United Utilities Sources – WFD Environmental Assessment Report

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Technical note:
Water Framework Directive Screening Assessment of the United Utilities Sources Strategic Resource Option

1. Introduction

1.1.1 The United Utilities Sources (UUS) Strategic Resource Option (SRO) is being delivered by United Utilities (UU) and is one of three SROs the water company is participating in, the others being United Utilities Vyrnwy Aqueduct (UUVA) and Severn to Thames Transfer (STT). 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.

1.1.2 To meet the Regulators' Alliance for Progressing Infrastructure Development (RAPID) Gate 1 submission environmental requirements[1], the UUS SRO must be subject to a range of environmental assessments. As part of this process, UU commissioned Wood Environment and Infrastructure Solutions Ltd (Wood) to undertake a Water Framework Directive (WFD) Screening Assessment of the options identified for the SRO.

1.1.3 This Technical Note presents the findings of the WFD Screening Assessment of the UUS SRO options being taken forward at Gate 1. It has used an assessment methodology applied to the water resource management options developed in support of UU's Water Resources Management Plan 2019 (WRMP19)[2].

1.2 United Utilities Sources Strategic Resource Option

1.2.1 The UUS SRO is one of 17 schemes promoted by Ofwat in the PR19 Final Determination[1] to identify new strategic water resources to address the water needs set out in the National Framework for Water Resources[3]. The SRO programme is managed by RAPID and governed through a gated process during AMP7 with the purpose of selecting the strategic resource options which provide best value for customers for delivery in AMP8. The gates are:

- **Gate 1:** Initial concept design and decision making;
- **Gate 2:** Detailed feasibility, concept design and multi-solution decision making;
- **Gate 3:** Developed design, finalised feasibility, pre-planning investigations and planning applications;
- **Gate 4:** Planning applications, procurement and land purchase.

[1] See Ofwat (2019) *PR19 final determinations: Strategic regional water resource solutions* and RAPID (2020) Accelerated *Gate One Assessment –summary of process and criteria Version 2*.
[2] United Utilities (2019) *Final Water Resources Management Plan 2019*. Available from https://www.unitedutilities.com/globalassets/z_corporate-site/about-us-pdfs/wrmp-2019---2045/final-water-resources-management-plan-2019.pdf [Accessed March 2021[.
[3] Environment Agency (2020) *Meeting our future water needs: a national framework for water resources*. Available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/872759/National_Framework_for_water_resources_main_report.pdf [Accessed September 2020].

1.2.2 Gate 1 of this process takes place in July 2021 and involves initial concept design and decision making. The Gate 1 decision, if supportive, will provide further funding for development of the schemes and the selected options will be included in the plan development process for the Regional Olans and Water Resources Management Plans 2024 (WRMP24s), as appropriate

1.2.3 The purpose of the UUS SRO, alongside the UUVA SRO, is to support the STT SRO proposal to transfer up to 180 mega litres per day (Ml/d) of water from Lake Vyrnwy to the Thames Water region via the River Severn by maintaining supply resilience to UU customers if water were to be transferred out of region.

1.2.4 Source options for the UUS SRO have been evaluated in terms of their benefits and costs and subject to environmental assessment in accordance with RAPID's Gate 1 requirements. This process has informed the selection of a preferred list of 27 options for the SRO including groundwater enhancement, improved reservoir release control, local interconnection and treatment, and river abstraction. The preferred list of options is presented in **Section 2** of this Technical Note.

1.2.5 It should be noted that, at this stage, the preferred options for the UUS SRO have not been selected. The options will be selected by Gate 2 (October 2022) with those ultimately chosen being dependent upon further assessment (including WFD Assessment), investigation and the volume of water required for trading.

1.3 RAPID's Environmental Requirements

1.3.1 RAPID has requested environmental information from water companies to support their respective SROs as part of the Gate 1 submission (July 2021). To meet RAPID's Gate 1 submission requirements[4], UU is to provide the following information for the UUS SRO options being taken forward:

- Initial option-level environmental assessments that meet local requirements and comply with Strategic Environmental Assessment (SEA) and Habitats Regulations Assessments (HRA) requirements, including consideration of in-combination effects and identification of environmental risks that need mitigating through the solution design and costing.
- Initial environmental, social, and economic valuations (or metric benefits) consistent with principles in the National Planning Statement and Water Resource Planning Guidelines.

1.3.2 To meet RAPID's requirements, the following environmental assessments have been completed:

- Strategic Environmental Assessment[5] (SEA);
- Habitats Regulations Assessment[6] (HRA);
- WFD Screening Assessment[7];
- Natural Capital Assessment (NCA);
- Biodiversity Net Gain (BNG) Assessment;
- Invasive Non-native Species (INNS) Risk Assessment.

[4] See Ofwat (2019) *PR19 final determinations: Strategic regional water resource solutions* and RAPID (2020) Accelerated *Gate One Assessment –summary of process and criteria Version 2*.
[5] *Statutory Instrument No.1633 - The Environmental Assessment of Plans and Programmes Regulations 2004.*
[6] *Statutory Instrument No.1012 - Conservation of Habitats and Species Regulations 2017.*
[7] *Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (the Water Framework Directive).*

1.3.3 This Technical Notes relates to the WFD Screening Assessment.

1.4 Water Framework Directive Assessment

Overview

1.4.1 The WFD[8] came into force in 2000 in the European Union (EU) and was transposed into UK law in 2003 with the principal aims of protecting and improving the water environment and promoting the sustainable use of water. Environmental Quality Standards (EQSs) for priority substances have been set by so-called 'daughter' directives to the WFD, in the form of the EQS Directive[9] and subsequent amendments (EQSD)[10] and the Groundwater Directive (GWD)[11]. The environmental objectives of the WFD and its daughter directives are to:

- Prevent deterioration of aquatic ecosystems;
- Protect, enhance and restore water bodies to good status, which is based on ecology (with its supporting hydromorphological and physico-chemical factors) and chemical factors for surface water, and water quantity and chemical status for groundwater;
- Comply with water related standards and objectives for environmentally protected areas established under other EU legislation, e.g. The Habitats Directive 92/43/EEC;
- Progressively reduce pollution from priority substances and cease or phase out discharges from priority hazardous substances; and
- Prevent or limit input of pollutants into groundwater and reverse any significant or sustained upward trends in the concentration of any groundwater pollutant.

1.4.2 The WFD sets a default objective for all rivers, lakes, estuaries, groundwater and coastal water bodies to achieve good status or potential by 2027 at the latest. Where it is not possible to achieve this (e.g. due to disproportionate costs), alternative water body objectives can be set. The current (baseline) status (e.g. 2015 classification), and the measures required to achieve the 2027 status objective, are set out for each water body in the relevant River Basin Management Plans (RBMPs), prepared by the Environment Agency (EA) and Natural Resources Wales (NRW) every six years.

1.4.3 The draft Water Resources Planning Guideline[12] provides a framework for the development of WRMPs; as the options for the UUS SRO are likely to be considered in WRMP24 and Regional Plan development, it is important that the Guideline is also taken into account. Regarding WFD assessment, the Guideline sets out that water companies:

- must ensure that feasible options support the achievement of the RBMP environmental objectives;

[8] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (the Water Framework Directive).
[9] Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council (the Priority Substances Directive).
[10] Directive 2013/39/EU of the European Parliament and of the Council of 12 August 2013 amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy.
[11] Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration (the Groundwater Directive) including Commission Directive 2014/80/EU which amends Annex II of the original Directive 2006/118/EC
[12] Environment Agency, Ofwat and Natural Resources Wales (2020) *Water Resources Planning Guideline Draft for consultation – July 2020*.

- need to assess new supply options against the RBMP measures and objectives for each water body and meet their obligations to avoid future deterioration;
- should confirm that there is no risk of deterioration from a potential new abstraction or from increased abstraction at an existing source;
- should ensure that any options do not prevent the achievement of good status (or potential).

1.4.4 Reflecting the draft Water Resources Planning Guideline, the All Company Working Group (ACWG) has developed guidance[13,14] on environmental assessment for SROs. This sets out that "*As part of the SRO assessment process, it must be demonstrated that an option will not cause the deterioration in status of any water bodies, as measured and defined in the Water Framework Directive (WFD). This assessment should include and consider any mitigation methods that would be put in place to protect a water body status*." At Gate 1, the ACWG Guidance sets out that a WFD screening assessment should be undertaken.

1.4.5 The National Assessment Unit (NAU), which includes representatives from the EA and Natural England (NE), has been established to provide strategic advice and guidance to water companies on environmental matters pertaining to the SROs, including the UUS SRO. Both the NAU and NRW have confirmed that their Gate 1 expectations include for WFD requirements to be taken into account in the initial environmental assessments completed for the UUS SRO.

WFD Assessment of the UUS SRO

1.4.6 In accordance with the requirements outlined above, a WFD Screening Assessment has been undertaken to identify if the options currently being considered for the UUS SRO would cause a deterioration in baseline conditions and, for those water bodies that are not currently attaining good status, where the options would not preclude the delivery of measures to facilitate the improvements needed to attain good status.

1.4.7 The WFD Screening Assessment of the UUS SRO options has been undertaken in two phases:

- **Phase 1**: Screening of the initial list of feasible options identified for the SRO, to assist UU in identifying those options to be taken forward at Gate 1[15];
- **Phase 2:** Further assessment of the preferred list of feasible options for the SRO to take into account regulator feedback and support UU's selection of the preferred solution post-Gate 1 (this report).

1.4.8 It should be noted that this WFD Screening Assessment is not the 'final' or 'full' WFD assessment that will be undertaken for the SRO. In accordance with the ACWG guidance, the assessment will be refined at each gate, and once the preferred solution for the SRO has been identified, to take into account further investigations/monitoring, developed design and/or mitigation. The full WFD assessment cannot be undertaken at Gate 1 as a preferred solution hasn't been selected and engagement with regulators has identified a need for further investigations post-Gate 1. It is therefore currently envisaged that this work will be undertaken concurrent with the wider WRMP24 and Regional Plan development process and will continue to the project/consenting stage post-Gate 2.

[13] Mott MacDonald (2020) *All Companies Working Group WRMP environmental assessment guidance and applicability with SROs*.
[14] Mott MacDonald (2020) *All Company Working Group Water Framework Directive: Consistent framework for undertaking no deterioration assessments*.
[15] Wood (2021) Technical note: WFD Screening Assessment of the United Utilities Sources and Vyrnwy Aqueduct Strategic Resource Options.

1.5 This Technical Note

1.5.1 This Technical Note presents the findings of the WFD Screening Assessment for the preferred list of UUS SRO feasible options. The remainder of this Technical Note is structured as follows:

- **Section 2:** Describes the options identified for the UUS SRO;
- **Section 3:** Outlines the methodology for the WFD Screening Assessment;
- **Section 5:** Summarises the results of the WFD Screening Assessment;
- **Section 6:** Presents the conclusions of the WFD Screening Assessment and sets out the next steps in the assessment process.

2. The United Utilities Sources SRO Options

2.1 Overview

2.1.1 The options for the UUS SRO being taken forward at Gate 1 have been selected following a process of options identification and appraisal. UU initially identified a long list of possible options that were subject to an initial round of screening (Primary Screening) to identify a total of 37 feasible options for the SRO. These feasible options were then assessed in terms of their Average Incremental Cost (AIC), modelled to determine their water resource benefit and subject to initial environmental assessment including WFD screening. Taking into account the AIC and the findings of the initial environmental assessments, as well as ongoing engagement with stakeholders, a preferred list of 27 feasible options for the UUS SRO has been identified.

2.2 United Utilities Sources SRO Options

2.2.1 In total, 27 options are being taken forward by UU at Gate 1. These options are summarised in **Table 2.1.**

Table 2.1 UUS SRO Options

Option Number	Gate 1 Ref	Option Name	Summary Description
STT019	24	Transfer from Wirral to Liverpool via Mersey Tunnel	[✂]
STT029	6	River Lune Transfer	[✂]
STT034	11	Hollingworth Lake	[✂]
STT041	13	Heaton Park	[✂]
WR001	14	River Alt to Prescot WTW	[✂]

Option Number	Gate 1 Ref	Option Name	Summary Description
WR010	5	River Greta River Wenning to Lancaster	[✂]
WR049b	9	Abstraction from Ribble (lower) - Rivington	[✂]
WR076	25	New river abstraction, Upper Mersey (e.g. Bollin @ Lymm)	[✂]
WR099b	8	Worsthorne BH	[✂]
WR101	7	Franklaw BHs	[✂]
WR102b	17	Widnes BH Group	[✂]
WR102e	15	Bold Heath BHs	[✂]
WR105a	18	Lymm BH and WTW	[✂]
WR107b	12	Randles Bridge (Royal Oak).	[✂]
WR112	21	Bramhall Borehole	[✂]
WR113	19	Tytherington BH	[✂]
WR123	23	Helsby and Foxhill BHs PBD	[✂]
WR141	10	New river abstraction, River Irwell (e.g. Medlock)	[✂]
WR149	16	Lightshaw increased WTW capacity (SW)	[✂]
WR153	20	Simmonds Hill WTW (Manley Quarry BH)	[✂]
WR154	22	Sandiford Increased Capacity	[✂]
WR159	2	Individual Reservoirs Compensation Release Control	[✂]
WR810	3	Cow Green to Heltondale	[✂]
WR812	1	Kielder to Heltondale	[✂]
WR814a	26	Increased treatment capacity at Huntington WTW	[✂]

Option Number	Gate 1 Ref	Option Name	Summary Description
WR815	4	Killington Reservoir to Thirlmere Aqueduct	[✂]
WR821	27	Llangollen Canal	[✂]

3. Assessment Methodology

3.1.1 Each of the UUS SRO options have been assessed using the same assessment methodology employed for UU's draft WRMP19 feasible options, as set out in detail in the Final Water Resources Management Plan 2019: Water Framework Directive Assessment Report[16]. A summary of the methodology is provided below.

3.1.2 The approach to screening that has been adopted is broadly consistent with the ACWG guidance. It should be noted that the methodologies for the WFD assessments of the WRW Regional Plan and associated water company WRMP24s are (at the time of writing) currently being developed. In consequence, post-Gate 1, there will be a need to review the approach to the WFD assessment of the UUS SRO options to ensure that there is consistency with the methodologies employed for the assessments of the Regional Plan and WRMPs. However, at this stage, it is not anticipated that any such review would materially affect the findings of the assessment presented in this Technical Note.

3.2 Step 1: Collation of Option Data

3.2.1 The WFD screening assessments for each option are based on the engineering scope information provided by UU. Information has been provided on likely option 'activities' (e.g. new surface water abstraction, new pumping stations etc.) and locations. The engineering scopes are typically high-level documents, to enable desk top assessment, and do not contain information on construction methods, or the exact locations or designs of the new infrastructure. It is envisaged that this information will be made available at subsequent gates.

3.3 Step 2: Level 1 Screening of Options

3.3.1 Each option has been broken down into its main constituent parts ('activities') based on construction and operational phases. This includes activities such as:

- **Construction phase**; trenching and laying of new pipelines, building new abstraction infrastructure (e.g. installation of new river intakes, pumping stations), refurbishment of current infrastructure; and
- **Operational phase**: abstractions, discharges, maintenance of pipelines.

3.3.2 The likely impact of each activity has been assigned based on the definitions of impacts described in **Table 3.1**.

[16] Wood (2019) *Final Water Resources Management Plan 2019: Water Framework Directive Assessment Report*. Available from https://www.unitedutilities.com/globalassets/z_corporate-site/about-us-pdfs/wrmp-2019---2045/final-water-resources-management-plan-2019-water-framework-directive-assessment.pdf [Accessed March 2021].

Table 3.1 Impact Classification Categories

Level of impact	Description of impact
No or minimal impact	No measurable change in the quality of the water environment or the ability for target WFD objectives to be achieved.
Minor level of impact	Impacts from the option when taken on their own have the potential to lead to a minor localised, short-term, and fully reversible effect on the quality of the water environment that would not result in the lowering of WFD status. Impacts would be very unlikely to prevent any target WFD objectives from being achieved.
Medium level of impact	Impacts when taken on their own have the potential to lead to a widespread or prolonged effect on the quality of the water environment that may result in the temporary lowering of WFD status. Impacts have the potential to prevent target WFD objectives from being achieved.
High level of impact	Impacts when taken on their own have the potential to lead to a significant effect and permanent deterioration of WFD status. Impacts have a high risk of preventing target WFD objectives from being achieved.

3.3.3 Some activities (e.g. pipeline construction) are highly unlikely to have more than a minor level of impact on a WFD water body, irrespective of WFD status. This is because the activities are limited in spatial extent, will occur for a short duration in time, and/or have limited scope for interaction with the water environment at the WFD water body scale. The Level 1 screening assessment has assumed that all construction activities will be undertaken in line with good practice construction and pollution control measures, and that all relevant consents would be secured, and all regulatory conditions complied with (refer to **Section 3.5**).

3.3.4 Other activities have the potential for a medium or high level of impact on a WFD water body (it should be noted that no options have been identified as having a high level of impact at this stage). These include activities that could have long term impacts on water resources (e.g. a new surface water abstraction), or involve large scale construction activities that could result in extensive physical modification within the water body (e.g. construction of a new reservoir; embankment raising of an existing reservoir).

3.3.5 **Table 3.2** summarises the Level 1 screening impacts from the activities that make up the options.

3.3.6 For options that comprise of activities with a medium or high level of impact, the water bodies that the option could affect have been identified by comparing the UU engineering scopes to the spatial extent of WFD water bodies obtained from the EA's Catchment Data Explorer website[17] and NRW's Water Watch website[18], and the activities assigned to the relevant water bodies.

3.3.7 Water bodies that only include activities with a no or minimal or a minor level of impact have not been taken forward for the more detailed Level 2 screening. Options that include any activity that may have a medium or high level of impact have been taken forward for Level 2 screening.

3.3.8 In undertaking the Level 1 screening, consideration has also been given to feedback from the EA, NE and NRW on the options identified for the SRO (see **Section 3.6)**.

[17] EA Catchment data explorer, accessed September 2020: http://environment.data.gov.uk/catchment-planning/
[18] NRW Water Watch website, accessed September 2020: http://waterwatchwales.naturalresourceswales.gov.uk/en/

Table 3.2 Level 1 Screening Impacts from Option Activities

Level of impact	Construction activities	Operation activities	Level 1 screening result
No or minimal impact	• Trenching and laying of pipelines within the interfluves of a catchment (i.e. involving no watercourse crossings); • Modification of an existing water treatment works; • Construction of a new water treatment (set back from a watercourse); • Construction of new abstraction borehole headworks and associated surface infrastructure.	• Maintenance of pipelines; • Maintenance and use of pumping stations and water treatment works; • Maintenance and use of river intakes/outfalls; • Maintenance and use of abstraction borehole headworks and surface infrastructure.	Screened out of Level 2 detailed assessment
Minor level of impact	• Trenching and laying of pipelines involving watercourse crossings; • Construction or modification of a new pumping station and/or river intake; • Construction of new outfall structure to a watercourse or reservoir; • Refurbishment of existing abstraction boreholes or drilling of new abstraction boreholes.	• Transfer of water to an existing reservoir; • Use of existing surface water abstraction licences, within existing licence conditions and recent actual abstraction patterns.	Screened out of Level 2 detailed assessment
Medium level of impact		• New or increased surface water abstraction; • New or increased groundwater abstraction; • Use of existing groundwater abstraction licences, within existing licence conditions but beyond recent actual abstraction patterns.	Screened in to Level 2 detailed assessment
High level of impact	• Construction of new impounding reservoir (e.g. resulting in the impoundment of an existing watercourse); • Modification to existing reservoir (e.g. embankment raising or new lining).	• Presence of new reservoir or modified existing reservoir.	Screened in to Level 2 detailed assessment

3.4 Step 3: Level 2 Detailed Assessment of Potential Impacts

3.4.1 Where the Level 1 screening of options has indicated that an activity may have a medium or high level of impact on a water body, further assessment of the potential impacts has been undertaken (it should be noted that no options have been identified as having a high level of impact at this stage).

3.4.2 The EA's Catchment Data Explorer website[19] and the NRW Water Watch website[20] were used to collate baseline WFD classification data for each water body for the Level 2 assessments. The Level

[19] EA Catchment data explorer accessed September 2020: http://environment.data.gov.uk/catchment-planning/
[20] NRW Water Watch website, accessed September 2020: http://waterwatchwales.naturalresourceswales.gov.uk/en/

1 and Level 2 assessments were based on the 2019 classifications, in line with the 2019 Cycle 2 RBMPs.

3.4.3 Additional baseline data for the Level 2 assessments was collected from the National River Flow Archive (NRFA)[21] and the EA's Abstraction Licensing Strategies (ALS)[22]. The ALS compare flow in rivers and water levels in aquifers to the recent actual abstraction patterns, the fully licensed abstraction quantity, and the resource allocation for the environment. NRFA data provide long term gauged flow data for some rivers that coincide with the options assessed, to provide additional hydrological context. As a result, all surface water catchments and groundwater management units are then assigned a resource availability, as follows:

- **Water available**: there is more water than required to meet the needs of the environment, therefore new abstraction may be possible without having an effect on the environment;
- **Restricted water available**: recent river flows or levels of groundwater are enough to meet the needs of the environment, but if all abstractions abstract at their licenced quantities, river flows or levels of groundwater would be lower than required to meet the needs of the environment;
- **Water not available**: recent river flows or levels of groundwater are below those needed to meet the needs of the environment. River flows or groundwater levels are below the requirements to help support WFD good ecological status.

3.4.4 As for the Level 1 screening, each option has been broken down into its main constituent activities. Each activity has been considered separately against each WFD classification element and the WFD baseline that has been collated. However, where feasible, assessments against elements have been grouped if the scale and level of impacts are expected to be similar.

3.4.5 The assessments are based on available data and evidence as far as possible. However, due to the limited nature of the engineering and baseline information available at this stage, expert opinion has been employed in most cases alongside feedback from the EA, NE and NRW on the SRO options (see **Section 3.6**). Where there is uncertainty over an option (e.g. the exact route of a pipeline is not known), a worst-case scenario approach has been used (e.g. the assessments have assumed that the pipeline has watercourse crossings rather than not).

3.4.6 The same level of impact categories have been used as in the Level 1 screening (**Table 3.1**). The final impact category identified for each part of an option assumes that generic construction good practice and pollution prevention measures would be put in place (see **Section 3.5**).

3.4.7 A confidence rating has been given to the Level 2 assessments, according to the confidence categories in **Table 3.3**. The confidence rating assigned to each assessment is a reflection on the amount of uncertainty in the option design (e.g. uncertainty over the location and quantity of a new abstraction would lower the level of confidence in the assessment), and the amount and quality of evidence upon which the impact level has been based. All the assessments that have only been subject to a Level 1 assessment are assigned a high confidence by default.

Table 3.3 Confidence Level Categories

Confidence category	Description of confidence
Low	Very limited evidence, high risk activity or assessment solely based on expert judgement.

[21] National River Flow Archive website, accessed September 2020: https://nrfa.ceh.ac.uk/
[22] Abstraction Licencing Strategies, accessed September 2020: https://www.gov.uk/government/collections/water-abstraction-licensing-strategies-cams-process

Medium	Reasonable levels of evidence for some aspects of the assessment. Some assumptions and expert opinion required.
High	Good level of evidence with minimal assumptions required or low risk activity.

3.4.8 The overall WFD impact of the options is based on the 'one out, all out' methodology used for the WFD. For example, this would mean that if the construction phase of an option has a final level of impact of 'no or minimal' but the operational phase has a level of impact of 'medium', the overall impact to WFD objectives from the option would be identified as 'medium level of impact'.

3.5 Assumptions

3.5.1 The WFD assessment is based on available data, primarily spatial data on the EA's Catchment Data Explorer website and NRW's Water Watch website, and the engineering scopes provided for each option. However, in all cases the option information had insufficient detail and so the use of assumptions in the assessment of construction and operational impacts is required. The assumptions used are as follows:

- Good practice construction measures will be used at all construction sites. As no detailed plans or construction methods were available for the assessments, they are based on the assumption that measures will be implemented that are consistent with the suite of Guidance for Pollution Prevention[23], and that all relevant consents would be secured and complied with. This is especially crucial in respect of in-channel works and works that take place in proximity to river channels (e.g. within 8 metres).
- All new transfer pipeline river watercourse crossings would be installed via trenchless techniques or via a trench and cover technique within a dry working area. Trench and cover techniques would require temporary over pumping of water or temporary diversion of the river channel, and a reinstatement of bed and bank material, and flow, once works are complete. Such works would require consent from the EA or Lead Local Flood Authority, which would ensure WFD compliance.
- Ground investigations would be undertaken prior to construction activities. These will identify any contaminated land and mitigation measures that may be required to manage potential WFD impacts.
- Extensions, modifications, or new pumping stations, water treatment works, etc. would be consented either via permitted development rights, or via planning consent from the relevant Local Planning Authority. Construction of these assets would involve a relatively small footprint in the context of any WFD water body catchment, would not be laterally extensive (compared to, for example, a new transfer main), and would not involve the requirement for in-channel works. Where planning consent is required, such developments would need to demonstrate that they are compliant with the objectives of the WFD in order to gain permission.
- Dewatering of excavations would not require a permit from the EA/NRW. Dewatering and a corresponding discharge of sufficient magnitude, duration, or sensitivity to require a permit may have a greater impact than assessed. However, it is assumed that the dewatering permit would limit any impacts to a minor level (localised and temporary). Dewatering would be of uncontaminated water, and water would be discharged within the same water body.

[23] http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/

- The relatively shallow and localised excavations associated with laying new transfer pipelines, and constructing new pumping stations, water treatment works etc. would not present a risk to the overall WFD status of groundwater bodies.
- Construction, refurbishment, and testing of groundwater abstraction boreholes would be undertaken under consent from the EA/NRW. Boreholes would be designed, constructed, and tested in such a way as to prevent groundwater becoming polluted, and in line with best practice.
- Options that involve a new transfer of water into the water environment (e.g. new outfalls into reservoirs) would be consented by an appropriate discharge activity permit that stipulates an appropriate standard for water quality in line with the requirements of the WFD standards.
- Options that involve abstraction of water that are within the limits of an existing abstraction license are assumed to be accounted for within the *recent actual* abstraction volumes. UU has undertaken an initial review with the EA as to whether the existing abstraction licenses have been accommodated within the recent actual calculations for determining water availability in the catchment/aquifer (see **Section 3.6**).

3.6 Incorporation of Regulator Comments

3.6.1 As set out in **Section 1.3**, UU has undertaken extensive engagement with regulators (EA, NRW and NE) on the SRO options. Where appropriate, regulator comments been incorporated into the assessment in the following way:

- To change the details of the Level 1 screening [✂]
- To override the results of the Level 1 and Level 2 screening to reflect regulator concerns around WFD compliance. This override has been applied where regulator concerns have not been identified in the Level 1 screening exercise (these concerns mainly relate to surface water quality issues, saline intrusion and resource availability).

3.6.2 The process for the incorporation of regulator comments has been presented in [✂] and [✂] and is also discussed in **Table 4.2**

4. Assessment Results

4.1.1 [✂]

4.2 Level 1 Screening

4.2.1 The Level 1 screening results are summarised in **Table 4.1**. Further to regulator comments on the SRO options, only two of the options (STT019 – Transfer from Wirral to Liverpool via Mersey Tunnel and WR113 - Tytherington BH) were assessed as having a minimal or low level of impact on WFD water bodies and subsequently were screened out of further assessment. These options are concluded to be WFD compliant, without the need for further investigation at this stage. However, it is recommended that this screening determination is reviewed post-Gate 1 once further option information is available and any environmental investigations are completed.

4.2.2 The remaining options were judged to have the potential for a medium or high level of impact, and for these options the WFD water bodies where the impacts may occur were identified. This resulted in 123 "option – water body combinations" which may be subject to a Medium or High level of

impact; these were carried forward to the Level 2 screening. It should be noted that 76 of this total are associated with one option (WR159 - Individual Reservoirs Compensation Release Control) reflecting EA concerns around alteration in actual compensation patterns on in-stream ecology.

Table 4.1 Summary of Level 1 Screening Results

Option Number	Option Name	Carried Forward to Level 2 Screening?	Number of water bodies where a Medium or High Level of Impact could occur
STT019	Transfer from Wirral to Liverpool via Mersey Tunnel	No	0
STT029	River Lune Transfer	Yes	2
STT034	Hollingworth Lake	Yes	3
STT041	Heaton Park	Yes	4
WR001	River Alt to Prescot WTW	Yes	1
WR010	River Greta River Wenning to Lancaster	Yes	2
WR049b	Abstraction from Ribble (lower) - Rivington	Yes	1
WR076	New river abstraction, Upper Mersey (e.g. Bollin @ Lymm)	Yes	2
WR099b	Worsthorne BH	Yes	1
WR101	Franklaw BHs	Yes	2
WR102b	Widnes BH Group	Yes	1
WR102e	Bold Heath BHs	Yes	2
WR105a	Lymm BH and WTW	Yes	1
WR107b	Randles Bridge (Royal Oak)	Yes	3
WR112	Bramhall Borehole	Yes	2
WR113	Tytherington BH	No	0
WR123	Helsby and Foxhill BHs PBD	Yes	2
WR141	New river abstraction, River Irwell (e.g. Medlock)	Yes	2
WR149	Lightshaw increased WTW capacity (SW)	Yes	1
WR153	Simmonds Hill WTW (Manley Quarry BH)	Yes	3
WR154	Sandiford Increased capacity	Yes	2
WR159	Individual Reservoirs Compensation Release Control	Yes	76
WR810	Cow Green to Heltondale	Yes	3

Option Number	Option Name	Carried Forward to Level 2 Screening?	Number of water bodies where a Medium or High Level of Impact could occur
WR812	Kielder to Heltondale	Yes	2
WR814a	Increase treatment capacity at Huntington TW	Yes	1
WR815	Killington Reservoir to Thirlmere Aqueduct	Yes	3
WR821	Llangollen Canal	Yes	1

4.3 Level 2 Screening

4.3.1 [✂]. Following the Level 2 assessments, three further options are concluded to be WFD compliant, without the need for further investigation at this stage; however, again, it is recommended that this screening determination is reviewed post-Gate 1 once further option information is available and any environmental investigations are completed.

- WR010 - River Greta River Wenning to Lancaster;
- WR112 - Bramhall Borehole;
- WR812 – Kielder to Heltdonale.

4.3.2 These options were judged to have minor or no impact on WFD status following the Level 2 screening. This conclusion was supported by regulator comments on the options. It should be noted that this conclusion does not mean that further information will not need to be provided to prove WFD compliance – it will do in all cases – but rather that the regulator has not, at this age, expressed a concern about a compliance risk from these options.

4.3.3 The remaining 21 options have been assigned a 'Medium Level of Impact', for the reasons set out in **Table 4.2**. This table contains information on the regulator comments for these options and any subsequent changes that were made in the assessment outcome. Where the regulator flagged concern with an option's potential WFD impact, a "Medium Level of Impact – Low confidence" has been assigned.

Table 4.2 Summary of Level 2 Screening Results

Option No.	Option Name	WFD Water Body ID	Confidence in Level 2 Assessment	Regulator Comments (Summary)	Change Post-Regulator Comments
STT029	River Lune Transfer	GB112072065980	Low	[✂]	[✂]
STT034	Hollingworth Lake	GB112069064720	Low	[✂]	[✂]
STT034	Hollingworth Lake	GB31231398	Low	[✂]	[✂]
STT041	Heaton Park	GB112069064600	Low	[✂]	[✂]
WR001	River Alt to Prescot WTW	GB112069061442	High	[✂]	[✂]
WR049b	Abstraction from Ribble (lower) – Rivington	GB112071065500	Low	[✂]	[✂]
WR076	New river abstraction, Upper Mersey (e.g. Bollin @ Lymm)	GB112069061382	Medium	[✂]	[✂]
WR099b	Worsthorne BH	GB112071065090	Low	[✂]	[✂]
WR101	Franklaw BHs	GB112072065822	Low	[✂]	[✂]
WR101	Franklaw BHs	GB41201G100500	Low	[✂]	[✂]
WR102b	Widnes BH Group	GB41201G101700	Low	[✂]	[✂]
WR102e	Bold Heath BHs	Sankey	Medium	[✂]	[✂]
WR102e	Bold Heath BHs	GB41201G101700	Medium	[✂]	[✂]
WR105a	Lymm BH and WTW	GB41201G101700	Low	[✂]	[✂]
WR107b	Randles Bridge (Royal Oak)	GB41201G101700	Low	[✂]	[✂]
WR123	Helsby and Foxhill BHs PBD	GB112068060330	High	[✂]	[✂]
WR123	Helsby and Foxhill BHs PBD	GB41101G202600	Medium	[✂]	[✂]

Option No.	Option Name	WFD Water Body ID	Confidence in Level 2 Assessment	Regulator Comments (Summary)	Change Post-Regulator Comments
WR141	New river abstraction, River Irwell (e.g. Medlock)	GB112069064641	Medium	[✂]	[✂]
WR149	Lightshaw increased WTW capacity	GB41201G101700	Low	[✂]	[✂]
WR153	Simmonds Hill WTW (Manley Quarry BH)	GB112068060500	Medium	[✂]	[✂]
WR153	Simmonds Hill WTW (Manley Quarry BH)	GB112068060330	Medium	[✂]	[✂]
WR153	Simmonds Hill WTW (Manley Quarry BH)	GB41101G202600	Medium	[✂]	[✂]
WR154	Sandiford Increased Capacity	GB112068060450	Low	[✂]	[✂]
WR154	Sandiford Increased Capacity	GB112068060480	Low	[✂]	Overridden Level 1/2 results based on regulator concerns; these assume increased abstraction.
WR159	Individual Reservoirs Compensation Release Control	76 water bodies (see Appendix A)	Low	[✂]	[✂]
WR810	Cow Green to Heltondale	GB30328860	Low	[✂]	[✂]
WR810	Cow Green to Heltondale	GB103025076080	Low	[✂]	[✂]
WR810	Cow Green to Heltondale	GB40302G700300	Low	[✂]	[✂]
WR814a	Increased treatment capacity at Huntington WTW	GB31231212	Low	[✂]	[✂]
WR815	Killington Reservoir to Thirlmere Aqueduct	GB112073071090	Low	[✂]	[✂]
WR821	Llangollen Canal	GB112072065980	Low	[✂]	[✂]

4.4 Combined Level 1 and Level 2 Screening Results

4.4.1 The results of the Level 2 assessment have been combined with the results of the Level 1 assessment to produce a combined assessment result which is summarised in **Table 4.2** [✂]

Table 4.3 Summary of Combined Assessment Results for Feasible Options

	Number of option–water body combinations	Number of water bodies	Number of options
High level of impact	0	0	0
Medium level of impact	108	94	**22**
Minor level of impact	83	64	**19**
No or minimal impact	21	19	**11**

Note that a water body may have varying levels of impact from different options, and an option may have differing levels of impact on different water bodies. This means that some water bodies and options are counted more than once in the values in this table.

* This tables shows the number of official WFD water bodies as seen on catchment data explorer. Some of the options are expected to impact areas within coastal and operational catchments.

5. Summary, Conclusions and Next Steps

5.1 Summary and Conclusions

5.1.1 A WFD screening assessment has been undertaken of the preferred list of 27 UUS SRO feasible options, using the same methodology as applied during the WRMP19 WFD Assessment. Each option has been subject to a Level 1 screening exercise. Option-water body combinations that have been identified as being subject to a medium or high level of impact in the Level 1 screening have then been subject to a Level 2 assessment.

5.1.2 Following the Level 2 screening, 22 options are assessed as having the potential to have a medium level of impact on a total of 107 WFD water bodies (see Table 5.1).

Table 5.1 Summary of Assessment

Option Number	Option Name	Phase 1 Screening Result	Phase 2 Screening Results
STT019	Transfer from Wirral to Liverpool via Mersey Tunnel	Screened Out	Screened In
STT029	River Lune Transfer	Screened In	Screened In
STT034	Hollingworth Lake	Screened In	Screened In
STT041	Heaton Park	Screened In	Screened In
WR001	River Alt to Prescot WTW	Screened In	Screened In

Option Number	Option Name	Phase 1 Screening Result	Phase 2 Screening Results
WR010	River Greta River Wenning to Lancaster	Screened In	Screened Out
WR049b	Abstraction from Ribble (lower) - Rivington	Screened In	Screened In
WR076	New river abstraction, Upper Mersey (e.g. Bollin @ Lymm)	Screened In	Screened In
WR099b	Worsthorne BH	Screened In	Screened In
WR101	Franklaw BHs	Screened In	Screened In
WR102b	Widnes BH Group	Screened In	Screened In
WR102e	Bold Heath BHs	Screened In	Screened In
WR105a	Lymm BH and WTW	Screened In	Screened In
WR107b	Randles Bridge (Royal Oak)	Screened In	Screened In
WR112	Bramhall Borehole	Screened In	Screened Out
WR113	Tytherington BH	Screened Out	Screened In
WR123	Helsby and Foxhill BHs PBD	Screened In	Screened In
WR141	New river abstraction, River Irwell (e.g. Medlock)	Screened In	Screened In
WR149	Lightshaw increased WTW capacity (SW)	Screened In	Screened In
WR153	Simmonds Hill WTW (Manley Quarry BH)	Screened In	Screened In
WR154	Sandiford Increased capacity	Screened In	Screened In
WR159	Individual Reservoirs Compensation Release Control	Screened In	Screened In
WR810	Cow Green to Heltondale	Screened In	Screened In
WR812	Kielder to Heltondale	Screened In	Screened Out
WR814a	Increase treatment capacity at Huntington TW	Screened In	Screened In
WR815	Killington Reservoir to Thirlmere Aqueduct	Screened In	Screened In
WR821	Llangollen Canal	Screened In	Screened In

5.1.3

5.1.4 Assigning a medium level of impact to an option means that the activities that form part of the option pose a potential risk of either (i) deterioration of WFD status and/or (ii) the inability of a water body to attain its target status. In such cases, further WFD assessment is required to provide a more option-specific and robust conclusion that may include the requirement for bespoke design measures and/or environmental mitigation in order to ensure that WFD objectives are not compromised.

5.1.5 In addition, it is recommended that all options are reviewed post-Gate 1 to take account of the latest available information.

Mitigation Measures

5.1.6 The scope of further work and potential mitigation measures has been identified taking into account regulator feedback on each option (see **Table 4.2**). Further work to develop mitigation measures includes:

- Further information on abstraction impacts, including groundwater modelling for some options;
- Investigation into surface water quality impacts on receiving waters;
- Investigation of the potential for saline intrusion for some groundwater abstractions;
- Investigation of downstream ecological impacts of changes in flow regime;
- Investigation of ecological impacts resulting from changes in reservoir drawdown;
- Cross-checking with the emerging work on Environmental Ambition in the Regional Plan

5.1.7 The scope of these investigations will vary between options. It may be that for some options a brief desktop exercise and further discussion with the regulator will be sufficient, though it is likely that some options will require more detailed further investigation. It is also likely that a number of these options will coincide with active or recently concluded WINEP schemes. The WFD conclusions associated with this work should feed into Mitigation Measure development.

5.1.8 In this context (at the time of writing), UU is preparing an Environmental Monitoring Plan for submission at Gate 1. Taking into account regulator feedback, the Plan will detail the investigations to be completed prior to Gate 2 (and beyond) in response to the issues/uncertainties identified in this WFD assessment and to inform the selection of the preferred solution for the UUS SRO. The Environmental Monitoring Plan will be a 'live' document that is developed over time and its implementation will be reviewed in liaison with the NAU and NRW.

In-combination Assessment

Water body cumulative assessment

5.1.9 Where two or more options are located in the same water body, there is the potential for a cumulative impact on that water body. Table 5.2 lists those lake, river and groundwater water bodies which are impacted by more than one option at Level 2.

Table 5.2 In combination assessment – water bodies with impacts from multiple options

Water body ID	GB112068060330 (River)	GB112069064720 (River)	GB31230833 (Lake)	GB31231164 (lake)	GB31231212 (Lake)	GB31231398 (Lake)	GB31232150 (Lake)	GB41101G202600 (Groundwater)	GB41201G101700 (Groundwater)
WR102b									1

WR102e									1
WR105a									1
WR107b									1
WR123	1							1	
WR149									1
WR153	1							1	
WR159			1	1	1	1	2		
WR810			1						
WR814a					1				
WR815				1					
WR821		1							
Total	2	2	2	2	2	2	2	2	5

Operational Catchment Cumulative Assessment

5.1.10 In addition, where two or more options are located in multiple water bodies within one operational catchment there may be cumulative effects on WFD objectives. For example, impacts in a downstream water body may combine with impacts from an upstream water body and result in a greater impact than assessed for each individual water body. Table 5.3 lists those operational catchments which are impacted on by more than one option/water body combination at Level 2.

Table 5.3 In combination assessment – WFD Operational Catchments with more than one option/water body impact

WFD Operational catchment	Bollin Dean Mersey Upper	Calder	Calder Upper	Colne Water	Croal Irwell	Darwen	Duddon	Gowy	Goyt Etherow Tame	Mersey Basin Lower and Merseyside North Permo-	Roch Irk Medlock	Weaver Lower	Wirral and Cheshire West Permo-Triassic Sandstone Aq
STT34											2		
STT41											1		

WR076	1												
WR099b		1											
WR102b										1			
WR102e										1			
WR105a										1			
WR107b										1			
WR123								1					1
WR141					1								
WR149										1			
WR153								1				1	1
WR154												2	
WR159	6	7	3	5	14	1	2		23		13		
WR810		2				1							
WR814a											1		
WR815											1		
WR821											1		
Total	**7**	**10**	**3**	**5**	**15**	**2**	**2**	**2**	**23**	**5**	**19**	**3**	**2**

Next steps for the Cumulative Assessment

5.1.11 As a part of the next phase of work more detailed in-combination assessments will need to be undertaken for those options which have the potential to propagate downstream impacts with respect to the quantity and dynamics of flow, water quality and hydroecology. These assessments should flow from the specific assessments discussed against each option and should inform the development of mitigation measures.

5.2 Next Steps

5.2.1 The WFD assessment of the preferred list of options for the UUS SRO has identified that further assessment is required in respect of the majority of the options to confirm the potential impacts on WFD water bodies and the requirements, or otherwise, for bespoke mitigation in order to ensure that WFD objectives are not compromised. In accordance with the ACGW guidance, this further WFD assessment will be undertaken prior to Gate 2 and will:

- reflect the WFD assessment methodologies developed for the WRW Regional Plan and WRMP24;
- take account of the further investigations to be undertaken prior to Gate 2, as detailed in the Environmental Monitoring Plan;
- draw upon ongoing engagement with regulators; and
- reflect the most recent available information from UU on the options for the SRO.

5.2.2 Further to the selection by UU of the option(s) that will comprise the preferred solution for the UUS SRO, the WFD assessment at Gate 2 will additionally include a detailed in-combination assessment. Gate 2 should also involve a review of the work on Environmental Ambition being led by the regional Water Resources Group (WRG). This work is developing options for change in abstraction in response to projected climatic and population change into the 2050s, information on water bodies which could be subject to unsustainable future pressure have previously been supplied by the Environment Agency to the regional WRGs for inclusion in the Regional Plans. Options for sources associated with water bodies flagged for reduction in deficit by 2050 should be cross-checked with the list of options being proposed here as these options will likely be less attractive from a WFD perspective.

5.2.3 There will also be a need for further detailed WFD assessments as a part of the permitting and consenting process. This will apply to all options that are ultimately taken forward by UU, though the level of detail in the assessments will depend on the likely impacts, an initial indication of which has been given in this assessment. At the moment, the use of Article 4.7 has not been anticipated for this assessment.

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