

UUS0002: UU Sources Preliminary Feasibility Assessment

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1. Executive summary

- We have delivered our Gate 1 programme on time and within budget
- We recommend that the United Utilities Sources (UUS) Strategic Resource Option (SRO) progresses to Gate 2
- We have selected 27 source options for further investigation as part of the Gate 2 plan
- The UUS SRO can enable a range of transfer volumes up to a maximum of 180 MI/d in conjunction with Vyrnwy Aqueduct (VA) SRO
- We are on track for the Gate 2 concept and design activities

1.1.1. The UUS SRO is one of 17 schemes promoted by Ofwat in the PR19 Final Determination (PR19 FD¹) to identify new strategic water resources to meet projected supply deficits as a consequence of population growth and climate change. This report contains a summary of the activities and associated outcomes for the period up to Gate 1. The content is also consistent with information previously shared with the Regulators' Alliance for Progressing Infrastructure Development (RAPID) through Quarterly Dashboard Reports.

1.1.2. We are delivering the UUS SRO as one of three SROs we are participating in – the others being Vyrnwy Aqueduct (VA) SRO and Severn to Thames Transfer (STT) SRO. We are delivering the STT SRO in partnership with Severn Trent Water and Thames Water. Although these schemes are separate SROs, they directly interface with each other to enable water to be transferred from North West England to the Midlands and South, as shown in **Figure 1**.

1.1.3. There are a number of potential implications of water transfers to United Utilities (UU) and the customers we serve, and therefore we have established the principles shown in **Table 1** below. Certain challenges such as impacts on customers' bills are industry wide and are being considered as part of the RAPID working groups.

Table 1 - Water Transfer Principles

Principle	Criteria
Drinking Water Quality	UU customers will receive drinking water that is fully compliant with all regulatory standards.
Customer Acceptability	Customers must continue to have confidence in their water supply and acceptance in terms of taste, odour, appearance (discolouration) and pressure.
Resilience	The transfer must not have a net detrimental impact – and should ideally improve – the resilience of the water resource and assets used to provide services to customers.
Environment	The projects must not have a significant adverse effect on the environment, must be approved through regulatory oversight and must support, or at least not have a detrimental impact on the company's overall environmental performance.
Customer Bills	The scheme should provide demonstrable value for money for customers in the North West, as reflected in customer bills and customers in the region must receive a fair proportion of the national benefits, which arise from the scheme.

Source: UU Water Trading Principles 2021

¹<https://www.ofwat.gov.uk/wp-content/uploads/2019/12/PR19-final-determinations-United-Utilities-Water-final-determination-.pdf>

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Figure 1 - Illustration of the Interface between SROs



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1.1.4. The purpose of the UUS SRO is to offset water transferred out of region to maintain resilience for customers in the North West. A detailed description of the scheme is in Section 2. We have developed 27 feasible options to progress through Gate 1 that in total could provide an additional capacity of over 550 MI/d. We have presented indicative costs based on past assumptions but are clear that these will need to be refined as we progress through the water resources planning process and better understand the requirements of other companies while ensuring we protect resilience to customers in the North West.

1.1.5. Key facts and conclusions are shown in **Table 2** below.

Table 2 - Key facts and conclusions

Description	Comments
Key assumptions	<ul style="list-style-type: none"> ▪ The UUS and VA SROs are required to support the STT SRO. ▪ The UUS SRO and VA SROs are interdependent and therefore would need to be delivered conjunctively to enable out of region transfers. ▪ The UUS SRO will be selected in the Water Resources West (WRW) and Water Resources South East (WRSE) Regional Plans. ▪ The Kielder and Cow Green inter-regional transfers are not selected as part of the UUS SRO preferred solution (this would potentially change both procurement and planning strategies and lead to a longer delivery programme) ▪ Environmental and water quality impacts which emerge in Gate 2 can be mitigated. ▪ Stakeholder concerns can be addressed prior to planning being submitted.
Key risks	<ul style="list-style-type: none"> ▪ We have identified a number of risks and have actions to mitigate them, with nothing preventing further progression of the SRO to Gate 2. For details please see Section 9.
Hierarchy of options	<ul style="list-style-type: none"> ▪ We have selected 27 source options which can be viewed in Section 10 'Option cost/benefits comparison'. The options are subject to further detailed assessment prior to Gate 2 to facilitate further selection to meet the volume, utilisation and best value requirements of regional modelling.
Key Conclusions and Recommendations	<ul style="list-style-type: none"> ▪ We recommend that the UUS and VA SROs are merged post Gate 1 to provide a single coherent transfer strategy. ▪ The submission has been externally assured and a supporting UUW Board Statement has been provided. ▪ The UUS SRO is able to support transfer volumes up to 180 MI/d (in conjunction with the VA SRO) and we therefore recommend progression to Gate 2 for further detailed assessment. ▪ The conjunctive nature of the UUS and VA SROs mean they would only be viable if both were approved through the gated process. ▪ There are sufficient water sources in the North West to compensate for transfer volumes up to 180 MI/d. ▪ We have selected 27 source options for further assessment prior to Gate 2. ▪ We are able to provide scalability of transfer volumes from 0 MI/d to 180 MI/d, with costs ranging from £42.2m to £255.6m to accommodate projected increasing regional demand profiles. ▪ The Town and Country Planning Act 1990 (TCPA) is the current recommended planning route. ▪ Our initial assessment is that the UUS SRO does not meet the criteria for a Direct Procurement for Customers (DPC) approach. ▪ The earliest delivery date for the UUS SRO ranges from 2028 (for transfers up to 50 MI/d) to 2033 for the maximum transfer of 180 MI/d (assuming a clear justification to support the planning applications is made in the WRMPs and Regional Plans).

Source: UUS RAID Log (March 2021), Solutions Assessment Matrix (March 2021)

1.1.6. In summary, based on our Gate 1 preliminary feasibility study we believe that we can contribute to the national framework for improving resilience to extreme droughts by offering an option that is cost effective, flexible and resilient while minimising disruption for customers in the North West or adverse effects to the environment.

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2. Solution description

- We believe the UUS SRO meets the requirements of both the National Framework and relevant Regional Plans
- We have selected 27 source options for progression to Gate 2 for further investigation
- We have developed the UUS SRO to provide a range of transfer volumes up to 180 Ml/d in conjunction with VA SRO

- 2.1.1. UUS SRO fully aligns with the ambitions of the Environment Agency’s (EA) publication ‘Meeting our Future Water Needs: a National Framework for Water Resources’ (March 2020). The purpose of UUS SRO is to meet the national challenge of projected supply–demand deficits, primarily by increasing supply resilience in the South East of England through the transfer of up to 180 Ml/d via STT SRO. We will do this while also ensuring 1-in-500 year drought resilience within the UU region as required by the Framework. We are also contributing to the water transfer section of UUs WRMP24 and aligning to the Water Resource Regional Plans.
- 2.1.2. The UUS SRO solution promotes cost efficient source options, selected to facilitate transfer volumes (supported by VA SRO, refer to Section 1, **Figure 1**), by the release of raw water directly from Lake Vyrnwy into River Vyrnwy or transferred through a new River Vyrnwy bypass pipeline into the River Severn. The UUS SRO provides new sources to be brought online if water were to be transferred out of region, maintaining resilience for customers in the North West.
- 2.1.3. Lake Vyrnwy provides a resilient, high quality and cost-effective supply to many customers every day, as part of a large conjunctive supply system. This is a significant benefit because if we release water for transfer we can replace it by using other existing sources. However, the additional pressure placed on other sources would mean that our risk of needing to impose customer restrictions, and damaging the environment, would increase. The purpose of the UUS SRO is to mitigate the impact on our wider resilience. A key benefit of our conjunctive supply system is UUS SRO options do not have to be located near to Lake Vyrnwy. This allows us to develop more cost effective, resilient options in less environmentally sensitive areas. It also means that if an option is discounted in the future we can easily substitute it for another. When viewed as a larger pool of options, the UUS SRO is extremely reliable in this context.
- 2.1.4. A key point to appreciate is that the total deployable output (DO) of the UUS SRO does not need to equate to the Lake Vyrnwy transfer volume. We have presented indicative costs in this document based on previous assumptions but it is important to note that the capacity of source options required for UUS SRO is still to be determined through the Water Resources Planning process and as a result, the accuracy of backfill volumes and costs will continue to improve as we progress through to Gate 2. Assessing this relationship is complex and requires modelling due to factors including:
- The pattern of utilisation, in particular the duration of transfers and how they align to hydrological conditions in the North West, is a critical design aspect.
 - The geographical location of additional capacity and how it is deployed into the network. Again, these benefits will vary across different types of drought event.
- 2.1.5. We are designing the solution to work well across a wide range of event types such that the risk of customer restrictions or environmental impact does not increase due to the transfer. This will not completely eliminate the risk of customer restrictions.
- 2.1.6. We have evaluated source options for their benefits, costs and risks, which has led to the selection of 27 source options, geographically spread across the North West (refer to Section 2, **Figure 4**). There are various types of sources each with their own yield. There are three sources out of region which are the Kielder and Cow Green Reservoirs, operated by Northumbrian Water, and Shropshire Union

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Canal (Llangollen Canal), operated by Canal & River Trust (CRT). Additionally, there is also an in-region third-party source option which is Killington Reservoir operated by CRT.

2.1.7. We can provide transfer volumes up to 180 MI/d and for regional planning purposes, we have developed 5 indicative water transfer volumes of 50 MI/d, 75 MI/d, 135 MI/d, 150 MI/d and 180 MI/d. Each transfer volume consists of a selection of various source types that provide a deployable output to maintain resilience (as shown in Section 2, **Figure 5**). Design, planning and delivery constraints will be investigated and costs refined for Gate 2. Both UUS & VA SRO Capex costs are illustrated to show the full costs of enabling the transfer volumes, as shown in **Figure 2** below. Opex costs for individual options can be seen in Section 10, **Table 12**. The overall Opex costs will be determined once source options are confirmed.

Figure 2 – Indicative view of UUS SRO option configuration with Capex costs (inc. optimism bias)

UU Source Options and Vyrnwy Aqueduct SRO Capex Summary	Water Transfer Volumes				
	50MI/d	75MI/d	135MI/d	150MI/d	180MI/d
Example portfolio of options					
Demand management options					
Borehole abstraction					
Reservoir					
Borehole abstraction					
Borehole abstraction					
Borehole abstraction					
Borehole abstraction					
River abstraction					
Borehole abstraction					
River abstraction					
UU Sources Capex (Total £m's)	42.2	104.7	166.0	191.3	255.6
Vyrnwy Aqueduct Capex (Total £m's)	0.00	22.0	145.0	170.0	179.0
UU Sources and Vyrnwy Aqueduct (Total £m's)	42.2	126.7	311.0	361.3	434.6

Source: Solutions Assessment Matrix (March 2021)

2.1.8. The costs to each future gateway for UUS SRO are forecast to be in line with the PR19 FD values, as shown in **Figure 3**.

Figure 3 – Costs to each gateway for UUS SRO only

	Gate 1	Gate 2	Gate 3	Gate 4
Ofwat allowance for each gate	£0.72m (actual cost £0.668m)	£1.08m	£2.52m	£2.88m

2.1.9. **Table 10** in Section 10 summarises the range of criteria each source option has been evaluated against. All 27 source options are recommended for progression to Gate 2, where a preferred list will be selected.

2.1.10. UUS SRO works in conjunction with the VA SRO and the STT SRO to support water transfer (as shown in Section 2, **Figure 4**). The UUS SRO provides benefits on several levels:

- It operates in tandem with the VA SRO, to protect the resilience of customers' supplies and the environment from the impacts of water transfer.
- It also operates conjunctively with the other STT SROs to maximise the overall benefit and reliability of the STT scheme.

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- It builds on our highly integrated regional network, meaning UUS options can be located across the North West.
- It considers a wide range of source types (as shown in Section 2, **Figure 4**).

- 2.1.11. We have carried out water resource modelling to understand the benefit for each source option, ensuring outputs can be deployed into the regional network. We have modelled source options to assess their conjunctive use benefit using a Water Options Appraisal Methodology (refer to Section 4), to determine cost effectiveness and viability of solutions to support water transfer volumes up to 180 MI/d.
- 2.1.12. Each source option has undergone environmental assessment following the principles of Strategic Environmental Assessment (SEA), Habitats Regulations Assessment (HRA) and Water Framework Directive (WFD) Assessment. In addition, we have completed a high-level Natural Capital Assessment (NCA), Biodiversity Net Gain (BNG) Assessment and Invasive Non-Native Species (INNS) Risk Assessment. These assessments have highlighted areas of environmental risks and provided environmental costings to support the Average Incremental Social Cost (AISC), as shown in Section 5, **Table 4** and Section 10, **Table 12** respectively.
- 2.1.13. We recognise that some sources may cause a change in customers' water and we are working with customers to understand their preferences (as shown in Section 8). Consequently, we will undertake the drinking water safety planning, and Regulation 15² new sources (where appropriate), approach to all options in the selected list as we progress to our Gate 2 submission, covering raw water catchments, treatment and distribution to mitigate the impact on customers.
- 2.1.14. Wider resilience benefits associated with some river abstraction options may offer opportunities to abstract water during river flooding events. These benefits will be considered as part of the environmental assessments to be completed in Gate 2. River modelling is also to be completed in Gate 2 and any river flow or quality benefits or risks will be discussed with the National Assessment Unit (NAU).
- 2.1.15. At the lower water transfer volumes up to 75 MI/d, minimal enabling works are required on the VA SRO as raw water can be released (by direct discharge) into the River Vyrnwy. For water transfer volumes greater than 75 MI/d, additional enabling works are required on the VA SRO and raw water releases would then require a combination of direct discharge and the use of a new River Vyrnwy bypass pipeline (STT SRO) to feed in to the upper reaches of the River Severn.

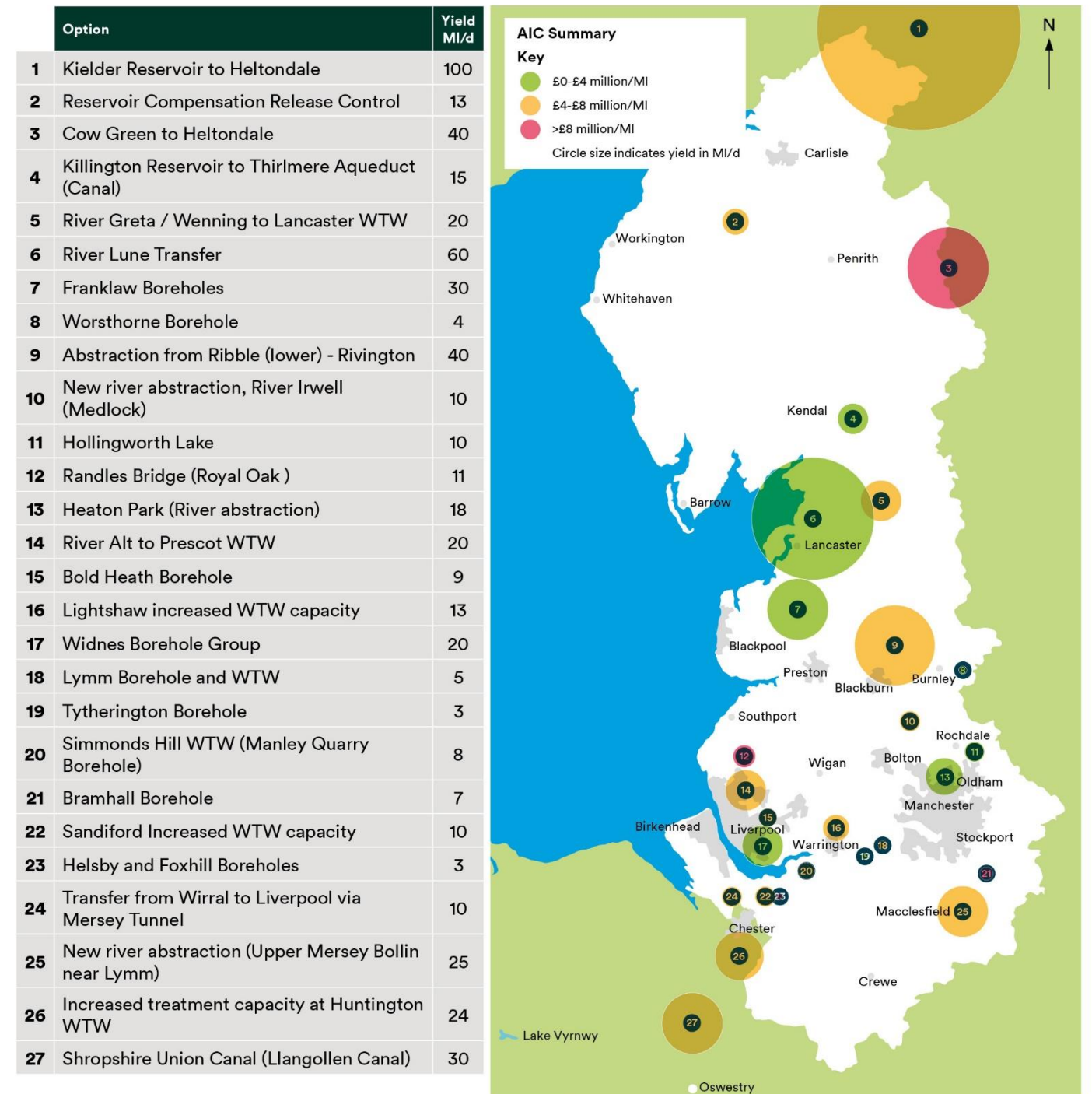
² <http://dwi-content.s3.eu-west-2.amazonaws.com/wp-content/uploads/2020/11/03165754/Part-05-Monitoring-Additional-Provisions-B.pdf>

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Figure 4 - Geographical view of UU Source Options ordered from North (1) to South (27)



Figure 5 - Visualisation Analysis Tool



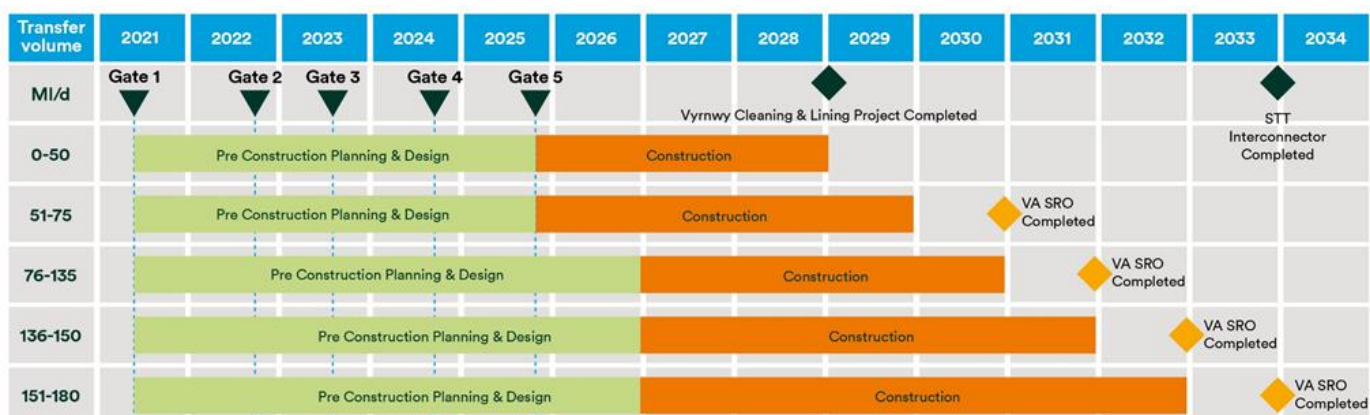
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3. Outline project plan

- We have delivered our Gate 1 programme on time and within budget
- We have developed a programme which outlines key activities and outputs for Gates 2-5
- We believe a 180 MI/d transfer solution can be delivered by 2033 with an opportunity to accelerate this to 2028 for transfer volumes at 50 MI/d or less

- 3.1.1. We have delivered our Gate 1 programme on time and within budget. Although the Covid-19 pandemic impacted our programme in a number of areas, we have introduced measures to mitigate many of these challenges. The key exception to this is face-to-face customer acceptability research.
- 3.1.2. Customer acceptability is a key consideration in the selection of source options as we wish to minimise the impact of potential changes in customers’ water. We have undertaken an online customer research programme (as shown in Section 8) and had planned a series of ‘Hall Tests’ where customers would be invited to physically interact with different water samples - such as undertaking taste tests, boiling kettles, lathering soap – to understand their perception of changes in water (primarily hardness). Due to Covid-19 restrictions, we have deferred this activity in to Gate 2.
- 3.1.3. The timing of the solution will be determined through regional modelling and water resource management plans (WRMP). To support a supply deficit in the South East, the UUS SRO is dependent upon the delivery of the STT SRO, currently scheduled for earliest completion in 2033. However, in conjunction with the VA SRO we are able to release water (up to 150 MI/d) into the River Severn in advance of this date, providing an opportunity for 3rd party abstractors.
- 3.1.4. Due to the scalability of our source options, it is possible that we could transfer volumes up to 50 MI/d by 2028, due to fewer sources being required and minimal enabling works on the VA SRO to facilitate the transfer. The delivery dates associated with each transfer volume are shown in **Figure 6** below, with an earliest construction start date of 2025.

Figure 6 - UUS SRO High Level Programme for different ranges of transfer volumes

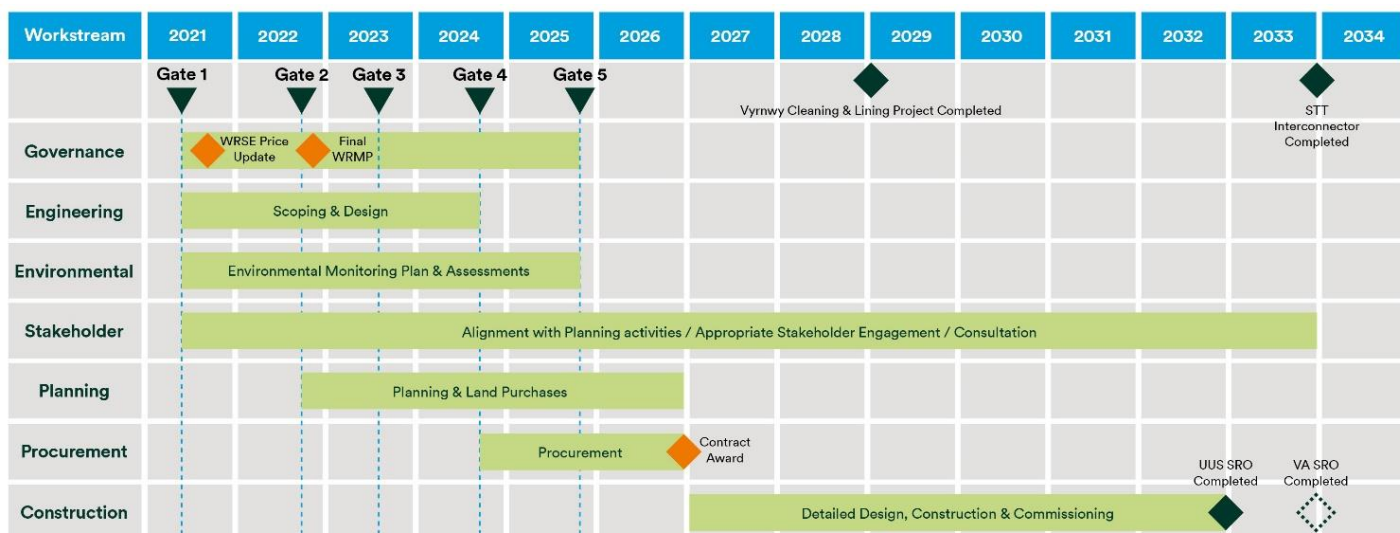


Source: UUS SRO Programme Plan

- 3.1.5. We have identified the key milestones and activities associated with delivery of the UUS SRO programme post Gate 1 submission through to Gate 5. This also encompasses the pre-construction activities required to be ‘construction ready’ in AMP8. The programme below assumes the full 180 MI/d is required, as shown in Figure 7. Due to the number of source options at this stage, we have not detailed the source level activities. This detail will be developed as the preferred solution is confirmed in Gate 2.

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Figure 7 - Key Milestones and Activities to Completion



Source: UUS SRO Programme Plan

3.1.6. We have developed this programme based on our current understanding of the requirements and timescales of the RAPID gated process and the wider regional planning process. We expect the WRMP requirements to be defined prior to the initial consultation on water WRMP plan in January 2022. As a result, the programme is subject to change and therefore we have maintained a detailed assumptions and dependencies log. We have highlighted the key items shown in **Table 3** below.

Table 3 - Key Assumptions and Dependencies

Workstream	Assumption/Dependency
Stakeholder	It is assumed that the stakeholder management plan will address stakeholder concerns to enable timely and successful delivery of planning consents.
Procurement	It is assumed that construction contracts will be awarded through UU frameworks and not be subject to a DPC process (see Section 6 for outcome of DPC assessment)
Planning	It is assumed that the UUS SRO options would be consented under the Town and Country Planning regime.
Programme	The UUS and VA SROs are interdependent and therefore will be delivered in tandem to enable out of region transfers.
	If the water is required in the South East, the UUS & VA SROs have a dependency on the STT SRO Interconnector.
	It is assumed that both UUS and VA SROs are selected in both WRW and WRSE Regional Plans.
	It is assumed that the UUS SRO solution satisfies the requirements of the Water Transfer Principles agreed with the UU Executive.
Engineering	For indicative costing purposes the back fill volumes required are assumed to be those presented in PR19 however these will change as we progress through the water resources planning process
	It is assumed that the maximum reliable yield of Lake Vyrnwy is 185 MI/d and that a minimum of 5 MI/d of raw water is required to maintain a blended solution, which supports a maximum transfer volume of 180 MI/d.
Environmental	It is assumed that environmental and water quality impacts which may emerge following detailed feasibility can be mitigated to enable support from environmental regulators and achievement of planning consents.

Source: UUS SRO RAID Log (May 2021)

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4. Technical information

- We have engaged with regional groups and engineering experts to define the configuration of source options for a range of transfer volumes
- We have produced robust cost estimates in alignment with the relevant cost consistency methodology

- 4.1.1. We can provide transfer volumes up to 180 MI/d and for regional planning purposes we have developed 5 indicative water transfer volumes of 50 MI/d, 75 MI/d, 135 MI/d, 150 MI/d and 180 MI/d. Each transfer volume will require an increasing number of sources to be brought into operation to maintain customer supplies. For transfer volumes greater than 50 MI/d some enabling works will be required on the VA SRO.
- 4.1.2. The UUS SRO will maintain customer supplies in the North West in conjunction with the enabling works delivered by the VA SRO. Once the UUS SRO and VA SRO have been commissioned the raw water from Lake Vyrnwy can be released to the River Severn by a combination of direct discharge into the River Vyrnwy and transfer through the River Vyrnwy bypass pipeline (part of the STT SRO) as shown in Section 1, **Figure 1**. The configuration of the solution for different transfer volumes is still to be determined and can draw on a range of source options that are detailed in Section 10, **Table 11** and Section 2, **Figure 4**.
- 4.1.3. For each transfer volume there will be a selection of source options. Each source option has a range of design lives for the assets (ranging between 10 years for instrumentation and up to 60+ years for civil works), including replacement and maintenance requirements which have been considered in the pricing submitted to WRSE in March 2021.

Initial costs and benchmarking

- 4.1.4. A summary of Capex and Opex, initial water resource benefit assessment, Average Incremental Cost (AIC) and a brief description of how the solution will be operated, as shown in Section 10, **Table 11**. The indicative costs for the proposed transfer volumes are shown in Section 2, **Figure 2**.
- 4.1.5. We have scoped and estimated each source option (with Capex including optimism bias, Opex including maintenance requirements) in line with Mott MacDonald 'Cost Consistency Methodology Rev C'³. We have developed estimates for the 27 source options using our estimating database developed from a range of previous projects, including projects with similar scope of work. We carried out market testing at PR19 to benchmark our costs for 14 sample projects against our framework partners, as well as Costain and Mott MacDonald. This exercise showed that our internal estimates were below average (34th percentile) and provides confidence that our costs are efficient. In addition we have participated in benchmarking of costs for the River Vyrnwy bypass pipeline element of the STT SRO which showed our estimating to be between 4% lower and 16% higher than the Jacobs benchmark. We will continue to refine our costs as we develop our designs through to Gate 2.

Initial water resources benefit

- 4.1.6. We undertook water resources modelling to determine water resource benefits of each option as part of a selection process to reach a list of 27 source options. The modelling that underpinned the Water Trading Adaptive Pathway in the 2019 Water Resources Management Plan (WRMP19) provided the basis for analysing options. Our approach for Gate 1 adopted the outputs of the WRMP19 and re-created the water transfer option configuration using the latest list of UU source options under consideration (As shown in Section 2, **Figure 2**). The modelling outputs gave due consideration and alignment with WRMP24 process and in the provision of pricing data to WRSE in March 2021.

³ Mott MacDonald, Cost Consistency Methodology (Rev C), Technical Note and Methodology, published August 2020

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- 4.1.7. Our total option capacity is in excess of 550 MI/d providing sufficient coverage to allow the release of 180 MI/d from Lake Vyrnwy at varying utilisation rates. The working assumption is that UUS SRO could benefit WRSE, however there is also potential to support other transfers to abstractors within the River Severn catchment. The amount of additional source deployable output may change once expected utilisation is confirmed through the regional water resource plans. To evaluate the options further to gain increased accuracy on deployable output and to understand conjunctive effects of the options, an enhanced UUS SRO water resource model will be developed in Gate 2. The model will also be able to link into the STT SRO system model that is also being developed in Gate 2 and will enable effective regional water resource planning to be undertaken as part of the STT SRO.
- 4.1.8. We have provided initial data to regional groups to support high-level assessment of regional water resource benefits, including provision of indicative pricing information to WRSE in March 2021.

5. Environmental and drinking water quality considerations

- We have completed SEA, HRA, WFD and INNS assessments for all options
- We have undertaken an initial NCA and BNG assessment to identify, at an early stage, opportunities to deliver environmental and social benefits that we will explore further prior to Gate 2
- We have committed to Water UK's Net Zero 2030 Routemap and are actively contributing to the All Company Working Group (ACWG) Carbon Task & Finish Group
- We have undertaken a source level assessment of risks to inform our Gate 2 water quality programme

Introduction

- 5.1.1. We are committed to ensuring that the UUS SRO supports, or at least does not have a detrimental impact on our overall environmental performance and that customers continue to have confidence in their water supply and acceptance in terms of taste, odour, appearance (discolouration) and pressure.
- 5.1.2. We have undertaken environmental assessments of the UUS SRO options following the principles of SEA, HRA and WFD assessment. In addition, we have completed a high-level NCA, BNG assessment and INNS assessment. Our assessments:
- are aligned with the approaches adopted for the assessment of WRMP19 (where applicable)
 - have been informed by extensive stakeholder engagement
 - evaluate the environmental effects of the options, facilitating the early identification of measures to mitigate adverse effects and deliver environmental benefits
 - have established that further environmental investigation is required prior to the selection of the options for the UUS SRO, particular in respect of effects on biodiversity and water quality
- 5.1.3. We have also considered the likely raw water, treatment and distribution risks (including customer acceptability). Each option has a different risk profile and we will undertake drinking water safety planning, and Regulation 15 new sources (where appropriate), approach to all options in the selected list as we progress to our Gate 2 submission.

Initial Option Level Environmental Assessments

Overview and Approach

- 5.1.4. Environmental considerations have been at the forefront of our option selection process. Our environmental assessments have been undertaken in accordance with the methodologies developed for WRMP19, an approach agreed with the NAU and Natural Resources Wales (NRW) and subject to engagement with regulators. We have taken into account the findings of the assessments in our Solutions Assessment Matrix (SAM) to identify the selected list of 27 options that are being taken

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forward at Gate 1 for the UUS SRO (further information regarding our option evaluation process is presented in Section 10).

- 5.1.5. Following primary screening, which included a high level consideration of environmental risks, we carried out SEA, HRA and WFD assessment of the feasible options for the UUS SRO in order to:
- Evaluate the significant environmental effects of the options, including where their implementation may cause deterioration in WFD water body status and/or adverse effects on the integrity of European designated nature conservation sites
 - Consider possible in-combination effects
 - Identify measures to mitigate adverse effects and opportunities to deliver environmental benefits
 - Inform our programme of post Gate 1 environmental investigations
- 5.1.6. The options have subsequently been subject to further environmental assessment including NCA, BNG and INNS risk assessments.
- 5.1.7. We recognise that there will be a need to align our environmental assessments with work undertaken for WRMP24 and the WRW Regional Plan. We are therefore proactively working with WRW and its environmental assessment team to ensure consistency in terms of the breadth and scope of assessments and to avoid unnecessary duplication.

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Assessment Findings

5.1.8. The findings of the SEA, HRA and WFD assessment of the options are shown in **Table 4** below.

Table 4 - Summary of Environmental Assessment Findings

	Biodiversity	Geology/Soi	Water	Flood Risks	Air Quality	Health	Population	Heritage	Landscape	Commentary
1. Kielder to Heltondale	Yellow	Green	Yellow	Green	Red	Green	Red	Green	Red	-Potential construction and operational effects on European and nationally designated nature conservation sites including the River Eden Special Area of Conservation (SAC) require further assessment. -Potential for significant transport effects (congestion) and associated air quality impacts during construction. -Likely significant landscape effects (due to development in the Northumberland/Lake District National Parks and Lake District World Heritage Site).
2. Individual Reservoirs Compensation Release Control	Yellow	Green	Yellow	Green	Green	Green	Green	Green	Green	-There is a need to consider further downstream impacts.
3. Cow Green to Heltondale	Yellow	Green	Yellow	Green	Red	Green	Green	Green	Red	-Potential construction and operational effects on designated nature conservation sites including the River Eden SAC and habitat on the margins of Cow Green reservoir require further assessment. -Potential for significant transport (congestion) effects and associated air quality impacts during construction. -Significant landscape effects likely (due to works in the Yorkshire Dales/Lake District National Parks and Lake District World Heritage Site).
4. Killington Reservoir to Thirlmere Aqueduct	Green	Green	Yellow	Green	Green	Green	Green	Green	Green	-CAMS ledger requires update and resource availability is therefore uncertain.
5. River Greta / Wenning to Lancaster WTW	Green	Green	Green	Green	Green	Green	Green	Green	Green	-No significant negative effects identified.
6. River Lune Transfer	Yellow	Green	Yellow	Green	Green	Green	Green	Green	Green	-Potential effects on downstream European designated sites due to abstraction from the River Lune requires further assessment. -CAMS ledger requires update and resource availability is therefore uncertain.
7. Franklaw Boreholes	Green	Green	Yellow	Green	Green	Green	Green	Green	Green	-Borehole source is subject to a WINEP study and therefore water availability is uncertain.
8. Worsthorne Borehole	Green	Green	Green	Green	Green	Green	Green	Green	Green	-No significant negative effects identified.

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	Biodiversity	Geology/Soi	Water	Flood Risks	Air Quality	Health	Population	Heritage	Landscape	Commentary
9. Abstraction from Ribble (lower) - Rivington	Yellow	Green	Yellow	Green	Green	Green	Green	Green	Green	-Potential for construction works to affect the Ribble and Alt Estuaries SPA/Ramsar/SSSI and for operational effects on fish. This requires further assessment. -CAMS ledger requires update and resource availability is therefore uncertain. -New infrastructure located in Flood Zone 3.
10. New river abstraction, River Irwell (Medlock)	Green	Green	Yellow	Green	Green	Green	Green	Green	Green	-Potential for reduction in dilution downstream requires further investigation.
11. Hollingworth Lake	Yellow	Green	Yellow	Green	Green	Green	Green	Green	Green	-Potential operational effects on the Rochdale Canal SAC requires further assessment. -Water quality impacts (Ogden Reservoir) require further investigation.
12. Randles Bridge (Royal Oak)	Green	Green	Green	Green	Green	Green	Green	Green	Green	-Limited water available and groundwater modelling is therefore required.
13. Heaton Park (River Abstraction)	Green	Green	Yellow	Yellow	Green	Green	Green	Green	Green	-Reductions in flows could affect dilution in the River Roch and requires further investigation. -Infrastructure would be located in Flood Zone 3 and further investigation regarding embankment stability is required.
14. River Alt to Prescot WTW	Yellow	Green	Yellow	Green	Green	Green	Green	Green	Green	-Potential effects on the Sefton Coast SAC/SSSI, Ribble and Alt Estuaries SPA/Ramsar/SSSI/NNR and fish due to reduced flows requires further assessment. -Water quality in the River Alt is poor and therefore further investigation required.
15. Bold Heath Boreholes	Green	Green	Green	Green	Green	Green	Green	Green	Green	-No significant negative effects identified.
16. Lightshaw increased WTW capacity	Yellow	Green	Yellow	Green	Green	Green	Green	Green	Green	-Potential significant effects on nearby designated nature conservation sites requires further assessment. -Potential for saline intrusion requires further investigation.
17. Widnes Borehole Group	Green	Green	Yellow	Green	Green	Green	Green	Green	Green	-The Groundwater Management Unit (GWMU) is highly over licensed and further investigation is required to confirm resource availability
18. Lymm Borehole and WTW	Green	Green	Yellow	Green	Green	Green	Green	Green	Green	-GWMU is over licensed and further investigation is required to confirm resource availability.
19) Tytherington Borehole	Green	Green	Green	Green	Green	Green	Green	Green	Green	-No significant negative effects identified.
20. Simmonds Hill WTW (Manley Quarry Borehole)	Yellow	Green	Yellow	Green	Green	Green	Green	Green	Green	-Effects of abstraction on the Mersey Estuary Ramsar/SSSI/SPA requires further assessment. -Sources are part of an existing WINEP investigation/existing abstractions may be causing WFD waterbody deterioration. Resource availability is therefore uncertain.

UU Sources: Preliminary Feasibility Assessment

	Biodiversity	Geology/Soi	Water	Flood Risks	Air Quality	Health	Population	Heritage	Landscape	Commentary
21. Bramhall Borehole										-No significant negative effects identified.
22. Sandiford Increased WTW Capacity										-Potential for increased abstraction to affect Oak Mere SAC which requires further assessment. -Delamere Boreholes are part of an existing WINEP investigation and therefore resource availability is uncertain.
23. Helsby and Foxhill Boreholes										-Potential for reduced flows into the Mersey Estuary which could affect downstream European and nationally designated sites. This requires further assessment. -Sources subject to a WINEP investigation and therefore water availability is uncertain.
24. Transfer from Wirral to Liverpool via Mersey Tunnel										-Potential for significant transport (congestion) effects and associated air quality impacts during construction.
25. New river abstraction, Upper Mersey (Bollin near Lymm)										-New infrastructure proposed in Flood Zone 3.
26. Increased treatment capacity at Huntington WTW										-Requirement for additional abstraction to be confirmed given restricted water resource availability.
27. Shropshire Union Canal (Llangollen Canal)										-Potential operational effects on the Dee (and the River Dee and Bala SAC) which requires further investigation.

Key

	<ul style="list-style-type: none"> Significant negative environmental effects identified. Further investigation and detailed review of potential for mitigation required at Gate 2. Adverse effects on European designated nature conservation sites likely (Biodiversity criterion only). Further investigation and detailed review of potential for mitigation required at Gate 2. High level of impact on WFD water bodies (Water criterion only). Further investigation and detailed review of potential for mitigation required at Gate 2.
	<ul style="list-style-type: none"> Significant negative environmental effects identified that can be reasonably mitigated and/or further investigation is required. Adverse effects on European designated nature conservation sites possible and/or further investigation is required (Biodiversity criterion only). Medium level of impact on WFD water bodies and/or further investigation is required (Water criterion only).
	<ul style="list-style-type: none"> No or only minor negative environmental effects identified. No risk of adverse effects on European designated nature conservation sites (Biodiversity criterion only). No or minor level of impact on WFD water bodies (Water criterion only).

UU Sources: Preliminary Feasibility Assessment

5.1.9. For a large proportion of the source options, we have identified that adverse effects on biodiversity and water are potentially significant and/or uncertain, but we believe these can be mitigated. In terms of biodiversity, in most cases this reflects the potential for construction works and/or increased abstraction from surface and ground water sources to affect designated nature conservation sites. With regard to water, our engagement with the NAU has identified that there is uncertainty with regard to the availability of water in most catchments and therefore, for many of the options, impacts on WFD waterbodies cannot be ruled out at this stage. We will further investigate these issues prior to Gate 2.

Environmental, Social and Economic Valuations

Overview and Approach

- 5.1.10. We completed Environmental and Social (E&S) costings of the feasible options for the UUS SRO, based on the Benefits Assessment Guidance approach, to inform the AISC and selection of the list of options (see Section 2).
- 5.1.11. In accordance with the requirements of the NAU & Natural Resources Wales (NRW), ACWG guidance and Water Resources Planning Guideline, we have also carried out a high-level assessment of the potential natural capital benefits of the list of options and opportunities for delivering BNG to ensure that our proposals would not result in a net loss of biodiversity and deliver overall a positive impact
- 5.1.12. Beyond Gate 1, we will quantify the ecosystem services and calculate a monetary valuation of the benefits/dis-benefits. The identification of a solution for the UUS SRO will also permit more detailed consideration of opportunities for BNG.

Assessment Findings

- 5.1.13. The opportunities to increase natural capital and biodiversity that we have identified are associated with, for example, enhancements at river and hedgerow crossings, creation of pollinator strips in arable fields and enhancements through changes in management on soft landscaping at existing water treatment infrastructure. We will continue to explore these and other opportunities to deliver environmental net gain beyond Gate 1 in liaison with key stakeholders and as more detailed designs are developed. Any offsetting or mitigation schemes will be included in the design so that future stages of NCA can take account of any potential social and environmental benefits.
- 5.1.14. The SEA has also identified additional potential social and amenity benefits associated with the UUS SRO options including in respect of the creation of recreational opportunities, investment in local supply chains and the creation of jobs.

Drinking Water Quality Considerations and Risk Assessments

- 5.1.15. Prior to Gate 1, our Water Quality and Public Health Manager has been engaged in the review of the solutions assessment. Options under consideration have been reviewed by this experienced professional, and guidance provided on the likely raw water, treatment and downstream risks (including acceptability). This has taken the form of a red/amber/green assessment; in each case highlighting any inherent risks, the degree of uncertainty around the risks and likelihood of unknowns. This early screening has already led to the elimination of a small number of options, where the likely risk or risks introduced by the solution has been too great to be feasibly addressed through treatment or other mitigation. A “gap analysis” has also been undertaken with respect to those progressing through Gate 1 – where UU holds existing drinking water safety plans these have been reviewed for any risks that cannot be readily addressed by the proposed solution. We have undertaken workshops with representatives of RAPID and DWI to talk them through this approach and will further engage with them as we go through the next stages of the process.

UU Sources: Preliminary Feasibility Assessment

- 5.1.16. On evaluating the 27 options in the UUS SRO selected list, each option has a very different risk profile. Some solutions under consideration require little additional mitigation for water quality risks; whereas others require a full new treatment process with a much more complex assessment. The latter of these will be undertaken and updated as more detail of the engineered solution progresses. Consequently, we will undertake the drinking water safety planning, and Regulation 15 new sources (where appropriate), approach to all options in the selected list as we progress to our Gate 2 submission. We have liaised with representatives of RAPID and the Drinking Water Inspectorate to outline this approach and will provide regular updates on the solution level assessments summarised in **Table 5**, as they further develop.
- 5.1.17. Network modelling including water quality blending risk assessments were carried out for each option to understand changes and any impacts on customers for both quality and pressures. Network modelling supported by process engineers carried out these assessments in line with industry hardness assessment guidelines. The output of the modelling showed potential customers impacted and the scale of the impact (change in water quality).
- 5.1.18. This information was shared with the drinking water quality, stakeholder and customer acceptability work stream leads to develop customer communication and engagement plans.

Conclusions and Issues Arising

- 5.1.19. Overall, the UUS SRO will provide water to customers who would otherwise be affected by the transfer of water from Lake Vyrnwy to the River Thames, ensuring supply resilience when the transfer is operational. Water resource and asset resilience are both criteria included in the SAM (see Section 10). Environmental resilience benefits have not been identified at this stage but will be investigated further prior to Gate 2, once a preferred solution has been identified.
- 5.1.20. Our environmental assessments and engagement with regulators have identified a need for further investigation before we are able to select the preferred solution for the UUS SRO. We have developed an Environmental Monitoring Plan (EMP) in conjunction with the NAU & NRW, which sets out a programme for this work. Through our environmental assessments, we have already started to identify potential opportunities to deliver environmental and social (including amenity) benefits. These will be explored further following the selection of the preferred solution for the UUS SRO.
- 5.1.21. We have estimated construction and operational carbon emissions for all of the UUS SRO options. This includes embodied carbon, emissions from vehicles and carbon associated with the power required during operation. We are working alongside the rest of the water industry to set out its plans to be carbon neutral by the end of this decade. We have committed to Water UK's Net Zero 2030 Routemap which is 20 years ahead of the UK Government's own legally binding target of 2050 and forms the world's first detailed plan to get an entire industry sector to net zero. We are also actively contributing to the ACWG Carbon Task & Finish Group which is aiming to develop a consistent carbon ambition across all SRO projects.
- 5.1.22. We have calculated the social and environmental costs of the options identified for the UUS SRO in the AISC. We will consider these costs further prior to Gate 2, informed by ongoing environmental assessment including NCA and BNG Assessment. Our approach to assessing overall costs and benefits to determine best value is set out in Section 10.

Table 5 – Assessment of Drinking Water Quality




UU Sources: Preliminary Feasibility Assessment

Source ID	WRMP19 Ref	Name	Yield MI/d	Option Type	WQ RAG	Relevant DWSPs (Reg. 28 Reports)	Reason New DWSPs are required
1	WR812	Kielder to Heltondale	100	Reservoir	G	Downstream Water Quality Zones Only	New/Extended Catchment & Treatment Processes
2	WR159	Impounding Reservoir Compensation Release Control	13.2	Reservoir	N/A	N/A	N/A
3	WR810	Cow Green to Heltondale	40	Reservoir	G	Downstream Water Quality Zones Only	New/Extended Catchment & Treatment Processes
4	WR815	Killington Reservoir to Thirlmere Aqueduct	15	Canal Abstraction	R	UUT-Risk-T183-10-20, UUT-Risk-T195-10-120 and UUT-Risk-L006-10-20 & Downstream Water Quality Zones	New/Extended Catchment & Treatment Processes
5	WR010	River Greta / Wenning to Lancaster WTW	20	River Abstraction	A	UUT-RISK-T45 & Downstream Water Quality Zones	New/Extended Catchment
6	STT029	River Lune Transfer	60	River Abstraction	R	UUT-RISK-C045b & Downstream Water Quality Zones	Treatment
7	WR101	Franklaw Boreholes	30	Borehole Abstraction	A	UUT-RISK-C163c; UUT-RISK-T163 & Downstream Water Quality Zones	None
8	WR099B	Worsthorne Borehole	4	Borehole Abstraction	G	UUT-RISK-C204c; UUT-RISK-T204 & Downstream Water Quality Zones	None
9	WR049B	Abstraction from Ribble (lower) - Rivington	40	River Abstraction	A	Downstream Water Quality Zones Only	New/Extended Catchment & Treatment Processes
10	WR141	New river abstraction, River Irwell (Medlock)	10	River Abstraction	R	Downstream Water Quality Zones Only	New/Extended Catchment & Treatment Processes
11	STT034	Hollingworth Lake	10	Reservoir	G	Downstream Water Quality Zones Only	New/Extended Catchment & Treatment Processes
12	WR107B	Randles Bridge (Royal Oak)	11	Borehole Abstraction	A	UUT-RISK-T224 & Downstream Water Quality Zones	New/Extended Catchment
13	STT041	Heaton Park (River Abstraction)	18	River Abstraction	R	Downstream Water Quality Zones Only	New/Extended Catchment & Treatment Processes
14	WR001	River Alt to Prescott WTW	20	River Abstraction	R	UUT-RISK-T197 & Downstream Water Quality Zones	New/Extended Catchment
15	WR102E	Bold Heath Boreholes	9	Borehole Abstraction	A	Downstream Water Quality Zones Only	New/Extended Catchment & Treatment Processes

UU Sources: Preliminary Feasibility Assessment

Source ID	WRMP19 Ref	Name	Yield MI/d	Option Type	WQ RAG	Relevant DWSPs (Reg. 28 Reports)	Reason New DWSPs are required
16	WR149	Lightshaw increased WTW capacity	13	Borehole Abstraction	A	UUT-RISK-T212 & Downstream Water Quality Zones	New/Extended Catchment
17	WR102B	Widnes Borehole Group	20	Borehole Abstraction	A	UUT-RISK-C141a; UUT-RISK-C203a; UUT-RISK-C142a; UUT-RISK-T141; UUT-RISK-T203; UUT-RISK-T142 & Downstream Water Quality Zones	None
18	WR105A	Lymm Borehole and WTW	4.5	Borehole Abstraction	A	UUT-RISK-C134a; UUT-RISK-T134 & Downstream Water Quality Zones	None
19	WR113	Tytherington Borehole	3	Borehole Abstraction	G	UUT-RISK-C043a; UUT-RISK-T043 & Downstream Water Quality Zones	None
20	WR153	Simmonds Hill WTW (Manley Quarry Borehole)	8	Borehole Abstraction	A	UUT-RISK-C189c; UUT-RISK-T189 & Downstream Water Quality Zones	None
21	WR113	Bramhall Borehole	6.5	Borehole Abstraction	A	Downstream Water Quality Zones Only	New/Extended Catchment & Treatment Processes
22	WR154	Sandiford Increased WTW Capacity	10	Borehole Abstraction	A	UUT-RISK-C214b; UUT-RISK-T214 & Downstream Water Quality Zones	None
23	WR123	Helsby and Foxhill Boreholes	3	Borehole Abstraction	A	Downstream Water Quality Zones Only	New/Extended Catchment & Treatment Processes
24	STT019	Transfer from Wirral to Liverpool via Mersey Tunnel	10	Transfer	G	All existing WTW, SRs and Water Quality Zones in the Wirral and Merseyside DMZs	None
25	WR076	New river abstraction, Upper Mersey Bollin near Lymm	25	River Abstraction	R	Downstream Water Quality Zones Only	New/Extended Catchment & Treatment Processes
26	WR814A	Increased treatment capacity at Huntington WTW	24	Increase Capacity	A	UUT-RISK-C215a; UUT-RISK-T215 & Downstream Water Quality Zones	None
27		Shropshire Union Canal (Llangollen Canal)	30	Canal/River Abstraction	R	UUT-Risk-T034-10-20 & Downstream Water Quality Zones	New/Extended Catchment

UU Sources: Preliminary Feasibility Assessment

Key	
	▪ Significant/uncertain raw water risks and/or robust treatment needed and/or acceptability challenge.
	▪ Limiting hazards in raw water anticipated but need further assessment and/or modest treatment upgrades and/or minor acceptability challenge expected.
	▪ Known/readily addressed raw water quality and modest (or proven) treatment improvements/optimisation and no/limited acceptability challenge expected.

6. Initial outline of procurement and operation strategy

- We have assessed the UUS SRO as being ‘somewhat less suitable for DPC’. This will be reviewed prior to Gate 2 when the solution is defined
- If the Kielder Reservoir source is included in the future, our assessment is that this component is ‘somewhat suitable for DPC’
- We have assessed 17 procurement strategies, with our current preference being ‘Strategic Relationship’

6.1.1. In partnership with external consultants we have made an initial assessment of the scheme’s suitability for Direct Procurement for Customers (DPC) and also outlined a preferred procurement strategy.

6.1.2. With respect to DPC we have assessed the scheme against the suitability criteria developed by KPMG on behalf of Ofwat⁴. Although the total expenditure is likely to be greater than £100m in aggregate, the inherent scalability of the UUS SRO means that discrete sources may be introduced on a phased basis over a number of years to meet increasing demand. Additionally, we consider the diversity of project options means both construction and operation of these assets to be complex. Control of many of these assets rests with UU today and, with the information we have at this stage, we consider it would be operationally costly and complex to appoint a Competitively Appointed Provider (CAP) to manage these numerous projects. Consequently, our assessment at Gate 1 is that the UUS SRO is “somewhat less suitable for DPC”. The outcome of our assessment against the KPMG criteria, is shown in **Figure 8**.

⁴ https://www.ofwat.gov.uk/wp-content/uploads/2017/12/DPC-A-technical-review-FINAL_08.12.17.pdf

UU Sources: Preliminary Feasibility Assessment

Figure 8 - DPC Suitability Assessment for UUS SRO

	Project 'somewhat suitable for DPC'	Project 'somewhat less suitable for DPC'	UU Sources SRO
Project Size	Very Large Schemes with capex Values in excess of £100m	Small schemes with Totex values close to or below £100m	Multiple small schemes below £100m individually but above in total. Could lead to Kielder transfer which would be a separate assessment
Stakeholder interactions and statutory obligations	Limited or marginal impact on the appointees ability to meet item statutory obligations (e.g. Non portable or raw water sources)	Asset materially contributes towards appointee meeting statutory obligations	Raw water sources - 180M/d / requires offsetting, do not have appropriate resilience to absorb - requires new sources to offset - Multiple element - review
Interaction with network	Assets where there are limited economies of scale and scope with the rest of the appointees network system OR where those economies of scale or scope could be maintained through contracts	Assets where there are material economies of scale and scope with the rest of the appointees network system or where economies of scale or scope cannot be maintained through contracts	Discrete projects that do not have economies of scale with existing assets.
	Simple or limited, well understood and manageable interactions with the appointee's network	Significant, complex and frequent interactions with the appointees' network	Potential for multiple options that could be delivered as separate projects and are integrated in the appointees asset base
	Separate non-contiguous networks or assets within the appointees area	Assets that are actively managed as part of the overall system operation of the network	Core to service provision
Contributions to supply capacity and ability to specify outputs	Assets where capacity is regularly needed and contracting requirements can be more easily defined and priced	Assets where capacity is rarely needed (e.g. Resilience schemes and contracting requirements difficult to specify)	Due to integration requirements there may be difficulties around formation of defined solution (at this time)
	Schemes where outputs can be clearly defined and are not subject to substantial change from other factors or difficult to predict in the future (e.g. Around asset condition at handback)	Assets where capacity requirements are not well understood uncertain	
	Schemes where outputs cannot be clearly defined	Schemes where outputs cannot be clearly defined	
Asset and operational failures	Assets where operational failure risk is well understood and mitigations well established for similar assets	Assets where operation failure risk is not well understood with limited track record of effective mitigations	Would form part of normal BAU operation (processes, operations and maintenance)
	Well developed market or technical supply chains with strong experience of similar project delivery	Weak market or technical supplychains with limited experience of similar project delivery	Well established market
		Assets where there are no alternative back up supplies	

6.1.3. This assessment assumes that the solution delivered for UUS SRO encompasses a number of small to medium sized capital schemes across a large geographical area. However, for completeness, we have also considered the possibility that the large strategic Kielder Reservoir source option may form part of the solution and have therefore undertaken a separate DPC analysis. This suggests that Kielder would be of a size and type which would be “somewhat suitable for DPC”. As a very large construction project transporting raw water from Kielder (Northumbrian Water), it would involve relatively simple, measurable and manageable interactions with the existing UU supply system. As a discrete project it would be possible to contract for both the delivery and ongoing management of the resulting new assets. However, there is uncertainty on the frequency of utilisation of the Kielder option and this would potentially make it less favourable for DPC. This assessment will therefore be reviewed prior to Gate 2.

6.1.4. In addition to DPC assessments we have also evaluated emerging procurement strategies. We have utilised our proprietary tool the Market Engagement Methodology (MEM) which takes 17 commercial approaches to create a funnel of possible contracting methods, providing primary and secondary options to be considered in the next stage of the project. Our Gate 1 assessment has refined this list to three possible approaches with the optimal procurement solution to be that of a Strategic Relationship. This is defined as working with the supply chain to co-develop the outcome and UU maintain ownership and operation of the assets. While Strategic Relationship is the primary option, there are two alternative options which we will continue to consider prior to Gate 2, namely Framework Providers and Joint Specification. Brief descriptions of these procurement approaches are shown in **Table 6** below.

Table 6 - Proposed Procurement Strategies for Further Consideration

Procurement Strategy (Preferred)	Outline Description
Strategic Relationship	Focusing on relational contracting mechanisms at the business level, inclusive of Delivery Partners, Delivery Consortia, Strategic Partnering and Alliancing.

UU Sources: Preliminary Feasibility Assessment

Procurement Strategy (Alternative options for consideration)	Outline Description
Framework Providers	Incorporating frameworks of various types, this focuses on the aggregation of focused services.
Joint Specification	UU engage the marketplace to help define and develop elements of the requirement.

- 6.1.5. As with the DPC assessment, we have also considered the procurement implications of the Kielder Reservoir source option being selected. This would be a substantial and discrete construction project with simple manageable interactions with both the Northumbrian Water and UU supply systems. Our assessment suggests four main possible contracting solutions: Design Build Operate Maintain (Finance), Build Own Operate Transfer, Build Own Operate, and Strategic Relationship. There are a further five options which are Joint Venture, Alliance, Design and Build, Project Partnering and Operate and Maintain. These options are all in line with our expectations of a possible large DPC project.
- 6.1.6. In terms of anticipated operational utilisation of the UUS SRO this is dependent on the outcome of the regional planning process to model the likely frequency and duration of transfers. We expect clarity on this between Gates 1 and 2 to enable us to provide a detailed assessment of forecast utilisation of Lake Vyrnwy. WRSE has provided several draft utilisation sequences, including most recently a sequence derived by simulating WRSE’s stochastic regional hydrological dataset. The level of utilisation is dependent on model setup, and the balance between supported and unsupported transfer is particularly sensitive to the River Severn flow dataset used. The latest simulated overall utilisation of the STT SRO is 12% (i.e. transfer occurs on 12% of the days in the record), with support required 6% of the time. It is important to note that for the selection of UUS SRO options, the overall utilisation percentage is less important than the specific pattern of utilisation, in particular the duration of individual support events and corresponding hydrological conditions in UU’s supply area (See Section 2).
- 6.1.7. If the water is only required to supply the South East, there may be a dependency on consent being granted for the STT SRO Interconnector before planning permissions can be sought for the UUS SRO.
- 6.1.8. We anticipate the operation of transfers will be integrated within our existing Production Planning function due to the inherent impact they will have on UUs water supply system. This is a 24/7 operation which monitors a range of inputs including projected demand, planned asset outages and weather forecasts to inform a weekly optimised production plan. The team continuously monitor performance against the plan and make necessary amendments to mitigate for changing forecasts or unplanned incidents.

7. Planning considerations

- The majority of source options have been assessed to be consented under the Town and Country Planning Act
- The Kielder Reservoir source option may meet the criteria under the Planning Act 2008 for the DCO planning route and Section 35 of the Planning Act 2008 could be available for larger schemes such as Cow Green Reservoir

Summary

- 7.1.1. We consider that the most appropriate consenting strategy for the UUS SRO would be pursuing consents under the Town and Country Planning Act 1990, either under permitted development rights or express planning permissions⁵ or most likely a combination of the two.

⁵ The term 'express planning permissions' refers to the requirement for planning permission from the local planning authority. This is to differentiate it from planning permission granted by development orders

UU Sources: Preliminary Feasibility Assessment

- 7.1.2. However, for some of the larger-scale source options (e.g. Cow Green & Kielder Reservoirs), it may be that they are treated as Nationally Significant Infrastructure Projects (NSIPs) under the Planning Act 2008 and are required to be consented by way of a Development Consent Order (DCO), or that there may be merit in seeking a direction from the Secretary of State that the proposal should be treated as a NSIP (a Section 35 Direction) where, for example, wider powers (e.g. in relation to land interests and/or rights) are required.
- 7.1.3. This strategy is subject to review as the development of the UUS SRO progresses. In particular, the overall strategy will need to be revisited when the preferred solution has been defined at Gate 2. It will also need to be considered alongside the wider strategy for the regional water resource plans.

Proposed consenting strategy

- 7.1.4. The UUS SRO comprises of a number of discrete projects, ranging from relatively small-scale interventions to large-scale regional transfer schemes – as such, there is no 'one size fits all' consenting strategy for this SRO. Instead, each individual component of the UUS SRO will need to be considered on a case by case basis.
- 7.1.5. Depending on the precise nature of any smaller-scale works, there would be scope to rely on planning permission automatically granted as a result of permitted development rights under the Town and Country Planning (General Permitted Development) (England) Order 2015. This is particularly the case for works that are largely below ground or comprise the construction of plant and machinery on our 'operational land'.
- 7.1.6. However, elements of the UUS SRO may be captured by the Environment Impact Assessment (EIA) regime. This would particularly apply to long distance pipelines. This effectively removes permitted development rights subject to a screening opinion from the local planning authority. Should a screening opinion confirm that the development is "EIA development" a planning application accompanied by an Environmental Statement would be required. Under these circumstances the relevant legal tests applicable to artificially 'slicing' up a project to avoid EIA would have to be carefully considered.
- 7.1.7. In reality it is likely that the consenting strategy will rely on a combination of express planning permissions and the use of permitted development rights.
- 7.1.8. For any larger-scale projects that automatically fall within the categories of NSIP in the 2008 Act (e.g. for transfers that have a deployable output of over 80 Ml/d), these would have to be consented by way of a DCO – i.e. there would be no optionality. At this stage this would only potentially apply to the Kielder Reservoir source option.
- 7.1.9. A Section 35 Direction could also be sought from the Secretary of State such that some of the larger-scale projects that are comprised in the UUS SRO are consented by way of a DCO. This option would only be available for projects that could legitimately be said to be 'nationally significant'.

Benefits and risks

- 7.1.10. The benefits of the proposed strategy are as follows:
- Maximising the use of permitted development would offer a flexible approach in terms of delivery, particularly as additional conditions would not be imposed on the works
 - Adopt a flexible approach by splitting the consenting of the works between permitted development and planning permissions (subject to EIA tests)
 - Less preparatory work when compared to a DCO application for smaller-scale schemes, limiting intensive DCO activities to only those schemes that require it

UU Sources: Preliminary Feasibility Assessment

- The planning regime under the 1990 Act is a consenting mechanism that we are very familiar with, utilising our tried and tested processes for securing consents and managing stakeholders
- DCO would provide one single, unified consent for larger-scale works, with the benefit of 'supplementary' powers and consents that a DCO can confer (e.g. in relation to land)
- One single decision-maker under DCO – where required reduces risk of refusals/inconsistencies in decisions

7.1.11. However, the proposed consenting strategy is not without risks, although we consider these can be mitigated. An indication of some of the key risks and our proposed mitigations are shown in **Table 7** below.

Table 7 – Planning risks and mitigations

Key risk	Mitigation
Express planning permissions from the local planning authorities would be needed – this carries the risk of delays, inconsistency of handling and the risk of refusal	Engage with the local planning authorities during pre-application including entering into, for example, Planning Performance Agreements (PPAs) (to ensure suitable and adequate resource can be deployed to deal with the applications). Applications need to be supported by suitable pre-application consultation and engagement with the public and key statutory stakeholders.
Some of the UUS source options will not have the benefit of the 'supplementary' powers and consents that a DCO can confer (e.g. in relation to land).	Identify early which 'supplementary' powers and consents (e.g. where third-party land is required) are needed (if any) and devise a strategy for seeking alternative means to obtaining those powers – consider requirement for compulsory purchase orders, etc., as part of programming and plan for a worst case. Noting that Water Industry Act powers are available for pipe laying and access to existing infrastructure.
There will be multiple decision-makers	Engage with the local planning authorities and other regulators and ensure consistency of approach in submissions. This will help avoid any inconsistencies.
Refusal of DCO/planning application.	Early engagement with key stakeholders ensure the DCO/planning application (including any necessary mitigation) to be fully-formed, to limit scope of contentious matters and ensure objections limited as far as possible.
Onerous conditions or requirements attached to DCO or planning permission, which could limit development or impede implementation.	In respect of planning permissions, engage with the local planning authorities early and ensure submissions have sufficient detail of proposed mitigation articulated to provide for adaptive approaches In respect of the DCO process, draft any requirements appropriately and provide robust evidence to the Secretary of State.
Works trigger EIA thresholds, meaning permitted development rights may not be available for certain works	Early consideration of EIA issues as part of scheme development, with early engagement with local planning authorities and statutory environmental bodies to conclude optimal strategy – obtaining legal advice at key stages to test robustness of approach and consideration and use of EIA screening as appropriate.
Legal challenges to consenting decisions.	Proactively obtain legal advice at all stages of the development, to ensure applications are robust.

Source: UUS SRO RAID Log (May 2021)

UU Sources: Preliminary Feasibility Assessment

Timescales

- 7.1.12. The timescales associated with consents under the 1990 Act are difficult to set out, as they are entirely dependent on the nature and scale of the development, as well as the particular local planning authority's capacity and performance.
- 7.1.13. As an example, the target for a local planning authority to determine an application for 'EIA development' is 16 weeks - however, this is not a 'statutory' timescale. There are ways to seek to reduce or gain more certainty on these timescales, e.g. through the use of Planning Performance Agreements. However, experience shows that a 16 week period is often extended.
- 7.1.14. Should a local planning authority refuse an application, an applicant can appeal to the Planning Inspectorate, acting on behalf of the Secretary of State. Such an appeal can add another 12 months or more to the decision making process.
- 7.1.15. In respect of options that could be consented through the DCO route, indicative timescales – pre-application (18 months), pre-Examination, Examination, Reporting and Decision stages (15 months) are each required by statute to be completed within the maximum time (33 months).

8. Stakeholder engagement

- We have delivered engagement in collaboration with other SRO's supporting the STT SRO, ensuring messages to stakeholders and customers are consistent
- We believe that stakeholders are broadly supportive. More detailed engagement will occur as the need and solutions are defined in Gate 2
- Customers have some concerns around water source changes and the perceived impact on water quality and want to be notified in advance of any changes

Our approach to stakeholder engagement

- 8.1.1. Collaboration has been key in our approach to stakeholder engagement across the water companies, Regulators, and regional planning groups - WRW and WRSE. Our principles for engagement are:
- To build on the engagement undertaken through WRMP19 and regional planning, taking account of the issues and concerns raised by stakeholders and local communities.
 - To ensure the entirety of the scheme is understood, this includes the sources of water, transfer via the River Severn and the conveyance into the Thames catchment.
 - To fit with the regulatory processes established under the guidance of RAPID.
 - To ensure consistency and coordination with regional and water resource planning.
- 8.1.2. A stakeholder steering group has been set up with representatives from a number of water companies, members of this group are also representatives on the corresponding regional planning groups (WRW & WRSE) so consistency was ensured. As a steering group we agreed, and adopted, a tiered approach to engagement as shown in **Figure 9**. The focus for Gate 1 has been on Tier 1 stakeholders.
- 8.1.3. We are engaging with a broad range of stakeholders, at a Tier 1 level as we develop the UUS SRO. Most stakeholders are positive or neutral towards the current proposals for a transfer. Many are fully engaged with helping shape how the scheme progresses and are making key representations along the way. There is more to do before we could conclude we have support, while the feasibility studies are taking place the clarity that some stakeholders seek is not yet there. Because of this we have not been able to fully engage with some organisations, which will be addressed in Gate 2.

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8.1.4. Ongoing engagement is key to ensuring we have a scheme that is both feasible and supported by stakeholders. We will update our plan regularly, following discussions with stakeholders. The plan is presented as two strands of activity; engagement via the water resources planning process and engagement on specific scheme issues.

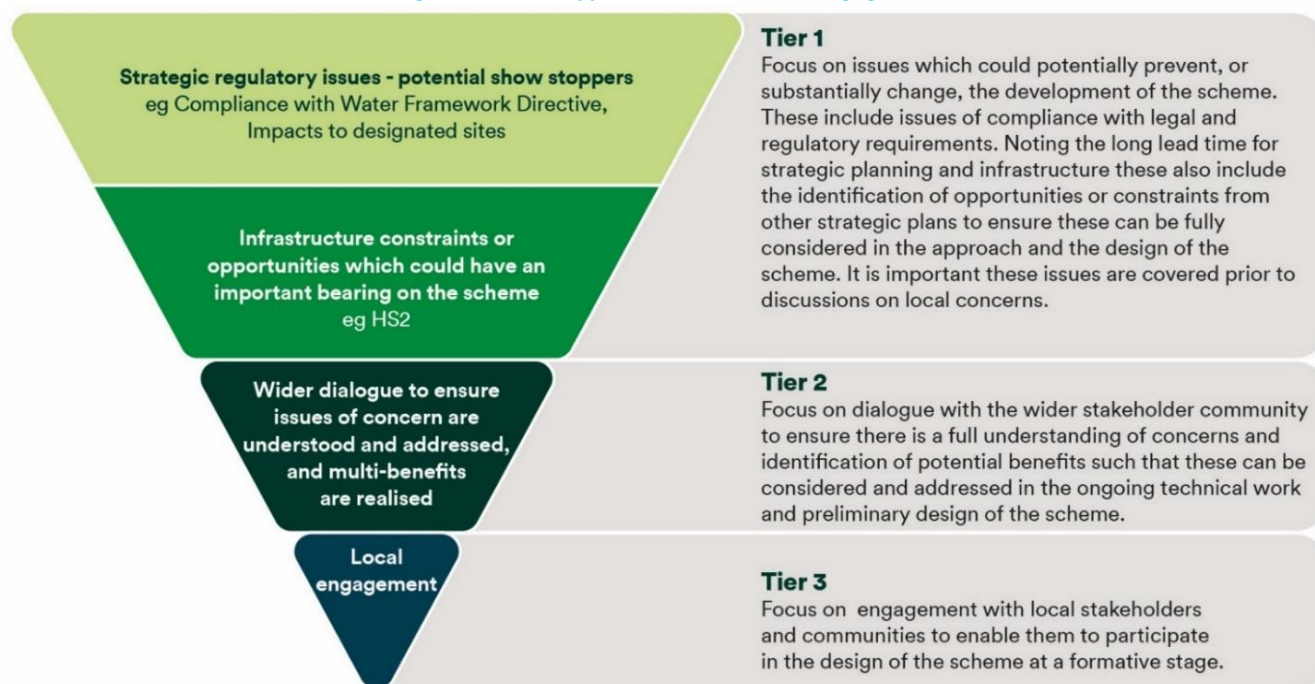
Customers

8.1.5. We have engaged directly with customers to gain their views of the impacts of changes of water supply, which may be required to facilitate water transfers more strategically, as well as to understand their opinions of the specific SRO proposals under consideration.

8.1.6. The first, quantitative study looked at customers' acceptability of potential changes to water sources. This showed that customers think they have a good understanding of water quality in their area and were protective of any perceived deterioration. They were strongly supportive of proposals to help other regions with less water, but wanted to know the reasons for any proposed impact on their own supply in advance. Questions were raised about impact on health and wellbeing as well as on domestic appliances, which need to be considered. If potential high volumes of complaints are to be avoided, effective communications campaigns supported by regulators and industry bodies, will be needed in the event of changes in supply.

8.1.7. The second, qualitative study looked at customers attitudes more broadly in respect of the proposed water source options and water transfer in particular. Again, although customers were supportive of helping other regions with less water, they thought that their own water quality should not suffer. Customers thought the proposals for water transfer appear sensible, but there were initial concerns about the impact on the environment. There were also concerns that the water company should do all it could to avoid impact on the consumer, and should look to innovate and use technology where possible to provide customer protection. Mitigating messaging campaigns may also be required when transfers are operated to address customer concerns.

Figure 9 - Tiered Approach to Stakeholder Engagement



Overview of stakeholder activity to date

8.1.8. For Gate 1 our focus for engagement has been on the wider STT SRO including topics on regulatory, policy and strategic issues, which could potentially prevent, or substantially change, the development of the STT SRO and its associated SROs. Alongside the scheme specific discussions, we have also

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engaged via WRW and WRSE to ensure stakeholders understand how the UUS SRO and other SROs, fit within the strategic planning framework.

- 8.1.9. We have set out our engagement plan, which provides an overview of the engagement undertaken and key points of discussion. A summary of some of the key topics discussed as shown in **Table 8**.

Table 8 – Key Topics of Stakeholder Engagement

Topic	Stakeholder
The regulatory mechanism, of a put and take arrangement, has been agreed in principle	EA, NRW
A comprehensive “gap analysis” has been completed, this served as the foundation for the agreed environmental investigations and monitoring plan for Gate 2. This collaboration has culminated in the provision of an NAU Gate 1 SRO Feedback form, which is part of the Gate 1 submission.	EA, NE, NRW
The Vyrnwy source water and specifically to the need to ensure protection of the environment and mitigation required.	NRW
Focus on ensuring regulatory compliance, alignment with DWSPs including the monitoring and assessment programme. Need to ensure customer acceptability of potential changes to water quality	DWI, CCG’s
Collaborative activity to complete flow trials and understand losses in the Rivers Severn and Avon	EA, NRW
Need for planned, timely and well managed engagement with local communities and compliance with Wellbeing requirements	Welsh Government, NRW, Wales Water Management Forum
Early engagement with identified local stakeholders classed as Tier 1	Windermere Liaison Group, Vyrnwy Liaison Group

Source: UUS SRO Stakeholder Management Plan Gate 1

Next steps- planned stakeholder engagement for Gate 2

- 8.1.10. For Gate 2 our focus will broaden to include the Tier 2 stakeholders and include the following activities:
- continued engagement with wider stakeholder population regarding the development of the regional plans, the selection and prioritisation of solutions and the interregional reconciliation of plans.
 - continued engagement with the NAU & NRW on the technical studies underway and more detailed engagement as scheme specifics become more established.
 - continued engagement with Consumer Council for Water (CCW) and Customer Challenge Groups (CCG) to share ongoing customer engagement work.
 - ongoing engagement with other Tier 1 stakeholders.
 - as the design of the scheme is developed, introductory discussions with the Local Authorities and key local stakeholders will focus on the planning process.

Customer Research

Study 1- Water quality – acceptability of changes in water supply sources – summary of findings

- 8.1.11. Over December 2020, DJS Research Ltd (DJS) conducted an online survey with domestic household customers across the region. The key objective of the research was to measure customer attitudes on current water quality and to gain insight on acceptability should there need to be a change in supply. In total, 1,057 surveys were completed.

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- 8.1.12. Customers are open to a change in supply but want to be notified (75%), and most crucially informed on the reasons behind it. Even if notified, there are still concerns over the impact on water quality; customers' initial impression is that there would be a reduction in quality. Questions are raised over what impact a reduction in quality would have on household appliances, health and wellbeing and the types of soaps/detergent used. Ensuring appropriate information is provided to customers around these questions will be crucial.
- 8.1.13. The reaction to any change in supply will be governed by two things: the duration of change, and the reason behind the change. A change of up to 1 week is generally acceptable (77% stated low to moderate level of concern). However if the change was to last 3 months, 51% stated a high to very high level of concern.
- 8.1.14. When prompted, there was a high level of acceptability for a change in supply across a number of events/circumstances; however, these were not set to any specific duration or timeline and therefore this level of acceptability might vary if a duration is applied. Eighty five percent of customers would find a change in supply acceptable if it was due to having to transfer water outside of the North West to areas in need. However, customers in Cumbria are significantly less likely to find this acceptable (64%). Note that customers were not provided with information on what areas the water would be supplied to.
- 8.1.15. This data provides strong contextualised evidence on the perceptions of water quality and the impact a change in supply would have. However, further face-to-face research is required in order to test acceptability of specific water samples, which will be essential to understanding views on water quality and the potential impact of the water transfer scheme on customer satisfaction.

Study 2 - Customer Preference research to inform long-term water resources planning

- 8.1.16. Focus group-based deliberative research was conducted with customers of UuW during September 2020, as part of a wider project to capture views from customers of all the water companies making up WRSE, along with potential 'donor' companies including UU and STW. In total, 84 customers were consulted, over two sessions of 1 ½ hours for each group of between 8 – 10 customers. The aim of the research was to understand views on:
- water resources and the risk of emergency drought restrictions;
 - resilience planning;
 - Supply and demand options; and sharing resources and strategic options.
- 8.1.17. For UU, the research took place over September 2020. The groups were implemented online, featuring two sessions with participants, with a mix of discussion topics and exercises. The group also completed pre-read and between sessions 'home-work' exercises. The research explored a range of issues within these topic areas to test customers' broad priorities and help establish a view on what the level of customer support will be for various outcomes. The group also covered the proposals for new sources and transfers out of the region. Accordingly, the insight that has been highlighted has been generated as a result of direct engagement with UU customers, and it reflects what they expressed as their opinions, in relation to the key SRO concepts discussed.
- 8.1.18. The summary of customer views covers: (i) understanding of strategic planning needs for water resources; (ii) preferences for water sharing and transfers in general; and (iii) reactions to the UU SRO proposals. The findings are meant to be viewed alongside the quantitative results generated by the DJS project in this context, rather than as an isolated set of insight on its own;
- 8.1.19. At the initial explanation of the redirection of water sources, customers were supportive and said that the option 'makes sense', however when considering the SRO in more depth there was more negative sentiment. Participants in the group felt they would find the plan more acceptable if it had the full support of the EA, and if they were informed that all the water outputs would reach safe standards.

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- 8.1.20. Participants were also asked how they would feel about a difference in taste, or the hardness of their water, if they were moving to alternative sources. While some were accepting of change, a number would resist any deterioration in perceived quality. Overall, there was mixed sentiment in the group. Participants were drawn between wanting to support the South during drought conditions, but were concerned about water quality in the North and felt there should be alternative options or technologies considered.
- In conclusion, the range of customer views heard in the UU deliberative group is consistent with the understanding formed from previous research. The initial response from customers has been positive, particularly in terms of the rationale for sharing water. However, more detailed context and information is required for customers to determine whether an SRO is the best choice for them.

In summary:

- 8.1.21. Customers want to understand the options in terms of the alternative combinations of source(s) and transfer(s) that could be taken forward, and how each compares in terms of potential impacts on service levels, the environment, local communities and customer bills.
- 8.1.22. Customers also want wider information on how SROs fit into the long-term plan for water resources alongside demand measures and local supply options that are not large enough to meet SRO criteria and how the options fit into the long-term plan for the region. The discussion also shows that the acceptability of the SRO proposals to all affected customers is not a given. Some adverse reactions were observed on the possibility of changes in taste and water hardness as a result of a switch to alternative sources to provide the capacity to support transfers.
- 8.1.23. While the relatively small customer sample is not necessarily a representative finding for all UU customers, it does illustrate (at least) that supplier customers can place significant weight on maintaining current service levels. As such, there could be a fine balance between the potential for a deteriorated level of service and the willingness to support the source options, which would allow water transfer through the STT SRO.
- The focus group is not intended to be a definitive, quantitative, regionally representative study of uninformed customer opinions, but rather a qualitative ‘bellwether’ reading, which together with the attitudes and opinions expressed by the remaining 76 respondents, gives a realistic viewpoint of UU customer reactions (both uninformed & by the later session, informed) to the water service and quality aspects presented by the challenge of water transfers.

Next steps – planned customer engagement for Gate 2

- 8.1.24. This initial customer research has provided the evidence to demonstrate the level of customer understanding of the need for water transfers and the level of support for the principles of water transfers. Further customer preference research to Gate 2 is planned to address the issues and concerns raised by customers. It will include the following topics:
- Water quality- It is evident from this research that water quality is something that many customers hold strong views on. We will be carrying out further research (including Hall Test activity deferred from Gate 1 due to Covid-19) in order to test acceptability of specific water samples, which will be essential to understanding views on water quality and the potential impact of the water transfer scheme on customer satisfaction.
 - Communication –Customers from this current and previous research are broadly supportive of the rationale for sharing water. More research will be required providing detailed context and information so customers are more able to determine whether a water transfer is the best choice for them and how it fits with the long term water resources plan for the region.
 - Service levels - supplier customers can place significant weight on maintaining current service levels. As such, there could be a fine balance between the potential for a deteriorated level of service and the

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willingness to support the source options that would allow water sharing. We need to further explore and communicate that water transfers would not come at the expense of service levels.

- As the schemes develop, customers and communities will want to know more and help shape how the scheme will be constructed, its operation and what that means for them and their environment.

9. Key risks and mitigations measures

- We have not identified any risks which would prevent UU SRO progressing to Gate 2
- The identified risks are consistent with those presented to RAPID in Quarterly Reports
- We have identified mitigating measures to ensure that all risks are reduced to an acceptable level

9.1.1. We have developed and maintained a RAID (Risks, Actions, Issues, Decisions) log from the inception of this project. The log is monitored, updated, reviewed and reported on a monthly basis and governed through a UU SRO Project Management Board.

9.1.2. The risks and mitigating measures contained within this submission are consistent with those reported in the quarterly dashboards issued to RAPID up to Gate 1 as they are based on the same source data from our RAID log.

9.1.3. We have detailed the key risks and associated mitigating measures, which have been assessed using our corporate risk assessment tool. The UUS SRO key risks and mitigations, are shown in **Table 9**.

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Table 9 - UUS SRO Key Risks and Mitigations

RAPID Ref	Project Area	Key Risk	Impact	Mitigation	Risk Score Pre Mitigation	Risk Score Post Mitigation
RSK003	Environmental	There is a risk that the UUS solution(s) identified to supply customers may not be acceptable due to adverse impact on the environment. Additional environmental studies will be required as the scheme develops.	This may result in adverse impact on the environment.	Additional environmental studies will be required as the scheme develops.	12	8
RSK007	Programme	There is a risk that the future need for the volumes of water to be transferred to the South East and when they will be required is not clear. Transitioned from an Issue (ISS001) through mitigation as we have identified a number of trading volumes which provide flexibility to meet potential WRSE requirements.	This may result in the UU programme of work and potentially lead to inefficiencies in developing options.	Ongoing engagement with WRSE and support for modelling activity.	12	8
RSK002	Stakeholder & Planning	There is a risk that changes in water could lead to customer acceptability issues during water transfer periods. Detailed impact analysis is required and planned over and above work done to date which will inform mitigation actions.	This may result in customers rejecting the water, increase in customer complaints which would impact CMEX.	Detailed impact analysis is planned over and above work done to date which will inform mitigation actions.	12	8
RSK004	Stakeholder & Planning	There is a risk that UU's stakeholders may not be supportive of transferring water to other regions.	This may result in opposition to scheme leading to both reputational damage and impact on the planning process [Town and Country planning]	Stakeholder engagement plan is being delivered to mitigate this.	12	6
RSK006	Environmental	There is a risk that the EA's review of existing abstraction licences within the UU region could negatively impact the source options we are considering for water transfers by reducing the volumes that can be abstracted.	This may result in reduction in the volumes that can be abstracted.	The water abstraction availability is being assessed in partnership with the EA, NRW and NAU.	12	6
RSK008	Engineering	There is a risk that the water resource options identified to support the STT as part of the UU Sources project will not provide water in the right areas of the UU water network system to ensure water supply resilience to UU customers.	This may result in UU unable to meet resilience requirements.	A UU Sources Water Resource model is needed and will be built to mitigate this risk.	9	9
RSK005	Engineering	There is a risk that this project does not find viable raw water options that would ensure resilience within UU does not deteriorate during the operation of out of area water transfer exports.	This may result in UU not unable to meet / limit agreed trading volumes.	Water Resource and Network Modelling underway to ensure sources and resilience are in place to maintain supply.	6	4

Source: UUS SRO RAID Log (May 2021)

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10. Option cost/benefits comparison

- We have selected 27 source options for progression to Gate 2 for further investigation
- We have applied the Cost Consistency Methodology (Rev C)
- We have aligned our option selection process with HM Treasury’s Green Book guidance

10.1.1. The UUS SRO options have been evaluated against an extensive range of criteria to determine the best value options for customers and the environment to take forward to Gate 2. **Table 10** below summarises the criteria used in the assessment process. For each of the criteria we have applied established best practice methodologies to undertake the analysis of the source options. We have developed a bespoke business decision tool called the SAM which provides a summary of the evaluation of the options and the determination of next steps. The SAM enables us to ensure that the options considered satisfy the Water Transfer Principles as shown in Section 1, **Table 1** of the Executive Summary.

Table 10 - Assessment criteria for UUS SRO options

Assessment Criteria	Summary of Assessment
Cost	Opex, Capex and carbon.
Water Resources Modelling	Using WRMP19 models to determine deployable output/benefit.
Network Modelling	Water hardness customer impact analysis.
Environmental Assessments	Primary screening, SEA, HRA, WFD, BNG, NCA, INNS and AISC assessments. Secondary screening. Abstraction and water availability review. Assessments based on WRMP and Regional Plan methodology.
Customer Water Acceptance	Network modelling and sample data reviews for water hardness analysis on customers.
Drinking Water Quality	DWSP including sample data review.
Planning and Consenting	Review of planning and consenting requirements and process.
Engineering Design	Process block diagrams, design and treatment requirements.
Operability	Asset operability and alignment with existing asset base.

Source: *Water Trading Principles*

10.1.2. In order to promote and endorse the selected list of source options, a governance process was embedded that included assessment and approval from subject matter experts across the business with the formation of a Technical Assurance Group (TAG). The TAG provided technical governance for all the criteria of the SAM and its purpose was to promote options that were both viable and cost effective (measured by AIC). Qualitative assessments (H/M/L) were provided by subject matter experts for eight of the nine criteria in the SAM with the AIC values used for engineering design. The options were then taken forward to a second stage of the process for endorsement by a Solutions Assessment Group (SAG) which provided a wider, strategic assessment of options, for example stakeholder and customer implications.

10.1.3. The detailed content of the SAM including individual ratings as shown in **Table 12**. Source options are listed in geographic order from North (1) to South (27) and can be referenced against Section 2, **Figure 4**, which illustrates their locations. It should also be noted that the options contained within the SAM are subject to review and refinement, as further detailed assessments are undertaken prior to Gate 2.

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- 10.1.4. Regional water resource and network modelling will determine utilisation rates and inform the combination of selected source options at Gate 2.
- 10.1.5. The selected list of 27 source options provide flexibility to accommodate both different transfer volumes and manage the risks associated with environmental impact, resilience and customer acceptability. We therefore have a balance of sources encompassing;
- A geographical spread across the North West in line with the conjunctive nature of our existing supply network
 - A range of source types – including reservoirs, canal and river abstractions and boreholes, each with different water hardness profiles
 - New and existing abstraction locations
 - Inclusion of both UU and Third-Party sources
 - Consideration of potential inter-region transfers
- 10.1.6. A Kielder and Cow Green Reservoir initial evaluation has been undertaken on the transfer of raw water into UUs supply system, as an alternative to developing sources in the North West. These options offer a resilient water resource projected over the long term and remain viable sources, supported by the following:
- The options can potentially provide benefit to UU as well as other abstractors.
 - The costs of these options are significantly higher than source options in the North West but become more cost effective, with higher utilisation rates.
 - The EA have raised significant environmental concerns about these options, particularly invasive species and the pipeline route, which is currently designed to pass through a sensitive environment.
 - At the current cost and projected environmental impact these two options are unlikely to be accepted in Regional Plans when compared to other options at this stage.
- 10.1.7. Despite these challenges, Kielder and Cow Green Reservoirs remain viable options that have potential to form part of a preferred solution once further evaluation is undertaken prior to Gate 2. As we obtain more clarity regarding the environmental and customer acceptability issues associated with options within the North West it may be that an inter-regional transfer becomes preferable.

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Table 11 - Option costs benefit in accordance with ACWG Cost Consistency Methodology (Rev C)

Option name	Units	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Source 7	Source 8	Source 9	Source 10	Source 11	Source 12	Source 13	Source 14
Option benefit	MI/d	100	13.2	40	15	20	60	30	4	40	10	10	11	18	20
Total option benefit (NPV)	MI	867,359	123,036	359,667	139,813	186,418	539,500	279,626	38,646	359,667	93,209	93,209	98,908	161,850	179,833
Maximum Flow															
Total planning period indicative capital cost of option (CAPEX NPV)	£m	443,835,784	13,656,134	207,757,957	48,423,610	63,654,594	117,219,212	72,199,425	5,761,370	72,881,318	73,431,773	13,962,325	71,011,217	118,268,684	115,859,264
Total planning period indicative operating cost of option (OPEX NPV)	£m	101,454,495	506,345	77,372,582	6,841,581	17,551,682	49,013,587	25,070,575	3,405,983	32,702,968	11,399,744	6,485,009	13,596,922	18,677,129	21,996,048
Total planning period indicative option cost (NPV)	£m	545,290,279	14,162,479	285,130,538	55,265,191	81,206,276	166,232,800	97,270,001	9,167,353	105,584,286	84,831,517	20,447,334	84,608,139	136,945,813	137,855,311
Average Incremental Cost (AIC)	p/m ³	62.9	11.5	79.3	39.5	43.6	30.8	34.8	23.7	29.4	91.0	21.9	85.5	84.6	76.7
Carbon															
Embodied Carbon	(tCO2e)	391,399	885	93,804	11,785	22,516	17,674	10,656	675	30,447	11,493	4,008	24,156	29,117	34,452
Operational Carbon	(tCO2e)	19,163	-	12,132	1,001	3,726	5,565	4,007	368	5,892	1,703	987	4,206	4,218	3,371
Option name	Units	Source 15	Source 16	Source 17	Source 18	Source 19	Source 20	Source 21	Source 22	Source 23	Source 24	Source 25	Source 26	Source 27	
Option benefit	MI/d	9	13	20	4.5	6	8	14	10	3	10	25	24	30	
Total option benefit (NPV)	MI	83888	121171	186418	41944	55,925	74,567	125883	93209	27963	93209	224792	215800	242775	
Maximum Flow															
Total planning period indicative capital cost of option (CAPEX NPV)	£m	23,245,254	57,599,731	63,922,796	35,067,685	10,974,611	44,979,386	86,798,307	35,784,002	24,406,502	41,860,639	109,496,978	98,093,129	113,382,936	
Total planning period indicative operating cost of option (OPEX NPV)	£m	12,145,787	11,271,763	11,781,827	3,949,080	5,675,618	4,608,928	14,631,690	18,746,656	6,198,810	3,627,819	21,820,510	22,021,974	16,319,228	
Total planning period indicative option cost (NPV)	£m	35,391,041	68,871,494	75,704,623	39,016,765	16,650,229	49,588,314	101,429,997	54,530,658	30,605,312	45,488,458	131,317,489	120,115,104	129,702,164	
Average Incremental Cost (AIC)	p/m ³	42.2	56.8	40.6	93.0	29.8	66.5	80.6	58.5	109.5	48.8	58.4	55.7	53.4	
Carbon															
Embodied Carbon	(tCO2e)	8,104	10,290	6,593	3,379	3,569	5,076	14,779	3,974	4,153	6,484	27,743	8,736	16,708	
Operational Carbon	(tCO2e)	2,149	1,698	4,123	552	740	4,012	2,643	3,641	1,341	577	2,871	2,053	2,709	

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Table 12 - Solutions Assessment Matrix scorecard for source options (geographic order from North (1) to South (27))⁶

Source ID	Name	Option Type	CAPEX (£m)	CAPEX with Optimism Bias (£m)	OPEX (£m/year)	AISC (p/m3)	Drinking Water Quality	Environmental	Customer Water Acceptance	Operational Impact	Asset Resilience	Water Resources Resilience	Engineering	Stakeholder	Planning
1	Kielder to Heltondale	Reservoir	457.60	567.42	3.01	96.97	L	H	L	M	H	L	M	H	H
2	Impounding Reservoir Compensation Release Control	Reservoir	6.76	8.38	0.02	10.17	L	L	L	L	H	M	L	H	L
3	Cow Green to Heltondale	Reservoir	164.00	203.36	2.20	93.30	L	H	L	M	H	L	M	H	H
4	Killington Reservoir to Thirlmere Aqueduct	Canal Abstraction	33.25	41.23	0.20	45.04	H	H	M	M	H	M	L	H	M
5	River Greta / Wenning to Lancaster WTW	River Abstraction	46.80	58.03	0.49	50.53	M	L	L	M	H	M	M	H	M
6	River Lune Transfer	River Abstraction	70.35	87.23	1.39	32.98	H	M	M	L	M	M	L	H	L
7	Franklaw Boreholes	Borehole Abstraction	39.50	48.98	0.69	37.20	M	M	M	L	L	M	L	M	L
8	Worsthorne Borehole	Borehole Abstraction	2.40	2.98	0.01	22.45	L	L	M	M	H	L	L	L	L
9	Abstraction from Ribble (lower) - Rivington	River Abstraction	51.80	64.23	1.33	33.73	M	M	M	M	H	M	L	H	M
10	New river abstraction, River Irwell (Medlock)	River Abstraction	39.90	49.48	0.45	97.30	H	M	H	M	L	L	H	H	M
11	Hollingworth Lake	Reservoir	9.00	11.16	0.18	24.10	L	M	H	M	H	M	L	H	L
12	Randles Bridge (Royal Oak)	Borehole Abstraction	52.20	64.73	0.68	106.94	M	M	M	M	L	M	M	M	M
13	Heaton Park (River Abstraction)	River Abstraction	77.40	95.98	0.98	96.90	H	M	H	M	L	M	M	H	M
14	River Alt to Prescott WTW	River Abstraction	78.20	96.97	0.66	92.87	H	M	M	M	M	M	M	H	M
15	Bold Heath Boreholes	Borehole Abstraction	18.30	22.69	0.35	49.45	M	L	M	M	M	L	M	L	M

⁶ As there is no ACWG consistency methodology for calculating AISC, we have used a UU methodology

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Source ID	Name	Option Type	CAPEX (£m)	CAPEX with Optimism Bias (£m)	OPEX (£m/year)	AISC (p/m3)	Drinking Water Quality	Environmental	Customer Water Acceptance	Operational Impact	Asset Resilience	Water Resources Resilience	Engineering	Stakeholder	Planning
16	Lightshaw increased WTW capacity	Borehole Abstraction	30.70	38.07	0.44	60.74	M	H	M	M	M	L	M	M	L
17	Widness Borehole Group	Borehole Abstraction	32.70	40.55	0.49	46.14	M	M	H	M	M	L	M	M	L
18	Lymm Borehole and WTW	Borehole Abstraction	20.30	25.17	0.20	104.46	M	M	H	M	M	L	H	H	M
19	Tytherington Borehole	Borehole Abstraction	6.94	8.61	0.16	32.52	L	L	M	L	L	L	L	H	L
20	Simmonds Hill WTW (Manley Quarry Borehole)	Borehole Abstraction	25.40	31.50	0.37	79.39	M	M	M	L	L	L	M	M	L
21	Bramhall Borehole	Borehole Abstraction	50.10	62.12	0.48	90.92	M	L	H	L	L	L	M	H	M
22	Sandiford Increased WTW Capacity	Borehole Abstraction	20.00	24.80	0.51	65.37	M	M	M	M	L	L	M	L	L
23	Helsby and Foxhill Boreholes	Borehole Abstraction	14.30	17.73	0.14	136.89	M	M	M	M	M	L	H	M	L
24	Transfer from Wirral to Liverpool via Mersey Tunnel	Transfer	40.85	50.66	0.14	68.29	L	L	L	M	L	H	M	L	M
25	New river abstraction, Upper Mersey Bollin near Lymm	River Abstraction	68.90	85.44	0.65	64.49	H	L	H	L	L	M	M	H	M
26	Increased treatment capacity at Huntington WTW	Increase Capacity	50.50	62.62	0.65	56.00	M	L	L	L	L	H	M	M	L
27	Shropshire Union Canal (Llangollen Canal)	Canal/River Abstraction	66.90	82.96	0.72	53.80	M	H	L	M	M	M	M	M	H

Note: Metrics presented for the options in this table may differ to the metrics previously presented in the WRMP19 submission following more detailed assessment.

Source: Solution Assessment Matrix [May 2021]

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- 10.1.8. A potential combination of options from the selected list has been established to provide an indicative cost for the solution across the 5 proposed transfer volumes as outlined in Section 2, **Figure 2**. This has allowed prices to be submitted to WRSE for regional modelling purposes. As further work is undertaken on the source options to understand and manage risk and uncertainty, the options put forward will change and this will be reflected in the associated costs for the solution volumes. The solution costs include the enabling work required on the VA SRO for the five different volumes. Due to the scalability of our source options, it is possible that we could transfer volumes up to 50 MI/d by 2028, due to fewer sources being required and operational enabling activities on the VA SRO to facilitate the transfer.
- 10.1.9. With respect to calculation of cost data at Gate 1 we have actively contributed to the development of the Cost Consistency Methodology (Rev C)⁷ delivered by Mott MacDonald on behalf of the ACWG. This methodology has been shared and agreed with RAPID and we have adhered to the guidance therein in development of our solution costs, as shown in **Table 11**. This has also formed part of our external assurance process, more details of which are shown in Section 12.
- 10.1.10. Our Gate 1 cost estimates for UUS SRO are approximately 86% higher than previously estimated in PR19 (£206m versus £111m). This is a result of the following factors:
- A number of the source options identified at PR19 are no longer available having either been deemed infeasible or delivered as part of our business as usual activities. Therefore, alternative options were selected to match the deployable output requirements.
 - More detailed engineering work at Gate 1 has revealed additional scope as a result of network changes or factors previously unidentified.
 - An increase of 4.7% due to inflation.
 - Our estimates have had a number of changes to their cost structure. For example, construction risk (Tender to Outturn Adjustment) has increased from 1.5% to 4%.
- 10.1.11. We have also aligned our option selection with Green Book guidance. We believe that Gate 1 has parallels with elements of the Strategic Outline Case (SOC) phase and accordingly we have delivered a number of activities which map against the SOC guidance;
- **Critical Success Factors** – Adopted UU Water Transfer Principles that outline the criteria that must be met for water transfers to take place. These are aligned to a holistic option assessment process that evaluates all options for a range of criteria and is represented in our SAM.
 - **The Economic Case** – A long list of options have been rationalised to a selected list that represent best value for customers.
 - **The Commercial Case** – We have outlined a preferred procurement strategy for delivery of the project.
 - **The Financial Case** – Selected source options have been costed and an optimism bias applied using the Cost Consistency Methodology (Rev C). Possible funding routes have also been explored as part of our procurement strategy.
 - **The Management Case** – We have applied appropriate programme management and governance processes to manage risks and applied both internal and external assurance reviews. We have also established our forward plan for Gate 2.
- 10.1.12. These SOC cases will be further developed as part of the Gate 2 programme.

⁷ Mott MacDonald, Cost Consistency Methodology (Rev C), Technical Note and Methodology, published August 2020

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11. Impacts on current plan

- There are no impacts on our current plan. The proposed transfer of up to 180 MI/d is in alignment with our WRMP19 and maintains the supply-demand balance in the North West
- 11.1.1. In our WRMP19 submission we outlined a ‘Water Trading Adaptive Pathway’ developed in consultation with customers, stakeholders and environmental regulators. As part of this process 11 options were identified to support a transfer of up to 180 MI/d, subject to further detailed assessment.
- 11.1.2. Following Gate 1 feasibility, 2 of these options – Worthington Reservoir and Ecclestone Hill Borehole - have been removed from the list we are proposing within this submission. This is due to one or more of the following factors:
- The option has subsequently been brought into supply to support current demand requirements and is therefore unavailable for use in transfers
 - Upon further investigation and assessment the option is no longer viewed as technically viable
 - Potential changes to abstraction license conditions from environmental regulators
 - Option is no longer preferable due to customer or environmental impacts
- 11.1.3. These risks will remain as we progress through future gates and therefore we have considered it prudent to increase the portfolio of options under consideration to mitigate against more sources being discounted prior to Gate 2. We are now proposing 27 options (as seen in Section 10, **Table 12**) which provide flexibility to accommodate environmental, engineering and customer acceptability challenges while maintaining a transfer volume of up to 180 MI/d.
- 11.1.4. Although the constituent options to support a transfer have changed - and will continue to change as we undertake further assessments up to Gate 2 – the core WRMP19 assumption of a transfer volume of up to 180 MI/d is still valid and therefore does not alter the supply-demand balance outcome. Additionally, WRMP19 modelling assumed any transfer volume would be offset by new sources to maintain existing resilience. Again, this assumption remains valid.
- 11.1.5. The latest UU supply demand forecast will be published in August 2021 as part of the regional WRMP process and we will incorporate this new information into our plans during Gate 2. We have actively engaged with our water resources colleagues throughout our Gate 1 activity and we continue to align with the project team developing our WRMP24 submission.

12. Assurance

- We have successfully assured that we have delivered the RAPID Gate 1 requirements
- The UUW Board have provided a supporting Assurance Statement

Introduction

- 12.1.1. We have prepared our submission in accordance with the stated assessment criteria outlined in the “Strategic regional water resource solutions: guidance for 2021” document, published February 2021. This document highlights the following three key assessment criteria:
1. *Robustness* – throughout the programme we have adopted an approach to optioneering and feasibility that demonstrates appropriate and proportionate evidence in support of assertions. Where evidence is less compelling we have identified this alongside any plans to address it.
 2. *Consistency* – we have ensured consistency throughout the UUS SRO submission and aligned to the VA and STT SRO submissions. Our methodologies and approach align with both internal UUW and national policies and guidance. Our approach to assurance is in line with our published assurance

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framework. This has included external assurance as identified by our risk assessment, and both first and second line assurance undertaken internally. This assures the both the integrity and consistency of the information provided

3. *Uncertainty* – an active RAID log has been in place during the programme and all options considered for the Gate 1 submission have assessed risks and mitigations as part of their criteria.

Assurance framework and findings

12.1.2. Our published assurance framework has evolved over time adopting an industry recognised risk based approach. We have utilised this structured assurance framework and tailored it accordingly to ensure that the assurance that we have applied to each area of the plan is both proportionate and comprehensive. In line with our PR19 and Annual Performance Reporting (APR) assurance framework, it is comprised of five linked processes summarised below. In addition to this, where possible we have aligned the assurance framework with the STT SRO, delivered jointly with Thames Water and Severn Trent Water, in order to ensure a consistency of approach. This approach was mandated by both the STT and UUS SRO Programme Board during the initial set up phase of the programme.

- 1) Requirements— All requirements set out by RAPID have been cross referenced to a set of deliverables within each identified workstream, enabling us to ensure relevant success criteria were being met. These requirements have remained under review and when changed, deliverables have been reassessed to reflect the nature of this changing environment.
- 2) Accountability — A RACI (Responsible/Accountable/Consulted/Informed) matrix was developed and each owner was responsible for the management, risk assessment and assurance of their deliverables.
- 3) Programme management — An experienced programme management team was formed, managing the programme through a central plan reporting to the UUS SRO Programme Board.
- 4) Risk assessment — Each deliverable went through a risk assessment, with this process being used to determine both the level of governance that was to be applied to the deliverable and the level of assurance required. This is in line with our published assurance framework.
- 5) Robust assurance processes — A structured and risk-based three lines of assurance process was applied to the deliverables within the programme. This included the use of an assurance partner (Deloitte LLP), internal corporate audit reviews and a range of subject matter expert (SME) reviews and challenges.

Confidence and assurance in our programme

12.1.3. Utilising this existing approach provides confidence to the UUW Board that we are addressing all RAPID's requirements. The coverage of each line is summarised below:

- 1) First line assurance: Developing and maintaining sound processes, systems and controls.

Accountability for first line assurance of each area of the programme was assigned to the workstream leads that owned and managed that area of the plan. Fundamental to this concept is that those responsible for delivery are ultimately responsible for assurance of that deliverable.
- 2) Second line assurance: Providing the enabling framework and governance for the development of the plan.

Second line assurance and approval of the programme was provided by subject matter experts who oversee or specialise in risk management. Second line assurance was delivered independently of the deliverable owner, but was coordinated with the owner. The second line also monitored and provided assurance on the quality and robustness of the submission through

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peer review and challenge. All second line assurance was recorded when carried out, centrally collated with an auditable trail.

3) Third line assurance: Providing independent review and assurance of the plan.

- 12.1.4. We undertook a detailed and wide-ranging independent review of our programme. The main purpose of the independent assurance was to provide external review and feedback to the deliverable owner and sponsors; with this being used to provide the Executive and Uuw Board with independent assurance and confidence in the quality of the submission prior to sign off. Since accepting the PR19 FD in January 2020, our approach to assurance was presented to the Uuw Board in October 2020 with a further interim update in February 2021, prior to the final sign off which took place in June 2021.
- 12.1.5. At the start of the programme we appointed a central assurance provider, Deloitte LLP who provided early assurance on the programme and its governance, with further scheduled reviews at key stages.
- 12.1.6. The scope of the initial review was based around the set up and the structure of the programme, the scope of the assurance activity and targeted reviews of deliverables during the development of the plan. The second review, was a more detailed review in to deliverables and project cost allocations as well as confirming the assurance was completed in line with the plan. Deloitte reported no significant issues requiring senior management intervention. All actions raised as a result of these reviews have been addressed and closed off as complete. The Deloitte report concluded *“Following the completion of our work as above, UU has confirmed to us that the programme teams have completed the recommendation actions raised in respect of our findings, and these have been assured through the programmes’ internal governance mechanisms. Based on completion of these actions as advised by UU, on the basis of the work we performed, we are not aware of any matters that would affect UU’s decision to progress to Gate 2”*.
- 12.1.7. The Uuw Board have provided a supporting Assurance Statement confirming they are satisfied that the data and approaches used to develop the concept design and decision making information meet the requirements of the Gate 1 submission.

13. Solution or partner changes

- We recommend that the UUS and VA SROs are merged post Gate 1 to provide a single coherent transfer strategy
 - There have been no changes in solution partner or solution substitutions at Gate 1
 - Inclusion of Kielder or Cow Green Reservoir source options, may lead to a joint SRO being proposed at Gate 2
- 13.1.1. Our feasibility work at Gate 1 has illustrated the mutually inclusive nature of the VA and UUS SROs as they deliver a single output – a transfer volume released into the River Vyrnwy. Each SRO can only be progressed through a gate in conjunction with the other and therefore we are proposing that they are merged into a single SRO post Gate 1. This would provide a single coherent strategy (and future delivery programme) encompassing the ‘end to end’ system.
- 13.1.2. The majority of source options are located within our operating region and will interface with our existing asset base. We therefore anticipate working independently in delivering these solutions should they be approved through the RAPID gated process.
- 13.1.3. An exception to this principle are two sources from outside the UU operating region. We are considering transfers from Kielder and Cow Green Reservoirs which are assets operated by Northumbrian Water. We have initiated positive discussions between the two companies and these will be progressed as part of Gate 2. Due to their scale, complexity and strategic nature, if either of

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these source options are selected as part of our Gate 2 preferred solution it may lead to a joint proposal for a new SRO to be developed in alignment with RAPID's criteria for new solutions.

14. Efficient spend of gate allowance

- We confirm that our Gate 1 outturn is forecast to be below the PR19 FD allocation
- We believe our expenditure to Gate 1 has been efficient, as we have adhered to the criteria provided by RAPID for efficient expenditure, namely that activities should be relevant, timely, complete and of high quality
- We forecast to deliver Gate 2 activities within the PR19 FD allocation

14.1.1. The PR19 FD allowance for UUS SRO is £7.2m, with a 10% allocation to Gate 1 equating to £0.72m. We confirm that our total Gate 1 outturn forecast is £0.668m (92.77% of allocation) based on actual costs incurred to March 2021 combined with forecast expenditure to the end of Gate 1. We understand that this underspend of £0.052m (7.23%) may be available for future activity and customer share, should this scheme progress to Gate 3.

14.1.2. An overview of the Gate 1 expenditure is shown in **Table 13** below. An element of the underspend was due to the deferment of customer acceptability Hall Tests, now scheduled for Gate 2.

Table 13 - Cost overview to Gate 1 - 4

Description	Cost £m	Comments
Gate 1 Allowance @ 17/18 prices	£0.720m	10% of total allowance
Gate 1 costs	£0.566m	Based on actuals to March 2021 and forecast to Gate 1, in 17/18 price base
Third-Party costs	£0.102m	Funding for EA, NE, NRW (NAU)
Total Gate 1 costs	£0.668m	A breakdown of these costs is shown in Table 14
Variance (underspend)	£0.052m	Forecast expenditure is 7.23% less than the PR19 FD allocation
Forecast Gate 2 costs @ 17/18 prices	£1.080m	Based on current forecast
Gate 3 & 4 allowances @ 17/18 prices	£5.400m	Remaining total of allowance

The UUS SRO forecast outturn is based on actual cost through to end March 2021 and forecast to 5th July 2021 with deflation using CPI-H indexes

Table 14 - Breakdown of costs against activities undertaken to Gate 1

UUS SRO Workstreams	Spend Proportion (%)	Value of spend (£)	Description
Programme Direction & Governance	7.32%	£48,929	Activities including day-to-day liaison, reviews, decision making and oversight; Programme and Steering boards; managing in-company assurance, reporting and governance; ACWG, Regional Co-ordination Group, RAPID 'Task & Finish' and cross-SRO interfaces and support.
Programme Management & Delivery	11.93%	£79,678	Senior programme resources, plus PMO, scheduling and PM workstream support.
Assurance & Submission Production	8.42%	£56,221	Assurance activities including third line assurance and the management of the submission through the internal review and approval processes.
Commercial	4.36%	£29,113	Assessment and development of initial Gate 1 procurement strategy for the SRO.

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UUS SRO Workstreams	Spend Proportion (%)	Value of spend (£)	Description
Engineering	30.44%	£203,327	Identification and assessment of source options, completing feasibility, technical and cost estimating assessments to support the development a number of selected options available for this SRO.
Network Modelling	4.44%	£29,652	Identification and assessment of source options requiring water and wastewater network modelling including water quality blending assessments and initial wastewater catchment feasibility studies.
Environmental	30.96%	£206,801	We have undertaken environmental assessments of the SRO options following the principles of SEA, HRA and WFD assessment. In addition, we have completed a high-level NCA, BNG assessment and INNS assessment. It also includes NAU third party charges to support these SRO activities.
Stakeholder & Planning	2.14%	£14,263	Stakeholder engagement planning and activities. Carried out customer research via two studies. An element of the underspend was due to the deferment of customer acceptability Hall Tests, now scheduled for Gate 2. (See Section 3). Development of initial Gate 1 planning consents strategy.
Total Costs	100%	£667,985	

Note: (i) All figures are deflated to 17/18 cost base.

- 14.1.3. In delivering the submission we have adhered to the criteria provided by RAPID for efficient expenditure, namely that activities should be relevant, timely, complete and of high quality, and that this should be backed by benchmarking and assurance activity.
- 14.1.4. Expenditure to Gate 1 has been efficient as evidenced by, packages of work only being promoted if they support delivery of the Gate 1 requirements outlined in the PR19 FD. This has been validated through a mapping exercise of project deliverables against PR19 FD requirements.
- 14.1.5. Where possible we have utilised UU Framework Agreements to award packages of work. These frameworks have been competitively tendered and externally benchmarked to ensure value for money for customers. Utilisation of these frameworks has also expedited delivery of work as contractual terms have been agreed in advance.
- 14.1.6. Where possible we have sought to maximise internal resources before engaging external contractors as this tends to deliver greater value. We have driven efficiencies by using a small core programme team, supported by technical experts.
- 14.1.7. We have continuously monitored budgets and reported on a monthly basis to the UUS SRO Programme Board to ensure costs are in line with forecasts and any negative variances have been rectified by the delivery of recovery plans.
- 14.1.8. We have also actively engaged with the ACWG, contributing funding to consistency projects (e.g. WRSE customer research).
- 14.1.9. Expenditure is only for relevant work in AMP7 and to the UUS SRO. There is no carryover of AMP6 spend. There is no expenditure claimed against 'business as usual' WRMP or other non-SRO related activities.

Forecast spend to Gate 2.

- 14.1.10. The PR19 FD allowance to Gate 2 is £1.08m based on a 15% allocation of £7.2m total funding. The forecast spend for Gate 2 is equal to this value, leaving a contingency value of £0 (0%).
- 14.1.11. We have developed a bottom-up Gate 2 budget through engagement with workstream leads and external stakeholders including the NAU, NRW and the Drinking Water Inspectorate. We have referenced the Gate 2 requirements published in the PR19 FD, and mapped activities and deliverables

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to achieve those outcomes. A detailed programme for Gate 2 is available in our response to Section 15.

14.1.12. It should be noted that this is a forecast and is based upon a number of assumptions, dependencies and risks.

14.1.13. We can confirm that our Gate 1 expenditure has been assured by Deloitte LLP.

15. Proposed Gate 2 activities and outcomes

- We have developed a detailed programme to deliver Gate 2 requirements as outlined in the PR19 FD
- We propose that the delivery incentive methodology applied at Gate 1 is equally applicable to Gate 2 and will ensure consistent appraisal of submissions

15.1.1. To develop our activities and outcomes to Gate 2 we have undertaken a workstream level gap analysis to understand the work packages required to meet the requirements for Gate 2 as stated in the PR19 FD. A summary of this is shown in **Table 15** below.

Table 15 - Gate 2 Activities and Outcomes

PR19 FD Gate 2 Requirements	Activities	Outcomes
Detailed feasibility, data collection and detailed design report	<ul style="list-style-type: none"> ▪ Water resource modelling ▪ Network/hydraulic modelling ▪ EA wastewater modelling ▪ Selected site audits and route selection ▪ Asset integrity review and surveys ▪ Source level drinking water quality assessments ▪ Environmental Monitoring Plan as agreed with the NAU 	<ul style="list-style-type: none"> ▪ Network profiles ▪ Testing schedule and required output ▪ Completed site surveys ▪ Completed / updated Asset register ▪ Water quality assessment report ▪ Updated Environmental assessments ▪ Updated Gate 2 Conceptual Design Report
Procurement strategy including assessment for potential direct procurement for customers' delivery	<ul style="list-style-type: none"> ▪ Undertake an updated DPC assessment of proposed solution. ▪ Conduct an updated assessment of contracting options for risk, delivery, cost and market appetite. 	<ul style="list-style-type: none"> ▪ An updated DPC assessment ▪ An assessment of the optimum contracting options/ commercial models for delivery of Gate 3 activities
Pre-planning application activity plan (land referencing, field surveys, environmental permitting plans)	<ul style="list-style-type: none"> ▪ Initiating land surveys over Winter 2021/2022 ▪ Initiating land access for surveys Spring/ Summer 2022 ▪ Engagement with relevant stakeholders/planning authorities 	<ul style="list-style-type: none"> ▪ Completed land surveys ▪ Updated Stakeholder engagement plan and outcomes
Assessment of key risks to identify potential regulatory barriers, guidance or changes required for the solution to progress	<ul style="list-style-type: none"> ▪ Management of assumptions, risks and issues including identification and delivery of mitigating actions where applicable. 	<ul style="list-style-type: none"> ▪ Updated RAID log ▪ Continued participation in regulatory Task & Finish Groups

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PR19 FD Gate 2 Requirements	Activities	Outcomes
Identification of mutually exclusive solutions	<ul style="list-style-type: none"> ▪ Identification of mutually exclusive source options due to unacceptable impacts on a single catchment or a single supply zone 	<ul style="list-style-type: none"> ▪ Updated Gate 2 Conceptual Design Report
Full comparison of solutions' costs and benefits as tested in regional modelling	<ul style="list-style-type: none"> ▪ Review/assess AIC & AISC & DO and include benefits ▪ Further water resource and network modelling 	<ul style="list-style-type: none"> ▪ Updated AIC & AISC calculations ▪ Updated DO calculations
Updated regional stakeholder engagement including customer preference studies	<ul style="list-style-type: none"> ▪ Customer Acceptability Research (Hall Tests carried over from Gate 1) ▪ Public Consultations (where required) ▪ Alignment with WRMP and regional planning stakeholder engagement. 	<ul style="list-style-type: none"> ▪ Full regional based stakeholder plan for UUS SRO ▪ Further customer research
Identification of any changes in solution partner (other water company) or solution substitutions	<ul style="list-style-type: none"> ▪ Continued engagement with Northumbrian Water regarding Kielder and Cow Green Reservoir source options 	<ul style="list-style-type: none"> ▪ Gate 2 Submission for a Kielder SRO (if identified as a preferred option) ▪ Memorandum of Understanding with Northumbrian Water (if required)
Assurance of data and approaches	<ul style="list-style-type: none"> ▪ Continued proactive engagement with the UUW Board ▪ Complete/action assurance activity required ▪ Engagement with external assurance and internal Corporate Audit, as required 	<ul style="list-style-type: none"> ▪ Development of the Assurance Approach ▪ UUW Board Assurance Statement ▪ Completed risk assessment
Proposals for Gate 3 activity and outcomes, and penalty assessment criteria and contributions	<ul style="list-style-type: none"> ▪ Development of Gate 3 Programme detailing activities, timescales and deliverables 	<ul style="list-style-type: none"> ▪ Gate 3 Programme ▪ Delivery Incentive Proposal

Source: Gate 2 Programme Plan

- 15.1.2. Sections 3 and 9 set out the key dependencies, assumptions and risks. While there are a number of key technical and commercial aspects to be addressed as the scheme develops, at this stage we do not anticipate any solution delay impacts for the delivery of Gate 2.
- 15.1.3. With respect to delivery incentives we propose that the criteria and methodology applied at Gate 1 should also be applied at Gate 2. We believe that the requirements for Gate 2 will require SROs to undertake similar activities and schemes should have reached a comparable level of maturity to enable comparisons to be made regarding the viability of solutions, and therefore the schemes should also be assessed against a common set of delivery incentives.
- 15.1.4. This approach aligns with the rationale stated in the PR19 FD for the introduction of customer cost-sharing at Gate 2 stage 'After Gate 2 the certainty of costs is also reduced as primarily desk-based activities move to predominantly site investigations and interactions with external bodies as part of planning activities'. We agree that after Gate 2 it is likely that SRO activities and timescales will begin to diverge due to the differing nature of the projects in terms of scale and complexity as they transition towards delivery stage – for example SROs may adopt different planning and procurement routes - and therefore we propose that bespoke delivery incentives are applied from Gate 3 onwards.

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16. Conclusions and recommendations

- We have delivered our Gate 1 programme on time and within budget
- We recommend that the UUS SRO progresses to Gate 2
- We have selected 27 source options for further detailed assessment
- The UUS SRO can enable a range of transfer volumes up to a maximum of 180 MI/d in conjunction with VA SRO
- We are on track to deliver the Gate 2 requirements

16.1.1. The key conclusions from our preliminary feasibility assessment are as follows;

- We recommend that the UUS and VA SROs are merged post Gate 1.
- The UUS SRO is able to support a transfer of up to 180 MI/d (in conjunction with the VA SRO) and we therefore recommend progression to Gate 2 for further detailed assessment.
- There are sufficient water sources in the North West to compensate for a transfer of up to 180 MI/d based on the utilisation figures provided by Thames Water as part of the WRMP19 process.
- We have selected 27 source options for further detailed assessment prior to Gate 2.
- We are able to offer scalability of transfer volumes up to 180 MI/d.
- The Town and Country Planning Act 1990 (TCPA) is the current recommended planning route.
- Our initial assessment is that the UUS SRO does not meet the criteria for a DPC procurement approach.
- Customers have concerns around potential water source changes to facilitate transfers and we will need to address these concerns as part of our Gate 2 investigations.
- The earliest delivery dates for the UUS SRO ranges from 2028 (for transfers up to 50 MI/d) to 2033 for the maximum transfer of 180 MI/d due to the dependency on the completion of the VA SRO (assuming a clear justification to support the planning applications is evidenced in the WRMPs and Regional Plans).
- The possible introduction of the Kielder or Cow Green Reservoir source options would lead to a change in procurement strategy, planning strategy and associated delivery dates

16.1.2. We have a good understanding of the key risks involved with delivering our scheme and have plans in place to mitigate those risks. We do not foresee any risk or barrier, which would prevent this SRO proceeding to Gate 2.

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Water for the North West