



United Utilities Water

Water Resources Management Plan

Water Framework Directive compliance assessment

Report for

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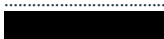
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Table 6.1 Summary of plan level WFD compliance for the United Utilities WRMP24

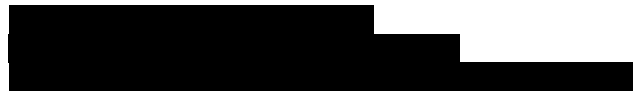
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Figure 4.1 Surface water bodies included in the cumulative assessment of the Preferred Plan

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Figure 4.2 Groundwater bodies included in the cumulative assessment

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1. Introduction and purpose of report

1.1 Background and purpose of report

Water companies in England and Wales have a statutory requirement to prepare a Water Resources Management Plan (WRMP) every five years. The latest Water Resource Planning Guideline (WRPG) produced by the regulatory bodies¹ (Ofwat, The Environment Agency and Natural Resources Wales) advises that it is the water companies' requirement to have regard to River Basin Management Plans (RBMPs) and Water Framework Directive regulations in their WRMPs. This report will demonstrate how United Utilities have met this requirement in the assessment of their WRMP24 feasible options and preferred plan options.

United Utilities Water Resource Management Plan

United Utilities Water (Uuw) is currently finalising its Water Resources Management Plan 2024 (WRMP24). Once approved, the WRMP24 will set out a long-term, best value and sustainable plan for water supplies in the North West. The WRMP24 plans for an adequate supply to meet demand from 2025 to 2050 and beyond, and a supply system that is resilient to drought. WRMPs are reviewed on a rolling five-year basis, with Uuw's most recent plan being published in 2019².

As part of the preparation of WRMP24, Uuw published its Draft Water Resources Management Plan 2024 (Draft WRMP24) for consultation between the 7th December 2022 and 15th March 2023, following submission to Defra. The Draft WRMP24 set out Uuw's proposals to ensure continued delivery of a secure and reliable supply of water from 2025 to 2050, looking beyond out to the year 2100.

Taking into account the responses received to the consultation on the Draft WRMP24 from regulators, stakeholders and the public, further engagement and environmental assessment, Uuw has selected its preferred plan for WRMP24. A Revised Draft Water Resources Management Plan 2024 (Revised Draft WRMP24) has subsequently been prepared and is being submitted to the Secretary of State for approval.

The draft WRMP24

The Draft WRMP24 set out Uuw's proposals to ensure continued delivery of a secure and reliable supply of water from 2025 to 2050, looking beyond out to the year 2100. For the five-year period (2025 to 2030), the WRMP24 aligns with Uuw's Business Plan proposals prepared for the Ofwat Price Review 2024.

Uuw's proposed best value plan (also referred to as the 'preferred plan' in this report) focused on delivering three strategic choices:

- Achieve Government targets to halve leakage and reduce customer consumption to 110 litres per person per day by 2050.

¹ Ofwat, NRW & EA (2022), Water Resources Planning Guideline – Updated 22 July 2022

² Uuw (2019) *Final Water Resource Management Plan 2019*, August 2019. Available at: <https://www.unitedutilities.com/corporate/about-us/our-future-plans/water-resources/water-resources-management-plan/>. [Accessed August 2022]

- Support national planning by developing large-scale water transfers that are adaptable and flexible to the changing needs of other regions.
- In line with customer preferences, improve the level of service for temporary use bans (TUBs), halving the expected frequency of occurrence to 1 in 40 years (2.5% annual chance). Concurrently, U UW will improve the frequency of implementing drought orders and drought permits to 1 in 50 years (2% annual chance).

U UW's demand forecast showed a very small increase of around 0.7% across the 25-year planning horizon, excluding the impacts of demand management programmes, and so the leakage reduction and water efficiency measures and TUBs measures will increase resilience in the supply.

U UW's Draft WRMP24 included provision [REDACTED] from the Vyrnwy system to support wider regional needs. This was based on:

- a reliable sustainable yield of Lake Vyrnwy [REDACTED];
- an additional 25 MI/d via a connection [REDACTED] to Shrewsbury to offset River Severn abstraction;
- an assumed average of 15% utilisation, reflecting flows in the River Severn; and
- 167MI/d of additional source capacity to offset traded water and maintain and enhance operational resilience.

The Draft WRMP24 proposed the following options across the three identified water resource zones within U UW's Draft WRMP24 operational area:

- seven supply options to provide 167MI/d of additional source by 2060;
- enabling works on the Vyrnwy Aqueduct to allow treated water from regional U U sources to be transferred by pumping into the Vyrnwy Aqueduct to maintain customer supplies (for transfer volumes greater than 50 MI/d); and
- 29 demand management, distribution/leakage and production efficiency options to provide some 282 MI/d.

The Draft WRMP24 also assumed delivery of an environmental destination scenario by 2050. This scenario will continue to take shape over time.

The Revised Draft WRMP24

Following consultation on the Draft WRMP24, U UW has reviewed its best value plan for WRMP24 and as a result, the preferred plan contained in the Draft WRMP24 has been modified. In particular, the number of supply options which now make up the preferred plan for the Revised Draft WRMP24 has significantly reduced owing to, in particular, decreased water transfer needs (following the final regional planning reconciliation round).

The Draft WRMP24 included a total of 168 MI/d of exports to STW and WRSE from U UW's SRZ, starting with a 75 MI/d transfer in 2031. Seven supply options were included in preferred plan to support these transfers. Transfers to WRSE are no longer selected in the preferred plan, linked to WRSE companies lowering their demand projections following consultation feedback. As a consequence of these changes there are fewer supply options in the Revised Draft WRMP24

preferred plan. When combined with updates to the demand management measures, this also means that improving UUW’s level of service for temporary use bans (TUBs) is no longer reliant on the dual-purposing of water transfer support options.

Further to detailed screening and selection of best value options, a total of three supply options have been identified by UUW as preferred options. The source options are geographically spread across UUW’s Strategic Resource Zone and all three are groundwater based options. The options are summarised in **Table 1.1**.

Table 1.1 Preferred Supply Options included in the Revised Draft WRMP24

Option ID	Option name	Yield (MI/d)	Description	Year selected
WR107a2	GWE_AUGHTON PARK a2	10	Commission two existing boreholes [REDACTED] transfer raw water to [REDACTED] WTW, increase capacity of WTW from 44 MI/d to 54 MI/d, modify treated water network as necessary in order to provide water to customers in the Southport and Liverpool DMZ areas	2030
WR111	GWE_WOODFORD	9	Increase abstraction from [REDACTED] BH; refurbish raw water main; treatment at new [REDACTED] WTW	2030
WR113	GWE_TYThERINGTON	3	Replacement of existing treated water main between [REDACTED] WTW and [REDACTED] SR as well as the replacement of existing BH pumps with new pumps at [REDACTED] boreholes to permit additional 3 MI/d TW transfer to existing storage	2030

Further to comments received from regulators on the Draft WRMP24, the preferred plan now also includes drought permit options taken from UUW’s Drought Plan³.

The three supply options in the preferred plan form part of the NWT SRO. The NWT SRO is currently being assessed as part of RAPID’s gated process for SROs; this includes environmental compliance. The environmental compliance assessments, and the supporting investigations, are ongoing with the outcomes available to inform the RAPID Gate 3 submission in 2024. In consequence, the findings have not been available in time for the Revised Draft WRMP24 (and its assessment).

As a result, these options all have residual uncertainties until investigations associated with NWT SRO Gate 3 conclude. Recognising this uncertainty, and consistent with the WRPG requirements⁴ and taking into account feedback from several environmental stakeholders including the Environment Agency (EA), Natural England (NE), Natural Resources Wales (NRW) and Mersey Rivers Trust, UUW has identified four alternative, ‘WFD / Habitats Regulations compliant’, WRMP options. With a combined output of 21.3 MI/d, they provide sufficient capacity to completely replace the

³ United Utilities (2022) *Final Drought Plan 2022*. Available from https://www.unitedutilities.com/globalassets/z_corporate-site/about-us-pdfs/final-drought-plan-2022/final-drought-plan-2022.pdf [Accessed May 2023].

⁴ Section 9.4.3 of the of the WRPG sets out that where due to uncertainty, “Alternatives are included in the plan at company and/or regional level where the avoidance of an adverse effect on integrity of European sites is certain, and these are available, feasible and deliverable”

three selected supply options in the preferred plan in the event that they are required (the supply capacity requirement is 20.4 MI/d).

The options that comprise the reasonable alternative plan are listed in **Table 1.2**.

Table 1.2 Options included in the WRMP Reasonable Alternative

Option ID	Option name	Yield (MI/d)	Description
WR026c	SWN_RIVER RIBBLE	4	New abstraction from the River Ribble at Clitheroe; new WTW and treated water transfers to Ribble DMZ service reservoirs [REDACTED]. The scheme would involve; new river abstraction on the River Ribble at Clitheroe ([REDACTED]); new WTW [REDACTED]; treated water to [REDACTED] SR with new PS and new TW mains.
WR065b	RES_WHITEHOLME	2	Raise the top water level of Whiteholme Reservoir by 1m to increase storage and restoration to pre-2015 levels. The option would involve the reinstatement of the reinforced concrete weir section to the previous top water level of 382.86m AOD. This would result in an increase in storage volume of approximately 418,700m ³ .
WR185	SSO_STOCKPORT PH II	12	Stockport Resilience Ph II: Pump more water from [REDACTED] BSP to [REDACTED] SR and then to [REDACTED] SR. The principal construction elements of this option are a new inline pumping station [REDACTED] upstream [REDACTED]; a new inline pumping station upstream [REDACTED] and, analysis equipment at effluent [REDACTED].
WR191	PRO_NORTH LANCASHIRE	4	This option would involve the construction of a new wastewater treatment system to treat filter washwater [REDACTED].

1.2 The Water Framework Directive

The Water Framework Directive (2000/60/EC) is an EU Directive establishing a framework for Community action in the field of water policy which aims to protect and improve the water environment. The Directive was brought into UK law in 2003 and subsequently revoked by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 in England and Wales. From this point forward “WFD” refers to the legislation applicable to England and Wales, not the EU Directive.

1.3 WFD requirements for WRMPs

The purpose of a WRMP is to set out how a water company will achieve a secure supply of water for its customers whilst protecting the environment and is resilient to a range of future challenges more extreme droughts, climate change, population growth.

As part of the WRMP, water companies must demonstrate that they have considered a range of environmental legislation, including the WFD regulations. The requirements for a WFD assessment of a water company WRMP are outlined in the 2023 WRPG (Box 1).

Box 1: WRP 2023**Section 8.2.2 Assessing environmental constraints**

"A. River Basin Management Plan and Water Framework Directive

River Basin Management Plan (RBMP) and the Water Framework Directive environmental objectives are a constraint on your options. You should screen out any options that have unacceptable environmental impacts that cannot be overcome.

You should ensure that there is no risk of deterioration from a potential new abstraction or from increased abstraction at an existing source before you consider it as a feasible option. Alternatively, if investigations are yet to be completed, you should set out what your alternative options would be should those investigations demonstrate that there will be an unacceptable environmental impact.

You should also assess new supply options against the RBMP measures and objectives for each water body and meet your obligations to avoid future deterioration. You should ensure that your feasible options do not compromise the achievement of RBMP objectives.

You should talk to the Environment Agency or Natural Resources Wales about any intended actions that may:

- *cause deterioration of status (or potential)*
- *prevent the achievement of the water body status objectives in the river basin management plans*
- *prevent the achievement of water body status (or potential) for new modifications*

You should do this as soon as possible before developing your plan. You should make a clear statement in your plan about any potential impacts."

These WRP requirements reflect Defra's Guiding Principles for Water Resources Planning⁵ (May 2016), which state that companies should take account of the government's objectives for the environment "including the appropriate parts of the EU Water Framework Directive". Defra also expects that companies will:

- Have regard to River Basin Management Plans (RBMPs) and their objectives when making decisions that could affect the condition of the water environment.
- Ensure that **current** abstractions and operations, as well as future plans, support the achievement of environmental objectives and measures set out in RBMPs.
- Ensure plans:
 - ▶ prevent deterioration in water body status;
 - ▶ support the achievement of protected area and species objectives;
 - ▶ support the achievement of water body status objectives.

⁵ Defra (2016) Guiding Principles for Water Resources Planning. May 2016

- Continue working with the Environment Agency to take a proportionate and evidence-based approach to identify the changes needed to current abstraction licences to meet environmental requirements.

Both WRPG and the Defra Guiding Principles refer to ensuring 'no deterioration' of water body status. A European Court of Justice (ECJ) ruling⁶ clarified that 'no deterioration' means a deterioration **between** a whole 'status class' (e.g., 'good', 'moderate', etc.) of one or more of the relevant 'quality elements' (e.g., biological, physico-chemical, etc.). This definition applies equally to Artificial Water Bodies and Heavily Modified Water Bodies in respect of the relevant quality elements that relate to the defined uses of these water bodies. The ECJ ruling further states that if the quality element concerned is already in the lowest class, any deterioration of that element constitutes a deterioration of the status. References to 'no deterioration' in this WFD methodology align to this ECJ ruling.

⁶ ECJ Case C-461/13: Bund für Umwelt und Naturschutz Deutschland v Bundesrepublik Deutschland <http://curia.europa.eu/juris/document/document.jsf?docid=178918&mode=req&pageIndex=1&dir=&occ=first&part=1&text=&doclang=EN&cid=175124> [accessed 30.6.16]

2. WFD Compliance Assessment Methodology

The purpose of this section is to set out the approach used when assessing the WFD compliance of the feasible options and preferred plan of United Utilities' WRMP24. **Section 2.1** identifies the WFD Assessment Objectives used throughout the WRMP process. **Section 2.2** describes the proportionate level of detail for the assessments.

The assessment approach presented here has been applied to the feasible list of options, the Preferred Plan, and the Reasonable Alternative Plan. All options have been through a form of high-level WFD screening prior to being included in the Refined Feasible List of options. As a result, any options where there are any unalterable WFD constraints, therefore not suitable for promotion, are either not included or are flagged in the Revised Feasible List.

All assessments will be undertaken for the reporting unit of a WFD water body. The appropriate baseline information for water bodies status and targets is as set out using 2019 WFD status, as available on the Catchment Data Explorer⁷ for the third cycle of RBMPs (RBMP3).

2.1 WFD Assessment Objectives for testing compliance

This section provides the WFD Assessment Objectives used as a test of constraint when testing WFD compliance at an individual potential option-level as set out in WRPG (2023). This section also provides the additional, progressive WFD Assessment Objectives that have been assessed at a plan-level.

Option-level WFD Assessment Objectives

Principally, the WFD acts as an indicator of constraint and determines where the WRMP or constituent options do not meet WFD Objectives set out in Regulation 13 of the WFD Regulations. In line with WRPG (2023) and UKWIR (2021) guidance the principle WFD Assessment Objectives that the WRMP (both feasible options and programmes) has been tested against are:

1. To prevent deterioration of any WFD element of any water body - in line with Regulation 13(2)(a) and 13(5)(a)⁸.
2. To prevent the introduction of impediments to the attainment of 'Good' WFD status or potential for any water body in line with Regulation 13(2)(b) and 13(5)(c)⁹.

⁷ Catchment Data Explorer <https://environment.data.gov.uk/catchment-planning>

⁸ The no deterioration baseline for each water body and element is the status reported in the RBMP and is taken to be the third cycle RBMP (RBMP3), using waterbody-specific information as reported on the Catchment Data Explorer.

⁹ WRPG (2023) states that this a test to identify any options that 'prevent the achievement of the water body status objectives in the river basin management plan'. At present this is RBMP2. Discussion with EA and through review of EA internal guidance#1 identified that the EA consider 'less stringent objectives are not permanent and the assessment of any new activity or project must take into account the need to continue to aim for good status. The new activity or project must not jeopardise the achievement of good status in the future, irrespective of whether a less stringent objective was set in RBMP2'.

3. To ensure that the planned programme of water body measures in RBMP2 to protect and enhance the status of water bodies are not compromised.

If an option has been assessed to definitively not comply with the WFD Assessment Objectives set out above, then the option has been reported as WFD non-compliant and removed from the WRMP process. This only applies to options for which a clear and obvious conclusion around non-compliance can be reached, and for which no mitigation to provide compliance is possible.

If an option is assessed to potentially not comply with the WFD Assessment Objectives set out above, then the option has been reported as 'potentially WFD non-compliant'. If an option is reported as 'potentially WFD non-compliant' it has remained in the WRMP process as it may be appropriate to consider the option further where it is considered that additional evidence to improve confidence in the assessment and/or licence design could mitigate the potentially WFD non-compliant issues. Any risks of WFD non-compliance would be investigated as part of a licence application, and mitigation requirements agreed with the Environment Agency.

Plan-level WFD Assessment Objectives

The WFD Assessment Objectives presented above are the fundamental WFD Assessment Objectives that have been tested against at both the option-level and plan-level.

There are a number of further WFD Assessment Objectives, set out in the WRPG, which have been tested against at a plan-level. These are considered as progressive WFD Assessment Objectives rather than tests of constraint and do not lead to WFD non-compliance where they are not achieved. These objectives are as follows:

4. To assist the attainment of the WFD Objectives for the water body – in line with Regulation 13(2)(b) and 13(2)(c)
5. To assist the attainment of the objectives for associated WFD protected areas – in line with Regulation 13(6)
6. To reduce the treatment needed to produce drinking water and look to work in partnership with others, promoting the requirements of Article 7 of the WFD.

A negative answer to the WFD Assessment Objectives above does not determine that the plan has WFD constraints; however, they can be used in decision making by the water company.

Where WFD Assessment Objectives 1, 2 and/or 3 are not met by a programme or plan then, unless there is no reasonable alternative, that plan has not been progressed as the preferred plan without discussion with the relevant regulatory body. Discussion with the regulatory body includes:

- If a plan is reported as potentially WFD non-compliant it may be appropriate to consider an adaptive plan where it is considered that additional evidence to improve confidence in assessment and enhanced design could mitigate the potentially WFD non-compliant issues.
- Where a plan is assessed as WFD non-compliant, in circumstances where there is an over-riding public interest or the benefits of achieving the WFD Assessment Objectives are outweighed by benefits to human health, human safety or sustainable

development there is scope to apply for a Regulation 19 exemption as to why these WFD Assessment Objectives are not achieved.

2.2 Proportionate level of detail for assessments

Throughout the WRMP process WFD compliance has been tested at relevant stages parallel to the wider WRMP programme. The approach taken to test WFD compliance for feasible options and consequent programmes of options is as follows:

- Stage 1 Option-level Assessment – this is a full assessment that covers the feasible list of options.
- Stage 2 Programme-level assessment – the cumulative effects of the options that make up any Programmes have been assessed.
- Stage 3 Preferred WRMP programme assessment – the preferred WRMP programme for United Utilities has been assessed for impacts with other water companies' WRMPs, regional WRMPs and impacts with any WRMPs for other water resource zones within their own company.

In order to ensure the WFD assessment is proportionate for each stage an outline of the assessment for each stage is provided in this section.

Stage1 Option-level assessment

As advocated in the UKWIR (2021) guidance, each option has gone through a process to determine if it is compliant with the three principal WFD Assessment Objectives (as set out in Section 2.1). For proportionality of option assessment there are four steps, with each step becoming increasingly detailed. Where there is sufficient confidence in an assessment's conclusions the option has not progressed onto the next step. The four steps are summarised in the bullet points below, and further described in the subsequent sections:

- *Step 1 Screening based on activities* - to either exclude options from further assessment where it can be reasonably expected that the option would not have an influence on any WFD status elements or supporting elements, or identify which activities require progressing to Steps 2 or 3 assessment and in which water bodies.
- *Step 2 Screening based on magnitude of hydrogeological/hydrological impact and water body context*- to either exclude options from assessment where they are negligible or low impact, or identify which activities require progressing to Step 3 assessment and in which water bodies.
- *Step 3 Impact assessment* – either using existing assessments or an expert judgement approach based on source-pathway-receptor to establish likelihood of compliance with agreed WFD Assessment Objectives in all relevant water bodies. A confidence rating has been given to all assessments to reflect the amount of uncertainty in the design, environmental baseline and magnitude of impact.
- *Step 4 Detailed impact assessment* - specific to the option using measured baseline data, including additional bespoke collected evidence, and detail on design and operating pattern.

Further detail on how these steps have been assessed is set out below for the option-level assessment.

Step 1: Screening based on activities

All options in the feasible list have been subject to this step. Where an option is screened as WFD compliant at this stage it has been accompanied by a robust explanation as to why this assessment can be made without the need to progress the option to Step 2. Instances where there is considered no risk to WFD compliance are identified as:

- Demand management activities;
- Supply options which have passed a sustainability assessment¹⁰ at an abstraction rate up to the proposed option rate;
- Network constraint (i.e., improving infrastructure to achieve greater deployable output) options that do not result in additional abstraction (in comparison to recent abstraction rates), or where that additional abstraction has been identified as sustainable; provided the construction does not affect WFD protected areas or increase the risk of the transfer of INNS.

At this stage, the majority of construction activities can be screened out of further assessment with these activities being mitigatable assuming best practice construction techniques, and only involving short-term impacts (i.e., will not cause deterioration over the 6-year RBMP cycle).

Where an option is concluded as potentially being non-compliant with the WFD Assessment Objectives after Step 1 screening, the option has been progressed to Step 2 screening.

Step 2: Screening based on magnitude of hydrogeological/hydrological impact and water body context

Step 2 screening identifies the water body name, ID and type of any water bodies that could potentially be impacted. The potential impacts are determined by the type of option. The UKWIR (2021) guidance identifies a range of option types and their potential impacts (**Table 2.1**).

Table 2.1 Potential effects to screen in to WFD assessment by option type

Option type	Impact type to test
New groundwater abstraction, or increase in license rate	<ul style="list-style-type: none"> • Change in groundwater quantity • Impact on groundwater dependent terrestrial ecosystems • Impact on connected surface waters (flow change effects on ecology and water quality dilution) • Likelihood of saline ingress into aquifer
Aquifer recharge/ aquifer storage and recovery	Effects specific to source water used for recharge

¹⁰ e.g., Surface water options WRGIS Band 1, 2 and 3 pass at fully licensed; groundwater options passing WFD groundwater tests; WINEP investigation are identified as sustainable by EA (UKWIR, 2021).

Reservoir	Impact on connected surface waters (flow change effects on ecology and water quality dilution)
Run-of river abstraction	Flow change effects on ecology and water quality dilution
River regulation	Flow change effects on ecology and water quality dilution in regulated reach
Reuse	<ul style="list-style-type: none"> • Flow and water quality change effects on ecology and chemical status in receiving watercourse • Flow and water quality change effects on ecology and chemical status in water course previously receiving discharge
Desalination	Hydrodynamic changes on ecology in abstracted water body, including through pathways of salinity and sedimentation pattern change
Inter-basin transfer	<ul style="list-style-type: none"> • Flow change effects on ecology and water quality dilution in donor watercourse • Direct ecological effects from introduction of invasive non-native species • Flow and water quality change effects on ecology and chemical status in receiving watercourse

At this stage, the context of the water body will be considered to identify any additional constraints e.g., any protected areas, or any planned water body measures in RBMP2.

For any options that are sourced from groundwater, any local surface water bodies that are likely to be hydraulically connected have been identified. The impact on both the groundwater water body and the surface water bodies has been assessed. Similarly, any links between lake water bodies and river water bodies have been taken into consideration when assessing options that impact lake water bodies.

Impacts are not confined to the water body where the option is located, as the impacts of an option can transverse multiple water bodies. In these instances, assessments have been conducted against each water body in the flow pathway until no WFD compliance risk is identified.

In England & Wales, hydrology is a supporting element to WFD status and is not a status element that contributes directly to WFD ecological status. Regulators' hydrogeological/hydrological assessment tools and their outputs can provide suitable information from which to assess the magnitude of effect. Hydrogeological/hydrological appraisal tasks that have been undertaken are:

- Review the regulatory position¹¹ on water available for abstraction in an aquifer, reach or catchment. The available quantity can be compared with the increase in abstraction associated with an option. These assessments often include an indication of water availability under different flow conditions, which adds specificity to potential operational considerations such as hands-off flow conditions.
- Review the regulatory position on WFD hydrology, including the pass-forward flow from rivers to transitional waters.

¹¹ Environment Agency Abstraction Licensing Strategy datasets:

<https://data.gov.uk/dataset/b1f5c467-ed41-4e8f-89d7-f79a76645fd6/water-resource-availability-and-abstraction-reliability-cycle-2> (April 2021)

<https://data.gov.uk/dataset/54181453-b5bd-4694-96b2-a1b5d40985b5/groundwater-management-units-coloured-according-to-water-resource-availability-colours> (September 2020)

- Review the regulatory position on the extent of influence of flow on status elements failing their targets, including biological status elements, physico-chemical status elements, hydro-morphology and groundwater quantitative status.
- For surface waters, review the likely changed river flow regime against measured river flows from the long-term records of nearby gauging stations held on the National River Flow Archive¹², to inform the magnitude of change in flow.

Where the hydrogeological/hydrological appraisal identifies operational activities that are considered with confidence to be low impact these will be concluded as WFD compliant, subject to review of local WFD protected areas.

Step 3: Impact assessment

Where a WFD assessment has not identified an option as WFD compliant through the screening processes of Step 1 and Step 2, the option has been subject to impact assessment.

For each option, the construction and operational activities which have been screened into the Step 3 impact assessment are identified. A source-pathway-receptor approach to identifying effects on WFD Assessment Objectives has been undertaken. Using that approach, the source of change is the construction or operational activity. The pathway includes physical environment changes such as water level change, flow velocity change, morphological change. The receptor is the WFD status element or the WFD protected area.

For each option, a source-pathway-receptor approach to identifying effects on WFD Assessment Objectives has been undertaken. In this approach, the source of change is the construction or operational activity, the pathway is any physical environment changes such as in water levels, flow velocities, morphology or water quality, and the receptor is the WFD status element or the WFD protected area. All relevant WFD status elements have been considered, according to the water body type:

- Groundwater bodies: Quantitative tests including dependent surface water body status, groundwater dependent terrestrial ecosystems (GWDTE), saline intrusion and water balance. Chemical tests including dependent surface water body status, GWDTEs, drinking water protected areas, saline intrusion and general quality.
- River water bodies: fish, invertebrates, macrophytes, physico-chemical water quality, chemicals;
- Transitional water bodies: phytoplankton, angiosperms, macroalgae, invertebrates, fish, physico-chemical water quality, chemicals.

Each element is assessed individually, and the worst-case compliance conclusion is taken as the overall conclusion for the water body (i.e., if one element is non-compliant, then the water body will be identified as being non-compliant), in line with Environment Agency (2011)¹³.

¹² <https://nrfa.ceh.ac.uk/data/search>

¹³ Environment Agency (2011) Method statement for the classification of surface water bodies

A confidence rating has been assigned to all assessments to reflect the amount of uncertainty in the option design, environmental baseline, and magnitude of impact. The confidence level categories that have been used are presented in **Table 2.2**.

Table 2.2 WFD compliance assessment confidence level categories

Confidence category	Description
Low	Known WFD compliance risks/ failures and potential pathways from option's activities - where assessment based on expert judgement alone
Medium	Reasonable levels of evidence for at risk activities. Some assumptions and expert opinion required around risk areas.
High	Good level of evidence with minimal assumptions or low risk activity

Step 4: Detailed impact assessment

The UKWIR (2021) guidance identifies that where there remains low confidence as to whether an option is compliant with the WFD Assessment Objectives and the option is included in the preferred or alternative plan, a more detailed impact assessment (which may include bespoke groundwater modelling) is required.

In the case of UU's WRMP development, a number of the options are included in the North West Transfer (NWT) Strategic Resource Option (SRO) at Gate 2. All of those options are subject to more detailed assessment at the individual option level, which can therefore be considered to constitute the first stages of a Step 4 assessment, as presented in Wood (2022a and 2022b). This more detailed evidence collection and assessment is continuing and will allow quantitative assessments with greater levels of confidence at later stages in the NWT programme.

Within this WFD compliance assessment report, the findings of the NWT assessments are presented within the Step 3 framework, for simplicity of reporting.

Stage 2: Programme level cumulative assessment

In order to support programme development, the potential for cumulative effects of different combinations of constrained options has been highlighted. Informed through the option-level assessment which already have been set out per water body, a list of all WFD water bodies assessed for the individual options was assimilated. Where more than one option was assessed for the same water body a cumulative assessment has been undertaken of the multiple options, against the agreed set of WFD Assessment Objectives, using the same methodologies as for the option-level assessment. This required the revision of the high level hydrological and/or hydrogeological assessment which underpins the testing of the WFD Assessment Objectives. It is noted that the programme level assessments include any additional linked water bodies which are impacted by the cumulative effect of options (in addition to those that are identified in the option-level assessment), such as downstream surface water bodies.

An overall WFD compliance statement for each programme has been prepared, setting out compliance with each of the agreed WFD Assessment Objectives and the level of confidence in the assessment.

Stage 3: Assessment of the Preferred WRMP against other plans and projects

The potential in-combination impact of the whole WRMP, regional WRMP and with WRMPs for other water companies has been considered. If assessment were to be necessary, then a similar process to that identified above for the individual options would be used.

2.3 Consultation

A draft WFD compliance assessment methodology report was issued to the regulators (The Environment Agency and Natural England) on 8th April 2021 to set out the method for completing the WFD compliance assessments for the water companies in the WRW region. A meeting was held with regulators on 28 April 2021 and comments on the report were received to get regulatory feedback on the draft methodology report. These comments were addressed and a Final WFD compliance assessment methodology report and comment log were issued to the regulators on 16th July 2021.

3. Option-level (Stage 1) WFD Assessment outcomes

This section outlines the outcomes of the WFD compliance assessment at an option-level for each of the options in the feasible list.

3.1 Feasible options included in the WFD Compliance Assessment

Through an extensive optioneering process, considering a wide range of potential options to balance future supply and demand, United Utilities have selected the most suitable options to make up the feasible options list. This list includes both demand side and supply side options, of which only the latter require a WFD Compliance Assessment. The supply side options are presented in **Table 3.1**.

For clarity, a “final step” column has been included, to identify to which stage the assessment has been taken. In summary:

- All options that have been assessed as part of the North West Transfer have been taken to Step 4, in the sense that (as discussed in Section 2) they have been subject to a more detailed level of assessment;
- All other options have been taken to Step 1, 2 or 3, depending on the nature of the option (as set out in the methodology in Section 2). The assessment outcome presented for these options is as concluded at the time of the feasible options assessments.

Additional columns have been added to the right-hand side of the table to confirm the likely final outcome of a WFD Compliance Assessment for each option individually. Some options that are shown as “Potentially non-compliant” have been concluded as such due to limited information about the scheme and potential environmental impacts, some of which could be addressed through further design and assessment. The “Likelihood of final WFD non-compliance” column and accompanying “Justification” column therefore sets out whether it is likely that an assessment of that option will ultimately be able to conclude compliance¹⁴.

3.2 Option level WFD Compliance Assessment

This section presents a summary of the option level WFD Compliance Assessment for all options included in the feasible list. It is the outcome of methodological Stage 1, which includes a summary of the screening (methodological Step 1 and Step 2) and impact assessment (methodological Step 3). These are reported in full in **Appendix A** and **Appendix B** respectively, with a summary in **Table 3.1**.

¹⁴ For options where the feasible options assessment concluded “potentially non-compliant”, the likelihood of final non-compliance is Low, Medium or High. For options where the feasible options assessment concluded “compliant”, the likelihood of final non-compliance is None or Very Low, depending on whether the abstraction involves any changes to the water environment.

In summary, the list of feasible options includes:

- 22 options that are anticipated to be Compliant with the WFD
- 37 options that are potentially non-compliant (with low confidence)
- 41 options that are potentially non-compliant (with medium confidence)
- 1 option that is expected to be non-compliant (with high confidence).

Note that this total included two options (WR159 and WR160) that were subsequently combined during the revised feasible options development process.

Table 3.1 Summary of WFD Compliance Assessment of Feasible Options

Option Type	Option Name	Option ID	Outcome*	Reason, if not confirmed as compliant*	Final step	Preferred Plan option?	Likelihood of final WFD non-compliance	Justification
Run-of-river abstraction	ICT_WIRRAL	STT019	Compliant (Step 2)		Step 2		None	No new/increased abstraction from the water environment.
Groundwater abstraction	IGA_CROASDALE	STT022	Potentially non-compliant (low conf.)	A potential strong connectivity between the aquifer and surface watercourses due to geology and proximity of surface watercourses to borehole could reduce river flows due to reductions in baseflow or increased losses to ground resulting from the new groundwater abstraction. Potential impacts are flow change effects on ecology and water quality dilution.	Step 3		Low	Requires quantified assessment of impact on aquifer and dependent surface water bodies, but current status of relevant elements is Good or High (except for persistent Priority Substances).
Run-of-river abstraction	SWN_RIVER LUNE	STT029	Potentially non-compliant (med. conf.)	New river abstraction could cause a major hydrological impact due to 34.2% decrease in flows at Q95 and due to restricted water available across the flow regime. Potential impacts are flow change effects on ecology and water quality dilution.	Step 3		Medium	Potential for a HOF to be agreed that would avoid non-compliance, although potentially at a relatively high flow. Requires assessment of potential impacts on in-river ecology and water quality.
Reservoir (new abstraction)	RES_HOLLINGWORTH	STT034	Potentially non-compliant (med. conf.)	Hollingworth Lake is understood to provide compensation flow to the River Roch and Rochdale Canal. Further detail would be required to confirm whether the option could reduce those flows, with subsequent potential to cause water quality deterioration through reduced dilution. Water discharged to [REDACTED] Reservoir could cause changes to the water quality and transfer of INNS are possible.	Step 3		Medium	Risks to INNS and chemicals associated with transfer of water between water bodies. Requires assessment of potential impacts on ecology and water quality.
Run-of-river abstraction	SWN_RIVER ROCH	STT041	Potentially non-compliant (med. conf.)	New river abstraction could reduce Q95 flows in the River Roch by 14% with limited water availability. Potential impacts are flow change effects on ecology and water quality dilution.	Step 3		Low	Option impact would be in line with STT041b (the Roch component only), which has been assessed for NWT Gate 2. See Option STT041b for details.
Run-of-river abstraction	SWN_RIVER IRWELL_ROCH	STT041b	Potentially non-compliant (low conf.)	NWT Gate 2 assessment has calculated that on the Roch, the new abstraction is anticipated to reduce Q95 flows by up to 10.3% compared to gauged in the 'all years' utilisation scenario, and 15.3% in the 1 in 500-year utilisation. Below the Irwell abstraction, the Q95 impact could reach up to 10% in the 'all years' scenario, and 17% in the 1 in 500-year scenario. The catchment is discharge-rich, with discharges supporting flows above natural at low flows. The Environment Agency's water availability summary from March 2022 stated that water would be available for the Roch and Irwell abstractions individually. Potential non-compliance is identified in NWT Gate 2 assessment, recognising the need for further assessments to come, including in relation to fish passage and water quality.	Step 4		Low	Further assessments will be carried out to understand potential risks to ecology and water quality, including fish barrier surveys and water quality modelling. Both rivers are discharge rich. It is likely that risks associated with low flows (including any potential consequences for ecology or water quality) can be mitigated by a HOF being applied.
Enabling works	STTA1 NWT_VYRNWY 1	STTA1	Compliant (Step 1)		Step 1		None	No new/increased abstraction from the water environment.
Enabling works	STTA1 NWT_VYRNWY 2	STTA2	Compliant (Step 1)		Step 1		None	No new/increased abstraction from the water environment.
Enabling works	STTA1 NWT_VYRNWY 3	STTA3	Compliant (Step 1)		Step 1		None	No new/increased abstraction from the water environment.
Enabling works	STTA1 NWT_VYRNWY 4	STTA4	Compliant (Step 1)		Step 1		None	No new/increased abstraction from the water environment.
Run-of-river abstraction	SWN_GLAZE BROOK	WR006	Potentially non-compliant (med. conf.)	New river abstraction could reduce Q95 flows in Glaze Brook by up to 22%. Potential impacts are flow change effects on ecology and water quality dilution.	Step 3		Medium	Existing failures of biological and water quality elements, and ALS indicates restricted water available. Although there is potential for a HOF to be agreed, the risk of introducing impediments remains.

Option Type	Option Name	Option ID	Outcome*	Reason, if not confirmed as compliant*	Final step	Preferred Plan option?	Likelihood of final WFD non-compliance	Justification
Run-of-river abstraction	SWN_RIVER GRETA	WR010	Potentially non-compliant (med. conf.)	New river abstractions could reduce Q95 flows by 40% in the River Wenning. Potential impacts are flow change effects on ecology and water quality dilution, with specific impacts on fish noted for the River Wenning and Lune.	Step 3		Medium	Potential for a HOF to be agreed that would avoid non-compliance, although potentially at a relatively high flow. Requires assessment of potential impacts on in-river ecology and water quality.
Run-of-river abstraction	SWN_RIVER IRWELL	WR015	Potentially non-compliant (low conf.)	<p>The Gate 2 NWT assessment calculated that impact of the proposed abstraction would be a 7% reduction from gauged flows at Q95 for the 'all years' utilisation scenario, and 11% reduction for the 1 in 500-year utilisation scenario. The catchment is discharge-rich, with discharges supporting flows above natural at low flows. The EA's water availability assessment (March 2022) states that there is unconstrained water available for an abstraction of this size.</p> <p>Potential non-compliance is identified in NWT Gate 2 assessment, recognising the need for further assessments to come, including in relation to fish passage and water quality.</p>	Step 4		Low	<p>The River Irwell is a discharge rich HWMB and a 10% reduction in low flows is less likely to have an impact on river morphology/ habitat availability, compared with a natural river.</p> <p>Further assessments will be carried out to understand potential risks to ecology and water quality, including fish barrier surveys and water quality modelling.</p> <p>It is likely that risks associated with low flows (including any potential consequences for ecology or water quality) can be mitigated by a HOF being applied.</p>
Run-of-river abstraction	SWN_RIVER GOYT	WR017	Potentially non-compliant (low conf.)	Point source water quality pressures and effected diatoms could be further impacted by a 7% decrease in Q95 flows as a result of the new river abstraction.	Step 3		Low	Limited proportional impact on flow, and potential for a HOF to be agreed that would avoid any non-compliance. Possible need for assessment of potential impacts on ecology and water quality.
Run-of-river abstraction	SWN_RIVER RIBBLE 26a	WR026a	Potentially non-compliant (med. conf.)	New river abstraction could reduce Q95 flows in the River Ribble by up to 10%. Potential impacts are flow change effects on ecology and water quality dilution. Water discharged to [REDACTED] Reservoir could cause changes to the water quality and transfer of INNS are possible.	Step 3		Low	Limited proportional impact on flow, and potential for a HOF to be agreed that would avoid any non-compliance. Possible need for assessment of potential impacts on ecology and water quality, including risks to INNS and chemicals associated with transfer of water between water bodies.
Run-of-river abstraction	SWN_RIVER RIBBLE 26ab	WR026b	Potentially non-compliant (low conf.)	New river abstraction could reduce Q95 flows in the River Ribble by up to 7%. Potential impacts are flow change effects on ecology and water quality dilution.	Step 3		Low	Limited proportional impact on flow, and potential for a HOF to be agreed that would avoid any non-compliance. Possible need for assessment of potential impacts on ecology and water quality.
Run-of-river abstraction	SWN_RIVER RIBBLE 26c	WR026c	Compliant (low conf.)			Reasonable Alternative Plan	Very Low	Review of the regulatory position of water availability and magnitude of flow change indicates the abstraction would be WFD compliant (potentially with a HOF).
Reservoir (raise height)	RES_HAWESWATER a	WR037a	Potentially non-compliant (low conf.)	Raising the top water level of Haweswater Reservoir by 0.5m could change the hydrological regime and morphological conditions within the reservoir, and water edge conditions with resulting impacts on ecological populations, particularly shoreline habitats. It could also impact the downstream watercourse by altering the reservoir over-topping regime and river high flows.	Step 3		Low	Limited change to hydrology of reservoir and downstream watercourse.
Reservoir (raise height)	RES_HAWESWATER ab	WR037b	Potentially non-compliant (low conf.)	Raising the top water level of Haweswater Reservoir by 1m could change the hydrological regime and morphological conditions within the reservoir, and water edge conditions with resulting impacts on ecological populations, particularly shoreline habitats. It could also impact the downstream watercourse by altering the reservoir over-topping regime and river high flows.	Step 3		Low	Limited change to hydrology of reservoir and downstream watercourse.
Run-of-river abstraction	SWN_RIVER EAMONT	WR038	Potentially non-compliant (low conf.)	Restricted/no water availability at medium-high flows due to Ullswater located upstream. Low confidence as abstraction at bottom of catchment and water available in the River Eden catchment, so any impacts will be localised.	Step 3		Low	Limited proportional impact on flow, and potential for a HOF to be agreed that would avoid any non-compliance. Low retained due to Eden designation as SAC.

Option Type	Option Name	Option ID	Outcome*	Reason, if not confirmed as compliant*	Final step	Preferred Plan option?	Likelihood of final WFD non-compliance	Justification
Run-of-river abstraction	SWN_RIVER IRTHING	WR041	Compliant (med. conf.)	Concluded to be compliant based on low proportional impact on flow and water being available in the ALS.	Step 3		Very low	Although concluded to be 'compliant', further consideration may need to be given to potential for impact on River Eden SAC downstream.
Run-of-river abstraction	SWN_RIVER ESK	WR042	Compliant (Step 2)		Step 2		Very Low	Review of the regulatory position of water availability and magnitude of flow change indicates the abstraction would be WFD compliant (potentially with a HOF).
Run-of-river abstraction	SWN_RIVER PETTERIL	WR043	Potentially non-compliant (med. conf.)	New river abstraction could reduce Q95 flows in the River Petteril by up to 26%. Potential impacts are flow change effects on ecology and water quality dilution.	Step 3		Medium	Potential for a HOF to be agreed that would avoid non-compliance, although potentially at a relatively high flow. Requires assessment of potential impacts on in-river ecology and water quality.
Run-of-river abstraction	SWN_RIVER RIBBLE 49a	WR049a	Compliant (low conf.)		Step 3		Very Low	Review of the regulatory position of water availability and magnitude of flow change indicates the abstraction would be WFD compliant (potentially with a HOF).
Run-of-river abstraction	SWN_RIVER RIBBLE 49b	WR049b	Potentially non-compliant (med. conf.)	Flows in the River Ribble could be reduced by 8% at Q95. Potential impacts are flow change effects on ecology and water quality dilution. Water discharged to ██████████ Reservoir could cause changes to the water quality and transfer of INNS are possible.	Step 3		Medium	Limited proportional impact on flow, and potential for a HOF to be agreed that would avoid any non-compliance. Possible need for assessment of potential impacts on ecology and water quality, including risks to INNS and chemicals associated with transfer of water between water bodies.
Run-of-river abstraction	SWN_RIVER RIBBLE 49bc	WR049c	Potentially non-compliant (med. conf.)	Flows in the River Ribble could be reduced by 11% at Q95. Potential impacts are flow change effects on ecology and water quality dilution. Water discharged to ██████████ Reservoir could cause changes to the water quality and transfer of INNS are possible.	Step 3		Medium	Limited proportional impact on flow, and potential for a HOF to be agreed that would avoid any non-compliance. Possible need for assessment of potential impacts on ecology and water quality, including risks to INNS and chemicals associated with transfer of water between water bodies.
Run-of-river abstraction	SWN_RIVER RIBBLE 49d	WR049d	Potentially non-compliant (low conf.)	The North West Transfer Gate 2 assessment has calculated an impact on flow at Q95 of less than 5% for the 'all years' utilisation scenario, and 9.2% for the 1 in 500 utilisation scenario. The EA have confirmed that water is available following the most recent CAMS ledger update (May 2022) The NWT Gate 2 fish assessment suggests that impacts on fish are likely to be low since impacts on flow are low, however, further study is required to predict the likely impact that a reduction in freshwater flow to the estuary may have on returning migrant fish (salmonids). Further assessment is also required of potential impacts on physical habitat availability	Step 4		Low	Impacts on flow are modest. Further assessments will be carried out to understand potential risks to ecology and water quality, including impacts of fish migration through the Ribble Estuary, and water quality modelling. It is likely that risks associated with low flows (including any potential consequences for ecology or water quality) can be mitigated by a HOF being applied.
Run-of-river abstraction	SWE_NORTH CUMBRIA	WR055	Compliant (Step 2)		Step 2		Very low	Review of the regulatory position of water availability and magnitude of flow change indicates the abstraction would be WFD compliant (potentially with a HOF). However further consideration may need to be given to potential for impact on River Eden SAC downstream.
Reservoir (increase abstraction)	RES_WORTHINGTON a	WR062a	Compliant (Step 1)		Step 1		None	Utilisation of existing raw water intake system from existing reservoir.
Reservoir (increase abstraction)	RES_WORTHINGTON b	WR062b	Compliant (Step 2)		Step 2		None	Utilisation of existing raw water intake system from existing reservoir.
Reservoir (raise height)	RES_WATERGROVE	WR065a	Potentially non-compliant (low conf.)	Raising the top water level of Watergrove Reservoir by 1m could change the hydrological regime and morphological conditions	Step 3		Low	Assume that an agreed reservoir release regime would be agreed as part of licensing. Limited

Option Type	Option Name	Option ID	Outcome*	Reason, if not confirmed as compliant*	Final step	Preferred Plan option?	Likelihood of final WFD non-compliance	Justification
				within the reservoir, and water edge conditions with resulting impacts on ecological populations, particularly shoreline habitats. It could also impact the downstream watercourse by altering the reservoir over-topping regime and river high flows.				change to hydrology of reservoir and downstream watercourse.
Reservoir (raise height)	RES_WHITEHOLME	WR065b	Compliant (Step 2)		Step 3	Reasonable Alternative Plan	None	Option is reinstating the reservoir to its previous condition as of approx. 2015, therefore no deterioration in WFD status is anticipated.
Run-of-river abstraction	SWN_RIVER DARWEN	WR074	Potentially non-compliant (med. conf.)	Flows in the River Darwen could be reduced by between 10-38% at Q95 (depending on abstraction location). Potential impacts are flow change effects on ecology and water quality dilution. Water discharged to ██████ Reservoir could cause changes to the water quality and transfer of INNS are possible.	Step 3		Medium	Potential for a HOF to be agreed that would avoid any non-compliance, although potentially at a relatively high flow (depending on abstraction location). Possible need for assessment of potential impacts on ecology and water quality, including risks to INNS and chemicals associated with transfer of water between water bodies.
Run-of-river abstraction	SWN_RIVER BOLLIN	WR076	Potentially non-compliant (low conf.)	<p>The NWT Gate 2 assessment has calculated that impacts at Q95 are predicted to be a 14% reduction from gauged in the 'all years' utilisation scenario, and a 22% reduction in the 1 in 500 year scenario. The catchment is discharge-rich, and the draft Upper Mersey ALS (Environment Agency, 2021) indicates that there is water available for abstraction at the proposed rate.</p> <p>Potential non-compliance is identified in NWT Gate 2 assessment, recognising the need for further assessments to come, including in relation to fish passage and water quality.</p>	Step 4		Low	<p>The River Bollin is a discharge rich HWMB, and reductions in low flows are less likely to have an impact on river morphology/ habitat availability, compared with a natural river.</p> <p>Further assessments will be carried out to understand potential risks to ecology and water quality, including fish barrier surveys and water quality modelling.</p> <p>It is likely that risks associated with low flows (including any potential consequences for ecology or water quality) can be mitigated by a HOF being applied.</p>
Reservoir (raise height)	RES_DOVESTONE	WR077a	Potentially non-compliant (low conf.)	Raising the top water level of Dovestone Reservoir by 1m could change the hydrological regime and morphological conditions within the reservoir and impact the downstream watercourse by altering the reservoir over-topping regime and river high flows.	Step 3		Low	Assume that an agreed reservoir release regime would be agreed as part of licensing. Limited change to hydrology of reservoir and downstream watercourse.
Reservoir (raise height)	RES_ERRWOOD	WR077b	Potentially non-compliant (low conf.)	Raising the top water level of Errwood Reservoir by 1m could change the hydrological regime and morphological conditions within the reservoir and impact the downstream watercourse by altering the reservoir over-topping regime and river high flows.	Step 3		Low	Assume that an agreed reservoir release regime would be agreed as part of licensing. Limited change to hydrology of reservoir and downstream watercourse.
Reservoir (raise height)	RES_FERNILEE	WR077c	Potentially non-compliant (low conf.)	Raising the top water level of Fernilee Reservoir by 1m could change the hydrological regime and morphological conditions within the reservoir and impact the downstream watercourse by altering the reservoir over-topping regime and river high flows.	Step 3		Low	Assume that an agreed reservoir release regime would be agreed as part of licensing. Limited change to hydrology of reservoir and downstream watercourse.
Reservoir (increase abstraction)	RES_APPLETON a	WR079a	Potentially non-compliant (low conf.)	Reinstatement of surface water abstraction of 3 Ml/d from Appleton Reservoir (currently used for fire-fighting supply only) could change the hydrological regime and morphological conditions within the reservoir, and water edge conditions with resulting impacts on ecological populations, particularly shoreline habitats	Step 3		n/a	Further investigations subsequent to the feasible options assessment determined that there is insufficient yield in the reservoir for the option to proceed.
Reservoir (increase abstraction)	RES_APPLETON b	WR079b	Potentially non-compliant (low conf.)	Reinstatement of surface water abstraction of 6 Ml/d from Appleton Reservoir (currently used for fire-fighting supply only) could change the hydrological regime and morphological conditions within the reservoir, and water edge conditions with resulting impacts on ecological populations, particularly shoreline habitats	Step 3		n/a	Further investigations subsequent to the feasible options assessment determined that there is insufficient yield in the reservoir for the option to proceed.

Option Type	Option Name	Option ID	Outcome*	Reason, if not confirmed as compliant*	Final step	Preferred Plan option?	Likelihood of final WFD non-compliance	Justification
Reservoir (increase abstraction)	RES_APPLETON c	WR079c	Potentially non-compliant (low conf.)	Reinstatement of surface water abstraction of 9 MI/d from Appleton Reservoir (currently used for fire-fighting supply only) could change the hydrological regime and morphological conditions within the reservoir, and water edge conditions with resulting impacts on ecological populations, particularly shoreline habitats	Step 3		n/a	Further investigations subsequent to the feasible options assessment determined that there is insufficient yield in the reservoir for the option to proceed.
Reservoir (increase abstraction)	RES_APPLETON d	WR079d	Potentially non-compliant (low conf.)	Reinstatement of surface water abstraction of 12.5 MI/d from Appleton Reservoir (currently used for fire-fighting supply only) could change the hydrological regime and morphological conditions within the reservoir, and water edge conditions with resulting impacts on ecological populations, particularly shoreline habitats	Step 3		n/a	Further investigations subsequent to the feasible options assessment determined that there is insufficient yield in the reservoir for the option to proceed.
Treated water transfer	ITC_CARLISLE	WR084	Compliant (Step 2)		Step 2		None	No new/increased abstraction from the water environment.
Groundwater abstraction	GWE_ROUGHTON GILL	WR095	Potentially non-compliant (low conf.)	A new abstraction of 2.2 MI/d from Roughton Gill Mine, which is assumed to discharge into Whelpo (Cald) Beck, is assessed as a decreased river discharge, where the ALS indicates restricted water availability at Q95. Potential impacts are flow change effects on ecology and water quality dilution.	Step 3		Low	Given the relatively small size of the abstraction, and its indirect impact on surface water, it is relatively unlikely to remain non-compliant. However, more detailed investigation and understanding is required to draw a conclusion.
Groundwater abstraction	GWE_BURNLEY a	WR099a	Potentially non-compliant (med. conf.)	A change in water balance status of the groundwater body from good to poor between 2015 and 2019 suggests that there are potential issues that may be exacerbated by abstraction. The water discharged to the River Brun may have an impact on the water quality of the watercourse as it may be of different phys-chem composition.	Step 3		Medium	Option within existing licence, although water balance status of aquifer is Poor, and licence changes would need to be discussed with the EA for use as a compensation borehole. Assessment required of impact on receiving watercourse, to establish baseline hydrological and ecological conditions.
Groundwater abstraction	GWE_BURNLEY b	WR099b	Potentially non-compliant (med. conf.)	A change in water balance status of the groundwater body from good to poor between 2015 and 2019 suggests that there are potential issues that may be exacerbated by abstraction. Water discharged to [REDACTED] Reservoir could cause changes to the water quality and transfer of INNS are possible (although not likely as groundwater source).	Step 3		Low	Option within existing licence, although water balance status of aquifer is Poor, and licence changes would need to be discussed with the EA (for use as a transfer licence). Assessment required of impact on receiving waterbody, but considered relatively low risk since it is an existing reservoir.
Groundwater abstraction	GWE_BURNLEY c	WR099c	Potentially non-compliant (med. conf.)	A change in water balance status of the groundwater body from good to poor between 2015 and 2019 suggests that there are potential issues that may be exacerbated by abstraction.	Step 3		Low	Option within existing licence, although water balance status of aquifer is Poor.
Groundwater abstraction	GWE_THORNCLIFFE	WR100	Potentially non-compliant (med. conf.)	Although the 2019 water balance status is good, the ALS indicates restricted water availability for the North Furness aquifer (0 MI/d available; reason - over licensed on water balance), therefore an increase in abstraction volume of 4.5 MI/d has the potential to cause deterioration.	Step 3		Medium	This source has been subject to AMP7 WINEP, which has identified risks of WFD non-compliance associated with the abstraction. As a result, the decision was made not to progress this option for NWT.
Groundwater abstraction	GWE_FRANKLAW	WR101	Potentially non-compliant (med. conf.)	The ALS indicates there is no water available for the groundwater body. A potential strong connectivity between the aquifer and surface watercourses due to geology and proximity of surface watercourses to borehole could reduce river flows due to reductions in baseflow or increased losses to ground resulting from the new groundwater abstraction. Potential impacts are flow change effects on ecology and water quality dilution.	Step 3		Medium	This source has been subject to AMP7 WINEP, which has identified risks of WFD non-compliance associated with fully licensed abstraction. This could result in this option being concluded to be non-compliant.
Groundwater abstraction	GWE_WIDNES	WR102b	Potentially non-compliant (med. conf.)	NWT Gate 2 assessment: The Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone groundwater body is potentially non-compliant for dependent surface water body status, saline intrusion, water balance and chemical status. Of these, saline intrusion and water balance have been assigned medium confidence of non-compliance, based on classification information at the GWMU level. The Environment Agency has	Step 4	Reasonable alternative plan	Medium	Groundwater balance and impacts on surface water body flow will be quantified and revised based on outcomes of the updated Lower Mersey & North Merseyside groundwater model (for Gate 3). The likely outcome is uncertain at this stage.

Option Type	Option Name	Option ID	Outcome*	Reason, if not confirmed as compliant*	Final step	Preferred Plan option?	Likelihood of final WFD non-compliance	Justification
				indicated that there is insufficient water available for the proposed option capacity based on current evidence. Therefore, additional abstraction could lead to deterioration in quantitative water balance of the aquifer. Proposed option is within existing abstraction licence but would increase recent actual levels of abstraction.				Further evidence collection will be undertaken in the connected surface water body/bodies, to inform impact assessment. Likelihood of final non-compliance reduced for this option, since it is within an existing licence.
Groundwater abstraction	GWE_BOLD HEATH	WR102e	Potentially non-compliant (med. conf.)	The ALS indicates that there is limited/restricted water availability in the aquifer, therefore, additional abstraction could lead to deterioration in quantitative water balance of the aquifer. There is historic saline intrusion in the area.	Step 3		Medium	Option requires new licence to be agreed, and EA's water availability assessment indicates that restricted water is available. Assessment would need to be updated based on outcomes of the updated Lower Mersey & North Merseyside groundwater model.
Groundwater abstraction	GWE_LYMM a1	WR105a1	Potentially non-compliant (med. conf.)	NWT Gate 2 assessment: The ALS indicates that there is limited/restricted water availability in the aquifer. The EA's updated water availability assessment in March 2022 indicates that 2.9 MI/d is available, which is less than the proposed option abstraction rate. Therefore, additional abstraction could lead to deterioration in quantitative water balance of the aquifer. There is historic saline intrusion in the area.	Step 4		Medium	Licence in place, however, the EA's updated water availability assessment in March 2022 indicates that less water is available than the proposed abstraction rate. Poor saline intrusion and chemical status elements. Assessment would need to be updated based on outcomes of the updated Lower Mersey & North Merseyside groundwater model.
Groundwater abstraction	GWE_LYMM a2	WR105a2	Potentially non-compliant (med. conf.)	The ALS indicates that there is limited/restricted water availability in the aquifer, therefore, additional abstraction could lead to deterioration in quantitative water balance of the aquifer. There is historic saline intrusion in the area.	Step 3		Medium	Option impact would be in line with WR105a1, which has been assessed for NWT Gate 2. See Option WR105a1 for details.
Groundwater abstraction	GWE_LYMM b1	WR105b1	Potentially non-compliant (med. conf.)	The ALS indicates that there is limited/restricted water availability in the aquifer, therefore, additional abstraction could lead to deterioration in quantitative water balance of the aquifer. There is historic saline intrusion in the area.	Step 3		Medium	Option impact would be in line with WR105a1, which has been assessed for NWT Gate 2. See Option WR105a1 for details.
Groundwater abstraction	GWE_LYMM b2	WR105b2	Potentially non-compliant (med. conf.)	The ALS indicates that there is limited/restricted water availability in the aquifer, therefore, additional abstraction could lead to deterioration in quantitative water balance of the aquifer. There is historic saline intrusion in the area.	Step 3		Medium	Option impact would be in line with WR105a1, which has been assessed for NWT Gate 2. See Option WR105a1 for details.
Groundwater abstraction	GWE_WALTON_1	WR106a	Potentially non-compliant (med. conf.)	The ALS indicates that there is limited/restricted water availability in the aquifer, therefore, additional abstraction could lead to deterioration in quantitative water balance of the aquifer. There is suspected saline intrusion. The proximity of surface watercourses and restricted surface water availability means any drawdown may have an impact.	Step 3		Medium	Option impact would be in line with WR106b, which has been assessed for NWT Gate 2. See Option WR106b for details.
Groundwater abstraction	GWE_WALTON_2	WR106b	Potentially non-compliant (med. conf.)	NWT Gate 2 assessment: The ALS does not identify a GWMU for this area. The EA's updated water availability assessment in March 2022 indicates that 2.9 MI/d is available, less than the proposed option abstraction rate. Therefore, additional abstraction could lead to deterioration in quantitative water balance of the aquifer. Historic saline intrusion in the area.	Step 4		Medium	Licence in place, however, the EA's updated water availability assessment in March 2022 indicates that less water is available than the proposed abstraction rate. Poor saline intrusion and chemical status elements. Assessment would need to be updated based on outcomes of the updated Lower Mersey & North Merseyside groundwater model.
Groundwater abstraction	GWE_AUGHTON PARK a1	WR107a1	Potentially non-compliant (med. conf.)	The ALS indicates that there is limited/restricted water availability in the aquifer. Therefore, additional abstraction could lead to deterioration in quantitative water balance of the aquifer. Surface water bodies are potentially hydraulically connected to the aquifer in the vicinity of the abstractions, so flows could be reduced due to reductions in baseflow or increased losses to ground resulting from increased groundwater abstraction.	Step 3		Medium	Option impact would be in line with WR107a2, which has been assessed for NWT Gate 2. See Option WR107a2 for details.

Option Type	Option Name	Option ID	Outcome*	Reason, if not confirmed as compliant*	Final step	Preferred Plan option?	Likelihood of final WFD non-compliance	Justification
Groundwater abstraction	GWE_AUGHTON PARK a2	WR107a2	Potentially non-compliant (med. conf.)	NWT Gate 2 assessment: The Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone groundwater body is potentially non-compliant for dependent surface water body status, GWDTes, water balance and chemical status. Of these, water balance has been assigned medium confidence of non-compliance based on current evidence. The ALS indicates that there is currently limited/restricted water availability in the aquifer. The Environment Agency has indicated that there is sufficient water available for the proposed capacity within the Recent Actual surplus, however, this option would require a new licence.	Step 4	Preferred plan	Medium	Groundwater balance and impacts on surface water body flow will be quantified and revised based on outcomes of the updated Lower Mersey & North Merseyside groundwater model. The likely outcome is uncertain at this stage. Further evidence collection will be undertaken in the connected surface water body/bodies, to inform impact assessment. Option requires new licence to be agreed. Likelihood of licence being agreed is uncertain at this stage.
Groundwater abstraction	GWE_RANGLES BRIDGE	WR107b	Potentially non-compliant (low conf.)	The Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone groundwater body is potentially non-compliant for dependent surface water body status, GWDTes and chemical status. These are all low-confidence and may be considered a precautionary conclusion. The ALS indicates that there is limited/restricted water availability in the aquifer based on current evidence, however, the March 2022 EA water availability assessment indicates that 12 Ml/d is available within the Recent Actual surplus. Abstraction licences are already in place, and UU are currently in negotiation with the Environment Agency to retain rather than revoke these.	Step 4	Reasonable alternative plan	Low	Groundwater balance and impacts on surface water body flow will be quantified and revised based on outcomes of the updated Lower Mersey & North Merseyside groundwater model. The likely outcome is uncertain at this stage. Further evidence collection will be undertaken in the connected surface water body/bodies, to inform impact assessment. Likelihood of final non-compliance reduced for this option, since it is within an existing licence.
Groundwater abstraction	GWE_WOODFORD	WR111	Potentially non-compliant (med conf.)	NWT Gate 2 assessment: The Manchester and East Cheshire Permo-Triassic Sandstone groundwater body is potentially non-compliant for dependent surface water body status, GWDTes, water balance and chemical status. Of these, water balance has been assigned medium confidence of non-compliance based on current evidence. The ALS indicates that there is currently limited/restricted water availability in the aquifer. The Environment Agency has indicated that there is sufficient water available for the proposed capacity within the licensed surplus, however, this option would require a licence variation.	Step 4	Preferred plan	Medium	Groundwater balance and impacts on surface water body flow will be quantified and revised based on outcomes of the updated East Cheshire groundwater model. The likely outcome is uncertain at this stage. Further evidence collection will be undertaken in the connected surface water body/bodies, to inform impact assessment. Option requires licence variation to be agreed. Likelihood of variation being agreed is uncertain at this stage.
Groundwater abstraction	GWE_TYThERINGTON	WR113	Potentially non-compliant (low conf.)	The Manchester and East Cheshire Permo-Triassic Sandstone groundwater body is potentially non-compliant for dependent surface water body status, GWDTes, water balance and chemical status. These are all low-confidence and may be considered a precautionary conclusion. The ALS indicates that there is currently limited/restricted water availability in the aquifer, although the EA water availability information provided in March 2022 indicates that there is sufficient water available within licence. The Tytherington borehole has been flagged by the EA as 'at risk' from environmental destination though is uncertainty is very high.	Step 4	Preferred plan	Low	Groundwater balance and impacts on surface water body flow will be quantified and revised based on outcomes of the updated East Cheshire groundwater model. The likely outcome is uncertain at this stage. Further evidence collection will be undertaken in the connected surface water body/bodies, to inform impact assessment. Likelihood of final non-compliance reduced for this option, since it is within an existing licence.
Groundwater abstraction	GWE_CROSS HILL_1	WR120a	Potentially non-compliant (med. conf.)	Potential strong connectivity between the aquifer and surface watercourses due to geology and proximity of surface watercourses to borehole could reduce river flows due to reductions in baseflow or increased losses to ground resulting from the new groundwater abstraction. Potential impacts are	Step 3		Medium	This source has been subject to AMP7 WINEP, which has identified risks of WFD non-compliance associated with the abstraction. As a result, the decision was made not to progress this option for NWT.

Option Type	Option Name	Option ID	Outcome*	Reason, if not confirmed as compliant*	Final step	Preferred Plan option?	Likelihood of final WFD non-compliance	Justification
				flow change effects on ecology and water quality dilution. Also, Poor status Chemical drinking water protected area				
Groundwater abstraction	GWE_CROSS HILL_2	WR120b	Potentially non-compliant (med. conf.)	Potential strong connectivity between the aquifer and surface watercourses due to geology and proximity of surface watercourses to borehole could reduce river flows due to reductions in baseflow or increased losses to ground resulting from the new groundwater abstraction. Potential impacts are flow change effects on ecology and water quality dilution. Also, Poor status Chemical drinking water protected area	Step 3		Medium	This source has been subject to AMP7 WINEP, which has identified risks of WFD non-compliance associated with the abstraction. As a result, the decision was made not to progress this option for NWT.
Groundwater abstraction	GWE_EATON a	WR121a	Potentially non-compliant (med. conf.)	Potential strong connectivity between the aquifer and surface watercourses due to geology and proximity of surface watercourses to borehole could reduce river flows due to reductions in baseflow or increased losses to ground resulting from the new groundwater abstraction. Potential impacts are flow change effects on ecology and water quality dilution.	Step 3		Medium	This source has been subject to AMP7 WINEP, which has identified risks of WFD non-compliance associated with the abstraction. As a result, the decision was made not to progress this option for NWT.
Groundwater abstraction	GWE_EATON b	WR121b	Potentially non-compliant (med. conf.)	Potential strong connectivity between the aquifer and surface watercourses due to geology and proximity of surface watercourses to borehole could reduce river flows due to reductions in baseflow or increased losses to ground resulting from the new groundwater abstraction. Potential impacts are flow change effects on ecology and water quality dilution.	Step 3		Medium	This source has been subject to AMP7 WINEP, which has identified risks of WFD non-compliance associated with the abstraction. As a result, the decision was made not to progress this option for NWT.
Groundwater abstraction	GWE_NEWTON HOLLOWES	WR122	Potentially non-compliant (med. conf.)	Potential strong connectivity between the aquifer and surface watercourses due to geology and proximity of surface watercourses to borehole could reduce river flows due to reductions in baseflow or increased losses to ground resulting from the new groundwater abstraction. Potential impacts are flow change effects on ecology and water quality dilution.	Step 3		Medium	This source has been subject to AMP7 WINEP investigation, which has identified risks of WFD non-compliance associated with the abstraction. Investigation due March 2023.
Groundwater abstraction	GWE_NORTH SHROPSHIRE	WR125	Potentially non-compliant (med. conf.)	Potential strong connectivity between the aquifer and surface watercourses due to geology and proximity of surface watercourses to borehole could reduce river flows due to reductions in baseflow or increased losses to ground resulting from the new groundwater abstraction. Potential impacts are flow change effects on ecology and water quality dilution.	Step 3		Medium	This source has been subject to AMP7 WINEP, which has identified risks of WFD non-compliance associated with fully licensed abstraction. This could result in this option being concluded to be non-compliant.
Groundwater abstraction	GWE_FAIRHILL	WR127	Potentially non-compliant (low conf.)	Potential connectivity between the aquifer and surface watercourses due to geology and proximity of surface watercourses to borehole could reduce river flows due to reductions in baseflow or increased losses to ground resulting from the new groundwater abstraction. Potential impacts are flow change effects on ecology and water quality dilution.	Step 3		Low	Option within existing licence, and there is currently water available in the aquifer and connected surface water.
Groundwater abstraction	GWN_TARN WOOD	WR128	Potentially non-compliant (low conf.)	Potential connectivity between the aquifer and surface watercourses due to geology and proximity of surface watercourses to borehole could reduce river flows due to reductions in baseflow or increased losses to ground resulting from the new groundwater abstraction. Potential impacts are flow change effects on ecology and water quality dilution.	Step 3		Low	Option within existing licence, and there is currently water available in the aquifer and connected surface water.
Run-of-river abstraction	EFR_HORWICH	WR140	Potentially non-compliant (med. conf.)	Flows in the River Douglas could be reduced by 14.3% at Q95. Potential impacts are flow change effects on ecology and water quality dilution.	Step 3		Low	Impacts on flow are relatively modest. It is likely that risks associated with low flows (including any potential consequences for ecology or water quality) could be mitigated by a HOF being applied.
Run-of-river abstraction	EFR_ROSENDALE	WR141	Potentially non-compliant (med. conf.)	Flows in the River Irwell could be reduced by 16% at Q95. Potential impacts are flow change effects on ecology and water quality dilution.	Step 3		Low	Impacts on flow are relatively modest. It is likely that risks associated with low flows (including any potential consequences for ecology or water

Option Type	Option Name	Option ID	Outcome*	Reason, if not confirmed as compliant*	Final step	Preferred Plan option?	Likelihood of final WFD non-compliance	Justification
								quality) could be mitigated by a HOF being applied.
Run-of-river abstraction	SWN_RIVER TAME	WR144	Potentially non-compliant (low conf.)	NWT Gate 2 flow impact assessment shows that impacts on flow in the River Tame would be consistently below 10% immediately downstream of the abstraction. The impacts would be further reduced by the downstream CAMS Assessment Points, to less than 5% impact on flows at Broomstairs above Q98. The ALS indicates that there is water available across the flow regime. Potential non-compliance associated with biological elements.	Step 4		Low	Flow impacts are relatively limited. It is likely that risks associated with low flows (including any potential consequences for ecology or water quality) can be mitigated by a HOF being applied. Further assessments will be carried out to understand potential risks to ecology and water quality, including fish barrier surveys and water quality modelling.
Groundwater abstraction	GWN_NORTH CUMBRIA	WR148	Potentially non-compliant (low conf.)	Potential strong connectivity between the aquifer and surface watercourses due to geology and proximity of surface watercourses to borehole could reduce river flows due to reductions in baseflow or increased losses to ground resulting from the new groundwater abstraction. Potential impacts are flow change effects on ecology and water quality dilution. Also, Poor status Chemical drinking water protected area	Step 3		Low	There is currently water available in the aquifer and connected surface water.
Groundwater abstraction	ITC_WIGAN	WR149**	Potentially non-compliant (med. conf.)	NWT Gate 2 assessment: The Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone groundwater body is potentially non-compliant for dependent surface water body status, GWDTEs, saline intrusion, water balance and chemical status. Of these, saline intrusion and water balance have been assigned medium confidence of non-compliance, based on classification information at the GWMU level. Gate 2 assessment concluded that the latest EA water availability update indicates that the GWMU is over-licensed, with insufficient water available for option based on current evidence. The Environment Agency has indicated that there is insufficient water available for the proposed capacity, and there are known salinity issues. [note that the feasible options assessment had initially assigned Non-compliant (high conf.) to this option. Based on subsequent work for NWT, the conclusion has now been set at Medium confidence for consistency with the Gate 2 Groundwater options report (Wood, 2002). This does not necessarily reflect a reduced level of concern, but provides consistency in assessment approach between options. This will be reviewed with an updated groundwater model]	Step 4		Medium	Groundwater balance and impacts on surface water body flow will be quantified and revised based on outcomes of the new Lower Mersey & North Merseyside groundwater model (for Gate 3). The likely outcome is uncertain at this stage. Further evidence collection will be undertaken in the connected surface water body/bodies, to inform impact assessment. Option may require licence variation to be agreed. Likelihood of variation being agreed is uncertain at this stage.
Groundwater abstraction	ITC_WEST CHESHIRE 1	WR153	Potentially non-compliant (low conf.)	ALS indicates limited groundwater availability (although abstraction within licence limit) and potential connectivity between the aquifer and surface watercourses due to geology and proximity of surface watercourses to borehole could reduce river flows.	Step 3		Medium	This source has been subject to AMP7 WINEP, which has identified risks of WFD non-compliance associated with the abstraction. As a result, the decision was made not to progress this option for NWT.
Groundwater abstraction	ITC_WEST CHESHIRE 2	WR154	Potentially non-compliant (med. conf.)	ALS indicates limited groundwater availability and potential connectivity between the aquifer and surface watercourses due to geology and proximity of surface watercourses to borehole could reduce river flows. Also, close proximity to GWDTE (SAC)	Step 3		Medium	This source has been subject to AMP7 WINEP, which has identified risks of WFD non-compliance associated with the abstraction. As a result, the decision was made not to progress this option for NWT.
Reservoir (optimise compensation release)	WR159 RWL_COMPENSATION GP 1&2	WR159 and WR160	Potentially non-compliant (low conf.)	The proposed reductions in compensation flows from the reservoirs by improvements to flow control structures and operations, will reduce the amount of flow in the receiving downstream watercourse. Potential impacts could include effects on ecology and water quality dilution	Step 3		Low	Optimising compensation releases could notably reduce flow downstream at some locations. Further assessment would be required for individual compensation releases.

Option Type	Option Name	Option ID	Outcome*	Reason, if not confirmed as compliant*	Final step	Preferred Plan option?	Likelihood of final WFD non-compliance	Justification
Network resilience	SSO_STOCKPORT PH II	WR185	Compliant (Step 1)		Step 1	Reasonable Alternative Plan	None	No new/increased abstraction from the water environment.
Network resilience	SSO_STOCKPORT PH III	WR186	Compliant (Step 1)		Step 1		None	No new/increased abstraction from the water environment.
Run-of-river abstraction	SWE_DAMAS GILL	WR187	Potentially non-compliant (low conf.)	Due to the size of the abstraction from a relatively small stream, there is the potential for significant impacts on the in-river habitat with the potential to completely dry section of the water course. Low confidence due to the lack of hydrological information.	Step 3		Medium	Limited detail is available about this option, leaving uncertainty about the impacts: further assessment of hydrological impacts and resulting potential for impacts on ecology would be required.
Run-of-river abstraction	NIT_THIRD PARTY_21a	WR188a1	Potentially non-compliant (med. conf.)	Flows in the River Goyt could be reduced by 10.5% at Q95. Potential impacts are flow change effects on ecology and water quality dilution (particular issue for phosphate and diatoms). Transfer of raw water to Peak Forest / Macclesfield Canal has potential to transfer INNS and change water quality/chemical status.	Step 3		Low	Flow impacts are relatively limited. It is likely that risks associated with low flows (including any potential consequences for ecology or water quality) can be mitigated by a HOF being applied. Possible need for assessment of potential impacts on ecology and water quality in the river and canal, including risks to INNS and chemicals associated with transfer of water between water bodies.
Run-of-river abstraction	NIT_THIRD PARTY_21b	WR188a2	Potentially non-compliant (med. conf.)	Flows in the River Goyt could be reduced by 10.5% at Q95. Potential impacts are flow change effects on ecology and water quality dilution (particular issue for phosphate and diatoms). Transfer of raw water to Peak Forest/Macclesfield Canal has potential to transfer INNS and change water quality/chemical status.	Step 3		Low	Flow impacts are relatively limited. It is likely that risks associated with low flows (including any potential consequences for ecology or water quality) can be mitigated by a HOF being applied. Possible need for assessment of potential impacts on ecology and water quality in the river and canal, including risks to INNS and chemicals associated with transfer of water between water bodies.
Run-of-river abstraction	NIT_THIRD PARTY_21c	WR188b1	Potentially non-compliant (low conf.)	Abstraction may change the hydrological regime and water quality of the canal and could impact on the ecological status of the water body - low confidence due to lack of hydrological information.	Step 3		Low	Flow impacts are likely to be relatively limited due to small abstraction volume (2 MI/d). It is likely that risks associated with low flows (including any potential consequences for ecology or water quality) can be mitigated by a HOF being applied.
Run-of-river abstraction	NIT_THIRD PARTY_21d	WR188b2	Potentially non-compliant (low conf.)	Abstraction may change the hydrological regime and water quality of the canal and could impact on the ecological status of the water body - low confidence due to lack of hydrological information.	Step 3		Low	Flow impacts are likely to be relatively limited due to small abstraction volume (2 MI/d). It is likely that risks associated with low flows (including any potential consequences for ecology or water quality) can be mitigated by a HOF being applied.
Process losses (washwater treatment)	PRO_NORTH LANCASHIRE	WR191	Compliant (Step 1)		Step 1	Reasonable Alternative Plan	None	No new/increased abstraction from the water environment.
Run-of-river abstraction	NIT_THIRD PARTY_1	WR800	Compliant (Step 2)		Step 2		Very low	No increased abstraction from the water environment as the new abstraction would be balanced by abstraction trading.
Run-of-river abstraction	WIT_THIRD PARTY_4a	WR810a	Potentially non-compliant (low conf.)	Changes in reservoir water level could affect the water edge conditions with resulting impacts on ecological populations, particularly shoreline habitats (SSSI and SPA/SAC status). Changes to the water quality of the receiving reservoir and transfer of INNS are possible, which could impact on the ecological status of the water body as well as pose a risk of adverse effects on the River Eden SAC.	Step 3		Medium	Limited detail is available about this option, leaving significant uncertainty about the impacts, which include potential impacts on designated sites. Likely need for assessment of potential impacts on ecology and water quality, including risks to INNS and chemicals associated with transfer of water between water bodies.
Run-of-river abstraction	WIT_THIRD PARTY_4b	WR810b	Potentially non-compliant (low conf.)	Changes in reservoir water level could affect the water edge conditions with resulting impacts on ecological populations, particularly shoreline habitats (SSSI and SPA/SAC status).	Step 3		Low	Limited detail is available about this option, leaving significant uncertainty about the impacts, which include potential impacts on designated

Option Type	Option Name	Option ID	Outcome*	Reason, if not confirmed as compliant*	Final step	Preferred Plan option?	Likelihood of final WFD non-compliance	Justification
								sites. However, this option (in comparison to WR810a) does not involve transfer between water bodies, which reduces the likelihood of a 'non-compliant' conclusion.
Run-of-river abstraction	WIT_THIRD PARTY_5	WR811	Potentially non-compliant (low conf.)	Changes in reservoir water level could affect the water edge conditions with resulting impacts on ecological populations, particularly shoreline habitats (SSSI and SPA/SAC status). Changes to the water quality of the receiving waterbody and transfer of INNS are possible, which could impact on the ecological status of the water body as well as pose a risk of adverse effects on the River Eden SAC.	Step 3		Medium	Limited detail is available about this option, leaving significant uncertainty about the impacts, which include potential impacts on designated sites. Likely need for assessment of potential impacts on ecology and water quality, including risks to INNS and chemicals associated with transfer of water between water bodies.
Run-of-river abstraction	WIT_THIRD PARTY_6a	WR812a	Potentially non-compliant (low conf.)	Changes to the water quality of the Haweswater Reservoir and transfer of INNS are possible, which could impact on the ecological status of the water body as well as pose a risk of adverse effects on the River Eden SAC.	Step 3		Medium	Limited detail is available about this option, leaving significant uncertainty about the impacts, which include potential impacts on designated sites. Likely need for assessment of potential impacts on ecology and water quality, including risks to INNS and chemicals associated with transfer of water between water bodies.
Run-of-river abstraction	WIT_THIRD PARTY_6b	WR812b	Compliant (Step 2)		Step 2		Very low	Regulator review of SRO Gate 1 options indicates resource available from Kielder Water. Assume no change to releases from Kielder to downstream watercourses.
Run-of-river abstraction	WIT_THIRD PARTY_6c	WR812c	Compliant (Step 2)		Step 2		Very low	Regulator review of SRO Gate 1 options indicates resource available from Kielder Water. Assume no change to releases from Kielder to downstream watercourses.
Run-of-river abstraction	WIT_THIRD PARTY_7	WR813	Potentially non-compliant (high conf.)	Abstraction from Scammonden Water is assessed as compliant. The transfer of raw water to Huddersfield Narrow Canal could cause changes to the water quality of the receiving water body and transfer of INNS, as well as the transfer of priority hazardous chemicals (PFOS) to the water environment within the canal, where they are not currently found.	Step 3		Medium	Need for assessment of potential impacts on ecology and water quality, including risks to chemicals (notably PFOS) and chemicals associated with transfer of water between water bodies.
Run-of-river abstraction	WIT_THIRD PARTY_8a	WR814a	Compliant (Step 1)		Step 1		None	Option involves a reduction in abstraction from the River Dee.
Run-of-river abstraction	WIT_THIRD PARTY_8c	WR814c	Potentially non-compliant (low conf.)	The proposed abstraction location could have significant effects on the River Dee (since flows will be reduced from a point higher in the catchment than the current abstraction). Could have significant effects on ecology and water quality dilution in the upper catchment, which may impact on the River Dee SSSI and Bala Lake SAC	Step 3		Medium	Limited detail is available about this option, leaving uncertainty about the impacts, which include potential impacts on designated sites. Although it may be possible to mitigate impacts from abstracting further up the catchment, e.g., with a HOF, the Abstraction Licensing Strategy has no water available in the Dee catchment.
Run-of-river abstraction	NIT_THIRD PARTY_9I	WR815	Potentially non-compliant (low conf.)	Increased releases from the reservoir to support the new canal abstraction could impact the hydrological regime and water quality within the reservoir, which in turn could impact the ecological status. Flows in the Peasey Beck could be reduced by up to 32% at Q95. Low confidence as further investigation is required to understand the hydrological interaction between Lancaster canal, Peasey Beck, and Killington Reservoir.	Step 3		Medium	Limited detail is available about this option, leaving significant uncertainty about the impacts. Initial view suggests [REDACTED] on flow, although this could be revised following further investigation of the hydrological interaction between the scheme elements. Potential for a HOF to be agreed that would avoid non-compliance, although potentially at a relatively high flow.
Run-of-river abstraction	NIT_THIRD PARTY_11	WR817	Potentially non-compliant (low conf.)	It is assumed that the St Helens Canal is supplied with water from Carr Mill Dam, however, due to lack of detail on the exact source of the water, there could be changes to the hydrological regime and water quality of the canal. Black Brook may also be	Step 3		Low	Limited detail is available about this option, leaving significant uncertainty about the impacts. However, on the basis of the assumptions applied

Option Type	Option Name	Option ID	Outcome*	Reason, if not confirmed as compliant*	Final step	Preferred Plan option?	Likelihood of final WFD non-compliance	Justification
				hydrologically connected and experience the same impacts - low confidence reflects lack of detail on hydrological connectivity.				to the assessment, it is likely that risks associated with low flows could be managed/ mitigated.
Run-of-river abstraction	NIT_THIRD PARTY_12	WR820	Compliant (low conf.)		Step 3		Very Low	Low confidence assigned due to assumed compensation flow from an existing supporting waterbody – this will require confirmation.
Run-of-river abstraction	NIT_THIRD PARTY_13	WR821	Potentially non-compliant (low conf.)	Abstraction from the Shropshire Union Canal (via the Llangollen Canal) may cause flow change effects on ecology and water quality dilution, which may impact on the River Dee SSSI and Bala Lake SAC as a result of increased abstraction. Low confidence as additional information / investigation is required.	Step 3		Medium	Limited detail is available about this option, leaving uncertainty about the impacts, which include potential impacts on designated sites. The Abstraction Licensing Strategy has no water available in the Dee catchment, leading to a higher likelihood of non-compliance if abstraction from the Dee is included as part of the option.
Run-of-river abstraction	NIT_THIRD PARTY_15	WR824	Potentially non-compliant (low conf.)	Abstraction from Blenkinsopp Mine, which is assumed to discharge into Tipalt burn ordinarily, therefore has been assessed as a decreased river discharge - potential impacts are flow change effects on ecology and water quality dilution. Low confidence due to a more detailed investigation of the hydrological functioning of the local water environment required.	Step 3		Low	Given the relatively small size of the abstraction, its indirect impact on surface water, it is relatively unlikely to remain non-compliant. However, more detailed investigation and understanding is required to draw a conclusion.
Run-of-river abstraction	NIT_THIRD PARTY_16	WR825	Potentially non-compliant (low conf.)	Abstraction from Bridgewater Canal Mine, which is assumed to discharge into the Folly Brook and Saltey Brook ordinarily, therefore has been assessed as a decreased river discharge – potential impacts are flow change effects on ecology and water quality dilution. Low confidence due to a more detailed investigation of the hydrological functioning of the local water environment required.	Step 3		Low	Given the relatively small size of the abstraction, and its indirect impact on surface water, it is relatively unlikely to remain non-compliant. However, more detailed investigation and understanding is required to draw a conclusion.

* The "Outcome" and "Reason" columns present the assessment as at the time of the Feasible Options Assessment, unless stated otherwise.

** Option WR149 has since been discounted due to concerns re water quality deterioration in the wider groundwater unit, difficult to treat water quality issues and limited water availability

4. Programme-level (Stage 2) WFD Assessment

In order to understand the WFD compliance of the revised draft WRMP as a whole, a cumulative assessment has been undertaken of the options within the Preferred Plan, and also of the Reasonable Alternative Plan. This makes use of the individual option-level assessments (as presented in **Section 3**), but also recognises that when considered as a whole Plan, some water bodies could be impacted by more than one option. For each WFD water body that is impacted by one or more options within the plan, an impact assessment has been undertaken to understand the cumulative impact on the receptors within that water body as a result of all of the options being in operation. This section then provides an overall assessment of all options and all water bodies associated with the Preferred Plan (**Section 4.1**) and the Reasonable Alternative Plan (**Section 4.2**).

4.1 Cumulative Assessment of the Preferred Plan

Table 4.1 shows the options that make up the Preferred Plan and identifies those water bodies that are impacted by more than one option. The relevant options and water bodies are also shown in **Figure 4.1** (surface water bodies) and **Figure 4.2** (groundwater bodies). The list of water bodies is informed through the option-level assessments, but has also looked further downstream, where the individual option assessments did not extend to the coast. Potential impacts are considered on the:

- River Bollin- WR111 and WR113 are in the Bollin catchment, which is a tributary of the Mersey;
- Alt catchment- WR107a2 is in the Downholland Brook catchment, which is a tributary of the Alt;
- Lower Mersey and North Merseyside Permo-Triassic Sandstone Aquifers- option WR107a2 abstracts from this water body;
- Manchester and East Cheshire Permo-Triassic Sandstone Aquifers- options WR111 and WR113 abstract from this water body.

Each of the cumulative impacts identified above has undergone a hydrological assessment and associated WFD compliance assessment, using evidence and assessment gathered for the NWT project (Wood, 2022a and Wood, 2022b). The cumulative hydrological impacts include both the surface water abstractions (for which quantitative flow impacts have been calculated using modelled utilisation profiles), and groundwater abstractions (for which modelled utilisation profiles are available, but there is not yet a mechanism for quantifying the resulting impacts on surface waters). In order to accommodate the differing levels of quantification, a simple worst-case scenario has been assessed, which assumes that all sources are used at full capacity, and that full capacity will directly impact on the surface water body in question.

The cumulative assessment is summarised in **Table 4.2**, showing all water bodies that could be impacted by one or more options of the Preferred Plan. The detail is presented in **Appendix C**, for

water bodies that could be impacted by more than one option (**Appendix B** should be referred to for water bodies that would only be impacted by a single option).

Table 4.1 Summary of water bodies impacted by individual options (Preferred Plan)

Type	Waterbody ID	WR107a2	WR111	WR113
River	GB112069061012 - Mersey (Bollin confluence to Howley Weir) including Padgate Brook		√	√
	GB112069061360 - Dean (Bollington to Bollin)		√	√
	GB112069061320 - Bollin (Source to Dean)		√	√
	GB112069061382 - Bollin (Ashley Mill to Manchester Ship Canal)		√	√
	GB112069060640 - Downholland (Lydiate/Cheshire Lines) Brook	√		
	GB112069064500 - Downholland Brook)	√		
	GB112069061442 - Alt DS Bull Bridge	√		
Canal	GB71210004 - Manchester Ship Canal		√	√
Transitional	GB531206908100 - MERSEY		√	√
	GB531206908300 - ALT	√		
Groundwater	GB41201G101700 - Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone Aquifers	√		
	GB41201G101100 - Manchester and East Cheshire Permo-Triassic Sandstone Aquifers		√	√

Water bodies with the potential to be impacted by more than one option are shown in blue.

Table 4.2 Cumulative Assessment of the Preferred Plan

Type	Water body	Options contributing to cumulative effect	Risk of WFD non-compliance	Comments
Bollin and Mersey	GB112069061360 - Dean (Bollington to Bollin)	WR111, WR113	Potentially non-compliant (low confidence)	The Dean and Bollin (Source to Dean) have been assessed as potentially non-compliant for biological and physico-chemical elements. This is a precautionary conclusion in the absence of a quantified understanding of the impacts on flow from these two groundwater abstractions.
	GB112069061320 - Bollin (Source to Dean)	WR111, WR113	Potentially non-compliant (low confidence)	
	GB112069061382 - Bollin (Ashley Mill to Manchester Ship Canal)	WR111, WR113	Potentially non-compliant (low confidence)	Bollin (Ashley Mill to Manchester Ship Canal) has been assessed as being potentially non-compliant for fish associated with WR076. There are also uncertainties regarding water availability, which require further clarification from the Environment Agency. Any impacts felt from the groundwater abstractions upstream would add to the cumulative impact on flows in the lower reaches of the Bollin.
	GB112069061012 - Mersey (Bollin confluence to Howley Weir) including Padgate Brook	WR111, WR113	Compliant (med confidence)	Cumulative impacts on flow have been calculated at the confluence of the Bollin with the Mersey/Manchester Ship Canal. A worst-case scenario, assuming all abstractions are used permanently at their maximum capacity, results in an impact of up to 1.1% at Q95. This would reduce further by the Mersey Estuary, due to other non-impacted flows including the Dane and Gow, and the impacts of tidal mixing. These negligible impacts are unlikely to result in non-compliance of biological, physico-chemical or chemical elements.
	GB71210004 - Manchester Ship Canal	WR111, WR113	Compliant (med confidence)	
	GB531206908100 – Mersey estuary	WR111, WR113	Compliant (med confidence)	

Type	Water body	Options contributing to cumulative effect	Risk of WFD non-compliance	Comments
Alt	GB112069060640 - Downholland (Lydiate/Cheshires Lines) Brook	WR107a2	Potentially non-compliant (low confidence)	Downholland (Lydiate/Cheshires Lines) Brook is impacted by WR107a2 only. Potential non-compliance is due to increased borehole abstraction leading to reduced river baseflow impacting fish, invertebrate and macrophyte/phytobenthos populations, and reduced dilution of physico-chemical elements with the introduction of impediments to physico-chemical status. This is a precautionary conclusion in the absence of a quantified understanding of the impacts on flow from the groundwater abstraction. Downholland Brook water body has not been assessed individually but has been included to reflect the connectivity from the upper catchment to the Alt estuary. The same precautionary conclusion has been assumed as for the upstream water body, although noting that non-compliance is increasingly unlikely downstream due to the larger catchment area and additional flow contributed from other tributaries.
	GB112069064500 - Downholland Brook	WR107a2	Potentially non-compliant (low confidence)	
	GB112069061442 - Alt DS Bull Bridge	WR107a2	Potentially non-compliant (low confidence)	The Alt (d/s of Bull Bridge) has been assessed as potentially non-compliant for biological and physico-chemical elements. This is a precautionary conclusion in the absence of a quantified understanding of the impacts on flow.
	GB531206908300- Alt estuary	WR107a2	Compliant (low confidence)	A quantified understanding of the impacts on flow is not yet available (these will be calculated from the from the Lower Mersey & North Merseyside groundwater model once updated). Given the size of the estuary catchment relative to the cumulative rate of abstraction (which represents the worse-case scenario), it is unlikely to cause a deterioration in ecological status. Low confidence is assigned due to lack of quantified assessment of flow impacts.

Type	Water body	Options contributing to cumulative effect	Risk of WFD non-compliance	Comments
Groundwater	GB41201G101700 Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone Aquifers	WR107a2	Potentially non-compliant (medium confidence)	<p>The Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone groundwater body is potentially non-compliant for dependent surface water body status, GWDEs, saline intrusion, water balance and chemical status. The elements with medium confidence of non-compliance include:</p> <ul style="list-style-type: none"> - Water balance tests relating to option WR107a2 (where the most recent water balance calculations indicate that there is sufficient water available for the proposed capacity within the licensed surplus but not at fully licensed. As this option would require a new licence, the fully licensed water balance is relevant). <p>The dependent surface water body status and GWDEs are precautionary conclusions with low confidence of non-compliance, in the absence of a quantified understanding of the impacts on flow and/or groundwater levels.</p>
Groundwater	GB41201G101100 Manchester and East Cheshire Permo-Triassic Sandstone Aquifers	WR111, WR113	Potentially non-compliant (medium confidence)	<p>The Manchester and East Cheshire Permo-Triassic Sandstone groundwater body is potentially non-compliant for dependent surface water body status, GWDEs and water balance. The element with medium confidence of non-compliance is the water balance test relating to option WR111. Although the most recent water balance calculations indicate that there is sufficient water available for the proposed option capacity within the licensed surplus, option WR111 would require a licence variation. In addition, the groundwater body as a whole is over-abstracted.</p> <p>The dependent surface water body status and GWDEs are precautionary conclusions with low confidence of non-compliance, in the absence of a quantified understanding of the impacts on flow and/or groundwater levels.</p>

4.2 Cumulative Assessment of the Reasonable Alternative Plan

Table 4.3 shows the options that make up the Reasonable Alternative Plan, and associated water bodies. These are informed through the option-level assessments and have also considered whether it is necessary to look further downstream, where the individual option assessments did not extend to the coast. Only two of the four options have potential for impact on a WFD water body, and those two options are located in different catchments. Hence there are no water bodies that are impacted by more than one option in the Reasonable Alternative Plan.

The cumulative assessment is summarised in **Table 4.4**, showing all water bodies that could be impacted by the Reasonable Alternative Plan. **Appendix B** should be referred to for water bodies that would only be impacted by a single option. No separate assessment is shown for water bodies impacted by more than one option, since there are none.

Table 4.3 Summary of water bodies impacted by individual options (Reasonable Alternative Plan)

Type	Waterbody ID	WR026c	WR065b	WR185	WR191
River	GB112071065612 River Ribble d/s Stock Beck	√			
	GB112071065500 Ribble- Conf Calder to tidal	√			
	GB104027062610 Cragg Brook from Source to River Calder		√		
Lake	GB30431104 White Holme Reservoir		√		
(options with no impact on WFD water bodies)				√	√

Table 4.4 Cumulative Assessment of the Reasonable Alternative Plan

Type	Water body	Options contributing to cumulative effect	Risk of WFD non-compliance	Comments
River	GB112071065612 River Ribble d/s Stock Beck	WR026c	Compliant (low conf.)	This option could reduce flows in the River Ribble by up to a maximum of 4% at Q95 at the abstraction point, with decreasing impacts downstream towards the tidal limit. The River Ribble ALS (2013) indicates that water is available within the catchment across the flow regime, and a 2022 update from the EA for the Lower Ribble indicated that this was still the case. Therefore, this level of flow reduction is unlikely to result in deterioration of status or impede improvements, for any classification elements.
	GB112071065500 Ribble- Conf Calder to tidal	WR026c	Compliant (med conf.)	
	GB104027062610 Cragg Brook from Source to River Calder	WR065b	Compliant (high conf.)	
Lake	GB30431104 White Holme Reservoir	WR065b	Compliant (high conf.)	This option would restore Whiteholme Reservoir to its previous state (pre-2015), after which water levels were reduced due to safety concerns. As a result, it is assumed that the option would have no impact on WFD compliance.

5. Preferred WRMP (Stage 3) WFD Assessment against other plans and projects

The potential for combined impacts of UU's Preferred Plan (or Reasonable Alternative Plan) with other water companies' draft WRMPs has been considered. No potential in-combination impacts have been identified.

6. WFD compliance summary of United Utilities revised draft WRMP24

A summary of the assessment is provided in **Table 6.1**, which considers the overall compliance of the Preferred Plan and the Reasonable Alternative Plan.

The assessments shown in this report currently conclude potential non-compliance of the Preferred Plan, with individual options being potentially non-compliant with either low or medium confidence. Those that have low confidence of non-compliance are considered relatively precautionary assessments, whereas for those with medium confidence of non-compliance, there is a greater chance of a conclusion of non-compliant being retained following further assessments. However, in all cases, further evidence and assessment is required, and is being progressed through the North West Transfer programme of work.

The Reasonable Alternative plan is concluded to be compliant with respect to the WFD Assessment Objectives. This therefore represents an alternative that could be pursued, should the assessments being progressed through the North West Transfer programme conclude that any of the options in the Preferred Plan are not compliant with the WFD.

Table 6.1 Summary of plan level WFD compliance for the United Utilities WRMP24

WFD Assessment Objective	Summary of WFD compliance (Preferred Plan)	Summary of WFD compliance (Reasonable Alternative Plan)	Explanation
1) To prevent deterioration of any WFD element of any water body - in line with Regulation 13(2)(a) and 13(5)(a)	Potentially non-compliant	Compliant	The options in the Preferred Plan remain potentially non-compliant at this stage. This recognises the risks to compliance that subject to ongoing assessment through the NWT programme of work.
2) To prevent the introduction of impediments to the attainment of 'Good' WFD status or potential for any water body -in line with Regulation 13(2)(b) and 13(5)(c).	Potentially non-compliant	Compliant	The options in the Reasonable Alternative Plan have been assessed as being compliant.
3) To ensure that the planned programme of water body measures in RBMP3 to protect and enhance the status of water bodies are not compromised.	Compliant	Compliant	No planned water body measures, as identified in the RBMP3, have been identified as being compromised.
4) To assist the attainment of the WFD objectives for the water body – in line with	Neutral	Neutral	The assessment as presented here does not show that the plan would assist in attainment of the WFD objectives for any water

Regulation 13(2)(b) and 13(2)(c)			<p>bodies. However, this may be possible through delivery of BNG or other enhancements, once those are further developed. Demand and leakage management options could also assist.</p>
5) To assist the attainment of the WFD objectives for associated WFD protected areas – in line with Regulation 13(6)	Compliant	Compliant	<p>The HRA for the WRMP concludes that, based on the currently available data, none of the options in the Preferred or Reasonable Alternative plans will adversely affect the integrity of any European sites, alone or in combination.</p>
6) To progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment	Compliant	Compliant	<p>None of the options in the Preferred Plan or Reasonable Alternative Plan involve the deliberate release of pollutants to the aquatic environment.</p>

Appendix A

Option-level screening

This Appendix presents the results of the WFD compliance assessment screening outcomes (methodological Step 1 and Step 2) for all of the options included in the feasible list and indicates whether they were screened in for an impact assessment (methodological Step 3) based on the potential risk of deterioration of WFD status. Where an option has been screened in for an impact assessment, the water bodies that were screened in have also been identified. The outcomes of the screening steps are displayed. The impact assessment for the options and water bodies scoped in for further assessment are presented in Appendix B.

Option Name	WRMP24 Ref	Water body name	Water body ID	Option Type	Screened in	Reason for screening out
ICT_WIRRAL	STT019	Rivacre Brook	GB112068060350	Surface water	No	Step 2 Construction of new infrastructure will require appropriate consenting and permitting, but WFD compliance unlikely to be a barrier to implementation of the option. Operation - no new/increased abstraction from the water environment
IGA_CROASDALE	STT022	Ribble Carboniferous Aquifers Hodder - conf Easington Bk to conf Ribble Stocks Reservoir	GB41202G103000 GB112071065560 GB31230030	Groundwater	Yes	
SWN_RIVER LUNE	STT029	Lune - conf Wenning to tidal	GB112072065980	Surface water	Yes	
RES_HOLLINGWORTH	STT034	Roch (Source to Spodden) Rochdale Canal, western section Ogden Reservoir Rochdale	GB112069064720 GB71210517 GB31231398	Surface water	Yes	
SWN_RIVER ROCH	STT041	River Roch (Spodden to Irwell) Irwell (Roch to Croal) Irwell (Croal to Irk)	GB112069064600 GB112069060840 GB112069061451	Surface water	Yes	
SWN_RIVER IRWELL_ROCH	STT041b	Roch (Spodden to Irwell) Irwell (Roch to Croal) Irwell (Croal to Irk) Irwell / Manchester Ship Canal (Irk to confluence with Upper Mersey) Mersey/ Manchester Ship Canal (Irwell/Manchester Ship Canal to Bollin)	GB112069064600 GB112069060840 GB112069061451 GB112069061452 GB112069061011	Surface water	Yes	
NWT_VYRNWY 1	STTA1	NA	NA	Enabling works	No	Step 1 Construction phase - new pumping stations, new water line, requires further assessment Operation - no new/increased abstraction from the water environment
NWT_VYRNWY 2	STTA2	NA	NA	Enabling works	No	Step 1 Construction phase - new pumping stations, new water line, requires further assessment Operation - no new/increased abstraction from the water environment
NWT_VYRNWY 3	STTA3	NA	NA	Enabling works	No	Step 1 Construction phase - new pumping stations, new water line, requires further assessment Operation - no new/increased abstraction from the water environment
NWT_VYRNWY	STTA4	NA	NA	Enabling works	No	Step 1 Construction phase - new pumping stations, new water line, requires further assessment Operation - no new/increased abstraction from the water environment
SWN_GLAZE BROOK	WR006	River Glaze Mersey/ Manchester Ship Canal (Irwell/Manchester Ship Canal to Bollin)	GB112069061420 GB112069061011	Surface water	Yes	
SWN_RIVER GRETA	WR010	River Greta River Wenning Langthwaite Reservoir Lune - conf Greta to conf Wenning Lune - conf Wenning to tidal	GB112072071610 GB112072065990 GB31229988 GB112072066000 GB112072065980	Surface water	Yes	
SWN_RIVER IRWELL	WR015	Irwell / Manchester Ship Canal (Irk to confluence with Upper Mersey)	GB112069061451 GB112069061452	Surface water	Yes	
SWN_RIVER GOYT	WR017	Goyt (Sett to Etherow)	GB112069060960	Surface water	Yes	
SWN_RIVER RIBBLE 26a	WR026a	River Ribble d/s Stock Beck Ribble - conf Calder to tidal Stocks Reservoir	GB112071065612 GB112071065500 GB31230030	Surface water	Yes	
SWN_RIVER RIBBLE 26b	WR026b	River Ribble d/s Stock Beck Ribble - conf Calder to tidal	GB112071065612 GB112071065500	Surface water	Yes	
SWN_RIVER RIBBLE 26c	WR026c	River Ribble d/s Stock Beck Ribble - conf Calder to tidal	GB112071065612 GB112071065500	Surface water	Yes	
RES_HAWESWATER a	WR037a	Haweswater Beck Haweswater Reservoir	GB102076070720 GB30229073	Reservoir_Raise Height	Yes	
RES_HAWESWATER b	WR037b	Haweswater Beck Haweswater Reservoir	GB102076070720 GB30229073	Reservoir_Raise Height	Yes	
SWN_RIVER EAMONT	WR038	River Eamont (Lower)	GB102076070990	Surface water	Yes	
SWN_RIVER IRTHING	WR041	River Irthing DS Crammel Linn Waterfall	GB102076073981	Surface water	Yes	
SWN_RIVER ESK	WR042	River Esk	GB102077074190	Surface water	No	Step 2 Construction of new infrastructure will require appropriate consenting and permitting, but WFD compliance unlikely to be a barrier to implementation of the option. Operation - review of regulatory position of water availability (water available for licensing) and magnitude of flow change (max change in order of 2%) indicates the abstraction would be WFD compliant, although some limits (e.g. HOF) may be required.
SWN_RIVER PETTERIL	WR043	River Petteril d/s Blackrack Beck Eden - Eamont to tidal	GB102076074030 GB102076073940	Surface water	Yes	
SWN_RIVER RIBBLE 49a	WR049a	River Ribble Ribble	GB112071065500 GB531207112400	Surface water	Yes	
SWN_RIVER RIBBLE 49b	WR049b	River Ribble Ribble Anglezarke Reservoir	GB112071065500 GB531207112400 GB31231190	Surface water	Yes	
SWN_RIVER RIBBLE 49c	WR049c	River Ribble Ribble Anglezarke Reservoir	GB112071065500 GB531207112400 GB31231190	Surface water	Yes	
SWN_RIVER RIBBLE 49c	WR049d	Ribble - conf Calder to tidal Ribble Ribble (transitional water body)	GB112071065500 GB531207112400	Surface water	Yes	
SWE_NORTH CUMBRIA	WR055	River Eden (Lower)	GB102076073940 GB30228476	Surface water	No	Step 2 Construction of new infrastructure will require appropriate consenting and permitting, but WFD compliance unlikely to be a barrier to implementation of the option. Operation: review of regulatory position of water availability (water available for licensing) and magnitude of flow change (max change in order of 1%) indicates the abstraction would be WFD compliant, although some limits (e.g. HOF) may be required.
RES_WORTHINGTON a	WR062a	na	na	Reservoir_Increase Abstraction	No	Step 1 No new construction Operation - utilising existing systems and recommission of existing WTW, no new/increased abstraction.
RES_WORTHINGTON b	WR062b	River Douglas Worthington Reservoir	GB112070064780 GB31231496	Reservoir_Increase Abstraction	No	Step 2 Construction of new infrastructure will require appropriate consenting and permitting, but WFD compliance unlikely to be a barrier to implementation of the option. Operation - utilising existing raw water intake system, no new abstraction.
RES_WATERGROVE	WR065a	River Roch (source to Beal) Watergrove Reservoir	GB112069064720 GB31231164	Reservoir_Raise Height	Yes	

RES_WHITEHOLME	WR065b	Cragg Brook from Source to River Calder White Holme Reservoir	GB104027062610 GB30431104	Reservoir_Raise Height	No	Step 2 Modification of dam infrastructure will require appropriate consenting and permitting, but WFD compliance unlikely to be a barrier to implementation of the option. Operation - reinstating the reservoir to its previous condition as of approx. 2015, therefore no deterioration in WFD status is anticipated. The SPA and SAC will be directly affected as a result of increased reservoir levels but it is extremely unlikely that the interest features of the SAC and SPA will be adversely affected (as return to previous 2015 condition).
SWN_RIVER DARWEN	WR074	River Ribble Fishmoor Reservoir	GB112071065500 GB31230883	Surface water	Yes	
SWN_RIVER BOLLIN	WR076	R. Bollin (Ashley Mill to Manchester Ship Canal) Mersey (Bollin confluence to Howley Weir) including Padgate Brook Manchester Ship Canal	GB112069061382 GB112069061012 GB71210004	Surface water	Yes	
RES_DOVSTONE	WR077a	Chew Brook Dovestone Reservoir	GB112069061300 GB31231829	Reservoir_Raise Height	Yes	
RES_ERRWOOD	WR077b	River Goyt (Source to Randall Carr Brook) Errwood Reservoir	GB112069060850 GB31233043	Reservoir_Raise Height	Yes	
RES_FERNILEE	WR077c	River Goyt (Source to Randall Carr Brook) Fernilee Reservoir	GB112069060850 GB31232950	Reservoir_Raise Height	Yes	
RES_APPLETON a	WR079a	Appleton Reservoir Manchester Shipping Canal	GB31232665 GB71210004	Reservoir_Inc abstraction	Yes	
RES_APPLETON b	WR079b	Appleton Reservoir Manchester Shipping Canal	GB31232665 GB71210004	Reservoir_Inc abstraction	Yes	
RES_APPLETON c	WR079c	Appleton Reservoir Manchester Shipping Canal	GB31232665 GB71210004	Reservoir_Inc abstraction	Yes	
RES_APPLETON d	WR079d	Appleton Reservoir Manchester Shipping Canal	GB31232665 GB71210004	Reservoir_Inc abstraction	Yes	
ITC_CARLISLE	WR084	River Eden (Lower)	GB102076073940	Transfer	No	Step 2 Construction of new infrastructure will require appropriate consenting and permitting, but WFD compliance unlikely to be a barrier to implementation of the option. Operation - water transfer only option, no new/increased abstraction.
GWE_ROUGHTON GILL	WR095	Wheljo (Cald Beck)	GB102076073740	Groundwater	Yes	
GWE_BURNLEY a	WR099a	Douglas, Darwen and Calder Carboniferous Aquifers River Brun	GB41202G100300 GB112071065090	Groundwater	Yes	
GWE_BURNLEY b	WR099b	Douglas, Darwen and Calder Carboniferous Aquifers River Brun Hurstwood Reservoir	GB41202G100300 GB112071065090 GB31230625	Groundwater	Yes	
GWE_BURNLEY c	WR099c	Douglas, Darwen and Calder Carboniferous Aquifers River Brun	GB41202G100300 GB112071065090	Groundwater	Yes	
GWE_THORNCLIFFE	WR100	Furness Permo-Triassic sandstone aquifers Mill Beck (Poaka Beck)	GB41201G101900 GB112074069790	Groundwater	Yes	
GWE_FRANKLAW	WR101	Fylde Permo-Triassic Sandstone Aquifers River Wyre DS Grizedale Brook confl	GB41201G100500 GB112072065822	Groundwater	Yes	
GWE_WIDNES	WR102b	Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone Aquifers Netherley Brook	GB41201G101700 GB112069060680	Groundwater	Yes	
GWE_BOLD HEATH	WR102e	Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone Aquifers Whittle Brook	GB41201G101700 GB112069060990	Groundwater	Yes	
GWE_LYMM a1	WR105a1	Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone Aquifers	GB41201G101700	Groundwater	Yes	
GWE_LYMM a2	WR105a2	Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone Aquifers	GB41201G101700	Groundwater	Yes	
GWE_LYMM b1	WR105b1	Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone Aquifers	GB41201G101700	Groundwater	Yes	
GWE_LYMM b2	WR105b2	Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone Aquifers	GB41201G101700	Groundwater	Yes	
GWE_WALTON_1	WR106a	Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone Aquifers Kecwick Brook	GB41201G101700 GB112068060520	Groundwater	Yes	
GWE_WALTON_2	WR106b	Weaver and Dane Quaternary Sand and Gravel Aquifers Mersey (Man Ship Canal, Irlam to Howley Weir)	GB41202G991700 GB112069061010	Groundwater	Yes	
GWE_AUGHTON PARK a1	WR107a1	Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone Aquifers Downholland (Lydiato/Cheshires Lines) Brook	GB41201G101700 GB112069060640	Groundwater	Yes	
GWE_AUGHTON PARK a2	WR107a2	Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone Aquifers Downholland (Lydiato/Cheshires Lines) Brook	GB41201G101700 GB112069060640	Groundwater	Yes	
GWE_RANDES BRIDGE	WR107b	Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone Aquifers Croxteth/Knowsley Brook	GB41201G101700 GB112069060610	Groundwater	Yes	
GWE_WOODFORD	WR111	River Dean (Bollington to Bollin) Manchester and East Cheshire Permo-Triassic Sandstone Aquifers	GB41201G101100 GB112069061360	Groundwater	Yes	
GWE_TYThERINGTON	WR113	Manchester and East Cheshire Permo-Triassic Sandstone Aquifers Bollin (Source to Dean)	GB41201G101100 GB112069061320	Groundwater	Yes	
GWE_CROSS HILL_1	WR120a	Wirral and West Cheshire Permo-Triassic Sandstone Aquifers The Birket including Arrowe Brook and Fender	GB41101G202600 GB112068060530	Groundwater	Yes	
GWE_CROSS HILL_2	WR120b	Wirral and West Cheshire Permo-Triassic Sandstone Aquifers The Birket including Arrowe Brook and Fender	GB41101G202600 GB112068060530	Groundwater	Yes	
GWE_EATON a	WR121a	Wirral and West Cheshire Permo-Triassic Sandstone Aquifers Wettenhall Brook	GB41101G202600 GB112068055440	Groundwater	Yes	
GWE_EATON b	WR121b	Wirral and West Cheshire Permo-Triassic Sandstone Aquifers Wettenhall Brook	GB41101G202600 GB112068055440	Groundwater	Yes	
GWE_NEWTON HOLLOW	WR122	Crowton Brook Wirral and West Cheshire Permo-Triassic Sandstone Aquifers	GB41101G202600 GB112068060550	Groundwater	Yes	
GWE_NORTH SHROPSHIRE	WR125	Shropshire Middle Severn - PT Sandstone East Shropshire R Tern - source to conf Loggerheads Bk	GB41101G202600 GB109054055150	Groundwater	Yes	
GWE_FAIRHILL	WR127	Eden Valley and Carlisle Basin Permo-Triassic sandstone aquifers River Eamont (Upper)	GB40201G100400 GB102076071020	Groundwater	Yes	
GWN_TARN WOOD	WR128	Eden Valley and Carlisle Basin Permo-Triassic sandstone aquifers Eden - Eamont to tidal Blackrack Beck	GB40201G100400 GB102076073940 GB102076074000	Groundwater	Yes	
EFR_HORWICH	WR140	Douglas - Upper Douglas - Middle Douglas - Lower	GB112070064850 GB112070064780 GB112070064820	Surface water	Yes	
EFR_ROSSENDALE	WR141	Irwell (Cowpe Bk to Rossendale STW) Irwell (Rossendale STW to Roch)	GB112069064640 GB112069064620	Surface water	Yes	
SWN_RIVER TAME	WR144	Tame (Chew Brook to Swineshaw Brook)	GB112069061111	Surface water	Yes	

GWN_NORTH CUMBRIA	WR148	Pow Maughan Beck Eden Valley and Carlisle Basin Permo-Triassic sandstone aquifers	GB40201G100400 GB102076073910	Groundwater	Yes	
ITC_WIGAN	WR149	Lower Mersey Basin and North Merseyside Permo-Triassic Sandstone Aquifers Spittle Brook Glaze Pennington Brook (Glaze) Hey/Borsdane Brook	GB41201G101700 GB112069061020 GB112069061420 GB112069060760 GB112069064520	Groundwater	Yes	
ITC_WEST CHESHIRE 1	WR153	Wirral and West Cheshire Permo-Triassic Sandstone Aquifers Peckmill Brook, Hoolpool Gutter at Ince Marshes.	GB41101G202600 GB112068060330	Groundwater	Yes	
ITC_WEST CHESHIRE 2	WR154	Wirral and West Cheshire Permo-Triassic Sandstone Aquifers Darley Brook Cuddington Brook (Source to Crowton Brook)	GB41101G202600 GB112068060450 GB112068060480	Groundwater	Yes	
WR159 RWL_COMPENSATION GP 1&2	WR159_160	Lowther (Upper) Lamalod Reservoir, Dean (Lamalod to Bollin) Greenbooth Reservoir, Naden Brook Springmill Reservoir Watergrove Reservoir Cowm Reservoir, Spodden Water Stocks Reservoir, Hodder - Stocks Reservoir to conf Croasdale Greenfield Reservoir Yeoman Hey Reservoir Dovestone Reservoir, Chew Brook Water Chew Reservoir Kinder Reservoir Errwood Reservoir Femilee Reservoir, Goyt (Source to Randall Carr Brook) Cowpe Reservoir, Irwell (Source to Whitewell Brook) Water Body Clough Bottom Reservoir, Whitewell Brook Clowbridge Reservoir, Limy Water Woodhead Reservoir Torside Reservoir Rhodeswood Reservoir Valehouse Reservoir Arnfield Reservoir, Etherow (Woodhead Res. to Glossop Bk.) Thirlmere, St John's Beck Rivington Reservoirs, Douglas - Upper Haweswater Reservoir, Haweswater Beck Llyn Elyrwy, Vrynwy - Lake Vrynwy to conf Afon Cowmwy	GB102076070690 GB31233063, GB112069060650 GB31231260, GB112069064710 GB31231212 GB31231164 GB31231141, GB112069064730 GB31230030, GB112071065390 GB31231778 GB31231791 GB31231829, GB112069061300 GB31231942 GB31232499 GB31233043 GB31232950, GB112069060850 GB31231115 GB31230858, GB112069064670 GB31230769, GB112069064680 GB31232065 GB31232111 GB31232136 GB31232150 GB31232166, GB112069060780 GB31229021, GB112075070430 GB31231288, GB112070064850 GB30229073, GB102076070720 GB30935568, GB109054049880	Reservoir_Comp flow over release	Yes	
SSO_STOCKPORT PH II	WR185	na	na	Network	No	Step 1 Construction phase - construction/refurbishment of infrastructure will require appropriate consenting and permitting, but WFD compliance unlikely to be a barrier to implementation of the option. Operation - network upgrade option, more water to be pumped from Manchester Ring Main to Greavefold and High Lane service reservoirs, both of which are not WFD waterbodies, therefore WFD compliant.
SSO_STOCKPORT PH III	WR186	na	na	Network	No	Step 1 Construction phase - construction/refurbishment of infrastructure will require appropriate consenting and permitting, but WFD compliance unlikely to be a barrier to implementation of the option. Operation - network upgrade option, more water to be pumped from Manchester Ring Main to Greavefold and High Lane service reservoirs, both of which are not WFD waterbodies, therefore WFD compliant.
SWE_DAMAS GILL	WR187	Wyre - Upper Damas Gill	GB112072065821 GB31230025	Surface water	Yes	
NIT_THIRD PARTY_21a	WR188a1	Goyt (Sett to Etherow) Goyt (Etherow to Mersey) Peak Forest Canal, upper section, and Macclesfield Canal, upper section	GB112069060960 GB112069061000 GB71210242	Surface water	Yes	
NIT_THIRD PARTY_21b	WR188a2	Goyt (Sett to Etherow) Goyt (Etherow to Mersey) Peak Forest Canal, upper section, and Macclesfield Canal, upper section	GB112069060960 GB112069061000 GB71210242	Surface water	Yes	
NIT_THIRD PARTY_21c	WR188b1	Peak Forest Canal, upper section, and Macclesfield Canal, upper section	GB71210242	Surface water	Yes	
NIT_THIRD PARTY_21d	WR188b2	Peak Forest Canal, upper section, and Macclesfield Canal, upper section	GB71210242	Surface water	Yes	
PRO_NORTH LANCASHIRE	WR191	na	na	Washwater treatment	No	Step 1 Construction phase - water treatment works upgrades Operation - utilising exiting systems, no new/increased abstraction
NIT_THIRD PARTY_1	WR800	River Bela	GB112073071070	Surface water	No	Step 2 Construction of new infrastructure will require appropriate consenting and permitting, but WFD compliance unlikely to be a barrier to implementation of the option. Operation - no new/increased abstraction from the water environment as the new abstraction would be balanced by abstraction trading, and water is available for abstraction within the catchment.
WIT_THIRD PARTY_4a	WR810a	Cow Green Reservoir Haweswater Reservoir	GB30328860 GB30229073	Surface water	Yes	
WIT_THIRD PARTY_4b	WR810b	Cow Green Reservoir	GB30328860	Surface water	Yes	
WIT_THIRD PARTY_5	WR811	Cow Green Reservoir Eden - Eamont to tidal	GB30328860 GB102076073940	Surface water	Yes	
WIT_THIRD PARTY_6a	WR812a	Haweswater Reservoir	GB30229073	Surface water	Yes	
WIT_THIRD PARTY_6b	WR812b	N Tyne from Lewis Burn to Tarslet Burn Kielder Water	GB103023075070 GB30327698	Surface water	No	Step 2 Construction of new infrastructure will require appropriate consenting and permitting, but WFD compliance unlikely to be a barrier to implementation of the option. Operation: Regulator review of SRO Gate 1 options indicated resource available from Kielder Water. Assume no change to compensation releases from Kielder to downstream watercourses.
WIT_THIRD PARTY_6c	WR812c	N Tyne from Lewis Burn to Tarslet Burn Kielder Water	GB103023075070 GB30327698	Surface water	No	Step 2 Construction of new infrastructure will require appropriate consenting and permitting, but WFD compliance unlikely to be a barrier to implementation of the option. Operation - regulator review of SRO Gate 1 options indicated resource available from Kielder Water. Assume no change to compensation releases from Kielder to downstream watercourses.
WIT_THIRD PARTY_7	WR813	Scamondden Water Huddersfield Narrow Canal east section Huddersfield Narrow Canal summit section Huddersfield Narrow Canal west section	GB30431243 GB70410269 GB70410520 GB71210268	Surface water	Yes	

WIT_THIRD PARTY_8a	WR814a	na	na	Surface water	No	<p>Step 1</p> <p>Construction phase - increased size of WTW, Construction of new infrastructure will require appropriate consenting and permitting, but WFD compliance unlikely to be a barrier to implementation of the option.</p> <p>Operation - reduction in industrial abstraction to allow increase in abstraction capacity for potable water treatment at Huntington WTW, assumed no net change in water abstraction.</p>
WIT_THIRD PARTY_8c	WR814c	Dee - Ceiriog to Alwen Dee - Chester Weir to Ceiriog	GB111067052060 GB111067057080	Surface water	Yes	
NIT_THIRD PARTY_9	WR815	Peasey Beck Bela Killington Reservoir	GB112073071090 GB112073071070 GB31229430	Surface water	Yes	
NIT_THIRD PARTY_11	WR817	Black Brook St Helens Canal	GB112069061230 GB71210088	Surface water	Yes	
NIT_THIRD PARTY_12	WR820	Shropshire Union Canal, Market Drayton to Ellesmere Port	GB71210133	Surface water	Yes	
NIT_THIRD PARTY_13	WR821	Shropshire Union Canal, Market Drayton to Ellesmere Port Llangollen Canal Dee - Ceiriog to Alwen Dee - Chester Weir to Ceiriog	GB71210133 GB70910082 GB111067052060 GB111067057080	Surface water	Yes	
NIT_THIRD PARTY_15	WR824	Tipalt Burn from Source to South Tyne	GB103023075580	Surface water	Yes	
NIT_THIRD PARTY_16	WR825	Folly Brook and Salteye Brook	GB112069061430	Surface water	Yes	

Appendix B

Option-level impact assessment

This Appendix presents the impact assessment (methodological Step 3) for the options that were screened in for more detailed assessment through the screening steps (as set out in Appendix A). An impact assessment table has been completed for each water body for each option that has been identified through the screening process.

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Appendix C

Preferred plan-level cumulative impact assessment

This Appendix presents the impact assessment for the water bodies that were screened in Section 4 for cumulative assessment of the Preferred Plan. An impact assessment table has been completed for each water body for each cumulative impact that has been identified through the screening process.

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