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Water Resources North Regional Plan – Strategic Environmental Assessment

Interim Environmental Report

Report for Water Resources North Regional Group

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Environmental Assessment of the Regional Plan

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Non-technical summary

To be completed in future iterations of the report

Table of Contents

Appendices

1 Introduction

This report includes the option-level Strategic Environmental Assessment (SEA) of the feasible options in the January 2022 WReN Emerging Regional Plan for Informal Consultation. This report will act as a template for the draft and final WReN Regional Plan SEA Environmental Report to be published in August 2022 and September 2023 respectively.

Any text highlighted in grey will be updated through an iterative process as the programme develops.

1.1 Background

Water Resources North (WReN) is one of five regional water resources groups working under the National Framework for Water Resources (the 'National Framework')[1].

WReN are developing a regional water resources plan for Yorkshire and the North East of England (the 'Regional Plan') to help to facilitate sustainable growth across Yorkshire, the Humber and the North East, whilst also protecting and enhancing the region's valuable natural environment. As the region has an assumed surplus of water, WReN are working with other regional water resources groups (principally Water Resources West and Water Resources East) to help secure resilient water supplies for the country as a whole.

A fundamental part of producing the Regional Plan is integrating environmental effects into the decision-making process to select the preferred plan and also evidencing compliance with the environmental legislation. The aim of environmental assessment within the plans is to provide for a high level of protection of the environment, integrating environmental considerations into the preparation and adoption of the plan with a view to contributing to sustainable development. Throughout the course of the development of the Regional Plan, the environmental assessments will seek to identify, describe and evaluate the likely significant effects on the environment of implementing the plan, as well as proposing measures to avoid, manage or mitigate any significant adverse effects and to enhance any beneficial effects.

These assessments consist of:

- Strategic Environmental Assessment (SEA) incorporating Invasive Non-Native Species assessment (INNS) and Biodiversity Net Gain (BNG);
- Habitats Regulation Assessment (HRA); and
- Water Framework Directive (WFD) assessment.

The Regional Plan option appraisal also integrates Natural Capital Assessment (NCA) within the WReN Options Appraisal workstream.

This Environmental Report presents the findings of the SEA of the Regional Plan. The HRA and WFD are documented separately[2,3].

1.2 Description of the WReN Regional Plan

WReN is designed to oversee water resources planning for Yorkshire and the North East of England. It is formed of three water companies operating in the north east of England, including Yorkshire Water, Northumbrian Water and Hartlepool Water (part of Anglian Water), as shown in **Figure 1.1**. Although WReN's core members and funders are the three water companies, key regulators and stakeholders

[1] https://www.gov.uk/government/publications/meeting-our-future-water-needs-a-national-framework-for-water-resources
[2] WReN (2021) Water Resources North Regional Plan: Habitats Regulation Assessment Interim Report, December 2021. Report prepared by Ricardo Energy & Environment.
[3] WReN (2021) Water Resources North Regional Plan: Water Framework Directive - Interim Report, December 2021. Report prepared by Ricardo Energy & Environment.

act to provide support on direction and decisions in an advisory capacity. Further information can be found on the WReN website[4].

WReN is actively engaging with and involving those who have an interest in water resources in the region. This includes sectors other than public water supply who make beneficial use of the water in the environment, such as agriculture, industry and energy. The importance of water to the region's environment, ecology and biodiversity will also play a key role in shaping WReN's future plans.

WReN are working with water companies and their customers, other water dependent sectors of the economy such as the agriculture and power sectors, and environmental groups and regulators. WReN's aim is to develop a long-term plan for managing water resources in the region, which will be published for consultation in 2022.

Where the Regional Plan impacts on public water supply – the drinking water that is supplied by the water companies in the WReN region – it will be reflected in the water companies' statutory draft Water Resource Management Plans (WRMPs) which will be submitted to Defra in August 2022 and consulted on shortly afterwards.

Where this plan affects other sectors (e.g. the agriculture and power sectors) and environmental groups, WReN are working with those sectors to understand how they can also support long term water resources resilience in the north, including looking for opportunities for collaborative solutions. WReN have established an environmental destination workstream which is taking an evidence-based approach to environmental destination, working across these key sectors and with regional and local groups, such as catchment partnerships, to identify environmental improvements that are meaningful to the WReN region and its catchments. The outcomes of this workstream are reported separately[5].

The options identification process is ongoing and will result in a list of feasible supply options to meet the needs of the region which could be used for public water supply, non-public water supply or environmental improvements. The options assessed in this report are part of these supply options. A range of demand reduction options have also been identified to address strategic supply-demand deficit planning problems in specific water resource zones. These include leakage, household customer and non-household customer water efficiency and enhanced metering options, which will be included in the environmental assessment process over the coming months as they are further developed.

1.3 Relevant Guidance

The Environment Agency's National Framework[6] sets out the requirement for development of regional plans.

The National Framework Appendix 2 'Regional Planning' provides a framework for Regional Plans and sets out the actions that 'must, should and could' feature in regional plans. Amongst the requirements are that it:

- must include enhanced environmental improvements;
- must also comply with SEA and HRA legislation;
- should look to use the natural capital approach in their decision making where appropriate; and
- must include environmental net gain in their decision making, to achieve measurable improvements for the environment on a regional and local level.

The decision making process for determining WReN solutions to regional and national needs will be developed following the Environment Agency Water Resource Planning Guidelines (WRPG)[7] and supplementary guidelines. The Supplementary Guidance 'Environment and society in decision

[4] https://www.waterresourcesnorth.org/
[5] WReN (2022) Emerging Regional Plan for Informal Consultation (January 2022) – Appendix 6 Environmental Destination
[6] https://www.gov.uk/government/publications/meeting-our-future-water-needs-a-national-framework-for-water-resources
[7] Environment Agency (2021) Water resources planning guideline, July 2021. Available at Water resources planning guideline - GOV.UK (www.gov.uk)

making'[8] and contains a number of requirements and recommendations for the scope of WRMP environmental assessment, in particular in relation to SEA, BNG and NCA. The Regional Plan will need to be reflected in the WRMPs and the assessments will therefore need to be consistent with the requirements of the WRPG.

UK Water Industry Research (UKWIR) have developed a number of methodologies which support the WRPG. This includes an updated guidance document for SEA, HRA, and new guidance for WFD assessment and NCA for strategic water resource plans and drought plans[9]. The guidance has recently been updated for WRMP24 and regional plans to account for recent developments in regulatory guidance, new legislation and current best practice methods.

The UK Government has also produced generic SEA guidance[10] that sets out the stages of the SEA process - the 'Practical Guide', which provides best practice guidance.

1.3.1 All Company Working Group methodologies

As part of the assessment of water companies' PR19 business plans, Ofwat introduced proposals in their December 2019 Final Determination[11] to support the delivery of Strategic Regional Water Resource Options (SROs) over the next 5 to 15 years with solutions required to be 'construction ready' for the 2025-2030 period. Ofwat set out a RAPID gateway process[12], for development of SROs for the co-ordination and development of a consistent set of SROs.

In October 2020, the group of Water Companies involved in developing SROs in the RAPID gateway process (known as the All Company Working Group - ACWG), published guidance[13] for environmental assessment methods for SROs which is aligned to the draft WRPG to increase the consistency of environmental assessment. This is supplemented with the ACWG Strategic Environmental Assessment: Core Objective Identification report (October 2020). These being the SEA objectives that the ACWG identified following a review of Water Company approaches to SEA.

The development of methodologies for the WReN environmental assessment has had regard to the ACWG guidance and the RAPID requirements as much as is practicable. This will facilitate inter-regional comparison and future assessment of any WReN options which enter the RAPID gateway process. This would include the Severn Trent Water and Yorkshire Water Derwent Valley dam raising option which has recently entered the RAPID gated process as a SRO.

1.4 SEA approach

SEA is a statutory requirement under the Environmental Assessment of Plans and Programmes Regulations 2004 ('the SEA Regulations') requiring the assessment of effects of certain plans and programmes on the environment. The objective of SEA is to:

> '*provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans with a view to promoting sustainable development'.*

The SEA Regulations requires preparation of an Environmental Report in which the likely significant effects on the environment of implementing the plan or programme, and reasonable alternatives taking into account the objectives and geographical scope of the plan or programme, are identified, described and evaluated.

[8] Environment Agency (2021) Water resources planning guideline supplementary guidance – Environment and society in decision-making, External guidance: 18643. November 2021.
[9] UKWIR (2021) Environmental Assessment Guidance for Water Resources Management Plans and Drought Plans. Report Ref 21/WR/02/15.
[10] Office of the Deputy Prime Minister (2005). A Practical Guide to the Strategic Environmental Assessment Directive.
[11] Ofwat (2019) PR19 Final Determinations, Strategic regional water resource solutions appendix
[12] Regulatory Alliance for Progressing Infrastructure Development (RAPID) Gated planning process https://www.ofwat.gov.uk/regulated-companies/rapid/
[13] Mott MacDonald Limited (2020). All Companies Working Group WRMP environmental assessment guidance and applicability with SROs. Published October 2020

1.4.1 Information requirements

Schedule 2 of the SEA Regulations requires the following specific information to be included within the Environmental Report:

- An outline of the contents and main objectives of the plan or programme, and of its relationship with other relevant plans and programmes. (see Section 2).
- The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme (see Section 3).
- The environmental characteristics of areas likely to be significantly affected (see Section 3).
- Any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC (the 'Birds Directive') and 92/43/EEC (the 'Habitats Directive') (see Sections 1.5 and 1.6).
- The environmental protection objectives, established at international, (European) Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation" (see Section 4).

1.4.2 Purpose of the Environmental Report

SEA incorporates the following generic stages as set out in the UK Government Practical Guide[10]:

- Stage A: Setting the context, identifying objectives, problems and opportunities, and establishing the environmental baseline (scoping).
- Stage B: Developing and refining options and assessing effects (impact assessment).
- Stage C: Preparing the Environmental Report (recording results).
- Stage D: Consulting on the Draft Plan and the Environmental Report (seeking consensus).
- Stage E: Monitoring the significant effects of the plan or programme on the environment (verification).

This Environmental Report documents stages B and C of the SEA being undertaken by WReN to establish the environmental effects of the regional water resources planning for Yorkshire and the North East of England. The purpose and scope of the WReN regional plan is explained in more detail in Section 1.2.

The requirements of the Environmental Report are set out in Regulation 12 of the SEA Regulations. According to Regulation 12(2) the Environmental Report shall

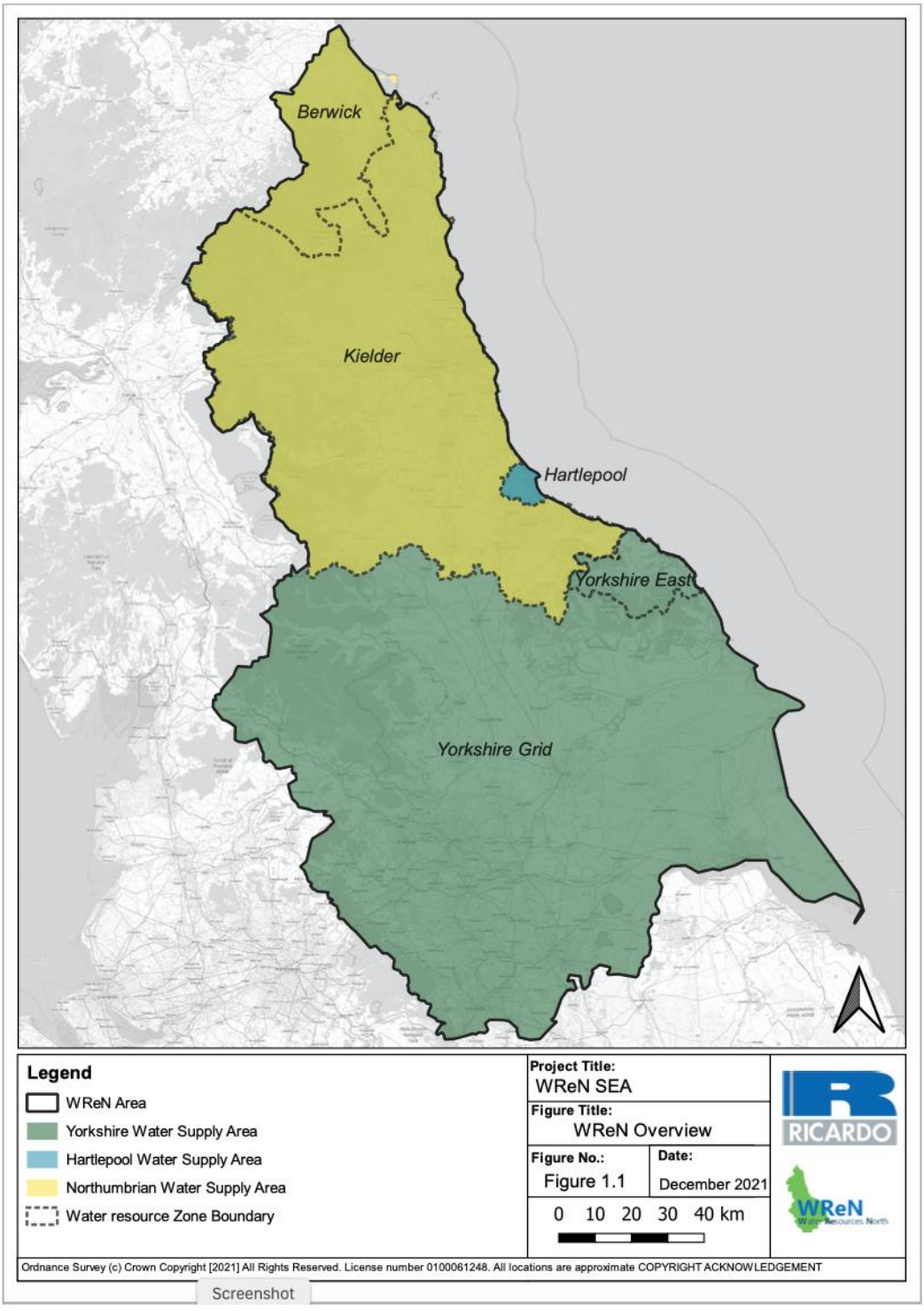
> *'identify, describe and evaluate the likely significant effects on the environment of-*
>
> > *a) implementing the plan or programme; and*
> >
> > *b) reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme.*

Schedule 2 of the SEA Regulations lists specific items of information which should be included in the Environmental Report. The Practical Guide provides a Quality Assurance checklist to help ensure that the requirements of the SEA Directive are met throughout the entire process. Compliance against this checklist is set out in **Appendix A**.

This Environmental Report identifies the baseline information for supply options under consideration for the WReN regional plan (a 'feasible list' of options), as well as identifying their environmental effects (beneficial or adverse). It also identifies the potential mitigation and enhancement measures, and

suggests monitoring that could be undertaken to track the environmental effects of the plan once implemented.

Figure 1.1: Study Area and Relevant Water Company Boundaries



1.5 Habitats Regulations Assessment

The HRA will be undertaken in accordance with available guidance[14,15,16,17,18,19,20] and will be based on a precautionary approach as required under the Conservation of Habitats and Species Regulations 2017 (as amended). A HRA Test of Likely Significance will be applied as a first step during assessment of the Regional Plan option list.

The objective of a HRA is to establish whether a plan or project is likely to have a significant effect on European sites (alone or in-combination with other plans or project), adopting the precautionary principle (Stage 1 Screening), and where likely significant effects cannot be ruled out, to determine through Appropriate Assessment (Stage 2 Appropriate Assessment) whether the plan or project would adversely affect the integrity of an European site(s). Where significant adverse effects are identified at the Appropriate Assessment stage, the derogation process would apply (Stage 3 Alternative Solutions and Stage 4 Imperative Reasons of Overriding Public Interest (IROPI)).

As the Draft Regional Plan submission does not form a statutory plan or project, the principles of the HRA process have been applied to help identify *risks to feasibility* and deliverability of the option components. A Stage 1 screening will be undertaken as part of the initial screening exercise for each of the feasible options.

The HRA Stage 1 screening[2] of feasible options has been completed prior to SEA option-level assessments has informed the SEA (biodiversity topic).

Following recent case law developments including the 'People over Wind' judgement, a number of options would require Stage 2 Appropriate Assessment should the options be included in the preferred plan. The approach will be 'appropriate' to the level of detail of this strategic plan whilst demonstrating compliance. It is unlikely that schemes will be included in the Regional Plan if an Appropriate Assessment cannot conclude no effect on site integrity, therefore, it is unlikely that HRA Stages 3 or 4 will be required.

1.6 Water Framework Directive Assessment

The WFD assessment's purpose is to ensure the Regional Plan both helps to avoid the deterioration and contribute to the improvement of the status of water bodies, including rivers, lakes, groundwater and estuarine and coastal waters.

A robust, practical approach has been used to deliver a proportionate WFD compliance assessment that complies with statutory requirements and regulatory guidelines. The approach has been primarily based on that set out in the updated UKWIR Guidance[21].

A sequential 4-stage process for undertaking WFD compliance assessments will be applied through the development of the Regional Plan. The sequential four steps are as follows:

1. WFD compliance assessment screening: involves a preliminary assessment of each option and identifies whether there may be any risk of deterioration in WFD status. This is based on expert judgement. Where a risk is identified, the option is subject to the WFD compliance assessment.

2. WFD compliance assessment: This involves assessment of the likely changes to hydro-

[14] European Commission Environment DG (2001) Assessment of plans and projects significantly affecting European Sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.
[15] Department for Communities and Local Government (DCLG) (2006) Planning for the Protection of European Sites. Guidance for Regional Spatial Strategies and Local Development Documents.
[16] English Nature (1997) The Appropriate Assessment (Regulation 48) The Conservation (Natural Habitats &c) Regulations, 1994. Guidance Note HRGN1.
[17] English Nature (1997) The Determination of Likely Significant Effect under The Conservation (Natural Habitats &c.) Regulations 1994. Guidance Note HRGN3.
[18] Defra (2012) The Habitats and Wild Birds Directives in England and its seas: Core guidance for developers, regulators & land/marine managers.
[19] Tyldesley, D. & Chapman, C. (2013) The Habitats Regulations Assessment Handbook. December 2020 edition DTA Publications.
[20] Environment Agency (2020). Water resources planning guideline – draft for consultation July 2020
[21] UKWIR (2021) Environmental Assessment Guidance for Water Resources Management Plans and Drought Plans. Report Ref 21/WR/02/15.

morphology and water quality occurring as a result of the construction or operation of the option and the possible risks to WFD status. In addition, the potential effects on WFD protected areas are assessed. .

3. Option level WFD compliance assessment: This involves summarising WFD compliance assessments of each of the options on the feasible list (from Steps 1 and 2).

4. Preferred plan WFD compliance statement: This involves a statement of the compliance of the preferred plan against each of the WFD compliance objectives (set out below). This involves assessment of the set of options within the programme, both alone and in combination with other options within the programme. The assessment is also used to identify where multiple options potentially impact on the same WFD waterbody, and potentially downstream waterbodies where appropriate.

Findings from the WFD compliance assessment have been integrated into assessments of relevant SEA topics.

1.7 Consultation

The SEA Regulations require consultation at the scoping stage and on the assessments documented in the Environmental Report. Scoping with the statutory consultation bodies defined by the SEA Regulations (the Environment Agency, Natural England and Historic England) is mandatory at both stages. Consultation with the public is only mandatory at the Environmental Report stage.

1.7.1 Consultation on the Scoping Report

The WReN Environmental Assessment Scoping Report[22] was issued for consultation on 20 April 2021 to statutory and stakeholder consultees. This included the Environment Agency, Historic England, Natural England, Energy UK, Aire Rivers Trust, Tyne Rivers Trust, National Farmers Union, Canal and Rivers Trust and the Royal Society for the Protection of Birds.

Consultation bodies were invited to express their views on the WReN Environmental Assessment Scoping Report and the scope of the SEA proposed in accordance with SEA Regulation 12(5).

Scoping consultation comments received from statutory consultees with responses to those comments set out in **Appendix B**, along with the consequent actions. The assessment stage was undertaken according to the scope and approach agreed through consultation on the Scoping Report.

1.7.2 Consultation on the Environmental Report

This Environmental Report has been produced in accordance with the approach agreed by WReN and taking into consideration the responses received from consultation bodies in response to the Scoping consultation. SEA reporting provides assessments of the likely significant effects of the Regional Plan options considered by WReN. This information is set out in this Environmental Report, which will be updated as the plan develops and will be publicly consulted upon alongside the draft WReN Regional Plan in August 2022.

1.8 Structure of the Environmental Report

This Environmental Report is the output of Stages B and C of the SEA process and documents the findings throughout the SEA process as described in Section 1.1. It has been prepared to facilitate consultation on the SEA process and outcomes (Stage D). The Environmental Report is structured as follows:

[22] WReN (2020) Water Resources North Regional Plan Environmental Assessment Scoping Report. Report produced by Ricardo Energy & Environment. Available at https://www.waterresourcesnorth.org/globalassets/water-resources-north/water-resources-north-environmental-assessment-scoping-report.pdf

- **Section 1** –describes the WReN Regional Plan and the approach to regional water resources management planning, as well as the requirement for, purpose and process of the SEA, and its context in relation to the WReN Regional Plan.
- **Section 2** – summery of policy context, key messages and environmental protection and social objectives from a review of relevant policies and plans. Further details are provided in **Appendix C**.
- **Section 3** – summary of environmental baseline review and the key environmental and social issues considered in the SEA. Identifies the current and future baseline conditions within the area of potential influence of the Regional Plan. Also included is a discussion of limitations identified in the data and the reasoning behind any assumptions made. Further details are provided in **Appendix D**.
- **Section 4** – Describes the methodological framework and processes that have been used to undertake the SEA of the individual options and assess any potential cumulative effects of options included in the WReN Regional Plan.
- **Section 5** – Assessment of individual Regional Plan options, presents the potential impacts of the various options against the SEA framework. Full details are provided in **Appendix E**.
- **Section 6** – Provides an assessment of options and cumulative effects assessment, discussing the potential in-combination impacts of individual options within the preferred plan and with other relevant programmes, plans and projects.
- **Section 7** – Outlines the assessment of the WReN regional preferred plan, alternative plans considered and associated cumulative assessments on an option and programme level, discussing the potential in-combination impacts of individual options within the preferred plan and with other relevant programmes, plans and projects.
- **Section 8** – Mitigation and enhancement, discusses measures envisaged to prevent, reduce and offset any significant adverse effects of implementing the plan.
- **Section 9** – Monitoring to track the environmental effects against the assessments, to help identify any adverse impacts and trigger deployment of any mitigation measures where necessary.

2 Policy context

2.1 Introduction

Schedule 2 of the SEA Regulations requires the following specific information to be included within the Environmental Report:

> *'An outline of the contents and main objectives of the plan or programme, and of its relationship with other relevant plans and programmes.'*
>
> *'the environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation.'*

In accordance with the Regulations, a review of relevant plans and programmes is presented in Section 2.2. A summary of their key objectives is presented in **Table 3.1**. These objectives were originally identified in the Environmental Assessment Scoping Report[22].

2.2 Review of plans, policies and programmes

A summary of key messages derived from the review is presented below in **Table 2.1**. The review identifies how the WReN Regional Plan might be influenced by other plans, policies, programmes and other objectives which the Regional Plan should consider. This information has helped to identify and inform the scope of the assessment, in particular the objectives for the SEA process.

Relevant plans, policies and programmes were identified from the wide range that has been produced at an international, national, regional and local level. The emphasis is on "relevant": plans and programmes that have no likely interaction with the Regional Plan (i.e. they are unlikely to influence the Regional Plan , or be influenced by it), have been excluded from the review.

The review and the key messages derived from it are documented in **Appendix C**. Alongside the current and future baseline information reviewed in Section 3, the key messages have been used to develop proposed objectives for the SEA (see Section 4).

Table 2.1 Key policy messages and objectives from the review of plans, policies and programmes

SEA Topic	Key Messages and Objectives
Biodiversity, flora and fauna	Conservation and enhancement of the natural environment and of biodiversity, particularly internationally and nationally designated sites and priority habitats and species (NERC Act Section 41 for England), whilst taking into account future climate change. Promote a catchment-wide approach to water use to ensure better protection of biodiversity. To achieve favourable condition for priority habitats and species in particular designated sites. Avoidance of activities likely to cause irreversible damage to natural heritage. Support well-functioning ecosystems, respect environmental limits and capacities, and maintain/enhance coherent ecological networks, including provision for fish passage and connectivity for migratory/mobile species. Strengthen the connections between people and nature and realise the value of biodiversity. Protection, conservation and enhancement of natural capital. Ecosystem services from natural capital contributes to the economy and therefore should be protected and, where possible, enhanced. Avoidance of activities likely to cause the spread of Invasive Non-Native Species (INNS) A need to protect the green infrastructure network.
Population and human health	Water resources play an important role in supporting the health and recreational needs of local communities and businesses. To ensure all communities have a clean, safe and attractive environment in which people can take pride. To ensure secure, safe, reliable, dependable, sustainable and affordable supplies of water are provided for all communities. Access to high quality open spaces and opportunities for sport and recreation can make an important contribution to the health and well-being of communities. Promotion of healthy communities and protection from risks to health and wellbeing. Promotion of a sustainable economy supported by access to essential utility and infrastructure services.
Material assets and resource use	Promote sustainable production and consumption whilst seeking to reduce the amount of waste generated by using materials, energy and water more efficiently. Consider issues of water demand, water supply and water quality in the natural environment and ensure a sustainable use of water resources. Contribute to a resource efficient, green and competitive low carbon economy. Maintain a reliable public water supply and ensure there is enough water for human uses, whilst seeking to maintain a healthy water environment.

SEA Topic	Key Messages and Objectives
	Minimise the production of waste, ensure waste management is in line with the 'waste hierarchy', and eliminate waste sent to landfill. Promote the sustainable management of natural resources.
Water	Promote sustainable water resource management, including a reduction in water consumption. Maintain and improve water quality and water resources (surface waters, groundwater and bathing water). Meet protected area targets related to water quality and flow in the Water Framework Directive. Expand the scope of water quality protection measures to all waters, surface waters and groundwater. Improve the quality of the water environment and the ecology which it supports, and continue to provide high levels of drinking water quality. Ensure appropriate management of abstractions and protect flow and level variability across the full range of regimes from low to high conditions. Prevent deterioration of water body status. Balance the abstraction of water for supply with the other functions and services the water environment performs or provides. Steer new development to areas with the lowest probability of flooding and manage any residual flood risk, taking account of the impacts of climate change. Promote measures to enable and sustain long term improvement in water efficiency. Promote a catchment based approach to the management and work with local stakeholders to deliver catchment-based solutions to water quantity and quantity. Develop a resilient and flexible water management approach to cope with changing climate, population and economic conditions. Reduce flood risk to people, residential and non-residential properties, community facilities and key transport links, as well as designated nature conservation sites and heritage assets and landscapes of value. Reduce risk of flooding by changing operation of reservoirs.
Soil, geology and land use	Protect and enhance the quality and diversity of geology (including geological SSSIs) and soils, including geomorphology and geomorphological processes which can be lost or damaged by insensitive development. Ensure that soils will be protected and managed to optimise the varied functions that soils perform for society (e.g. supporting agriculture and forestry, protecting cultural heritage, supporting biodiversity, as a platform for construction), in keeping with the principles of sustainable development.

SEA Topic	Key Messages and Objectives
	Promote catchment-wide approach to land management by relevant stakeholders, in order to benefit natural resources, reduce pollution and develop resilience to climate change. Promote mixed use developments, and encourage multiple benefits from the use of land in urban and rural areas, recognising that some open land can perform many functions. Encourage the effective use of land by reusing land that has been previously developed (brownfield land), provided that it is not of high environmental value.
Air and climate	Reduce greenhouse gas emissions. Targets include: reduce the UK's greenhouse gas emissions by at least 80% (relative to 1990 levels) by 2050. Reduce the effects of air pollution on ecosystems. Improve overall air quality. Minimise energy consumption, support the use of sustainable/renewable energy and improve resilience to climate change. Build in adaption to climate change to future planning and consider the level of urgency of associated risks of climate change impacts accordingly. Need for adaptive measures to respond to likely climate change impacts on water supply and demand. Achieve and sustain compliance with and contribute towards national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Minimise energy consumption, support the use of sustainable/renewable energy and improve resilience to climate change.
Archaeology and cultural heritage	Built development in the vicinity of historic buildings and Scheduled Monuments could have implications for the setting and/or built fabric and cause damage to any archaeological deposits present on the site. Ensure active management of the Region's environmental and cultural assets. Ensure effects resulting from changes to water level (surface or sub-surface) on all heritage assets are avoided. Consider effects on important wetland areas with potential for paleo-environmental deposits. Promote the conservation and enhancement of the historic environment, including the promotion of heritage and landscape as central to the culture of the region and conserve and enhance distinctive characteristics of landscape and settlements. Conserve and enhance the historic environment, heritage assets and their settings.

SEA Topic	Key Messages and Objectives
Landscape and visual amenity	Protection and enhancement of landscape (including designated landscapes, landscape character, distinctiveness and the countryside) Abstraction and low river flows could negatively affect landscape and visual amenity. Enhance the value of the countryside by protecting the natural environment for this and future generations. Improve access to valued areas of landscape character in sustainable ways to enhance its enjoyment and value by visitors and stakeholders.

3 Environmental baseline review

3.1 Introduction

Schedule 2 of the SEA Regulations requires the following specific baseline information to be included within the Environmental Report:

> *'the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme'*
>
> *'the environmental characteristics of areas likely to be significantly affected'*
>
> *'any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Council Directive 79/409/EEC on the conservation of wild birds and the* [92/43/EEC] *Habitats Directive.'*

An essential part of the SEA process is to identify the current baseline conditions and their likely evolution in the absence of the Regional Plan. It is only with knowledge of baseline conditions that potential impacts of the Regional Plan and its schemes can be identified, monitored, and if necessary mitigated.

Baseline data have been drawn from a variety of sources, including a number of the plans, policies and programmes reviewed and summarised earlier in **Table 2.1** and **Appendix C**.

The baseline data are presented in **Appendix D**. The likely future trends in the environmental and social issues considered (where information is available to do so) are also summarised. The key issues arising from the review of baseline conditions (and of relevant plans, programmes and policies) are summarised in Section 3.5.

3.2 Spatial extent of the SEA

The WReN region encompasses a varied landscape, from the Peak District National Park in the South West, stretching to the Northumberland National Park to the south of Scotland, and the North Sea coastline along the Eastern side of the region. Annual average rainfall across the region varies; highest near the Yorkshire Dales, whilst low lying and coastal areas, such as Berwick-upon-Tweed, average less than half the volume of rainfall each year, with little seasonal variation.

The WReN Regional Plan options may have effects outside of the WReN geographical region, for example export options to neighbouring regional groups such as Water Resources West and/or Water Resources East. Where this is the case the effects of the option in its entirety will be considered in the appraisal against the SEA objectives and documented in the Environmental Report. Where an option will potentially be included in the WReN Regional Plan and a neighbouring area Regional Plan the two groups will collaborate on the environmental assessment to ensure consistency in data inputs and assessment approach.

3.3 Temporal scope of the SEA

The current environmental and social baseline for the SEA study area is described in **Appendix D**, together with the likely future changes to this baseline as currently understood. The temporal period covered by the Regional Plan is potentially of long duration as the Regional Plan looks as far out as 2080, presenting uncertainties in characterising the future baseline which increases with time. These will need to be updated as part of the next regional plan process leading up to the next Regional Plan submission, as well as for subsequent submissions.

3.4 Limitations of the data and assumptions made

The principal limitations surround the future social and environmental baseline where there are substantial differences in the availability and temporal resolution of robust projections across the various SEA topic areas: for example, whilst some water companies are planning up to 80 years ahead and

climate change estimates extend to a similar horizon, regional population and housing forecasts rarely go beyond a 40 year horizon and forecasts of how the natural environment may change are very limited.

The study area for the SEA is relatively large and covers a number of different geographical and political regions, which makes establishing a baseline at the sub-regional level challenging. There are also challenges around extrapolating information from data collated at differing spatial resolutions. Spatial data have been obtained for most of the SEA topics, and the baseline is presented graphically as mapped information where appropriate. In some instances, reporting cycles mean that available information is dated.

Data have generally been sourced from national or regional bodies where information is collected for the Yorkshire and North East region using consistent methods. This allows for a more effective comparison between the regional and national averages; however, reliance on these data sets has in some cases meant that information is a number of years old.

3.5 Key issues

The baseline was set out in the Scoping Report and has been updated based on feedback provided through consultation. The baseline is detailed further in **Appendix D**. Key issues arising from the review of baseline conditions for each of the SEA topics are summarised in **Table 3.1**. These key issues have been used to support the development of the SEA objectives in Section 4.

Table 3.1 Summary of key sustainability issues

SEA topic	Key issues
Biodiversity, flora and fauna	• The need to protect or enhance the region's biodiversity, particularly protected sites designated for nature conservation. • The need to avoid activities likely to cause irreversible damage to natural heritage. • The need to take opportunities to improve connectivity between fragmented habitats. • The need to control the spread of Invasive Non-Native Species (INNS). • The need to engage more people in biodiversity issues so that they personally value biodiversity and know what they can do to help, including through recognising the value of the ecosystem services.
Population and human health	• The need to ensure water supplies remain affordable especially for deprived or vulnerable communities • The need to ensure continued improvements in levels of health across the region, particularly in urban areas and deprived areas. • The need to ensure water quantity and quality is maintained for other users including tourists, recreational users and other users such as farmers. • The need to ensure a balance between different aspects of the built and natural environment that will help to provide opportunities local residents and tourists, including opportunities for access to recreation resources and the natural and historic environment. • The need to accommodate an increasing population, that is geographically spread, focussed around several economic centres. • Sites of nature conservation importance, heritage assets, water resources, important landscapes and public rights of way contribute to recreation and tourism opportunities and subsequently health and well-being and the economy.

SEA topic	Key issues
Material assets and resource use	• The need to minimise the consumption of resources, including water and energy, reducing resource demand per capita. • The need to reduce the total amount of waste produced in the region, from all sources, and to reduce the proportion of this waste sent to landfill. • Need to reduce leakage from the water supply system. • The need to encourage more efficient water use. • The need to support regional and national commitments to decarbonisation.
Water	• The need to further improve the quality of the regions river, estuarine and coastal waters taking into account WFD status targets. • The need to maintain the quantity and quality of groundwater resources taking into account WFD status targets. • The need to improve the resilience, flexibility and sustainability of water resources in the region, particularly in light of potential climate change impacts on surface waters and groundwaters. • The need to ensure sustainable abstraction. • The need to ensure that people understand the value of water. • The need to reduce and manage flood risk.
Soil, geology and land use	• The need to protect geological features of importance and maintain and enhance soil function and health, including protecting Best and Most Versatile Agricultural land from development and pollution. • The need to manage the land more holistically at the catchment level, benefitting landowners, other stakeholders, the environment and sustainability of natural resources (including water resources). • The need to make use of previously developed land (brownfield land) and to reduce the prevalence of derelict land in the region.
Air and climate	• The need to reduce air pollutant and greenhouse emissions and limit air emissions to comply with air quality standards. • The need to mitigate against climate change through the reduction in greenhouse gas emissions to contribute to risk reduction over the long term. • The need to adapt to the impacts of climate change for example through, sustainable water resource management, specific aspects of natural ecosystems (e.g. connectivity) as well as accommodating potential opportunities of climate change. • The need to work towards achieving net zero emissions by 2030.
Archaeology and cultural heritage	• The need to conserve or enhance sites of archaeological importance and cultural heritage interest and their settings, particularly those which are sensitive to the water environment. • Ensure that any new infrastructure, provided in order to maintain or improve water resources within the District, does not impact upon the cultural heritage interest, or their settings.

SEA topic	Key issues
	• The need to prevent any further assets in the Yorkshire Water Area from entering the Heritage At Risk Register.
Landscape and visual amenity	• The need to protect and improve the natural beauty of the region's AONBs and other areas of natural beauty. • It is envisaged that landscape and designated sites will be maintained and enhanced for the enjoyment of the public. • The need to preserve Green Belt and openness in the area. • The need to ensure that local character is maintained, in the face of pressures from development and climate change.

4 Assessment methodology

4.1 SEA objectives

An objectives-led approach has been the approach adopted for SEA of WRMPs and is also the approach recommended by the ODPM Practical Guide. This section outlines the draft SEA objectives and proposed assessment framework that will be used to identify the environmental and social effects of the options identified in the Regional Plan.

Assessment objectives have been developed based on:

- The key policy messages, social and environmental protection objectives identified in the review of policies, other plans and programmes (see Section 2). It is important that the assessment takes these objectives into account as this will help it to highlight any area where the Regional Plan may help or hinder the achievement of the objectives of other plans (e.g. at local, national and international level).
- The current state of the environment in the area under consideration for the SEA (see Section 3) and the key environmental issues identified.

The SEA objectives are set out in **Table 4.1** alongside the key messages identified from the review of policies, plans and programmes and the key issues highlighted from the review of baseline information.

As well as the overall SEA objectives, a number of key questions have been developed for each SEA topic. These key 'indicator' questions will be used as prompts in the assessments to help ensure consistent and robust assessment of these SEA topic areas. These key questions will prompt the assessment and ensure it considers all the relevant aspects.

The SEA objectives are intended to reflect changes that contribute to sustainability. By assessing each option against the objectives, it is more apparent where there might be adverse effects and where options could be developed to provide beneficial effects.

The SEA objectives and indicator questions have been developed with regard to the SRO SEA objectives set out in Table 6.1 of the ACWG Strategic Environmental Assessment: Core Objective Identification report (see Section 1.3.1).

4.1.1 Interactions between objectives

Schedule 2, paragraph 6 of the SEA Regulations requires that the inter-relationship between the issues referred to between SEA topics shall be explored. The matrix in **Table 4.2** identifies potential interactions between the proposed SEA objectives. In most cases the interactions are identified as compatible, or no interactions occur. Exceptions comprise:

- Potential incompatibility between objectives 2.1 and 4.4, as efforts to increase water efficiency could exacerbate inequalities by disproportionately impacting low income or vulnerable communities.
- Potential mixed interactions between objectives 4.2, 6.3 and 8.1, as actions to improve water resource management and climate change resilience (e.g. water management infrastructure) could be considered to enhance or detract from landscape quality.

Table 4.1 SEA objectives and indicator questions

SEA topic	Plans, policies and programmes Key Messages	Baseline Key Issues	SEA Objectives	Indicator Questions
Biodiversity, flora and fauna	• Conservation and enhancement of the natural environment and of biodiversity, particularly internationally and nationally designated sites and NERC Act priority habitats and species, whilst taking into account future climate change. • Promote a catchment-wide approach to water use to ensure better protection of biodiversity. • To achieve favourable condition for priority habitats and species in particular designated sites. • Avoidance of activities likely to cause irreversible damage to natural heritage. • Support well-functioning ecosystems, respect environmental limits and capacities, and maintain/enhance coherent ecological networks, including provision for fish passage and connectivity for migratory/mobile species. • Strengthen the connections between people and nature and realise the value of biodiversity. • Protection, conservation and enhancement of natural capital. Ecosystem services from natural	• The need to protect or enhance the region's biodiversity, particularly protected sites designated for nature conservation. • The need to avoid activities likely to cause irreversible damage to natural heritage. • The need to take opportunities to improve connectivity between fragmented habitats. • The need to control the spread of Invasive Non-Native Species (INNS). • The need to engage more people in biodiversity issues so that they personally value biodiversity and know what they can do to help, including through recognising the value of the ecosystem services.	• To protect and enhance biodiversity, ecological functions, capacity, and habitat connectivity within the WReN region. • To provide opportunities for habitat creation or restoration and a net benefit/gain for biodiversity. • To protect, conserve and enhance natural capital and the ecosystem services from natural capital that contribute to the economy. • To avoid introducing or spreading INNS.	• Will it avoid damage to aquatic, transitional and terrestrial species and habitats including fish populations (particularly migratory fish)? • Will it enhance aquatic, transitional and terrestrial species and habitats? • Will it protect the most important sites for nature conservation? • Will it affect HRA compliance? • Is the option likely to affect ancient woodland? • Will the option affect a priority habitat on the priority habitat inventory? • Are there any opportunities for habitat creation or restoration and a net benefit/gain for biodiversity? • Will the option contribute to the loss or gain in habitat connectivity? • Will it ensure the sustainable management of natural habitats, taking into account climate change adaptability? • Will it affect WFD compliance e.g. good ecological potential/status? • Does it protect, conserve and enhance biodiversity natural capital

SEA topic	Plans, policies and programmes Key Messages	Baseline Key Issues	SEA Objectives	Indicator Questions
	capital contributes to the economy and therefore should be protected and, where possible, enhanced. • Avoidance of activities likely to cause the spread of Invasive Non-Native Species (INNS) • A need to protect the green infrastructure network.			and the ecosystem services the natural capital provides? • Is there a possibility for INNS to be spread/ introduced? • Is there an opportunity to improve biodiversity value through removal of INNS?
Population and human health	• Water resources play an important role in supporting the health and recreational needs of local communities. • To ensure all communities have a clean, safe and attractive environment in which people can take pride. • To ensure secure, safe, reliable, sustainable and affordable supplies of water are provided. • Access to high quality open spaces and opportunities for sport and recreation can make an important contribution to the health and well-being of communities. • Promotion of healthy communities and protection from risks to health and wellbeing. • Promotion of a sustainable economy supported by universal access to essential utility and infrastructure services.	• The need to ensure water supplies remain affordable especially for deprived or vulnerable communities • The need to ensure continued improvements in levels of health across the region, particularly in urban areas and deprived areas. • The need to ensure public awareness of drought conditions and importance of maintaining security of supply without the need for emergency drought measures. • The need to ensure water quantity and quality is maintained for other users including tourists, recreational users and other users such as farmers. • The need to ensure a balance between different	• To protect and improve health and well-being and promote sustainable socio-economic development through provision of access to a resilient, high quality, sustainable and affordable supply of water over the long term. • To protect and enhance the water environment for other users including recreation tourism and navigation.	• Will it help to ensure access to a resilient and secure supply of drinking water? • Will it help to promote healthy communities and protect from risks to health and wellbeing? • Will it assist in provision of essential infrastructure and services to support health and well-being and a sustainable economy? • Will it avoid negative effects on human health or quality of life, e.g. through noise, air quality or transport impacts? • Will it protect or enhance opportunities for recreation, tourist activities and navigation? • Will the option affect Public Rights of Way? • Will the option have an effect on active lifestyles, such as impacts on active travel through disruption to pedestrian and cycle routes?

SEA topic	Plans, policies and programmes Key Messages	Baseline Key Issues	SEA Objectives	Indicator Questions
		aspects of the built and natural environment that will help to provide opportunities local residents and tourists, including opportunities for access to recreation resources and the natural and historic environment. • The need to accommodate an increasing population. • Sites of nature conservation importance, heritage assets, water resources, important landscapes and public rights of way contribute to recreation and tourism opportunities and subsequently health and well-being and the economy.		• Does the option improve access to the natural environment for recreation, including those living within deprived areas?
Material assets and resource use	• Promote sustainable management of natural resources, sustainable production and consumption whilst seeking to reduce the amount of waste generated by using materials, energy and water more efficiently. • Consider issues of water demand, water supply and water quality in the natural environment and ensure a sustainable use of water resources.	• The need to minimise the consumption of resources, including water and energy • The need to reduce the total amount of waste produced in the region, from all sources, and to reduce the proportion of this waste sent to landfill.	• To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, including leakage from the water supply system, encourage its re-use and eliminate waste sent to landfill.	• Will it minimise the use of energy and promote energy efficiency? • Will it minimise waste, and increase the proportion sent to reuse or recycling? • Will it make use of existing infrastructure? • Will it help to encourage sustainable design or use of sustainable materials (e.g. supplied from local resources)?

SEA topic	Plans, policies and programmes Key Messages	Baseline Key Issues	SEA Objectives	Indicator Questions
	• Contribute to a resource efficient, green and competitive low carbon economy. Maintain a reliable public water supply and ensure there is enough water for human uses, as well as providing an improved water environment. • Minimise the production of waste, ensure waste management is in line with the 'waste hierarchy', and eliminate waste sent to landfill. • Promote the sustainable management of natural resources.	• Need to reduce leakage from the water supply system. • Daily consumption of water resources is higher than the national average in the area and there is a need to encourage more efficient use.		• Will the option affect major built assets and infrastructure, including transport infrastructure?
Water	• Maintain and improve water quality (surface waters and groundwater). • Improve the quality of the water environment and the ecology which it supports, and continue to provide high levels of drinking water quality. • Expand the scope of water protection to all waters, surface waters and groundwater. • Ensure appropriate management of abstraction and protect flow and level variability across the full range of regimes from low to high conditions. • Develop a resilient and flexible water management approach to cope with changing climate, population and economic conditions.	• The need to further improve the quality of the regions river, estuarine and coastal waters taking into account WFD status targets. • The need to maintain the quantity and quality of groundwater resources taking into account WFD status targets. • The need to improve the resilience, flexibility and sustainability of water resources in the region, particularly in light of potential climate change impacts on surface waters and groundwaters.	• To maintain or improve the quality of rivers, lakes, groundwater, estuarine and coastal waterbodies. • To avoid adverse impact on surface and groundwater levels and flows, and ensure sustainable management of abstractions. • To reduce and manage flood risk, taking climate change into account. • To increase awareness of water sustainability and efficient use of water.	• Will it avoid contamination of groundwater? • Will it help to minimise risks associated with unsustainable abstraction of ground and surface waters? • Will it abstract from a water resource with resource availability (with reference to CAMS status and WFD considerations)? • Is the option likely to contribute to or conflict with the achievement of WFD objectives? • Will it alter the flow or level regime or residence time of surface waters or groundwaters? • Will it enable flexible control over the level of abstraction at short

SEA topic	Plans, policies and programmes Key Messages	Baseline Key Issues	SEA Objectives	Indicator Questions
	• Balance the abstraction of water for supply with the other functions and services the water environment performs or provides. • Encourage more efficient use of water and promote awareness of water sustainability. • Steer new development to areas with the lowest probability of flooding and manage any residual flood risk, taking account of the impacts of climate change. • Promote a catchment based approach to the management and work with local stakeholders to deliver catchment-based solutions to water quantity and quantity. • Develop a resilient and flexible water management approach to cope with changing climate, population and economic conditions. • Reduce flood risk to people, residential and non-residential properties, community facilities and key transport links, as well as designated nature conservation sites and heritage assets and landscapes of value. • Reduce risk of flooding from reservoirs.	• The need to ensure sustainable abstraction. • The need to ensure that people understand the value of water. • The need to reduce and manage flood risk.		notice in response to changing environmental conditions? • Will it avoid reducing flood plain storage, or provide opportunities to improve flood risk management? • Will it enable a sustainable use of water resources that balances demand for water with environmental protection? • Will it contribute towards improving the awareness of water sustainability and its true value? • Will the option protect and enhance the environmental resilience of the water environment to climate change, flood risk and drought?
Soil, geology and land use	• Protect and enhance the quality and diversity of geology (including geological SSSIs) and soils,	• The need to protect geological features of importance and maintain	• To protect and enhance geology, geomorphology, and	• Will it avoid damage to and protect geologically important sites?

SEA topic	Plans, policies and programmes Key Messages	Baseline Key Issues	SEA Objectives	Indicator Questions
	including geomorphology and geomorphological processes which can be lost or damaged by insensitive development. • Ensure that soils will be protected and managed to optimise the varied functions that soils perform for society (e.g. supporting agriculture and forestry, protecting cultural heritage, supporting biodiversity, as a platform for construction), in keeping with the principles of sustainable development. • Promote catchment-wide approach to land management by relevant stakeholders, in order to benefit natural resources, reduce pollution and develop resilience to climate change. • Promote mixed use developments, and encourage multiple benefits from the use of land in urban and rural areas, recognising that some open land can perform many functions. • Encourage the effective use of land by reusing land that has been previously developed (brownfield land), provided that it is not of high environmental value.	and enhance soil function and health. • The need to manage the land more holistically at the catchment level, benefitting landowners, other stakeholders, the environment and sustainability of natural resources (including water resources). • The need to make use of previously developed land (brownfield land) and to reduce the prevalence of derelict land in the region.	the quality and quantity of soils.	• Will it avoid damaging the quality of agricultural land? • Will it protect, maintain and enhance soil function and health? • Will it ensure efficient use of land (e.g. make use of previously developed land)? • Will it contribute towards a catchment-wide approach to land management?
Air and climate	• Reduce greenhouse gas emissions to put UK on the path to net zero emissions. Targets include: reduce the UK's greenhouse gas emissions	• The need to reduce air pollutant and greenhouse emissions and limit air	• To maintain and improve air quality. • To minimise greenhouse gas emissions.	• Will it reduce or minimise air pollutant emissions? • Will it increase emissions to air in an areas sensitive to emissions

SEA topic	Plans, policies and programmes Key Messages	Baseline Key Issues	SEA Objectives	Indicator Questions
	by at least 80% (relative to 1990 levels) by 2050. • Reduce the effects of air pollution on ecosystems. • Improve overall air quality. • Minimise energy consumption, support the use of sustainable/renewable energy and improve resilience to climate change. • Build in adaption to climate change to future planning and consider the level of urgency of associated risks of climate change impacts accordingly. • Need for adaptive measures to respond to likely climate change impacts on water supply and demand. • Sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas.	emissions to comply with air quality standards. • The need to mitigate against climate change through the reduction in greenhouse gas emissions in order to contribute to risk reduction over the long term. • The need to adapt to the impacts of climate change for example through, sustainable water resource management, specific aspects of natural ecosystems (e.g. connectivity) as well as accommodating potential opportunities of climate change.	• To adapt and improve resilience to the threats of climate change.	(e.g. in proximity to an AQMA or sensitive habitat)? • Will it reduce or minimise transport or energy requirements, and associated air and greenhouse gas emissions and contribute to net zero emission targets? • Is there potential for the option to incorporate climate mitigation measures to reduce its carbon footprint, such as lower embodied carbon or incorporating renewable energy? • Is the option vulnerable to climate change effects? • Will it reduce vulnerability to risks associated with climate change effects (e.g. reduce the adverse effects of droughts and floods)?
Archaeology and cultural heritage	• Built development in the vicinity of historic buildings could have implications for the setting and/or built fabric and cause damage to any archaeological deposits present on the site.	• The need to conserve or enhance sites and the settings of archaeological importance and cultural heritage interest, particularly those which are sensitive to the water environment.	• To conserve and enhance the historic environment, heritage assets and their settings, and protect archaeologically important sites.	• Will it avoid harm to and protect the historic environment, heritage assets (including unknown heritage assets) and their settings? • -Will it respect, maintain and strengthen historic local character and distinctiveness?

SEA topic	Plans, policies and programmes Key Messages	Baseline Key Issues	SEA Objectives	Indicator Questions
	• Ensure active management of the Region's environmental and cultural assets. • Ensure effects resulting from changes to water level (surface or sub-surface) on all water dependent heritage assets are avoided. Consider effects on important wetland areas with potential for paleo-environmental deposits. • Promote the conservation and enhancement of the historic environment, including the promotion of heritage and landscape as central to the culture of the region and conserve and enhance distinctive characteristics of landscape and settlements. • Conserve heritage assets in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of this and future generations.			• Will is contribute to the better management of heritage assets and tackle heritage at risk? • Will abstraction alter the hydrological setting of water-dependent assets? • Will it improve access, value, understanding or enjoyment of heritage assets and their settings and culturally/historically important assets and their settings in the region?
Landscape and visual amenity	• Protection and enhancement of landscape (including designated landscapes, landscape character, distinctiveness and the countryside). • Abstraction and low river flows could negatively affect landscape and visual amenity. • Enhance the value of the countryside by protecting the natural	• The need to protect and improve the natural beauty of the region's AONBs and other areas of natural beauty.	• To protect and enhance designated and undesignated landscape, townscape and the countryside.	• Will it avoid adverse impacts and enhance designated landscapes? • Will the option affect visual amenity? • Will it improve access to valued areas of landscape character, e.g. the countryside and open space? • Will the option create or improve green infrastructure which

SEA topic	Plans, policies and programmes Key Messages	Baseline Key Issues	SEA Objectives	Indicator Questions
	environment for this and future generations. • Improve access to valued areas of landscape character in sustainable ways to enhance its enjoyment and value by visitors and stakeholders.			contributes to access to the landscape? • Will it help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?

Table 4.2 SEA objective interaction matrix

	SEA objective	1.1	1.2	1.3	1.4	2.1	2.2	3.1	4.1	4.2	4.3	4.4	5.1	6.1	6.2	6.3	7.1	8.1
1.1	To protect and enhance biodiversity, ecological functions, capacity, and habitat connectivity within Yorkshire Water's supply and source area.																	
1.2	To protect, conserve and enhance natural capital and the ecosystem services from natural capital that contribute to the economy.																	
1.3	To avoid introducing or spreading INNS.																	
1.4	To provide opportunities for habitat creation or restoration and a net benefit/gain for biodiversity																	
2.1	To protect and improve health and well-being and promote sustainable socio-economic development through provision of access to a resilient, high quality, sustainable and affordable supply of water over the long term.																	
2.2	To protect and enhance the water environment for other users, including recreation, tourism and navigation.																	
3.1	To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.																	
4.1	To maintain or improve the quality of rivers, lakes, groundwater, estuarine and coastal waterbodies																	
4.2	To avoid adverse impact on surface and groundwater levels and flows, and ensure sustainable management of abstractions.																	
4.3	To reduce and manage flood risk, taking climate change into account.																	
4.4	To increase awareness of water sustainability and efficient use of water.																	
5.1	To protect and enhance geology, geomorphology, and the quality and quantity of soils.																	
6.1	To maintain and improve air quality.																	
6.2	To minimise greenhouse gas emissions.																	
6.3	To adapt and improve resilience to the threats of climate change.																	
7.1	To conserve and enhance the historic environment, heritage assets and their settings and protect archaeologically important sites.																	
8.1	To protect and enhance designated and undesignated landscapes, townscapes and the countryside.																	

	Compatible
	Incompatible
	Mixed
	No direct interaction

4.2 Assessment Methodology

4.2.1 Primary assessment

An appraisal framework was used to assess each of the potential Regional Plan options against the SEA objectives. The appraisal framework has been applied to test the performance of each of the alternative measures (Regional Plan options) against the SEA objectives. This approach has enable the environmental performance of these options to be used to inform the selection of options for inclusion in the Regional Plan.

An example appraisal framework table is given in **Table 4.3**.The appraisal framework is structured as follows:

- The first and second columns set out the SEA topics and objectives.
- The scale of the effect, which might relate to either geographical scale or the size of the population affected, is identified in the third column on a scale of small, medium to large.
- The impact evaluation includes consideration of the nature of the impact, certainty of effect, duration and permanence (fourth, fifth and sixth columns of **Table 5.2**) in compliance with criteria for determining the likely significance of effects specified in the SEA Directive Article 3(5) and Annex II, and the SEA Regulations Part 2, Regulation 9(2a) and Schedule 1. With respect to duration of temporary effects, short-term impacts are defined as those that last for up to six months, medium term impacts are those that extend for six months to two years whilst longer term temporary impacts are assessed as those that extend to two to five years. A ‘significant long term’ temporary impact category is used for those temporary effects that continue beyond five years in duration.
- The seventh column identifies the magnitude of the effect on a scale of low, medium and high.
- The value/sensitivity of the receptor(s) is identified in the eighth column on a scale of low, medium and high.
- The ninth column will be populated during the assessment with a commentary and evaluation of the impact of each alternative measure on the objectives for each topic, with reference to the indicator questions set out in column three. The assessment will assume the implementation of standard best practice in implementing the measures and any defined mitigation measures (which will be set out) so that the significance of effects relates to the residual effects after mitigation in line with the ODPM Practical Guide and UKWIR SEA national guidance. The mitigation measures for any identified adverse effects will be identified within the appraisal framework.
- The residual adverse and beneficial effects (after application of best practice approaches and any appropriate mitigation measures) are identified in the tenth and eleventh columns respectively. These were identified separately so as to avoid mixing adverse and beneficial effects. The commentary in column nine, combined with the magnitude (column seven) and value/sensitivity (column eight) informs the residual adverse or beneficial effects.

Table 4.3 Example SEA appraisal matric for the biodiversity, flora and fauna topic

Topic	SEA objective	Scale of effect: geographical &/or population affected (Small/ Medium/ Large)	Certainty of effect (Low/ Medium/ High)	Duration of effect (short/ medium /long term)	Permanence of effect (permanent/ temporary)	Magnitude of effect (Low/ Medium/ High)	Value/ sensitivity of receptor (Low/ Medium/ High)	Potential residual effect on sensitive receptors (assuming good practice construction methods)	Residual Adverse Effect (likely to remain after reasonable mitigation)	Residual Beneficial Effect (likely to remain after reasonable mitigation)
Biodiversity, fauna and flora	1.1 To protect and enhance biodiversity, ecological functions, capacity, and habitat connectivity within the WReN region.									
	1.2 To provide opportunities for habitat creation or restoration and a net benefit/gain for biodiversity.									
	1.3 To protect, conserve and enhance natural capital and the ecosystem services from natural capital that contribute to the economy.									
	1.4 To avoid introducing or spreading INNS.									

The SEA appraisal framework is used to capture the assessment for each option (one table completed per option), alternative programmes and the Regional Plan as a whole.

Varying levels of uncertainty are inherent within the assessment process. The assessment has minimised uncertainty through the application of expert judgement. The level of uncertainty of the option assessment for each SEA objective has been reported in the appraisal framework. Where there is significant uncertainty which precludes an effects assessment category being assigned for a particular option and SEA objective, an "uncertain" residual effects assessment label has been applied to that specific SEA objective.

The assessment of the options and the overall Regional Plan has been carried out using the effects assessment matrix shown in **Figure 4.1**, taking account of the scale, duration and permanence of the effect. The definitions for the effect significance are explained beneath **Figure 4.1**.

The effects assessment has taken account of any proposed mitigation measures that have been incorporated into the option conceptual design and costs, i.e. it is the residual effects after the application of mitigation that will be assessed.

The resulting significance of effects have been considered in the prioritisation of options and programmes of options. Where major adverse residual effects are predicted, should the option/programme be included in the Regional Plan, measures envisaged to prevent, reduce and as fully as possible offset these effects on the environment (as a result of implementing the Regional Plan) are outlined Section 7 as appropriate. These will be in addition to any mitigation that has already been included in the conceptual design and costs of each alternative option. Mitigation may include additional provisions within the Regional Plan itself and/or measures to be applied during the Regional Plan implementation stage. It may also include proposals for changing other plans and programmes to address significant cumulative residual effects. WReN will consider how any remaining significant residual effects identified are to be monitored to identify any unforeseen adverse effects and to enable appropriate remedial action to be taken.

Figure 4.1 Significance matrix used to assess effects of each Regional Plan option on each SEA objective

Significance of Effect		Value/sensitivity of receptor		
		High	Medium	Low
Effect magnitude (includes scale of effect)	High	Major Beneficial / Major Adverse	Major Beneficial / **Major Adverse**	Moderate Beneficial / Moderate Adverse
	Medium	Major Beneficial / Major Adverse	Moderate Beneficial / Moderate Adverse	Minor Beneficial / Minor Adverse
	Low	Dependent on nature of impact/benefit	Minor Beneficial / Minor Adverse	Negligible

4.2.1.1 General Significance Definitions

Major - effects represent key factors in the decision-making process. They are generally associated with sites and features of international, national or regional importance. If adverse, such resources/features are generally those which cannot be replaced or relocated.

Moderate - effects are likely to be important considerations at a regional or district scale. If adverse, they are likely to be of potential concern.

Minor - effects are not likely to be decision-making issues. Nevertheless, the cumulative effect of such issues may lead to an increase in the overall effects on a particular area or on a particular resource.

Negligible - effects which are not perceptible, being within normal bounds of variation or the margin of forecasting error.

For the '**high' effect magnitude** (top row), a major effect significance is assigned for both high and medium value receptors to reflect the magnitude of the effect.

For the **'low' effect magnitude and 'high' value receptor** (bottom left box), the significance of effect could be minor, moderate or major dependent on the precise nature of the impact or benefit.

All options have been assessed to the same level of detail, in line with the SEA legislative requirements, national SEA guidance and the UKWIR SEA guidance. The level of detail for the environmental assessment of each option is consistent with the strategic nature of SEA. This is a high-level, strategic assessment, carried out without the detailed information which would be support an EIA. In the event that new options are introduced at a later stage (which may have less detailed information available) every endeavour will be made to ensure that the assessment is undertaken to a similar standard.

The analysis used a detailed suite of environmental and social datasets that are available at a consistent quality across the geographical footprint of all the options under consideration. The HRA[2] and WFD[3] assessments also informed the assessment at each key stage, with any adverse implications for Habitats Regulations or WFD compliance flagged during option assessments and used inform decision-making at the programme appraisal stage.

The assessment includes some quantitative analysis of environmental and social effects. The WReN decision making methodology also includes metrics which relate to environmental and social aspects. These metrics are incorporated in a multi criteria analysis (MCA) approach to producing a best value plan. Where there is a clear overlap between the decision-making metrics and the SEA objectives, the SEA outputs have provided the data for measuring the metric[23].

Each feasible option is also assessed against the natural, social, human and financial and manufactured capitals. The natural, social and human capitals overlap with the SEA objectives. The approach of combining the SEA with the capitals creates a risk that the costs and benefits could be double counted at both an option and plan level and the Supplementary Guidance 'Environment and society in decision making'[8] recognises it is not possible to avoid this completely. At the end of the option appraisal process, an assessment will be made of the environmental and social impacts of the preferred plan to identify if any double counting could be a factor.

The assessment also considers effects on sites designated at a national and local level. The assessment of effects on SSSIs took account of conservation objectives established by Natural England, and SSSI Impact Risk Zone (IRZ) datasets. Effects on other designated sites set out in the WRPG have also been assessed, comprising National Nature Reserves, Local Nature Reserves, Marine Conservation Zones, Scheduled Ancient Monuments, World Heritage Sites, National Parks and Areas of Outstanding Natural Beauty. Information on Local Wildlife Sites has been included in the assessment where data are available, however detailed assessment of impacts on Local Wildlife Sites would occur during project-level EIA preparation.

4.2.2 Secondary, cumulative and synergistic environmental effects

Schedule 2(6) of the SEA Regulations requires the assessment of "The likely significant effects on the environment, including short, medium and long-term effects, permanent and temporary effects, positive and negative effects, and secondary, cumulative and synergistic effects…." These can be defined as follows:

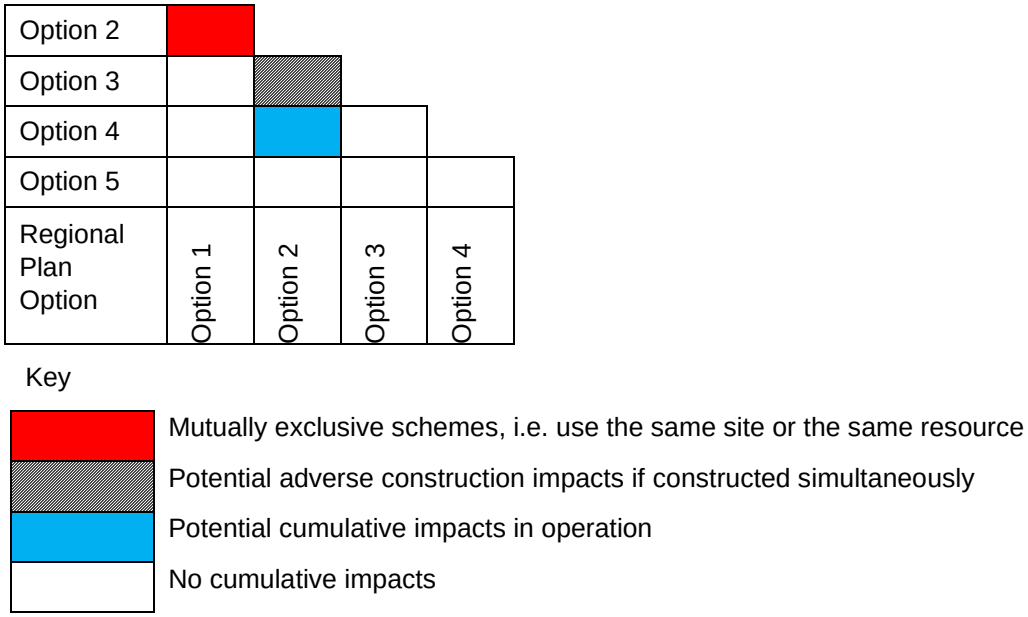
[23] WReN (2022) Emerging Regional Plan for Informal Consultation (January 2022) – Appendix 4 Objective and metric development.

- Secondary or indirect effects are effects that are not a direct result of the plan, (e.g. an abstraction that changes local groundwater levels and thus affects the ecology of a nearby wetland).
- Cumulative effects arise, for instance, where several nearby groundwater sources each have insignificant effects but together have a measurable effect on river flows; or where several individual effects of a preferred programme (e.g. traffic disruption) have a combined effect.
- Synergistic effects interact to produce a total effect greater than the sum of the individual effects. Synergistic effects often happen as habitats, resources or human communities get close to capacity. For instance, a wildlife habitat can become progressively fragmented with limited effects on a particular species until the last fragmentation makes the areas too small to support the species at all.

The term 'cumulative effects' is being adopted as the collective term to include secondary, cumulative and synergistic effects (as suggested by the Practical Guide). The SEA of the Regional Plan will include cumulative effects assessment at each of the assessment levels as described in the following sections (option-level, programme-level and overall Regional Plan). It should be noted that some options may be mutually exclusive (i.e. only one of these options can be developed) and this will also be identified in the SEA as part of the option-level assessment. For the programme level and Regional Plan level assessment, cumulative effects will include consideration of other plans, programmes and projects in the context of spatial and/or temporal proximity.

A matrix such as the example provided in **Figure 4.2** will be used to help consider interactions between options or programmes. In assessing these effects, consideration will be given to other factors which may affect the receiving environment in the short, medium and long term.

Figure 4.2 Cumulative Effects Assessment Matrix



4.2.2.1 Programme and Regional Plan level cumulative effects assessment

To meet the requirements of the SEA Regulations, consideration will be given to the cumulative effects between the preferred programmes and the Regional Plan with other relevant plans, programmes or projects. This will include consideration of effects with neighbouring Regional groups, including Water Resources East and Water Resources West Regional Plans and Drought Plans.

Cumulative effects with non-water resources related plans, programmes and projects will be considered where relevant, including existing completed projects, approved but uncompleted projects, ongoing activities, plans or projects for which an application has been made and which are under consideration by consenting authorities and plans and projects which are reasonably foreseeable (i.e. projects for which an application has not yet been submitted, but which are likely to progress before completion of

the development and for which sufficient information is available to assess the likelihood of cumulative and in-combination effects). Sources of information include the following:

- Land use and development plans to identify major development proposals (those which are likely to generate large scale construction or operational effects e.g. growth points, strategic centres;
- Transport and other infrastructure plans (e.g. flood risk management plans, energy, and other utilities).
- Local Plans

The following cumulative assessments are proposed in the SEA:

- An assessment of cumulative effects of options that could potentially be implemented at the same time. Mutually exclusive options (e.g. those that draw upon the same resource or use the same site) will also be identified.
- Assessment of cumulative effects of the WReN Regional Plan preferred programme with the other regional groups' Regional Plans and water company Drought Plans and WRMPs, and other relevant water management plans.

4.3 Limitations of the study

SEA is a high-level assessment aimed at highlighting potential environmental concerns. The environmental data used in this assessment are based on that which is readily available from existing sources. Difficulties encountered in undertaking this SEA included the requirement to rely on varying levels of detail in design specifications of schemes, many of which are at conceptual or outline design stage only. Assessment of impacts is necessarily limited when, for example, pipeline routes are at an indicative stage only.

Where particular limitations or outstanding issues are known, these are briefly described in the SEA appraisal tables for the relevant option concerned. Detailed assessments of options will be conducted at the detailed design stage (including project-level EIA) closer to the time of option implementation.

5 Assessment of options

The assessment for each of the plan options has been undertaken in accordance with the methodology set out in Section 4. Appraisal framework tables have been completed for each individual option and are provided in **Appendix E**. A summary of the likely significant effects for each option is provided in this section and is presented as a colour-coded visual evaluation matrix.

5.1 Resource management options

Figure 5.1 provides a summary of the SEA evaluation for each of the resource management options in the WReN Regional Plan. The detailed appraisal framework tables for each option are provided in **Appendix E**.

A wide variety of options have been assessed, leading to a range of environmental effects being identified. These reflect the scale of abstraction and/or the location of the option in relation to sensitive environments (aquatic and terrestrial). As may be expected, the smaller scale options generally have the lower environmental effects, but differences do occur between such options due to their environmental setting. Many of the options have no greater than minor adverse effects. However, some options may have moderate or major adverse effects for some of the SEA objectives, as discussed in the following paragraphs.

The Ouse Raw Water Transfer (R2) option is anticipated to have two moderate adverse effects on biodiversity, and archaeology and cultural heritage due to the construction of the Ouse abstraction and new pipeline. However, two major beneficial effects were identified, related to population and human health and climate change resilience due to a yield of 60Ml/d, therefore maintaining the supply-demand balance. The River Ouse water treatment works extension (R1a) option may also lead to moderate adverse effects on biodiversity.

Moderate adverse effects on groundwater levels and flows are associated with R6 South Yorkshire Groundwater Option 1 which would also result in minor beneficial effects on population and human health due to the due to the minor deployable output and continued water supply for economic activity.

The Sherwood Sandstone and Magnesian Limestone Boreholes Option 3 (R8c) is anticipated to lead to three moderate adverse effects; for population and human health, due to construction work being required in residential areas, and for cultural heritage, due to construction impacting upon the quality and settings of Scheduled Monuments and several Grade II Listed Buildings.

The R13 East Yorkshire Groundwater Option 2 is associated with moderate adverse effects on biodiversity due to the potential for adverse temporary effects on nearby ancient woodland. Moderate adverse effects on groundwater are also associated with the option pending further investigation.

The reservoir desilting option (Option R29) relates to 25 separate reservoirs, some of which could lead to adverse effects on European sites depending on the method of desilting that is adopted in the detailed design stage. It is therefore currently assessed as having a major adverse effect on biodiversity. If desilting requires extensive drawdown of the reservoirs, there will also likely be temporary moderate adverse effects on landscape and visual amenity given the setting of these reservoirs, some of which are located within or in visual proximity to the Peak District and Yorkshire Dales National Parks, as well as Nidderdale AONB. Desilting works have the potential to temporarily adversely affect water quality both within the reservoir and in the downstream watercourses due to elevated turbidity in the compensation flow release water. This will be mitigated by best practice methods (e.g. settling pools and use of straw bales to filter out sediments), but some minor impacts are likely. Desilting would only occur following careful planning and further investigations, and that the list of reservoirs included in the option may decrease if unacceptable environmental impacts are identified. However, an increase of 11Ml/d in deployable output will likely lead to moderate beneficial effects on population and human health and adapting to climate change.

Option R34 (River Calder Abstraction Option 1) has the potential for moderate adverse effects on population and human health, and archaeology and cultural heritage. A large proportion of the pipeline route will pass through heavily built areas, leading to temporary adverse effects from noise, dust and vibration and temporary adverse impacts on a range of recreational facilities and historical assets.

There are also moderate adverse effects associated with the River Aire Abstraction option 1 (R35), relating to archaeology and cultural heritage due to the pipeline route potentially passing through a World Heritage Site (WHS).

The desalination option at Hull (R61) has the potential for major adverse effects on biodiversity as it may impact on the Humber Estuary SAC/SPA/Ramsar, and intersects the impact zone of several SSSIs. In addition, major adverse effects are associated with the significant amount of resource use and energy required to operate this option.

All the Derwent Valley (DV) resource options, with the exception of DV3 and DV8(v), are anticipated to lead to major adverse impacts on biodiversity. Major adverse impacts for these options are also anticipated in relation to material assets and resource use, protection and enhancement of geology/soil quality, and minimisation of greenhouse gas emissions. However these options are also anticipated to be associated with major to moderate beneficial effects on population and human health and climate change resilience due to the increase in available public water supply.

Figure 5.1 Visual evaluation matrix summary for resource management options

Option	Impact	SEA objective 1.1	1.2	1.3	1.4	2.1	2.2	3.1	4.1	4.2	4.3	4.4	5.1	6.1	6.2	6.3	7.1	8.1	Summary Commentary
Yorkshire Water Grid Surface Water Resource Zone Options																			
R1a: River Ouse water treatment works extension	Adverse				None							None							Moderate adverse effects on biodiversity are identified as were nine minor adverse effects on the biodiversity, flora and fauna; population and human health; material assets and resource use; water; air and climate; and landscape and visual amenity topics.
	Beneficial											None							The scheme would have moderate beneficial effects with regard to provision of water supplies for population and human health; and resilience to the threat of climate change.
R2: Ouse Raw Water Transfer	Adverse				None							None							Two moderate adverse effects were identified – for biodiversity and archaeology and cultural heritage. Eight minor adverse effects were identified, including those relating to population and human health, material assets, water quality and water levels/flows, soil and land use, and air quality.
	Beneficial											None							Two major beneficial effects were identified, related to population and human health and an increase in deployable output as a result of the scheme of 60Ml/d (maintaining the supply-demand balance), and climate change adaptation. The scheme also provides the potential for minor beneficial effects on biodiversity enhancements.
R3: Increased River Ouse pump storage capacity	Adverse				None							None							One moderate adverse effect was identified relating to archaeology and cultural heritage. Six minor adverse effects were regarding biodiversity, population and human health, material assets, water, soil and land use, and GHG emissions.
	Beneficial											None							The scheme also provides the potential for moderate beneficial effects on biodiversity enhancements. Two minor beneficial effects were identified relating to climate change adaptation and population and human health due to the increase of 10Ml/d into the regional potable water supply.
R3a: River Ouse licence transfer	Adverse				None		None											None	Minor adverse effects on biodiversity are identified in relation to uncertainty in the HRA around the impacts on the Humber estuary. A HRA Stage 2 Appropriate Assessment would be required should this scheme be selected in the preferred programme.
	Beneficial				None		None											None	Two minor beneficial effects were identified relating to climate change adaptation and population and human health, both regarding the increased output into the regional water supply.
R5 Aquifer Storage and Recovery Scheme 1	Adverse				None														Eleven minor adverse effects were identified, including those relating to biodiversity, population/human health, material assets, water, soil and land use, air and GHG emissions, archaeology and landscape amenity.
	Beneficial																		Three minor beneficial effects were identified relating to population/human health, material assets/resource and climate change resilience.

Option	Impact	SEA objective 1.1	1.2	1.3	1.4	2.1	2.2	3.1	4.1	4.2	4.3	4.4	5.1	6.1	6.2	6.3	7.1	8.1	Summary Commentary
R6 South Yorkshire Groundwater Option 1	Adverse				None							None							The construction and operation of this scheme is not associated with any major European sites. However, the scheme may have one moderate adverse effect on water flows. Several minor negative effects on population and human health, resource use, water quality, soils and geology, GHG emissions, and landscape and visual amenity.
	Beneficial											None							Three minor beneficial effects were identified for population and human health (supply of a resilient water supply), climate change resilience and resource efficiency.
R8b: Sherwood Sandstone and Magnesian Limestone Boreholes Option 2	Adverse				None							None							Eleven minor adverse effects were identified, including those relating to biodiversity, population/human health, material assets, water, soil and land use, air and GHG emissions, archaeology and landscape amenity, including minor adverse effects were determined for biodiversity as the construction works would be within proximity of one SSSI and rural populations.
	Beneficial											None							Minor beneficial effects are anticipated for population health and climate change resilience, both associated with additional water supplies being available. The scheme also provides the potential for minor beneficial effects on biodiversity die to the potential for biodiversity enhancements associated with the scheme.
R8c: Sherwood Sandstone and Magnesian Limestone Boreholes Option 3	Adverse				None							None							Three moderate adverse effects were identified – for population and human health, water quality, and archaeology and cultural heritage. Eight minor adverse effects were identified, including those relating to population and human health, material assets, water quality and water levels/flows, soil and land use, and air quality.
	Beneficial											None							Minor beneficial effects are anticipated on community wellbeing and on climate resilience due to an increased potable water supply for the region. It also provides the potential for minor beneficial effects on biodiversity enhancement.
R12 East Yorkshire Groundwater Option 1	Adverse				None														Eight minor adverse impacts have been identified relating to biodiversity, population and human health, material assets, water quality and quantity, air & climate and landscape.
	Beneficial																		Two minor beneficial effects have been identified relating to population and human health, and climate change adaptation.
R13 East Yorkshire Groundwater Option 2	Adverse				None							None							Two moderate adverse effects were identified for biodiversity and water levels and flows. Six minor adverse effects were identified for population and human health, water quality, flood risk, and air and greenhouse gas emissions.
	Beneficial											None							Two minor beneficial effects were identified for population and human health, and climate change adaptation.
R29: Reservoir De-silting	Adverse				None														One major adverse effect was identified for biodiversity, and a moderate adverse effect were identified for landscape and visual amenity. Seven minor adverse effects relating to population and human health, material assets, water quality, air quality and greenhouse gas emissions, and archaeology/cultural heritage.
	Beneficial				None														Three minor beneficial effects were identified relating to population and human health (increase in deployable output/water supply) and climate change resilience, use of existing infrastructure.

Option	Impact	SEA objective 1.1	1.2	1.3	1.4	2.1	2.2	3.1	4.1	4.2	4.3	4.4	5.1	6.1	6.2	6.3	7.1	8.1	Summary Commentary
R34 River Calder Abstraction Option 1	Adverse				None							None							Two moderate adverse effects were identified relating to population and human health and archaeology and cultural heritage. Nine minor adverse effects were identified, including those relating to biodiversity, flora and fauna, material assets, water, air and GHG emissions and landscape and visual amenity.
	Beneficial											None							Two minor beneficial effects were identified with regards to population and human health and climate change resilience.
R35 River Aire Abstraction Option 1	Adverse				None							None							One moderate adverse effect was identified relating to archaeology and cultural heritage. Ten minor adverse effects were identified, including those relating to biodiversity, population & human health, material assets, water, soil and land use, air and GHG emissions and landscape/visual amenity.
	Beneficial											None							The scheme provides the potential for moderate beneficial effects on habitat restoration due to the requirement of compensatory habitat. Three minor beneficial effects were identified relating to population and human health, air and climate and material assets and resource use.
R51 Supply Dales from the Tees - treated	Adverse				None														Two moderate adverse impacts are anticipated with regard to resource use and archaeology and cultural heritage due to pipeline construction. Minor adverse impacts were identified for biodiversity, population and human health, water, soils and geology, air quality and GHG emissions and landscape and visual.
	Beneficial																		Moderate beneficial effects on human health and wellbeing associated with the provision of an additional 15 Ml/d which would help to maintain essential public water supplies and therefore help maintain public health and well-being. Moderate beneficial effects on improving resilience to climate change as the scheme would negate the need for North Area Reservoir 1 water to be treated at the WTW and would provide resilience to the Dales area. The scheme also provides the potential for moderate beneficial effects on biodiversity enhancement.
R61 East Yorkshire Coast desalinisation	Adverse																		Three major adverse effects are anticipated with regards to biodiversity, flora and fauna, material assets and resource use and GHG emissions. Two moderate adverse impact on natural capital enhancement and air emissions. Minor adverse impacts were identified for biodiversity, population and human health, water, soils and geology, air quality, archaeology and cultural heritage, and landscape and visual.
	Beneficial																		Moderate beneficial effects on human health and well being and climate change resilience associated with maintenance of essential public water supplies. A minor beneficial effect on surface and groundwater levels, as operation of the desalination plant should reduce reliance on these assets. It also provides the potential for moderate beneficial effects on habitat restoration due to the requirement of compensatory habitat.
DV3 South Yorkshire GW	Adverse				None							None							Minor negative effects are anticipated for population and human health due to construction works taking place in close proximity to residential dwellings; material assets due to materials being required for construction; air quality and greenhouse gases due to emissions arising from construction. Minor negative effects on landscape are anticipated due to construction work being required in a greenbelt.
	Beneficial											None							Minor positive effects are anticipated on community health and resilience to climate change due to an increase in potable water supply in the region. Minor beneficial effects are also anticipated on opportunities for biodiversity enhancements.
DV6 (iv) Tees to South Yorkshire Pipeline (50 Ml/d)	Adverse				None							None							Major adverse effects associated with pipeline construction are anticipated on biodiversity, flora and fauna, resource use, soils and geology, air quality, GHG emissions and landscape and visual amenity. Seven moderate adverse effects were identified for population and human health, water, and cultural heritage.
	Beneficial											None							Moderate beneficial effects on human health and wellbeing associated with the provision of an additional supply to maintain public water supplies. Moderate beneficial effects are also anticipated for resilience to climate change.

Option	Impact	SEA objective 1.1	1.2	1.3	1.4	2.1	2.2	3.1	4.1	4.2	4.3	4.4	5.1	6.1	6.2	6.3	7.1	8.1	Summary Commentary
DV6 (v) Tees to South Yorkshire Pipeline (80 Ml/d)	Adverse				None							None							Four major adverse effects are anticipated with regard to biodiversity, flora and fauna, resource use, soils and geology, air quality, GHG emissions and landscape and visual amenity, due to pipeline construction. Seven moderate adverse effects were identified for population and human health, water, and cultural heritage.
	Beneficial											None							Major beneficial effects on human health and wellbeing associated with the provision of an additional supply to maintain public water supplies. Major beneficial effects are also anticipated for resilience to climate change. Moderate beneficial effects are also anticipated on opportunities for biodiversity enhancements
DV6 (vi) Tees to South Yorkshire Pipeline (140 Ml/d)	Adverse				None							None							Four major adverse effects are anticipated with regard to biodiversity, flora and fauna, resource use, soils and geology, air quality, GHG emissions and landscape and visual amenity, due to pipeline construction. Six moderate adverse effects were identified for population and human health, water, and cultural heritage
	Beneficial											None							Major beneficial effects on human health and wellbeing associated with the provision of an additional supply to maintain public water supplies. Major beneficial effects are also anticipated for resilience to climate change. Moderate beneficial effects are also anticipated on opportunities for biodiversity enhancements
DV7 (iv) Tees- York Pipeline Option 1 (50 Ml/d)	Adverse				None							None							Four major adverse effects are anticipated with regard to biodiversity, flora and fauna, resource use, soils and geology and GHG emissions, due to pipeline construction. Five moderate adverse effects were identified for population and human health, air quality, cultural heritage and landscape and visual amenity.
	Beneficial											None							Moderate beneficial effects on human health and wellbeing associated with the provision of an additional supply to maintain public water supplies. Moderate beneficial effects are also anticipated for resilience to climate change. Moderate beneficial effects are also anticipated on opportunities for biodiversity enhancements
DV7 (v) Tees to York Pipeline Option 1 (80 Ml/d)	Adverse				None							None							Four major adverse effects are anticipated with regard to biodiversity, flora and fauna, resource use, soils and geology and GHG emissions, due to pipeline construction. Five moderate adverse effects were identified for population and human health, air quality, cultural heritage and landscape and visual amenity.
	Beneficial											None							Major beneficial effects on human health and wellbeing associated with the provision of an additional supply to maintain public water supplies. Major beneficial effects are also anticipated for resilience to climate change. Moderate beneficial effects are also anticipated on opportunities for biodiversity enhancements
DV7 (vi) Tees to York Pipeline Option (140 Ml/d)	Adverse				None							None							Five major adverse effects are anticipated with regard to biodiversity, flora and fauna, resource use, soils and geology and GHG emissions, due to pipeline construction. Five moderate adverse effects were identified for population and human health, air quality, cultural heritage and landscape and visual amenity.
	Beneficial											None							Major beneficial effects on human health and wellbeing associated with the provision of an additional supply to maintain public water supplies. Major beneficial effects are also anticipated for resilience to climate change. Moderate beneficial effects are also anticipated on opportunities for biodiversity enhancements
DV8 (iv) York to South Yorkshire Pipeline	Adverse				None					None		None							Five major adverse impacts are anticipated on Biodiversity, material assets and resource, soil, geology and land-use, and air and climate due to the scheme land-take, size and construction impacts.
	Beneficial									None		None							Major beneficial effects are anticipated on opportunities for biodiversity enhancements.

Option	Impact	SEA objective 1.1	1.2	1.3	1.4	2.1	2.2	3.1	4.1	4.2	4.3	4.4	5.1	6.1	6.2	6.3	7.1	8.1	Summary Commentary
DV8 (v) York WTW capacity increase	Adverse				None							None							One moderate adverse impact is anticipated with regard to biodiversity as a result of direct effects on internationally designated sites in close proximity to the scheme. The scale of the construction scheme is likely to create minor adverse impacts through construction activity.
	Beneficial											None							Moderate beneficial effects on human health and wellbeing associated with the provision of an additional supply to maintain public water supplies. Moderate beneficial effects are also anticipated for resilience to climate change. Minor beneficial effects are also anticipated on opportunities for biodiversity enhancements
Yorkshire Water East Surface Water Resource Zone Options																			
None																			
Northumbrian Water Berwick Water Resource Zone Options																			
None																			
Northumbrian Water Kielder Water Resource Zone Options																			
None																			
Hartlepool Water Hartlepool Water Resource Zone Options																			
None																			
Transfer Options																			
E2 YW export to Severn Trent Water	Adverse											**None**							Moderate negative effects are anticipated on soil and land use is anticipated, as the proposed pipeline intersects a permitted and an historic landfill site; on community health, due to construction works in a densely populated area, recreation, due to the proximity of the construction to Rother Valley Country Park, and air quality, as construction works will be required within the Sheffield Citywide AQMA. Minor negative effects are anticipated for natural capital assets, as construction may affect tranquillity, material assets, as the construction will require novel materials, flood risk, as there will be construction works required in Flood Zones 2 and 3, greenhouse gas emissions, heritage, as the construction would be within 1km of a number of heritage assets, and landscape, due to construction within areas of the South and West Yorkshire Greenbelt.
	Beneficial											**None**							Moderate positive effects are anticipated for community health and resilience to climate, due to an increase of 20-25Ml/d into the potable water supply for the region. Moderate beneficial effects are also anticipated on opportunities for biodiversity enhancements

Note: See Section 4.2 for description of SEA objectives.

Key:

	Major adverse		Major beneficial
	Moderate adverse		Moderate beneficial
	Minor adverse		Minor beneficial
	Negligible adverse		Negligible beneficial
None	Not applicable		

6 Assessment of the WReN Regional Preferred Plan

6.1 The preferred plan

This section of the report is to be completed once the preferred programme has been selected.

6.2 Alternative plans

This section of the report is to be completed once alternative programmes have been identified.

6.3 Option-level cumulative assessment

This section of the report is to be completed once the preferred programme has been selected and assessed cumulatively.

6.4 Programme-level cumulative assessment

This section of the report is to be completed once the preferred programme (and any other programmes) has been selected and other regional groups' Regional Plans are available.

7 Mitigation and enhancement

7.1 Overview

Key stages of the SEA process comprise Task B5: Mitigating adverse effects and Task B6: Proposing measures to monitor the environmental effects of plan or programme implementation. The sections below describe how these tasks have been addressed and how WReN intends to ensure that mitigation measures are implemented for any adverse effects that are identified and the means by which the environmental performance of the Regional Plan can be assessed.

7.2 Mitigation measures

Consideration of mitigation measures has been an integral part of the SEA process. The assessment has assumed the implementation of standard best practice mitigation measures and identified any additional measures as shown in the option SEA matrices (see **Appendix E**). The significance of effects identified in the matrices relates to residual effects after mitigation.

Certain assumptions have been made regarding this:

- Where suitable mitigation measures are known and identified, these have been taken into account and reported, such that the resultant residual impact has been determined.
- In line with recommendations made in the UKWIR Guidance[9], the SEA appraisals have assumed the implementation of reasonable mitigation, such as the use of best practice construction methods.

7.3 Residual effects

This section of the report is to be completed once the preferred programme has been selected.

7.4 Mitigation of cumulative impacts with other plans and programmes

This section of the report is to be completed once the preferred programme has been selected and other regional groups' Regional Plans are available.

8 Monitoring proposals

8.1 Overview

A key stage of the SEA process with regard to monitoring is Stage E: Monitoring the significant effects of the plan or programme on the environment. The sections below describe how these tasks have been addressed and how WReN proposes to monitor the effects of implementation of the Regional Plan.

8.2 Monitoring requirements

Monitoring will be required to track the residual environmental effects to show whether they arise as anticipated in the SEA appraisal, to help identify any adverse impacts and trigger deployment of any of the mitigation measures.

Monitoring for options identified in the preferred plan is set out in Section 8.3. These monitoring recommendations are based on the current understanding of the scheme design. As options are brought forward for development, further monitoring requirements may be set out in planning applications, borehole drilling and pump test consents, or in voluntary best-practice monitoring plans accompanying scheme development. This will be discussed with relevant key regulatory bodies and stakeholders. In practice, close dialogue should occur between WReN, Environment Agency, Historic England, Natural England and any affected third parties to agree the appropriate scale and duration of such scheme-specific monitoring activities proportionate to the assessed environmental risks.

8.3 Proposed monitoring

This section of the report is to be completed once the preferred programme has been selected.

Appendices

Appendix A Statutory consultee responses to the SEA Scoping Report
Appendix B Quality assurance checklist
Appendix C Review of policies, plans and programmes
Appendix D Environmental baseline review
Appendix E Option assessment matrices

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