSE Regional Plan and Thames Water's WRMP. We recognise that further environmental assessments will be required as the development and consenting of the scheme is progressed, but we have no reason to consider that a safe, effective reservoir, which would comply with environmental requirements, could not be built on this site.	No changes made to the plan in response to this comment – the environmental assessments carried out are appropriate for the WRMP planning stage.

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• Significant disruption in the area due to construction effects over a long period. • Impacts on the landscape e.g. as a result of bunds of 15 to 25m above ground. • Impacts on the amenity of those living nearby. • Impacts from traffic including congestion and air quality issues. • The need for active travel and public right of way connections. • Whether it is possible to create and use a railway siding to reduce road impacts. • How the Hanney Road / Steventon Road will be diverted. • What the proposal means for flood risk in the area. • Water quality including potential for algae growth. • Impacts on archaeology. • Impacts on biodiversity, including protected species. • The level of biodiversity net gain to be provided for. • How recreational benefits would be secured. • How the Wilts & Bucks canal might be restored. • The potential to replace existing solar farms on the land. 73. These environmental effects mean that obtaining a Development Consent Order for the SESRO through the NSIP process run by the Planning Inspectorate should be difficult to achieve.		
Cost to construct 74. The huge cost of the SESRO and the related pipelines (some £2 billion) is disproportionate to other lower cost options. The opportunity cost in failure of resilience both during and following construction is also high. 75. The SESRO cost report indicates that the SESRO would cost approx. £1,244m to construct[10]. Transfer pipelines to Affinity Water and Southern Water would	Para 74: The SESRO 150 Mm^3 option is identified as part of the "least cost" and "best value" plans in our rdWRMP and the revised Regional Plan. The "least cost" plan identifies the "lowest cost" (calculated incorporating discounting of future costs and incorporating externality costs associated with carbon emissions) way of ensuring supply-demand balance across the WRSE region throughout the planning period and as such we do not agree with the point raised with respect to the "opportunity cost in failure of resilience". While the capital	No changes are made to the plan following this response as our programme appraisal in the dWRMP and rdWRMP demonstrates that SESRO is a cost-effective way of meeting the region's water supply needs.

[10] Base capital cost in Table 2.1 of SESRO cost report https://www.thameswater.co.uk/media-library/home/about-us/regulation/regional-water-resources/south-east-strategic-reservoir/gate-2-reports/A-2---SESRO-Cost-Report.pdf

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cost an additional £368m to £455m[11] and £340m to £590m[12] respectively.	expenditure requirements of alternatives may be lower, alternative options have lower supply capability benefits and higher operating costs; the low operating costs of the reservoir and large supply benefit of the source, alongside the significant requirement for new resources mean that SESRO is a cost-effective scheme for the region. The base capital costs for the different options are correctly identified, though we note that, in addition to base costs, we include allowances for "costed risk" and "optimism bias" within our cost estimates for options.	
Ongoing operation costs 76. Although the SESRO is reported by the water companies as having lower running costs than some other options, it will have ongoing operation costs such as for pumping water and maintaining the facilities. A full examination of the ongoing operation costs is likely to show that the SESRO is not a good option compared to many other options. It is not clear, for example, that the ongoing costs of maintaining facilities at the reservoir have been fully accounted for. Conversely, it may be that the ongoing operation costs of some of the other options have been over-inflated, for example the Severn-Trent Transfer (STT) may have lower ongoing costs than estimated due to the likely usage being less than accounted for.	The operating costs for all options have been robustly identified and quantified. These are in the form of "fixed operational costs" (e.g., maintaining assets) and "variable operational costs" (e.g., pumping requirements), as well as "replacement" capital costs according to asset lives. OCC have not raised any specific items of operational cost which have been incorrectly considered within our cost appraisal, and do not give any reason for it being "likely" that operational cost estimates have been underestimated for the reservoir while operational costs may have been "over-inflated" for other options. We are concerned with the lack of an even-handed consideration given to different options by OCC in this regard.	No changes have been made to our plan in response to this comment. Our consideration is that robust costing methodologies have been applied, which are laid out in Section 7 of the TW WRMP and in the Gated process documentation.

[11] Cost in Table 3.1 of A2a-T2AT cost report https://www.thameswater.co.uk/media-library/home/about-us/regulation/regional-water-resources/water-transfer-from-thames-water-to-affinity-water/gate-2-reports/A2a--T2AT-Cost-Report-LTR.pdf
[12] Cost in Table 2.1 and 2.2 of T2ST cost report https://www.thameswater.co.uk/media-library/home/about-us/regulation/regional-water-resources/water-transfer-from-thames-water-to-southern-water/gate-2-reports/T2ST-Gate-2-Annex-A4---Costs-and-Carbon-Report.pdf

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Lack of clarity on how the water will be shared and effects of related pipelines 77. The SESRO is a joint proposal from Thames Water and Affinity Water. Operating decisions on how the water would be shared are not clear. 78. The SESRO proposal involves a pipeline for some 3km from and to the River Thames at Culham from where the water will be abstracted at times of high flow and returned at other times to be re-abstracted closer to London for Thames Water customers there. 79. The proposal has in the last few years, also been identified to serve Affinity Water customers in London, with a pipeline further east on the River Thames. This transfer is known as the Thames to Affinity Transfer (T2AT) and is anticipated to provide for up to 100Ml/d. The gate 2 documents submitted in November 2022 indicate that the likely location of a pipeline between the River Thames and the Affinity Water area dependent on SESRO, would be from a location near Slough, travelling then 14km north to the Harefield area. 80. More recently, a proposal has been developed to transfer water south in a pipeline starting at the pumping station for the reservoir i.e. near Drayton on the west side of the A34. A new water treatment works would also be located here to treat the water prior to transfer. This transfer is known as the Thames to Southern Water Transfer (T2ST) and is anticipated to provide the Southampton area with up to 120 Ml/d. However, such a transfer would not normally be required, instead the pipeline would normally only be operated at a minimum flow[13]. This 50-mile carbon intensive construction, designed only for occasional use running from the centre of England to a sea port begs the question of how it can possibly be seen as preferable to local desalination and further water recycling schemes being developed close to where the water is needed. Oxfordshire County Council would also have local concerns given construction effects, not least as we understand the pipeline would route	Para 77: The Thames Water WRMP (draft and revised draft) transparently demonstrates in Section 11 how water from SESRO would be used across the WRSE region. Para 78-81: The Thames to Affinity Transfer and Thames to Southern Transfer are correctly identified. All options are subject to robust environmental and engineering feasibility assessments prior to inclusion in the WRSE regional plan. Para 80: Southern Water has considered desalination plants in the development of its plan and thus these have been considered within the development of the regional plan. We note that some of Southern Water's proposed desalination plants have been found to be environmentally unacceptable, and so have been withdrawn from consideration. Para 82: In our draft and revised draft WRMPs, usage of SESRO to provide water for the SWOX (Swindon and Oxfordshie) WRZ is included. Para 83: Rather than "competing" for water, the SESRO resource would be a regional asset which would be shared. The WRSE programme appraisal approach identifies the best combination of options for the region. We have responded to the key points as they have been raised in more detail.	No changes made to the plan as a result of this point – the Thames to Southern transfer and Thames to Affinity transfer have been considered appropriately within the regional plan, and have been subject to robust cost, carbon and environmental assessments, as documented in the Gated process documentation. Changes made, or the reasons why no changes have been made, in response to the more detailed points as they have been made.

[13] See Section 4 scheme operation of T2ST https://www.southernwater.co.uk/media/7734/t2st-gate-2-annex-a3-concept-design-report.pdf

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through an Area of Outstanding Natural Beauty. 81. Thames Water has also identified potential spur connections from T2ST to provide support to areas around Newbury, Reading and Basingstoke and although these are not included in the WRSE draft regional plan, it is understood that potential will be kept under review[14]. 82. There is a possibility that some of the water from the reservoir might be used in Oxfordshire, if there is additional infrastructure to enable that. 83. 83.Thames Water, Affinity Water and Southern Water customers might be seen as competing for the water. It is clearly not possible to have a transfer of 100Ml/day to Affinity Water, 120Ml/day to Southern Water and some 100Ml/day returned to the river for Thames Water customers in London all at the same time, sourced by the SESRO, given the suggested capacity is 185Ml/day. Even if the figures are interpreted to understand that there might be differing amounts of water transferred depending on which company has more need at a particular time, there would remain an issue of competing demands particularly in times where drought affects more than one area. 84. Other options can be progressed to provide water elsewhere. These are discussed below in this response. Key points above: • While the 100 Mm3 size is better than the previously suggested 150 Mm3 • size, it is still much bigger than other reservoirs and too large in this location. • The SESRO effectiveness is queried, given that in times of drought it will be difficult to fill and rapidly emptied. • The lengthy construction timeline means that the SESRO does not offer an early solution to water supply issues. It's pre-selection crowds out early prioritisation of more resilient, lower risk options.		

[14] Paragraph 3.4.1 of T2ST https://www.southernwater.co.uk/media/7734/t2st-gate-2-annex-a3-concept-design-report.pdf

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
• Building the SESRO before other options means the plan is not adaptive or responsive on this point, and it will have a higher carbon footprint than if it was built later. • The SESRO will have significant and potentially unacceptable environmental effects. • The build cost of the SESRO and associated infrastructure is high. • The SESRO will have ongoing operation costs, which appear not to have been factored in correctly or accurately compared with other options. • The SESRO is designed to enable transfers of water to other areas in the South East, but it may be that those areas have other better options to utilise. • Given the concerns, the SESRO should be removed from the WRSE regional plan and the company plans, and not pursued as a strategic resource option.		
Options that don't involve new infrastructure **Reducing leakage** 85. WRSE is aiming to reduce leakage by 51% between 2017 and 2050 in accordance with the 50% reduction expected by the National Framework for Water Resources 2020[15]. Significant water savings will be achieved from this. However, there remains scope to reduce leakage faster and by more. 86. The information provided in the WRSE draft regional plan[16] indicates that the leakage rate for Thames Water will still be high in 2050. With five companies in the South East, the anticipated leakage reduction between 2017 and 2050 leads to rates of between 32 and 42 litres per property per day, but for Thames Water it still leaves a rate of 66 litres. If Thames Water were to achieve a lower rate there would be a quantifiable reduction in the need for new strategic water resource options. We understand that the Group Against Reservoir Development (GARD) has prepared calculations of the possible water savings, and they should be considered for inclusion in a revised	Para 85 and 86: Our plan meets the Environmental Improvement Plan targets with respect to leakage reduction, including the 50% by 2050 target. We do not agree that accelerating or undertaking further leakage reduction would present best value to our customers, as to do so would be much more expensive than the alternatives. We have responded to the GARD representation in detail and do not repeat our response to their leakage reduction proposals here.	We have not made changes to our plan following this response, as our dWRMP and rdWRMP meet government targets for leakage reduction. Further or faster leakage reduction would not be cost effective or present best value to customers.

[15] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/872759/National_Framework_for_water_resources_main_report.pdf
[16] See page 26 of WRSE draft regional plan https://wrse.uk.engagementhq.com/our-draft-best-value-regional-plan

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
regional plan.		
Reducing demand 87. The National Framework for Water Resources 2020 requires the regional water resource groups to contribute to a national ambition on average per capita consumption of 110 litres per person per day (l/p/d). The WRSE draft regional plan has an overall target of 115 l/p/d at 2050. The targets of the six companies are as follows: Affinity Water 113 l/p/d, Portsmouth Water 109 l/p/d, SES Water 106 l/p/d, South East Water 107 l/p/d, Southern Water 106 l/p/d, Thames Water 121 l/p/d. If Thames Water were to do more to help customers reduce their water use to achieve around 110 l/p/d there would be a quantifiable reduction in the need for new strategic water resource options and GARD has also prepared calculations of this. The other regions in England have addressed this matter in their draft regional plans as follows: West – assumes that the 110 l/p/d target will be met; East – assumes that government policy support will help reduce household per capita consumption to 110 l/p/d; North – indicates they are set to achieve the 110 l/p/d target; West Country – assumes that the 110 l/p/d target will be met. The WRSE regional plan should be based on achieving an average per capita household consumption of 110 l/p/d soon. 88. In September 2022, Ofwat published a review of the water companies' environmental incentives to support more water efficient new homes. The review indicates that much more can be done by companies[17]. Reducing the average household use of water by a substantial amount quickly can be achieved through a combination of factors; our comments on some factors are below:	The fact that our dWRMP did not include a PCC of 110 l/h/d is not due to the fact that we do not support measures to reduce demand, but rather because we were not confident that this target could be achieved. As such, our consideration was that, in order to ensure a resilient water supply, we should make evidence-based assumptions on future PCC levels which could be reached. Since our draft plan, the Water Resources Planning Guideline has been updated to state that the 110 l/h/d PCC target is to be set at the company level. Our rdWRMP24 preferred programme includes achieving this target. A key factor in hitting the 110 l/h/d target is government action. In our draft plan, when the 110 l/h/d target was not referenced in the Water Resources Planning Guideline, we made a set of assumptions around the interventions that government would make. With the introduction of EIP targets and inclusion of the 110 l/h/d target in the Guideline, we have changed these assumptions to assume that the government will take more action more quickly. We consider that there is risk around this, which is discussed in the main Statement of Response document. We are fully in support of government efforts to reduce household water consumption, including water labelling, minimum standard on white goods and changes to buildings regulations and will continue to promote these to government.	The demand management programme and assumptions around government-led intervention within our preferred programme in the rdWRMP24 result in achievement of the 110 l/h/d target, in order to comply with the WRPG revisions and EIP targets.

[17] Ofwat review of environmental incentives to support more water efficient new homes https://www.ofwat.gov.uk/wp-content/uploads/2022/09/Environmental_incentives.pdf

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
• Products that use less water: The government has recently carried out a consultation aimed at mandatory water labelling[18]. There is scope for water companies to do more, for example by providing information about and supporting the use of the most water efficient taps, showers, toilets, dishwashers and washing machines. • Regulation to ensure that new homes and retrofits are built with the most water efficient appliances: There is scope for water companies to do more to lobby government to bring about measures such as tighter water efficiency requirements in building regulations. • Innovative garden towns and other strategic developments: There is scope for water companies to support more innovation, for example with developments having a circular water strategy with water being cleaned, recycled and reused within the development. • "Net-Zero water" developments and water storage: There is scope for water companies and local authorities to work together on planning requirements for storage in or around new homes and to retrofit existing dwellings. They can also help supply containers for storing rainwater for use in public parks as well as individual gardens. • Education and information: People can hange propensities to lengthy showers, deep baths, half-empty washing machines etc through the receipt of good information detailing ways in which to save water. There is scope for water companies to undertake public information campaigns and support the take up of smart water meters to identify levels of water use. • Tariffs: Charges structured to penalise those who use excessive amounts of water could help to reduce such demands. There is scope for water companies to investigate the potential for such structured tariffs and for collaboration with local authorities and MPs to lobby the government for changes in legislation required. 89. .Oxfordshire County Council is willing to play its part in helping encourage a reduction in water use and would be prepared to explore opportunities to work	Water efficiency through information provision is included in our plan, as are tariffs to discourage excessive use of water.	

[18] Government consultation on mandatory water efficiency labelling, closed 25 Nov 2022 https://www.gov.uk/government/consultations/uk-mandatory-water-efficiency-labelling

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
with local authorities and the water companies. We know that Thames Water runs an exemplary scheme to persuade developers to reduce water demand, improve onsite storage and even aim for water neutrality by contributing to retrofit of existing dwellings and is also rolling out compulsory smart meters with commendable rapidity, and taking an innovative and aggressive approach to tracing and fixing leaks. We believe that a committed partnership approach across the entire region would be effective in reducing demand for water, improving the robustness of the projections used in this process.		
Temporary Use Bans 90. It can be appropriate to constrain water use at certain times, reflective of the need for behaviour change during extraordinary events. Temporary use bans, or 'hosepipe bans' can be largely accepted by the public during drought. Key points above: • The WRSE regional plan should require Thames Water to reduce leakage further and faster and amend its targets accordingly. • The WRSE regional plan should be based on achieving 110 l/p/d on average by 2050 rather than 115 l/p/d. Additional work should be done to ensure that can be achieved, particularly in the Thames Water area.	Our plan includes the implementation of Temporary Use Bans in line with our existing levels of service. We have response to the key points in the point above.	No changes – our plan includes temporary use bans
91. The WRSE draft plan requires a scheme to transfer water from the West region to the South East via the Grand Union Canal. Oxfordshire County Council strongly advocated for further consideration of this option in our response to the emerging regional plan. We are pleased that the proposed Grand Union Canal transfer has been given greater priority and an earlier start date in this draft regional plan than in the emerging regional plan where it was provided for only post-2040 and only in the high pathway. 92. The GUC scheme now involves transferring water from Minworth wastewater treatment works in the West via the Coventry Canal, Oxford Canal and Grand Union Canal to Affinity Water in the South East, supplying Affinity Water customers with up to 50Ml/d by 2031 and a further 50Ml/day by 2040 to 2050	The Revised WRSE Regional Plan includes the selection of a 100 Ml/d non-phased GUC scheme. The GUC scheme is for the benefit of Affinity Water and so we have not considered this point in detail, though it appears to correctly identify the GUC scheme. Please see the Affinity Water rdWRMP and regional plan for programme appraisal decisions made regarding the GUC. We note that Affinity Water's supply-demand balance calculations suggest that supplies are required from both the GUC and SESRO, it is not an either-or.	We have not made changes to the TW WRMP following this response, as it concerns the GUC scheme, which is an Affinity Water option. The WRSE regional plan and Affinity water WRMP include selection of a 100 Ml/d GUC, for the reasons set out in those plans.

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
as shown on Figure 3 [included in OCC's response, but not re-pasted here]. 93. The detailed information available on the strategic resource option indicates that that if demand management targets are met across the South East region, the Grand Union Canal transfer is required in a phased approach. If they are not met, the full proposal providing for 100Ml/day is likely to be required in a single phase[19]. The same information also indicates that the phased scheme would have a construction timeline of four years for the first phase and two years for the second phase, making it a relatively quick win. The proposal is said to be on schedule to go through the Development Consent Order (DCO) process and be construction ready by 2027 therefore enabling water transfer by 2031. 94. Elements of the Grand Union Canal would be upgraded as part of this, for example increasing canal bank and towpath levels at certain locations, and there would be new pipeline connections at either end. 95. The GUC option sensibly uses an existing canal resource to get water from the Midlands to London. It is understood that the option is supported by the Canal & River Trust and there would be benefits from upgraded facilities, flood alleviation, habitat creation etc. 96. The proposed location for new abstraction and treatment facilities at the southern end is in Leighton Buzzard in Hertfordshire. 97. Severn Trent Water and Affinity Water are jointly promoting this water supply option. The route does not go through Oxfordshire. It enables Affinity Water to have a different new source of water than that from a pipeline from the River Thames i.e. the Thames to Affinity Transfer. 98. Given that the source of the water is to be treated wastewater from the		

[19] Scheme layout from November 2022 Gate Two GUC submission https://www.severntrent.com/content/dam/sros-gate-2-documents/guc/GUC-Gate-Two-Submission111122-Redacted.pdf

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
Minworth Waste Water Treatment Works, it is an option which is resilient to drought because wastewater is produced and fed into the Works under all conditions. 99. Oxfordshire County Council supports the GUC proposal. **Key points above:** • The GUC proposal is supported as it brings new water into the South East, utilises existing canal infrastructure, can be constructed quickly, is resilient to drought, and is an alternative for Affinity Water to sourcing water from the River Thames via SESRO. The early timeline is also supported.		
100. Two reservoir proposals in Lincolnshire and Fenland have progressed significantly since the emerging Water Resources East (WRE) regional plan consultation early in 2022. The individual proposals have been subject to consultations to 21st December 2022 which include the concept plans shown in Figure 4. 101. Both new reservoirs are identified as having the capability to hold 55 Mm3 of water and the sites are in rural areas. The proposed Lincolnshire reservoir location is south-east of Sleaford in North Kesteven District, the water surface area to be some 5 km2, and the deployable output some 166 Ml/day. The proposed Fens reservoir location is north of Chatteris in Fenland District, with a water surface area also of some 5 km2, but a deployable output of some 87 Ml/day. 102. Both reservoirs are expected in the WRE draft regional plan to be in supply by 2040. A Development Consent Order (DCO) application is expected to be made in 2025 to enable this timeframe. 103. Oxfordshire County Council asked at the emerging WRE plan stage that there be a pipeline from Eastern England to Affinity Water in the South East in recognition of these new reservoirs, in particular the ability to transfer water from the Grafham Water reservoir once the new South Lincolnshire reservoir is constructed. Such a pipeline, transferring between 50 Ml/d and 150 Ml/d of potable water is reflected in the strategic resource option known as the Anglian	This response is of relevance for Affinity Water, Anglian Water and WRSE, rather than Thames Water. We note, however, than in our consideration the representation of the A2AT scheme is correct, i.e., that the scheme has been withdrawn from consideration in the WRSE plan as supplies are needed in the WRE region. As such, it is not that the A2AT has been withdrawn on the basis that SESRO is preferred and is instead on the basis that the water is needed in the WRE region.	We have not made changes to the WRMP as a result of this response, for the reasons set out in our consideration.

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
to Affinity Transfer (A2AT) referred to in Figure 1 of this response. However, the gate 2 submission from Anglian Water made public in November 2022[20] makes it clear that they do not want to proceed with the option to transfer water to Affinity Water's London area. Instead, they want to keep the water in the Water Resources East region. It is therefore the intention that Affinity Water will cease to be a partner, and a pipeline proposal be developed for gate 3 only as far south as Grafham Water in Cambridgeshire. This proposal is reflected in the WRSE and WRE draft regional plans as well as the draft company WRMP24s. 104. However, such a pipeline would give Affinity Water another potential source of water and reduce the reliance on the schemes delivering water from the Water Resources West region and/or the SESRO. The A2AT gate 2 submission report acknowledges that a pipeline to Affinity Water would enhance the connectivity and resilience of Affinity Water's overall supply network. Two route options were considered for gate 2, a western and an eastern route, with the western, which links with Grafham Water, appearing to be favoured. Figure 5 shows the two route options.		
105. The recommendation for a shorter pipeline between Peterborough and Grafham Water is estimated to cost some £276m. The full pipeline proposal had a cost estimate of some £317m to £532m and the work done to gate two indicates that the pipeline to Affinity Water's reservoir hub near Thaxted in Essex is a feasible option. It appears that cost and technical feasibility have not been the reasons for the recommendation not to proceed with the full length of the pipeline. Instead, it appears that the water companies and regional bodies have decided in favour of the SESRO and STT to help with Affinity Water's requirements rather than the A2AT. (In all cases Affinity Water also requires the GUC transfer of water.) For the reasons set out in other parts of this response, Oxfordshire County Council does not agree with the proposal to progress the SESRO. The A2AT could be part of a solution to avoid the need for the SESRO as some of Affinity Water's needs could be met		

[20] 27 See A2AT Gate 2 Submission Report final https://affinitywater.uk.engagementhq.com/strategicresource-options

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
from this source. The A2AT pipeline evaluations should be completed as the pipeline might be needed, if not in the short term, then longer term as part of an adaptive plan. The regional and company plans should be amended to provide for the possible need for the A2AT north-south transfer all the way to the Affinity Water hub. Key points above: • Evaluations of pipeline route options north-south from the Water Resources East area to the Water Resources South East area should be completed so that, if needed, this can be progressed enabling a transfer of water between Anglian Water and Affinity Water (A2AT), to supply water from around 2040.		
Severn to Thames Transfer (STT) 106. The WRSE draft regional plan requires a Severn to Thames Transfer (STT), which is a proposal to transfer water from the River Severn in the Water Resources West region to the River Thames in the Water Resources South East region, as shown on Figure 6 [included in response but not re-pasted here]. By 2050 this is envisaged to provide 160 Ml/d, utilising water available in the River Severn and water from a new water recycling scheme at Netheridge. By 2060 a further 130 Ml/d is envisaged, using further water sources including the Minworth water recycling scheme and enhancements to Lake Vyrnwy in Wales. (Lake Vyrnwy is a reservoir in Wales which is functionally part of the supply system for England and the abstraction is licenced to United Utilities.) 107. There are two sub-options for the route of STT: a new pipeline (from Deerhurst in Gloucestershire to Culham in Oxfordshire which could provide for up to 500 Ml/d); or to reinstate parts of the Cotswold Canals and augment that with pipelines (from Gloucester Dock to Culham which could provide for up to 300 Ml/d). The draft regional plan indicates that it is the 500 Ml/d pipeline Deerhurst to Culham which is preferred. The total of 160 Ml/d by 2050 and 130 Ml/d by 2060 is 290 Ml/d - the 500 Ml/d pipeline is stated in the November 2022 RAPID gate 2 main report as enabling only a deployable output of up to 354 Ml/d on average.	The Severn Thames Transfer was included in the WRSE regional plan and the Thames Water WRMP, as identified by OCC. In our rdWRMP, the assumed achievement of the 110 l/h/d PCC target means that the STT scheme would no longer be required. We will, however, continue to develop the scheme, either as a scheme which could be developed should the need arise or as an alternative should the DCO for SESRO not be successful. STT is noted by TW as a higher carbon option not on the basis of pumping requirements, as decarbonisation of the grid is incorporated into our programme appraisal. There are other ongoing operational carbon requirements involved in the STT. We note also that the STT involves significant carbon emissions due to the required construction and operation of several assets. In the case of an STT supported by Vyrnwy, the carbon emissions associated with STT include the construction and operation of the pipeline and treatment works, the construction of a large bypass to ensure that the River Vyrnwy is not adversely affected by releases, and the construction of replacement water resources required by United Utilities	We have not made changes to the carbon emissions assessment as a result of this response, as the emissions calculations have been conducted on an even-handed basis using robust estimates and incorporating the decarbonisation of the grid. However, as noted, the assumed achievement of the 110 l/h/d PCC target means that the STT scheme would no longer be required. We will, however, continue to develop the scheme, either as a scheme which could be developed should the need arise or as an alternative should the DCO for SESRO not be successful.

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
108. The transfer is being jointly promoted by Thames Water, Severn Trent Water and United Utilities. 109. The STT pipeline proposal includes water treatment works at the intake locations to mitigate potential impacts on water quality or from invasive species on the River Thames. A discharge outfall structure would need to be constructed within the banks of the River Thames at Culham. 110. The emerging regional plan for the South East early in 2022 indicated a need for STT post-2040 in the two higher pathways, with the highest pathway involving a greater transfer of water. The draft regional plan requirements for STT at 2050 and 2060 are later than earlier thought, and it is still only anticipated in the two higher pathways, not in the lowest of the three. 111. The draft WRSE plan favours SESRO being built before STT because the STT is seen as being a 'more expensive and carbon intensive option'[21]. It is noted that 'if SESRO is not developed, the Severn Thames Transfer would be required by 2040, along with other additional schemes.' 112. Provision is being made for the possibility of STT being provided by 2040. The November 2022 RAPID gate 2 main report for STT indicates that STT could be construction ready by 2028 and completed in 2033 if needed. This meets our 'resilience first' preference. The pipeline would be a Nationally Significant Infrastructure Project (NSIP) and therefore a Development Consent Order (DCO) would be sought. 113. The cost estimate for STT is £1,270m. This is a similar cost to the SESRO cost of £1,244m. 114. It is understood that the STT pipeline is considered to be more carbon intensive than SESRO due to its ongoing pumping costs; however, electric pumping will benefit from a decarbonised grid in future, and will mostly occur in	(Vyrnwy being used as a source of supply for their existing customers). We have incorporated utilisation assumptions into the carbon assessment and appraisal. We recognise that canal restoration could bring wider benefits, however, the Cotswolds Canal option is not the preferred solution for providing an STT on two grounds, as set out in the Gate 2 documentation: • The size of the canal option is limited to 300 Ml/d • The canal option is significantly more costly than a pipeline alternative As noted above, we do not agree with the proposed "resilience first" methodology, as the methodology is not fully defined and appears to involve prioritisation of preferred schemes rather than a robust appraisal. The methodology does not include consideration of cost or carbon impacts, and is not based on meeting supply-demand balance, as is as such unsuitable.	

[21] See page 10 and page 28 of the WRSE plan https://wrse.uk.engagementhq.com/our-draft-best-value-regional-plan

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
summer, when solar power will be plentiful and cheap. By contrast, most of the SESRO pumping will be in winter, when demand is higher and electricity both higher carbon and more expensive. 115. It is queried whether the ongoing operation costs are higher for STT than SESRO, considering all matters such as ongoing management and maintenance. The operational costs of STT are likely to be lower than estimated in the water company reports as those costs are based on it being operated 'flat out' for long periods, whereas such levels of pumping are unlikely to be needed. 116. Oxfordshire County Council noted in our response to the emerging WRSE regional plan early in 2022 that there are some environmental concerns with the STT. A key concern relates to the effects of construction over such a long distance, and by comparison the Cotswolds Canals option appears better given that there would be less pipeline construction and this option would use and enhance existing infrastructure. However, either sub-option would better meet policies about bringing in water to the South East and preferring underground infrastructure compared to a complex bunded reservoir such as SESRO. 117. The WRSE draft regional plan eventually requires both SESRO and STT but requires that the SESRO is built first. Oxfordshire County Council considers that STT should be pursued first for a range of reasons including that of 'resilience first'. As noted in other parts of this response, the SESRO should not be needed at all. Key points above: • The WRSE regional plan should bring forward the STT earlier than indicated in this draft plan.		
118. The draft WRSE plan has more proposals for water recycling than in the emerging regional plan earlier in 2022. Six water recycling schemes are proposed before 2035 with a further 7 to 12 identified between 2035 and 2075.	The Teddington DRA scheme, which involves abstraction with water to substitute this abstraction provided by water recycling. Other recycling schemes have been included in our programme appraisal and could have been selected as	No changes made as a result of this response – water recycling options have been considered as alternatives.

OCC Consultation Response	Our Consideration of the response	Changes to the draft WRMP, or if no changes are made, why not
119. Oxfordshire County Council indicated in its response on the emerging regional plan, that there are clear opportunities for more water recycling to meet future	options. These have been objectively assessed against the alternatives and not been found to be best value options for Thames Water's customers or the south east region. Our programme appraisal is detailed in Section 10 and 11 of the rdWRMP.	
120. There is one existing desalination plant in London. Only one additional desalination scheme in the Sussex Coast area is envisaged in the draft regional plan for the South East by 2035. The number of desalination schemes envisaged increases to between 7 and 14 new schemes depending on pathway between 2035 and 2075. 121. Oxfordshire County Council supports the inclusion of relatively small-scale desalination schemes as an innovative response to water supply issues.	Desalination schemes have been included in our programme appraisal and could have been selected as options. These have been objectively assessed against the alternatives and not been found to be best value options for Thames Water's customers, aside from in severe futures. Our programme appraisal is detailed in Section 10 and 11 of the rdWRMP.	No changes made as a result of this response – desalination options have been considered as alternatives.
122. onwards – responses to WRSE consultation questions and key questions	These are noted as repetition of previous points raised in the response and so we have not repeated them here	Changes made, or the reason why no change has been made, is detailed as points are raised.

Vale of White Horse District Council

Vale of White Horse District Council Consultation Response	Our consideration	Changes to the draft WRMP, or if no changes are made, why not
Q1. Aiming for the highest level of environmental improvements is a good goal that we support. However, constructing a large reservoir will have a large environmental impact that does not appear to have been considered in the overall process. Smaller, better distributed water storage facilities would have a lesser impact on the environment. Storage linked to existing and proposed gravel extraction works could be a more joined up approach to storing water for future use, should it be required.	Thank you for your comment, and your support of our goal of highest level of environmental improvements. The SESRO reservoir proposal is consistently selected in investment model runs undertaken for the WRSE regional plan as a necessary and appropriate key scheme within the overall regional plan solution to the future water resources challenges that the region is facing. We have considered environmental impacts of schemes, and of our plan overall. This is considered within our Environmental Assessments (see Section 9) and our programme appraisal (Section 10). We have considered different sites for potential new reservoirs. Gravel pits tend not to be suitable for reservoirs, as they do not hold water in (an impermeable layer of clay is required). As such, a key screening step for reservoir sites is a suitably thick layer of clay.	Information provided in response to the points raised, there are no changes to the draft plan in response to this point.

Q2. We object to your approach. Thames Water should have a much more ambitious plan for reducing demand. In your question above you describe you target of 123 litres of water per person per day on average as “above the government's national target”, which is misleading, ‘above’ implying that your target is doing better, the reverse of the case here. Your ambition falls significantly short and is significantly failing the government’s national target. Your aim for 123 litres per person per day does not reflect the government ambitions for achieving improvements to water efficiency. Water companies are expected to plan for an average 110 litres of water use per person per day. In January 2023 the Government launched the Environmental Improvement Plan, containing new potential water efficiency standards for new homes with a baseline of 105 l/p/d, with a higher standard of 100l/p/d where there is a local need. The WRMP should be revised to take this into account. As a local planning authority, we are willing to work with Thames Water to support this in our district through our emerging Local Plan. We consider that the programme set out in the WRMP for fixing leaking pipes and reducing water consumption from dwellings should be significantly expanded. Smart meters should be rolled out swiftly and widely. And, for example, has technology such as micro sensing to reduce in property leakage been considered to reduce demand? Could Thames Water fund water reuse projects such as grey water recycling and source collection and reuse? Thames Water has indicated in discussions with our authority that fixing the leaking Victorian water pipes in London is tricky because it causes significant disruption like road closure and parking bay suspensions. However, the scale of the proposed SESRO reservoir is such that it will cause major damage to a rural environment and the significant disruption in what is currently a peaceful rural area. It will also result in a loss of	Between the publication of our draft and revised draft WRMP, the water resources planning guideline has been updated to require that companies plan to achieve the 110 l/h/d target under the DYAA scenario. The Environmental Improvement Plan has also been published, which sets out a national target of 110 l/h/d by 2050. Our plan has been revised to include achievement of this target. Our revised plan clearly outlines (in Sections 8 and 11) how our water company-led interventions such as smart metering, water efficiency and customer engagement will contribute to achievement of the overall 110 l/h/d target. However, significant government action will be required if we are to achieve the 110 l/h/d target and our plan clearly sets this out. Regarding “micro sending for in-property leakage”, our smart metering programme will allow us to monitor whether issues such as leaky loos are causing wastage issues. This is incorporated into our demand management programme. Our goal of reducing leakage by 50% by 2050 (from 2017/18 levels) is already ambitious and operationally challenging. We have examined scenarios that sees the targets delivered sooner (and later), but the need is such that demand management and resource development have to proceed in parallel. In no small part this requirement is driven by the diminishing returns of leakage reductions, caused by the proportion of our leakage that will not be identified via traditional leakage control or pipe replacement methods, often very small leaks. Our consideration is that our programme of leakage reduction presents best value to customers. We acknowledge that SESRO’s construction would entail disruption for local communities. We will endeavour to work with communities as the designs and proposals for this scheme progress. Regarding your suggestion of grey water reuse and rainwater collection, rainwater harvesting has been considered as a demand reducing measure. We have previously offered water butts for garden usage and continue to promote rainwater capture within our multi-	Changes made as are highlighted in our consideration.

agricultural land and the wildlife living on the site will also be lost. Using innovative measures to fix leaks and reduce demand measures could have significantly less impact on our existing natural environment and a much lower carbon footprint than constructing a mega reservoir. The WRMP should be revised to prioritise fixing leaks and reducing demand for water over constructing a reservoir. Your lack of ambition on water efficiency and fixing leaks props up your water supply deficit calculations, fuelling your case for large scale strategic solutions like the reservoir proposed in Vale of White Horse district."	channel customer engagement activity. Scaling up, the difficulty is that retrofitting either rainwater and/or greywater system technologies into existing properties is extremely challenging and the fittings are not readily market available. We believe there are better opportunities to increase water use systems into new developments, particularly large ones, at the design stage. We have recently launched an industry first Environmental Incentive for developers, offering financial incentives to embed water efficiency fittings, water reuse technologies (RWH/GWR) and deliver 'water neutrality' for any new housing development in our supply area. This incentive model is being promoted to developers, planning authorities and regulators. We have also worked closely with Defra and other government areas, on efforts to strengthen future Building Regulations, so that water reuse technologies and requirements become business as usual.	

Q3. Vale of White Horse District Council supports the intention to reduce demand for water but we consider that this target should be more ambitious. You should seek to reduce demand by 50% well in advance of 2050. We recommend that instead of planning for additional new sources of water in case measures don't deliver the water Thames Water has forecast, further alternative measures should be considered for reducing demand for water and fixing leaks. We note that you are losing 650 mega litres a day, or 24% of water, through leakage, and that Thames Water has among the worse performance on leakage of all water companies. Your intention to increase the roll out of smart metering is welcome but this should be done more quickly than is set out in the WRMP. Thames Water could also encourage and facilitate customers to harvest rainwater and store it for gardening and nondrinking water uses like flushing WCs. We would like to see new housing include provision for storing water, for example in gardens or underground. If implemented now this could greatly reduce consumption and the need for large infrastructure schemes. -Thames Water should also invest in new technology such as no-dig 'pipe injection' techniques to plug existing leaks. -Thames Water and the other water companies should also focus on working with farmers and landowners to provide more 'at source' storage."	We do not agree that we should focus solely on demand management measures. Our programme appraisal demonstrates that, in addition to our ambitious demand management programme which meets demand management targets set in the Water Resources Planning Guideline and Environmental Improvement Plan, new supplies are needed. Our programme appraisal is presented in Sections 10 and 11 of our rdWRMP, and this clearly sets out the need for new water resources. We do not think that a plan which further accelerates demand reduction activity would present best value to customers, as it would be excessively costly and would present too much risk. We do not agree that we should look to further accelerate our metering programme. The speed of the metering programme is limited by deliverability, i.e., we do not think that we could accelerate the programme and confidently deliver it. Thames Water is implementing a Government-approved compulsory meter installation programme. Similar metering programmes are happening in other water supply regions. We took an industry lead role in opting for smart water meters to increase the leakage and usage reduction benefit. Our installation of smart meters in homes and businesses is already delivering a measurable reduction in usage and water loss across household and business customers, but there is more to do and our plan sets out the completion of the smart metering programme. By 2034/35, over 80% of the households on our network will be metered, and by 2039/40 this will increase to over 90%. Due to the complexity of older and converted buildings in London and Thames Valley, there will be a small component that will be deemed unmeterable, however the water use on these sites will be monitored through non-revenue bulk meters. Regarding your suggestions for grey water reuse and rainwater collection, rainwater harvesting has been considered as a demand reducing measure. We have previously offered water butts for garden usage and continue to promote rainwater capture within our multi-channel customer engagement activity. Scaling up, the difficulty is	Changes made are described in our consideration of this response.

	that retrofitting either rainwater and/or greywater system technologies into existing properties is extremely challenging and the fittings are not readily market available. We believe there are better opportunities to increase water use systems into new developments, particularly large ones, at the design stage. We have recently launched an industry first Environmental Incentive for developers, offering financial incentives to embed water efficiency fittings, water reuse technologies (RWH/GWR) and deliver 'water neutrality' for any new housing development in our supply area. This incentive model is being promoted to developers, planning authorities and regulators. We have also worked closely with Defra and other government areas, on efforts to strengthen future Building Regulations, so that water reuse technologies and requirements become business as usual. We have incorporated “leakage innovation” in our rdWRMP (this was also present in our dWRMP), as is described in Section 8 of our rdWRMP.	

Q4. Vale of White Horse District Council objects to the proposed reservoir at Abingdon. We do not consider it is necessary or effective. It would not be the optimal and most appropriate solution to address the future water needs of the South East of England. As set out in our response to the recent Water Resources South East consultation (20/02/2023), our Council is concerned that the proposed reservoir will result in significant carbon emissions during its construction. The project will also have significant impacts on those living near to the reservoir from this major construction project. This remains the case with a 100 million cubic metre reservoir as with the earlier 150 Mm3 proposal. It would damage the local environment and disrupt rural communities in Drayton, East Hanney and Steventon and the surrounding area. Local residents are understandably concerned about this. We have concerns regarding: • Landscape impact from the bunded reservoir • What the proposal means for flood risk in the local area • Diversions of the existing road and rights of way network through the site. Building a reservoir on land safeguarded in the Vale Local Plan for the restoration of the Wilts & Berkshire Canal, without delivering the project, if the reservoir goes ahead. Instead, Thames Water is proposing to reroute the canal around the reservoir, potentially adding to the cost of its eventual restoration. -Restoring the canal should be part of the proposals for the reservoir. • Loss of the solar farms located on the site. • Impact of construction on local people, the environment and roads.	Thank you for your comment(s). We have collated and summarised responses to Q4 in the Statement of Response. We understand the Council's opposition to the SESRO, but we do not agree that it would not be the best solution for the water needs of the South East of England. Our consideration is also that Sections 10 and 11 of the WRMP (both draft and revised draft) provide a comprehensive description of the reasons for the selection of the options in our best value plan and so we do not agree that we have pushed forward with the plan without justification or explanation. Reservoir development at any size will have significant impacts on local residents during construction. Reservoir development is also carbon intensive in the construction phase. However, we are required to take a long-term view commensurate with asset lives of the infrastructure being proposed. Once constructed the reservoir has benefits over alternatives such as low operational carbon and opportunities for new habitats and amenity benefits. We would seek to work with the council in order to minimise the unavoidable disruption during construction and to maximise the benefits post-construction. Our options appraisal and screening process has identified that a reservoir of up to 150 Mm3 capacity is feasible. The reservoir feasibility report and addendum detail the screening steps undertaken. It is correct that the Abingdon site is the only site with a feasible capacity of 100Mm3 or more. Our consideration is that the site selection and appraisal process is robust. Our options appraisal sets out the range of sites and sizes of reservoir that have been identified across the Thames catchment and how they've been assessed and screened. The SESRO site is the best of its size. We have considered options from 30 to 150Mm3 including phased development. Building multiple smaller reservoirs at various sites is an option, but it would not perform well in best value modelling due to economies of scale and multiples of disruption.	The Programme Appraisal for the revised draft plan has been re-done and Sections 10 (Programme Appraisal and Scenario Testing) and 11 (The Overall Best Value Plan) have been re-written following comments received and updates to the input data..

• What recreation benefits a bunded reservoir can provide consistent with the landscape and biodiversity values of the proposal and having regard to the traffic impacts of such uses • Whether biodiversity net gain can be achieved and the potential impact on protected species living on or near the site • Impact on the archaeological significance of the area There is some information within the draft WRMP that indicates other reservoir options have been looked at – for example supplementary report 'Feasibility Report Addendum – Reservoirs'. -These alternatives appear to have been rejected for a number of reasons, but Abingdon appears to have been selected as no other sites could fit a large 100Mm3 + reservoir. Our Council considers the proposed reservoir is too large and smaller water storage (if required) should be instead considered at various locations across the river basin rather than being concentrated in one location. Thames Water should be siting storage at locations closer to the river or between meanders where water can be fed into reservoirs by gravity rather than relying on energy intensive pumping systems. Thames Water should also work with extraction industries to provide storage at locations where mineral working are approved. The large reservoir will have a significant environmental impact and significant carbon emissions associated with this large construction project. In light of this, it is unclear why the large reservoir option is being pushed forward with all smaller options being taken off the table, without sufficient justification or explanation."	We are happy to meet with the council to discuss concerns regarding the specifics of the reservoir design as the option investigations progress via the Strategic Regional Option gated development process, overseen by the regulatory alliance, RAPID. Regarding the specific aspects of concern raised: • Landscape impacts are considered in the SEA (Appendix B) and will be considered in more detail through the EIA during the consenting process • Flood risk is considered in the SEA (Appendix B), with further detail available in the SRO Gate 2 documentation, and will be considered in more detail through the EIA during the consenting process • Diversions and rights of way – this is not an aspect which we consider necessary for consideration in a strategic WRMP • Our Gate 2 documentation gives detail on the conceptual design of the reservoir, including restoration of a section of the Wilts and Berks Canal. Our consideration is that this design is appropriate. • We will consider solar farms currently located on site in the future and these will be considered in the EIA – our Gate 2 documentation notes that floating solar arrays present an opportunity for renewable energy generation on the SESRO site. • We acknowledge that disruption would be caused to the local community. This will be explored in greater detail through the EIA. • Recreation benefits are considered within the Natural Capital assessment, and will be developed further as the project is taken through further planning processes • Biodiversity Net Gain is explicitly considered and is the subject of a specific assessment (see Appendix AA) – SESRO delivers a BNG of >10% • Archaeological aspects are considered within the SEA (Appendix B)	

Q5. In addition to the proposal to construct a large reservoir in our district, there are also proposals for two water transfer pipelines; the Severn to Thames Transfer (STT) and the Thames to Southern Transfer (T2ST). There is also a pipeline proposal to link SESRO with Farmoor reservoir. Our Council is concerned about the proposed disruption to our residents from these proposed pipeline projects. Some of the pipelines proposed will run through our Areas of Outstanding Natural Beauty, with potential adverse impacts to habitats, views and archaeology in the AONB. If these pipelines are required (please see our response to earlier questions on fixing leaks and reducing demand), it is important that route planning minimises adverse impacts and that trenchless techniques are used where possible. The proposed Thames to Southern Transfer (T2ST) is conditional on construction of the SESRO. We consider that instead water to meet Southern Water's needs in the Southampton area should come from solutions closer to where they are needed. A copy of our response to the draft Water Resources South East Best Value Regional Plan can be found on our website. As set out in our response we would like to see more schemes considered instead that provide water closer to where it is needed."	Our revised draft WRMP reflects the WRSE regional best value plan and includes for SESRO in 2040 alongside the T2ST and SESRO to Farmoor reservoir pipelines. The STT is no longer required from 2050 due to an updated requirement of the Water Resources Planning Guidelines, since draft WRMP, for a water company to reduce average per capita consumption (PCC) to 110 l/h/d by 2050. We will however continue to develop the STT as an adaptive option to mitigate the risks that SESRO could not be developed, or if government water efficiency policies do not reduce demand (or PCC) to the levels anticipated. The environmental impacts of the proposed SESRO options (and indeed of all options considered by the WRMP) have been assessed by Thames Water and presented in both the Strategic Environmental Assessment that accompanies the WRMP and also within our Gate 2 submission to RAPID (section 6). This strategic level appraisal of impacts has been taken into account when deriving the best value plan. Furthermore, any future promotion of one of the SESRO options would need to be subject to a formal Environmental Impact Assessment (EIA) and suitable mitigation identified and agreed with regulators before any consent was approved. Route planning of transfer has considered environmental impacts. The T2ST is not conditional on construction of SESRO, and could be supported by water from a supported Severn Thames Transfer.	

Q6. No, the draft plan does not represent the best value plan for our community or the environment. The inclusion of the SESRO scheme, located within the Vale of White Horse district, cannot represent the best value plan for our Council, and ignores the cost to local communities and residents. We note that the WRMP indicates that the costs for investing in our future water supply will increase the average household bill significantly in the future, reaching an extra £100 a year by 2050. Our residents, who are Thames Water customers, will not wish to pay for a plan that includes large construction projects that will impact on our local environment and contribute to climate change. More should be done more to encourage and incentivise householders to save water now, and to fix leaks, to avoid the high financial, social and environmental costs that are associated with major infrastructure projects. Thames Water should instead be focusing on encouraging customers to reduce their use of water and fixing leaks. If more work was undertaken by Thames Water to fix leaks and to encourage customers to save water and fix leaks, there may not be the need for the significant investment of constructing a large reservoir.	We have responded to points raised associated with suggestions for more leakage reduction and more consumption reduction in response to earlier points. Our rdWRMP24 programme appraisal (Sections 10 and 11) demonstrates that, even with ambitious programmes of leakage and consumption reduction, new resources are needed, and that SESRO is the best value option for providing water for the South East for the long term. The potential bill increases are associated with all the proposals within the WRMP. These have been calculated according to methods reflective of how water bill increases are calculated in the current regulatory regime. The reservoir is one part of a much wider programme of options to deliver the objectives of the Regional Plan for Water Resources. Leakage reduction and demand management makes up the majority of solution.	The Programme Appraisal for the revised draft plan has been re-done and Sections 10 (Programme Appraisal and Scenario Testing) and 11 (The Overall Best Value Plan) have been re-written following comments received and updates to the input data.

Q7. The plan has the proposed the SESRO scheme as its priority. -However, there are many other potential alternative solutions that Thames Water could instead have explored. As set out in our response to the draft WRSE Plan, we are concerned that there may be overestimates in the number of customers projected for the region, based on the population data and population growth forecasts. -This information should all be updated to reflect the more accurate information provided by the ONS 2021 Census. As a country we are facing a climate emergency. Our Council is committed to doing everything we can to help tackle the Climate Emergency. As set out in the Vale of White Horse Corporate Plan 20202024 our climate targets are for the Vale to be a carbon neutral council by 2030, to reduce all emissions across the Vale district by 75% by 2030 and to be a carbon neutral district by 2045. The proposed SESRO has a large carbon footprint and through its construction would severely impact the local environment in which it would be located. The construction of a reservoir in our district will increase our district's carbon emissions and adversely impact on the district's ability to become carbon neutral by 2045. Currently, there appear to be few benefits being offered to local people from the proposed plans for SESRO, only negative impacts. -Instead, if pursuing this option (which we do not support), Thames Water should more clearly set out a plan of appropriate mitigation. -For example, this could include: Flood alleviation measures that will benefit Abingdon and the surrounding area and to ensure that the new reservoir will not increase flood risk within the local area	As is demonstrated in Section 7 of our WRMP, we have considered and screened a wide range of potential options, applying a robust approach to our options appraisal. The inclusion of SESRO in the plan is reflective of the fact that this drives the overall best-value plan for the South-East. It provides a new source of water for the South-East by providing the storage for excess winter flows in the River Thames, to enable them to be converted into potable supplies during lower flow periods. In effect this is a new source of water during lower flow summer periods that would otherwise not be available for use. The draft WRSE Regional Plan required the Severn to Thames Transfer (STT) to be ready by 2050, after Teddington Direct River Abstraction and SESRO. Our work showed that a combination of options was needed, but that a new reservoir was a better first option, ahead of a transfer from the River Severn, as it is: • less expensive overall, with lower running costs • is more resilient - in a drought, it's hard to predict exactly when we'll need extra water supplies. The lead time to get water from the west of the country would be between three and four weeks, whereas it would be readily available from the reservoir and it is more resilient to our changing climate • forecasts suggest we'll see more droughts occurring at the same time across the whole country, so when the South East is in drought, the water for the transfer may actually be needed by customers in the Midlands and North West • The reservoir also has the potential to provide a wide range of economic, social and environmental opportunities – boosting biodiversity, natural capital and recreational benefits beyond those that can be offered by the water transfer. This is why many customers tell us they'd prefer a new reservoir over other schemes Due to the updated requirement in the Water Resources Planning Guidelines to reduce average per capita consumption (PCC) to 110 l/h/d by 2050, the STT is no longer required in the preferred programme. The STT (via pipeline) does feature if SESRO is excluded	Information provided in response to the points raised, there are no changes to the draft plan in response to this point.

• Clear recreational benefits – around the reservoir through walking and cycling, plus bird watching and on the reservoir through a range of water sports and opportunities to fish • Include measures to generate renewable energy from the development • Plans for a replacement of the solar farm • Providing a new section of the Wilts and Berks Canal • Commitment to biodiversity net gain The Council calls for a public inquiry to be held on the need for SESRO and other proposals in the draft WRMP. -This will ensure a correct process has been followed and the implications for each option have been fully assessed and explored in an appropriate level of detail.	and in some cases alongside SESRO if the supply demand challenge on the plan is increased. As such the plan supports the continuation of STT investigations within the SRO process. We have revised our programme appraisal and, as is detailed in Sections 10 and 11 of the rdWRMP, we have determined that the 150 Mm3 SESRO solution presents the best value solution for our customers and the WRSE region as a whole. The analysis undertaken to derive the best value plan for both WRSE and Thames Water's WRMP takes account of the operational and embodied carbon footprint of the options, and optimises the plan, to provide the best value overall, including taking account of the carbon footprint of the plan. The carbon emissions resulting from the SESRO options have been appraised in detail, with further information available through our Gate 2 submission to RAPID. Our demand forecast is produced using information provided by expert consultants and meets the requirement of the water resources planning guideline, which is to adopt a population forecast based on local authority plans. A plan based on ONS projections would not comply with the water resources planning guideline and so we do not agree that we should adopt such a forecast in our preferred programme. Our consideration is that appropriate consideration of the mitigation factors listed has been given in our Gate 2 documentation and environmental assessments. These will be developed further as the maturity of the reservoir's design progresses. The secretary of state will make the decision on whether our plan should be finalised, or whether a public inquiry should be held. This is not for us to decide.	


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