

Gate 1 queries process

Strategic solution(s)	Minworth
Query number	MIN003
Date sent to company	21/07/2021
Response due by	23/07/2021

Query

1. Please expand on any reasons behind 50 and 100 MI/d sized options being tested for GUC.
2. Please expand on the risks to South Lincs Reservoir SRO, of Minworth WTW not providing discharge to R.Tame and Trent, and how this interaction is being communicated and managed with SLR SRO and WRSE.
3. In reference to utilisation, please expand on what modelling outputs are expected from WRSE, and how these, and the regional plan outputs, will be used to will be used to calculate and refine utilisation figures for Gate 2.
4. Have assumptions been made that Minworth's discharge to, and subsequent re-abstraction from, R.Avon will be part of a put-take abstraction? Are there risks that re-abstraction conditions from R.Avon under low flows, may restrict the yield available from this option?
5. Have the resilience benefits provided for Minworth-STT in table 10.2, also been carried out for Minworth-GUC? Can a key also be provided for the scores in table 10.2.

Solution owner response

In all cases the documents submitted to RAPID contain information that is commercially confidential. Please ensure that appropriate steps and safeguards are observed in order to maintain the security and confidentiality of this information. Any requests made to RAPID or any organisation party by third parties through the Freedom of Information Act 2000, the Environmental Information Regulations 2004, or any other applicable legislation requires prior consultation and consent by each of Severn Trent Water Limited, and Affinity Water Limited in relation to Minworth SRO

before information is released as per the requirements under the respective legislations. The content of the requested documents is draft and relates to material or data which is still in the course of completion in travel to Gate 2, and should not be relied upon at this early stage of development and is liable to further change as more information comes to light as a result of further investigations. We continue to develop our thinking and our approach to the issues raised in the document in preparation for Gate 2.

Query 1

Please expand on any reasons behind 50 and 100 MI/d sized options being tested for GUC.

Query response

A 50MI/d and a 100MI/d source requirement were developed and tested primarily based on the GUC transfer need and constraints. At WRMP19, the Black & Veatch report indicated that there may be a rapid increase in engineering and cost requirements for the GUC scheme as flows approach 100MI/d, as higher flow rates start to require extensive embankment and bridge works to allow for the rise in water levels and velocities within the canal. The Gate 1 investigations on the GUC have concluded that such modifications are unlikely to be necessary at 100MI/d, but velocities and water level changes may be towards the upper end of the impacts that would be acceptable to the canal and its stakeholders. The smaller, 50MI/d version of the scheme is being tested further in Gate 2 to determine if there are any environmental and water quality issues could be mitigated through the use of a smaller volume of recycled water.

Query 2

Please expand on the risks to South Lincs Reservoir SRO, of Minworth WTW not providing discharge to R. Tame and Trent, and how this interaction is being communicated and managed with SLR SRO and WRSE.

Query response

The risk is perceived to be low at this stage, as we expect SLR and Minworth could co-exist. In theory, SLR would refill during the winter months for usage in the summer as drawdown from the reservoir. Whereas Minworth to support STT or GUC or a combination of the two, would be 'operational' in the summer. Therefore, schemes would be abstracting/diverting flows from this river system at different times of the year.

The issue is being communicated & managed with the SLR team via a number of means. Affinity are clearly involved in both schemes, both governance structures etc. However, Affinity, Severn Trent and Anglian all sit on the River Trent Working group, which also involves EA, power sector and navigation authorities. We also will rely

upon the RCG which will coordinate the regional groups as this river system (Tame & Trent) is sourced in WRW, but used in WRE and WRSE.

For completeness, we would like to draw your attention to the relevant sections of the Minworth, GUC and SLR SRO Gate 1 submissions that deal with this subject:

- Minworth section 5.17 details how environmental investigations have been jointly procured and carried out in collaboration with the SLR SRO
- GUC sections 2.35 and 6.26 details the interaction between the GUC (Minworth) SROs and the SLR SRO
- SLR section 2.8 details links to other options including Minworth SRO and GUC SRO

Query 3

In reference to utilisation, please expand on what modelling outputs are expected from WRSE, and how these, and the regional plan outputs, will be used to will be used to calculate and refine utilisation figures for Gate 2.

Query response

We have offered both the 50MI/d and 100MI/d GUC option to WRSE (fed by Minworth), as well as an STT-Minworth option for 115MI/d along with a combined option of 165 MI/d or 215 MI/d.

The WRSE model will inform which options are selected and at what size (in terms of DO) to meet the region's needs. The WRSE model will run for several scenarios, including specific environmental and resilience focused outputs to show the differences in portfolios of solutions, along with the typical least cost solution. If the scheme is not selected in any of these as part of the solution, we will likely consider and revisit the need to progress the investigations.

It should be noted that the first WRSE modelling outputs will not be available until the end of August 2021 and we plan to continue with our investigations in the meantime to ensure we can meet the Gate 2 deadline.

Query 4

Have assumptions been made that Minworth's discharge to, and subsequent re-abstraction from, R. Avon will be part of a put-take abstraction? Are there risks that re-abstraction conditions from R. Avon under low flows, may restrict the yield available from this option?

Query response

There is no re-abstraction from the River Avon involved in Minworth SRO. The diverted wastewater will be discharged to provide flow augmentation to the River Avon which then flows into the River Severn. This additional flow will support the STT SRO abstraction from a suitable location on the River Severn for onward transfer to the River Thames via the chosen interconnector; Deerhurst pipeline or Cotswold Canals.

No 'put & take' arrangements have been directly discussed with the Environment Agency. However, we have assumed that the Minworth transfer will form part of the 'put and take' arrangement agreed in principle with the Environment Agency and Natural Resources Wales covering the River Severn.

Existing River Avon abstractions are not subject to a Hands-off Flow restriction. We have therefore assumed that these are sustainable during low flow conditions and that the additional flow from the Minworth transfer will be available for abstraction at the STT SRO point of abstraction under all River Avon flow conditions.

As this query relates to impacts on the river post discharge, the investigations will sit solely within the STT SRO. We will test and discuss the validity of our assumptions with the Environment Agency as part of our Gate 2 studies.

Query 5

Have the resilience benefits provided for Minworth-STT in table 10.2, also been carried out for Minworth-GUC? Can a key also be provided for the scores in table 10.2.

Query response

The way RAPID split the source options for STT means that they are now individual options in the WRSE model, and all options in contention for WRSE need resilience & environmental metrics so the model can optimise with regards to certain scenarios. Whereas for GUC, there is only one source, so there is no need to consider the metric scores for source 1 vs source 2, which is the case for STT. The GUC option goes into WRSE with its own scores, and those scores include Minworth (i.e. a single option inclusive of source, transfer, treatment).

A brief description of each resilience benefits metric, along with the scoring guidance notes is provided below. These are extracts from the 'WRSE Resilience

Assessment Updated Technical Appendix V3' which can be provided in full if required.

All of the STT source SROs were calibrated across the individual SRO project teams to ensure a consistent approach to scoring of the metrics. The scores were then agreed with the team who developed the Resilience Framework on behalf of WRSE ensuring consistency across all SROs.

Metric R1 – Uncertainty of option supply/demand benefit.

- Estimate % difference between 10th percentile and mean of option benefit (%)
- For each option a 90% confidence interval range is evaluated and the range fed back as guidance to companies.
- Score 1-5 for each option based on the relative uncertainty for each of the option types.

Metric R3 – Risk of failure of planned service due to other physical hazards.

- This metric is most similar in concept to *outage*, but it is evaluated for new sources or demand management measures.

Metric R3 Scoring Guidance Notes

Score	Description	Notes and Application
1	Notably vulnerable. The location or nature of the scheme means that it is towards the upper end of risk. For PWS assets this means they are at a similar level of risk to those existing assets within the top 20% of outage scores, or they rely on systems that are notably vulnerable to a particular hazard type. Options that rely on multiple, exposed, in-sequence assets to function (e.g. multiple booster pumping stations) should be placed in this category.	Where risks have been deliberately and reliably designed out (e.g. fluvial floodplain protection) then options should not be placed in this category. This category should generally be used for sites where there is a clear, notable risk and should apply to around 10% to 20% of the options.
2	Vulnerable. This includes option types that are known to suffer from higher than 'typical' outage risks, options that have critical assets that do not have redundancy backup, or options and strategies where there is significant uncertainty around the level of risk that they face. Options that incorporate exposed critical assets where there are concerns over repair times could be placed in this category.	Overall, no more than 40% of options should fall into this category or notably vulnerable as above. Uncertainty in the option design is likely to be a key factor over the selection of this category. The precautionary principle should be applied where there are long transfer/supply routes or constraints on land availability that mean the option could have to be placed in a more vulnerable location.
3	Typical asset. Options that are typical of existing water company water resource schemes in terms of vulnerability and exposure will fall into this category.	Options and assets will be typical of existing water company arrangements in terms of duty/standby, number and exposure of sequential critical assets etc. Options where there are some uncertainties over location and nature can fall into this category, provided the uncertainties do not mean that critical assets could be vulnerable or exposed.

Score	Description	Notes and Application
4	Less vulnerable. These options/strategies will tend to be relatively well defined and their nature or level of redundancy means that they are less vulnerable than a typical resource option.	Schemes need to be reasonably well defined, or relate to asset types that are inherently low vulnerability in low exposure locations, to be included in this category. <i>Demand management strategies will tend to fall into this category by default, although some may be vulnerable to weather related events.</i>
5	Notably less vulnerable. These options/strategies will be well defined and there are no notable vulnerabilities in the design, location or makeup to the scheme/strategy.	Schemes require a good degree of certainty about placement, lack of critical asset points etc to be in this category. Simpler schemes that supply raw water to existing, well established treatment and distribution systems that are known to be low risk could be a typical example. <i>Simpler, distributed demand management strategies that are unlikely to be significantly disrupted by shock events could be placed into this category.</i>

Metric R5 – Catchment & raw water quality risks.

This assessment relates to the risk of disruption to supplies as a result of water quality events during times where there is resource stress (drought, freeze/thaw etc).

Metric R5 Scoring Guidance Notes

Score	Description	Notes and Application
1	Notably vulnerable. Equivalent to schemes scoring in the worst 20% of catchments.	Desalination schemes where there is a high variability in water quality other than the typical tidal cycle will fall into this category. Schemes where there are large unknowns and potential concerns over raw water quality should be placed into this category.
2	Vulnerable. Equivalent to schemes scoring in the 20% to 40% category.	Desalination schemes with a large, but predictable variability in turbidity etc fall into this category. Schemes where there are large unknowns/no reasonable DWSP equivalent but where there are no exceptional concerns should be placed in this category.
3	Typical asset. Equivalent to schemes scoring in the 40% to 60% category. <i>Demand management strategies score a 3 by default (they replace the need for water on a generalised basis).</i>	Schemes where there are some uncertainties, but it is very unlikely that risks would be notably high should be placed in this category.
4	Less vulnerable. Equivalent to schemes scoring in the 60% to 80% category.	Need to be reasonably confident that the catchment with the DWSP score is a good representation of the catchment served by the scheme. Schemes that improve catchment risks by a single point score here.
5	Notably less vulnerable. Equivalent to schemes scoring in the 80% to 100% category.	Need to be very confident that the catchment with the DWSP score is a good representation of the catchment served by the scheme. Schemes that significantly improve catchment risk (i.e. by 2 or more points) score here.

Metric R7 – Risk of failure of planned service due to exceptional events.

This metric covers those shocks that tend to be either societal in nature, or affect the supply chain or supporting services.

Metric R7 Scoring Guidance Notes.

Score	Description	Notes and Application
1	Notably vulnerable. The nature of the option means that it is towards the upper end of risk. Schemes/options in this category will tend to be notably vulnerable to more than one type of event – i.e. the nature of power supplies, availability of chemicals, dependence on remote control for remote assets etc have the potential to combine to cause significant problems. For networks it is likely that demand/weather shocks will be the largest risk and this category would apply to a scheme that is reliant on existing infrastructure that is known to be stretched during such events.	Very complex schemes that score poorly under metric A3 are more likely to fall into this category, and there may be synergy between the two metrics. <i>Demand management strategies are unlikely to fall into this category, except where they are known to be vulnerable to unexpected societal changes, such as those caused by the COVID-19 pandemic.</i>
2	Vulnerable. As above, but where there is only one notable risk, or where there are uncertainties over network capacity/redundancy.	Overall, no more than 40% of options should fall into this category or notably vulnerable as above. Uncertainty in the option design is likely to be a key factor over the selection of this category. <i>Higher risk demand management strategies that contain some vulnerability to societal change, or vulnerabilities or significant unknowns in relation to data or network loss, or where they rely on supply chain or delivery arrangements that are vulnerable to medium term disruptions (pandemic/civil unrest/economic shock etc) could be placed in this category.</i>
3	Typical asset. Options that are typical of existing water company water resource schemes in terms of vulnerability and exposure will fall into this category. Demand management strategies will only fall into this category if they rely on the more complex elements of existing customer interactions, or they are a 'mixed bag' with some medium term vulnerability in their ability to deliver during events such as pandemics/civil unrest/economic shock.	Options and assets will be typical of existing water company arrangements in terms of duty/standby, number and exposure of sequential critical assets etc. Options where there are some uncertainties over location and nature can fall into this category, provided the uncertainties do not mean that critical assets could be vulnerable or exposed. <i>High tech demand management strategies where there is relatively little experience of mass operation will tend to be placed in this category</i>
4	Less vulnerable. These options/strategies will tend to be relatively well defined and their nature or level of redundancy means that they are less vulnerable than a typical resource option. Demand management strategies that are not particularly vulnerable to data issues, cyber attack, or where events such as pandemics/civil unrest/economic shock will only have a short term, transient impact on delivery and implementation should be placed in this category.	Schemes need to be reasonably well defined, or relate to asset types that are inherently low vulnerability in low exposure locations, to be included in this category. <i>Demand management strategies that rely on well proven technologies, but where there is potential uncertainty about their effectiveness in the face of societal events will tend to be placed in this category.</i>
5	Notably less vulnerable. These options/strategies will be well defined and	Schemes require a good degree of certainty about placement, lack of critical asset points etc to be in this category. Simpler schemes that

Score	Description	Notes and Application
	there are no notable vulnerabilities in the scheme/strategy.	supply raw water to existing, well established treatment and distribution systems that are known to be low risk could be a typical example. Simpler demand management strategies that are unlikely to be significantly disrupted by societal shock events could be placed into this category.

Metric A3 – Operational Complexity and Flexibility

This metric is intended to focus on how the intervention affects the ability of the PWS to adapt, reconfigure and recover when shock events mean that normal modes of operation are disrupted.

Metric A3 Scoring Guidance Notes

Score	Description	Notes and Application
1	Notably complex. These interventions will tend to be both inflexible due to operational constraints on use (e.g. desalination water not suitable for transfer outside the intended area) <i>and</i> they either rely on multiple institutions to run, require specialist supply schemes/complex procedures to re-start after a failure event or are difficult to access to effect repairs.	This score is applied to supply side schemes where there is obvious inflexibility and complexities in the management/operation of the resource. <i>Not generally used for demand management.</i>
2	Complex. These interventions will tend to be both inflexible due to operational constraints on use (e.g. desalination water not suitable for transfer outside the intended area) <i>or</i> they either rely on multiple institutions to run or require specialist supply schemes/complex procedures to re-start after a failure event.	This score is used for schemes with single complex issues, or a number of lesser operational risks (e.g. difficulties in transfer combined with blending constraints). <i>Demand management can score within this category, but only in exceptional circumstances (e.g. it could result in significant amounts of 'locked in' supply capability as a result of demand reductions causing existing sources to become under-utilised, but where this is not certain enough to include as a change in Deployable Output).</i>
3	Typical asset. These interventions are 'typical' of a surface water type source in terms of complexity and management. Control curves, group licences, environmental procedures, transfers may be involved, but any co-operation needs across multiple institutions is unlikely to result in failure of the source to adapt or re-start. Typical transfers where there is some availability of workaround and storage fall into this category.	Use for schemes that represent typical PWS operation (clear, unambiguous asset management and operation agreements), some flexibility in the area and nature of supply etc), where any constraints (e.g. blending need) are straightforward and unlikely to significantly constrain scheme operation. <i>Demand management strategies will tend to score a 3 by default (they replace the need for water on a generalised basis), unless there is a clear risk that they will result in significant 'locked in' capacity for water company existing sources.</i>
4	Less complex. Interventions that involve typical, routine operational arrangements where group and annual licences are straightforward to manage, the site can be manually operated if required and there is reasonable connectivity/storage with the existing network	As for 3) above, but schemes need to be free from complex multi-institutional agreements, and have limited constraints on operation and use of the water in a flexible way.

Score	Description	Notes and Application
5	Notably less complex. Intervention is simple to manage, with limited interdependencies and an ability to deploy across multiple areas	To fall into this category the scheme must have no obvious operational constraints, be free from complex multi-institutional arrangements, and the scheme should be notable in its ability to support various parts of the network without difficulty or operational constraint.

Metric E1 – Modularity and Scalability

This metric is relatively straightforward, and reflects the ability of a given option to be delivered in a staged way that limits investment risk and provides opportunity to either scale back or extend development if the intervention is proving to more/less viable following further investigation and initial development.

Metric E1 Scoring Guidance Notes

Score	Description	Notes and Application
1	Notably inflexible. Option is fixed and binary without any real opportunity to scale back or extend development once the scheme has started.	Some reservoirs, where there is no real choice or flexibility around the source water availability, fall into this category. <i>Similarly, demand management strategies that present an either/or approach where the benefits are not well known until key policies are in place and large-scale implementation has started (e.g. Water Efficient Labelling) could fall into this category.</i>
2	Fairly inflexible. Option is fairly fixed and can only be changed in relatively minor ways once development has started.	As above, but there is some flexibility -e.g. reservoirs where there is flexibility around water sources, 'binary' demand management initiatives that can be effectively trialled before full scale implementation etc.
3	Typical scheme. The scheme will become well defined prior to full implementation, but can be scaled and adjusted as the detailed design is being developed.	'Typical' resource schemes where assets can be re-sized or adjusted once constraints are fully understood, and there is some opportunity for modular development of certain components (e.g. treatment streams). Demand management initiatives where changes can be made as the rollout progresses, but the scale and scope of the initiative is reasonably fixed, fall into this category.
4	Fairly flexible. Some modular development is possible and/or the intervention is scalable in response to external factors.	Schemes where there are relatively few 'hard constraints' so development can be pursued in a relatively modular way, and there may be some scope to extend or scale back the size of the scheme as required. Many demand management initiatives will tend to fall into this category as they may have expectations on their maximum size, but ultimately can be scaled back as required if they are not providing to be effective.
5	Notably flexible. Scheme is fundamentally modular and there is significant opportunity for scaling as required.	Probably limited to options such as desalination where development can be fully modular, or demand management initiatives where there is full flexibility in scale and the ability to adapt the initiative as better information becomes available

Metric E3 – Reliance on External Organisations to deliver changes.

This metric is intended to reflect the risk that a scheme cannot practically be delivered because of dependencies on multiple institutions to implement, or uncertain approvals and delivery mechanisms that rely on third parties.

Metric E3 Scoring Guidance Notes

Score	Description	Notes and Potential Data Sources
1	High risk. The scheme has known, significant challenges and relies on third party organisations to approve or deliver the scheme using processes that are not yet well established.	Complex schemes that required support and consent of multiple actors and institutions where there are significant uncertainties over delivery mechanisms and future working arrangements. <i>Demand management schemes that require major policy or regulatory changes that have not yet been committed to.</i>
2	Increased risk. The scheme has known challenges and is relying on some third party organisations to approve or deliver the scheme. The processes involved are reasonably well defined, but non-statutory or have little precedent.	Complex schemes that require the support or consent of institutions other than the planning authorities, with associated risks to scope. <i>Demand management schemes that require minor external policy support or legislation, which has not yet been committed to, or where there is a need to develop technologies externally that are not yet available.</i>
3	Typical scheme. Although the intervention or scheme faces challenges to approval or implementation, this is through well known processes with mature institutional arrangements.	Schemes that could involve bilateral trade, but do not rely on multiple institutions and will follow standard planning application routes (DCO or conventional) where there is likely to be some opposition. <i>Typical demand management schemes that only require existing policy support and follow known and well-practiced regulatory processes.</i>
4	Lower risk. The scheme is not only reliant on well-known processes with mature institutional arrangements, but the likelihood of challenge and major delay is low due to a lack of opposition or widespread support.	Typical supply schemes where expected objection risks are low. <i>Typical demand management schemes where there is broad support and customers and customer representatives are likely to be supportive.</i>
5	Negligible risk. The scheme is highly unlikely to experience substantive challenge or delay.	Smaller supply schemes that are carried out within permitted development rights, or where there is clear planning support and no known opposition. <i>'Flagship' demand management schemes with strong policy and/or customer support where delivery mechanisms are similar to existing, well tested approaches.</i>

Date of response to RAPID	23/07/21
Strategic solution contact / responsible person	<div style="background-color: black; width: 100px; height: 1.2em; margin-bottom: 5px;"></div> Minworth@severntrent.co.uk wrmppcomms@affinitywater.co.uk